

BECKER COUNTY

Local Water
Management Plan
January 1, 2017 - December 31, 2026



Becker
Soil & Water
Conservation District

Prepared By: Becker Soil and Water Conservation District

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Becker County Local Water Management Plan 2017-2027

Executive Summary

Purpose of the Plan

The purpose of the Becker County Water Management Plan 2017-2027 is to identify and assess priority water resource concerns, develop goals and objectives to address priority concerns, and provide direction for Becker County and Becker County Soil and Water Conservation District (SWCD) programs and decision making. Actions to achieve plan objectives are specified along with the necessary financial and staff resources and lead agency for a ten-year period, January 1, 2017 through December 31, 2026. An updated implementation plan and schedule will be created and included in 2022.

Pursuant to the requirements of Minn. Stat. 103B.311, this plan fulfills the following five requirements:

1. The plan must cover the entire county.
2. The plan must address problems in the context of watershed units and groundwater systems.
3. The plan must be based upon principles of sound hydrologic management of water, effective environmental protection, and efficient management.
4. The plan must be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or ground water system.
5. This revision of the Becker County Local Water Management Plan covers the period 2017-2027, with an amendment to the implementation schedule to be completed in 2022. In addition work plans and reports will be prepared annually.

Planning History

Administration of the Local Water Management Plan has been the responsibility of the Becker Soil and Water Conservation District since 1990. The first revision of the plan was completed in 1997 and expired December 31, 2003. The second update, or third plan was completed in 2005, updated in 2010 and extended in 2014 through December 31 of 2016.

Consistency with other plans:

In preparation of the Becker County Local Water Management Plan (LWMP) the most recent plans available from several entities were examined to ensure consistency with their concerns.

Though showing its age, The Becker County Comprehensive Plan that was completed and adopted in 2003 raises many of the issues that are addressed in this LWMP update. They complement each other in their concerns on water quality, shoreland protection, development pressures and septic system monitoring. The plan encourages cluster and community water and septic systems for lakeshore and cluster developments and seeks sustainable development and economic use of Becker counties natural resources.

The Pelican River Watershed District is currently in the process of updating their existing Management Plan with the revision anticipated in 2017. The LWMP will address several of the issues to be included in their updated plan, including increased treatment of urban stormwater runoff, reducing phosphorus loading into Big Detroit Lake, addressing agricultural runoff sources, preventing the spread of AIS and promoting educational opportunities to improve citizen knowledge and interest.

Despite not having an official Watershed District or management authority, the Otter Tail River Watershed Basin Plan completed in 2002 reflects many of the concerns of the County's LWMP. The Otter Tail River plan has been recognized by the Board of Water and Soil Resources as an adequate plan for addressing conservation programs. The Otter Tail River Basin is also currently undergoing MPCA's intensive monitoring and WRAPS Processes, which will provide information to further guide management activities in the future.

The White Earth Reservation Integrated Resource Management Plan that establishes goals, policies and strategies that guide the stewardship of the resources of the White Earth Indian Reservation's natural resources was reviewed for compatibility with the LWMP.

Other current plans reviewed for compatibility with the LWMP included the Buffalo-Red River Watershed District Management Plan, the Wild Rice Watershed District Management Plan, the Cormorant Lakes Watershed District Management Plan, various Becker County Lake Management Plans, the Crow Wing, Redeye and Buffalo River WRAPS, the White Earth Reservation Integrated Resource Management Plan, the Minnesota DNR's Prairie Conservation and Straight River Groundwater Management Plans and the Minnesota Department of Agriculture's Nitrogen Fertilizer Management Plan.

The Becker County Local Water Management Plan incorporates implementation activities that will assist in addressing the identified concerns of these plans. References, links and other plans considered throughout the planning process are included on pages 35-36 of the LWMP Priority Concerns Scoping Document.

Priority Concerns

Written surveys, a public meeting and numerous workgroups were used to identify the priority concerns for Becker County. A Priority Concerns Scoping Document summarizing the process used to identify priority concerns was prepared and is included in the Appendix. The two priority resource concerns identified in the Priority Concerns Scoping Documents are Surface Water Quality and Ground water Quality. Each of these priority concerns has several subparts, related objectives and identified or suggested actions. The priority concerns and sub-concerns in their entirety are described in the following section.

Priority Concern: Surface Water Quality, including:

- Stormwater Management
- Erosion & Sediment Control on Agricultural Land
- Nutrient, Turbidity and Bacteria Reductions in impaired watersheds
- Aquatic Invasive Species (AIS) Prevention
- Managing Soil Health
- Managing Hydrology (Water Quantity)
- Shoreland Protection
- Wetland Protection
- Development Pressure and Landuse Change
- Water Quality Monitoring

Priority Concern: Ground Water Quality, including:

- Septic System Maintenance, Inspection & Compliance
- Wellhead Protection
- Irrigation Water Management
- Nutrient Management
- Solid & Hazardous Waste Disposal
- Ground Water Monitoring

Priority Concern: Surface Water Quality

With six major watersheds, nearly 500 lakes and countless wetlands Becker County has an abundance of surface water area. Rivers, streams, lakes wetlands and marshes account for over 17% of Becker County's total surface area. The opportunities for aquatic recreation and water-oriented living draw over 300,000 visitors annually and comprise a significant portion Becker County's local economy and tax base.

Development pressure, land use conversion, municipal stormwater, agricultural runoff, invasive species and changing climate trends are contributing factors to water quality changes in local watersheds. These changes can affect the health of aquatic life as well as the public's use and enjoyment of property and local surface water bodies.

Managing land, water and soil to adapt to the effects of climate change such as increased overall annual precipitation, larger rainfall events with increased intensity, and rising mean temperatures, as well as addressing the existing and potential impacts of development, stormwater runoff, land use conversion and growing threats posed by aquatic invasive species undoubtedly presents challenges, but the efforts outlined below will serve to restore, protect and/or enhance the health of our local surface waters and their corresponding watersheds.

Surface Water Quality - Stormwater Management

"Stormwater is an all-inclusive term that refers to any of the water running off of the land's surface after a rainfall or snowmelt event." -Minnesota Stormwater Manual

Stormwater is a term used to describe all water that isn't able to soak into the ground and runs off into storm drains, ponds, lakes, rivers, and streams. Historically, this did not happen regularly since rainwater or snowmelt was able to infiltrate the ground. Now, with increased amounts of impervious surface, like parking lots, streets, and rooftops, more and more water from rain and snow simply runs straight to water bodies. This has the potential to negatively impact our local water resources, like increased flooding of streams and the pollution of our lakes and ponds.

Surface Water Quality - Erosion & Sediment Control on Agricultural Land

Soil erosion involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. Soil erosion on cropland is of particular interest because of its on-site impacts on soil quality and crop productivity, and its off-site impacts on water quantity and quality, biological activity and overall watershed health.

Specific Erosion and sedimentation issues in Becker County include:

- Sheet, Rill and Wind Erosion: Detachment and transportation of soil particles caused by rainfall runoff/splash, irrigation runoff or wind that degrades soil quality
- Concentrated Flow Erosion: Concentrated flow erosion processes are distinguished from sheet and rill processes in their enhanced ability to mobilize and transport large amounts of soil, water and dissolved elements.
- Excessive bank erosion from streams shorelines or water conveyance channels: Sediment from banks or shorelines threatens to degrade water quality and limit use for intended purposes.

Eroded soils leaving agricultural landscapes pose risks of water quality degradation in a variety of ways, including turbidity (decreased water clarity), excess nutrient loading and delivery of excess pathogens and chemicals from manure, biosolids, compost or chemical applications.

Surface Water Quality - Nutrient, Turbidity and/ or Bacteria Reductions in impaired watersheds.

Becker County is fortunate in that few lakes, rivers or streams in the county are on the Minnesota Impaired Waters List maintained by the Minnesota Pollution Control Agency (MPCA). While the majority of surface waters meet or exceed federal and state water quality thresholds, there are some streams and lakes listed as impaired for turbidity, excess nutrients, bacteria, and low biological integrity.

Specific goals and milestones have been set for the majority of affected watercourses and water bodies, either in an approved Total Maximum Daily Load (TMDL) plan or a Watershed Restoration and Protection Strategy Report (WRAPS).

Surface Water Quality - Aquatic Invasive Species (AIS) Prevention

Invasive species are defined as a nonnative species that: (1) causes or may cause economic or environmental harm or harm to human health; or (2) threatens or may threaten natural resources or the use of natural resources in the state. It is generally recognized that the most effective strategy against invasive species is to prevent their introduction and establishment. Preventive measures typically offer the most cost-effective means to minimize or eliminate environmental, societal, and economic impacts. Prevention relies on a diverse set of tools and methods, including inspections, outreach, regulations, and enforcement.

Management of water bodies in a way to decrease their susceptibility to invasion by invasive species (e.g., maximizing diversity and reducing disturbance of in-lake and near shore vegetation) may also constitute an element of prevention. There is a growing need to examine how we can increase our understanding of managing ecosystems with invasive species as part of the picture. Management should focus on maintaining resilient systems that can act to slow the establishment, spread, and dominance of invasive species. This could lead to a basic shift from focusing solely on control, by adding management of the site to limit invasion as a part of the whole management package.

Surface Water Quality - Managing Soil Health

According to the USDA NRCS, “Managing for soil health is one of the most effective ways for farmers to increase crop productivity and profitability while improving the environment.”

“Healthy soils hold more available water. The soil’s water-holding capacity reduces runoff that can cause flooding, and increases the availability of water to plants during droughts. Good infiltration and less need for fertilizers and pesticides keep nutrients and sediment from loading into lakes, rivers, and streams. Groundwater is also protected because there is less leaching from healthy soils.”

Surface Water Quality - Managing Hydrology (Water Quantity)

The natural hydrologic cycle is altered by removal of wetlands, perennial vegetation, ponds and depressions, draining soils, impervious surfaces, and collecting or conveying stormwater runoff from land to ditches, channels and storm sewers in urban, rural and agricultural landscapes. These activities affect the way that the landscape stores and releases water. The result is increased peak flows, lower base flows, and increased nutrient and sediment concentrations in streams, rivers, and lakes. Water quality is usually degraded when storage is removed, and improved when storage is added.

Drainage systems managed under Minnesota Statute 103E as well as tile drainage systems can consider environmental, land use and multipurpose drainage opportunities and alternatives before establishing drainage projects. Use of alternative drainage practices can help make working lands, as well as artificial and natural drainage systems, more resilient to extreme weather events and improve water quality.

Water storage in municipalities, shoreland areas and small developments can improve water and resiliency to extreme weather events. Some municipalities and townships stormwater systems are regulated by the MPCA through the Municipal stormwater (MS4) permitting process. In Becker County, the City of Detroit Lakes has a Storm Water Pollution Prevention Plan (SWPPP) and a general storm water permit for the collection and discharge of municipal storm water.

Perched at the top of numerous watersheds and with over 70 percent of our land mass draining to the Red River Basin, retention projects are also a crucial part of managing local hydrology and achieving regional goals for peak flow reductions.

Surface Water Quality - Shoreland Protection

Protecting natural shorelines is important for water quality, wildlife and the use and enjoyment of public lakes and rivers by all. Shoreland areas of lakes, rivers, streams and wetlands are critical habitat for most aquatic and many terrestrial wildlife species. Natural vegetation in shoreland areas is important for wildlife and for protecting from erosion caused by waves and ice.

Runoff to lakes and rivers from development is a concern in shoreland areas. Runoff from lawns and impervious surfaces typically contains more nutrients per acre compared with farmland. Enforcement of shoreland development regulations and treating stormwater runoff are important for protecting water quality.

Surface Water Quality – Wetland Protection for Multiple Benefits

In essence, the composition of a wetland allows it to act as both a sponge and filter for surface water. Once deemed wasteland, wetlands are now regarded as key components to maintaining water quality, and also a very important tool in efforts to reduce peak flows and reduce associated flood damage.

Wetlands throughout Becker County have varying amounts of protection enforced by different government regulations, such as the federal Clean Water Act, the Minnesota Wetlands Conservation Act and local ordinances adopted by watershed districts, municipalities and the County. While these varying protective mechanisms exist, they largely only regulate direct impacts to wetlands. Indirect impacts such as altered hydrology, increased pollutant loadings and encroachment can limit or compromise the functionality of wetland complexes and affect overall watershed health – including water quality and the integrity of biological communities.

Surface Water Quality – Development Pressure and Landuse Change

Becker County's natural resources have long provided both economic sustenance and a high quality of life for Becker County residents. The county agricultural production and its varied lakeshore environment continue to offer economic and quality-of-life benefits to county residents and visitors.

In recent years Becker County has seen increasing pressures on the county's agricultural and lake resources. Traditional agricultural areas have seen an increase in the development of non-farm housing, including those areas designated agricultural. Development is similarly cropping up on increasingly remote lakes, and in more intensive development patterns than historically seen. This development pressure may be attributed to economic incentives to sell and divide property due to high land values, potential investment returns, demand for riparian properties, and diminishing agricultural returns. Development pressure and impacts are a concern due to high growth rates and the cumulative effects of development on surface as well as groundwater resources.

Additional concern has been raised over increasing conversion of forested land to irrigated agricultural production. Portions of the County that have historically been forested and have coarse grained sandy soils (such as those of the Park Rapids (or Pineland) Sand Plain) have a high potential of contributing to surface and groundwater quality issues when converted to agricultural production without proper management.

Surface Water Quality – Water Quality Monitoring

Stakeholders and workgroup members agree: To truly be effective in assessing, preventing or addressing issues relating to surface water quality useful data must be available. Consistent, relevant and timely acquisition and sharing of water quality data will enable the identification of potential threats, evaluation of management actions, and measurement of the effectiveness of the actions taken.

Priority Concern: Ground Water Quality and Quantity

Becker County has an abundant groundwater resource in its surficial and buried drift aquifers located throughout the county. All of Becker County's citizens depend on the ground water for their drinking water, and maintaining a supply of high quality drinking water continues to rank as a high priority for local stakeholders. Since the first water management plan was adopted in 1990, protecting groundwater from contamination has always been high on the list for water plan implementation activities.

Private water wells are regulated by the County in accordance with the State Well Code under a delegation agreement with the Minnesota Department of Health. Public water supply wells are regulated and monitored by the Minnesota Department of Health (MDH). Several municipalities across the county are in various stages of developing wellhead protection plans with the MDH.

Ground Water Quality/Quantity - Septic System Maintenance, Inspection & Compliance

Septic systems both complying and non-complying with management regulations, have the potential to impact groundwater quality. Failing sewage systems discharge untreated waste water into the environment where it contaminates groundwater supplies, degrades surface waters, or poses a serious pathogenic health threat on the ground surface. Failing septic systems continue to be a problem throughout Becker County based on unacceptable failure rates. The Becker Planning and Zoning office estimates that the countywide failure rate could exceed 50%.

Ground Water Quality/Quantity – Wellhead Protection

Wellhead Protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area which supplies water to a public well. Much can be done to prevent pollution, such as the wise use of land and chemicals. Public health is protected and expense of treating polluted water or drilling new wells is avoided through wellhead protection efforts.

Specific wellhead protection requirements vary for the different classifications of public water systems in Minnesota which include transient non-community water systems (such as resorts, restaurants, and churches) and Community water systems. Few protective requirements are in place for private domestic wells, though those that are abandoned or in disrepair pose risks for groundwater contamination.

Ground Water Quality/Quantity – Irrigation Water Management

Irrigation water management primarily aims to control the volume and frequency of irrigation water applied to crops, so as to meet crop needs while conserving water resources. Competition for water resources for agricultural and other uses is increasing—even in portions of the state like Becker County that have abundant water. This makes it all the more essential to use irrigation water as efficiently as possible.

Another objective of irrigation management is to prevent irrigation-induced soil and water quality problems such as salinity, soil erosion or leaching of nutrients or pesticides into groundwater. Crop managers must understand the potential for these problems to occur and address them as needed. Irrigation water management can be significantly enhanced by practices that increase soil health, particularly those increasing the soil's moisture-holding capacity or decreasing evaporation.

Ground Water Quality/Quantity – Nutrient Management

Nutrient management is using crop nutrients as efficiently as possible to improve productivity while protecting the environment. Nutrients that are not effectively utilized by crops have the potential to leach into groundwater or enter nearby surface waters via overland runoff or subsurface agricultural drainage systems. Too much nitrogen or phosphorus can impair water quality.

The storage and application of livestock waste poses similar risks to water quality, making the guiding principles of nutrient management safe storage and preventing over-application of nutrients.

Ground Water Quality/Quantity – Solid & Hazardous Waste Disposal

Household hazardous waste, pesticides and herbicides, business and electronic waste, old prescription drugs, used oils, and many other common products should be properly disposed of, rather than simply dumping them into the environment or down the drain. If disposed of inappropriately, they may contaminate soil, ground water or surface water, and air quality. The first option should always be to reduce, reuse, or recycle it; if no other options are available then they must be properly disposed of. Many of these items are banned from landfills.

In Becker County the Environmental Services department offers a household hazardous waste program, as well as the VSQG (Very Small Quantity Generator) program which manages businesses hazardous waste upon request. The county is also a participant in the Minnesota Department of Agriculture's "Clean Sweep Program", which provides safe disposal of waste pesticides at no cost.

Ground Water Quality/Quantity – Groundwater Monitoring

To evaluate aquifer functions, groundwater quantity and the overall health of our drinking water supply it is crucial to regularly assess our groundwater supplies. Overall the quality of the groundwater in Becker County continues to be good, though elevated nitrate levels have been discovered in portions of the Park Rapids (or Pineland) Sand Plain located in the eastern part of Becker County, and elevated arsenic levels have been detected in pockets of the Pelican River Sand Plain located in the southwestern portion of the County. Since 1995 the Becker SWCD has conducted free well water testing clinics annually.

Taking Action: Local Water Plan Implementation Summary

Building on past successes, many of the objectives, goals and prescribed actions for the planning period involve a continuation of successful, existing partnerships and local programs. These programs will be enhanced with further use of GIS, LiDAR and other remote sensing technologies to provide more targeted education and outreach, and to prioritize planning and implementation activities. Public access to natural resources data and information will also be expanded.

Becker County's diverse landscape and varied landuse present a host of challenges for surface and groundwater quality protection. The scope and breadth of the Becker County Local Water Management Plan address a myriad of stressors from both urban and rural nonpoint pollution sources.

After carefully weighing the stressors affecting the identified priority concerns it became clear implementation activities must focus largely on agricultural landuse and shoreline development because:

- 1) Agricultural land use accounts for a majority of land area in the County.
- 2) Near shore development continues to be on the rise in Becker County.
- 3) The SWCD is responsible for plan implementation and works directly with both agricultural & shoreland owners to provide financial & technical assistance.
- 4) Point sources are regulated by the MPCA and are located mostly in municipalities.

The following is a summary list and description of plan objectives addressing priority concerns.

Protection and Restoration of Surface Water Quality

Stormwater Management

Promoting the reduction of pollutants in stormwater runoff, encouraging land use and stormwater management policy changes to minimize erosion, limit impervious area, mitigate runoff and constructing other water quality projects in conjunction with local development, recreation, transportation and other projects in all areas of the County are priority actions in the *Water Management Plan 2017-2027*.

Erosion & Sediment Control on Agricultural Land

Identifying and targeting high priority erosion areas and continuing local SWCD programs to reduce runoff and erosion and establishing and promoting proven soil and water conservation practices including buffer strips, filter strips, grassed waterways, terraces, crop residue, tillage practices, nutrient management, water retention, and other USDA-approved best management practices are priority actions in the *Water Management Plan 2017-2027*.

Nutrient, Turbidity and Bacteria Reductions in impaired watersheds

Continuing existing programs to reduce nonpoint source pollution and working cooperatively on a watershed basis to prioritize local implementation efforts consistent with local, watershed and TMDL implementation plans are priorities of the *Water Management Plan 2017-2027*.

Aquatic Invasive Species (AIS) Prevention

Minimizing, avoiding or eliminating the environmental, societal, and economic impacts of aquatic invasive species through increased outreach and education, targeted monitoring, treatment where viable, directly preventive measures such as watercraft inspection and decontamination and management of water bodies to decrease susceptibility to invasive species are priorities of the *Water Management Plan 2017-2027*.

Managing Soil Health

Managing agricultural lands for soil health through structural, vegetative and cultural management practices that minimize disturbance, increase biological diversity, reduce soil temperature, foster microbial activity, maintain soil cover, intercept rainfall and facilitate infiltration are priorities of the *Water Management Plan 2017-2027*.

Managing Hydrology (Water Quantity)

Managing surface water flow through means including maintenance of public and private ditch systems, culvert / conveyance sizing and replacement, regional distributed retention projects, removal of fish passage barriers, restoration or enhancement of wetlands and nonstructural floodplain management are priorities of the *Water Management Plan 2017-2027*.

Shoreland Protection

Encouraging shoreland development patterns that protect resources, limiting the amount of impervious surface, increasing infiltration, mitigating stormwater flow, establishing perennial vegetation, protecting natural environment lakes, reducing phosphorus on lakes with high sensitivity, and enforcement of local and state ordinances are priorities of the *Water Management Plan 2017-2027*.

Wetland Protection

Becker Soil and Water Conservation District will continue administration of the Wetland Conservation Act within the City of Detroit Lakes and greater Becker County. Identifying, assessing and prioritizing wetland areas for protection and enhancement and restoring wetlands for water quality as well as wildlife are priorities of the *Water Management Plan 2017-2027*.

Development Pressure and Landuse Change

Encouraging landuse patterns that protect agricultural land, forests, lakes, rivers and wetlands, supporting sustainable development of natural environment lakes, emphasizing the importance of natural shoreline vegetation for maintaining water quality and aquatic habitat, requiring stormwater management plans for all riparian development and redevelopment, encouraging forest management in vulnerable areas prone to land conversion, and promoting permanent protection of sensitive, native and/or forested habitats are priorities of the *Water Management Plan 2017-2027*.

Water Quality Monitoring

Working to support and streamline citizen monitoring programs, systematic collection of water quality data, establishing and maintaining a publically accessible countywide surface water quality database, monitoring targeted and/or impaired waters annually are priorities of the *Water Management Plan 2017-2027*.

Protection and Preservation of Ground Water Quality & Quantity

Septic System Maintenance, Inspection & Compliance

Reducing public health threats and increasing compliance with State rules with installation of onsite wastewater treatment are priorities of the *Water Management Plan 2017-2027*. The County program is administered in the Environmental Services Department. The program includes a local ordinance, permits, inspections, education and enforcement and continues to inventory and monitor ISTS systems around Becker County lakes to insure compliance with ISTS rules and regulations.

Wellhead Protection

Continuing the Minnesota Department of Health-delegated, County Well Code program, providing financial and technical assistance with well sealing and administration of local land use regulations are high priorities. Assisting with source water protection plans, targeting education and providing information to local government officials in areas with a high susceptibility to ground water contamination or elevated nitrate levels are high priorities of the *Water Management Plan 2017-2027*.

Irrigation Water Management

Providing technical and financial assistance to irrigated agricultural operators to increase irrigation efficiency, scheduling irrigation applications according to crop water use and evapotranspiration, offering in-season nutrient assessments, and collecting county-wide precipitation data are high priorities of the *Water Management Plan 2017-2027*.

Nutrient Management

Assisting landowners with the adoption and implementation of comprehensive nutrient management practices, ensuring the proper use and abandonment of manure pits, and working with livestock and row crop producers to improve nutrient management planning and application methods in sensitive areas are high priority actions related to livestock production and feedlots in the *Water Management Plan 2017-2027*.

Solid & Hazardous Waste Disposal

The County will continue operating the Household Hazardous Waste Facility that currently accepts mercury products with funding from Xcel Energy, household pesticides with funding assistance from the MPCA, and ag waste pesticides with funding from the MDA. Ensuring continued convenient local collection of mercury products for recycling and ag pesticides for disposal are priorities of the *Water Management Plan 2017-2027*.

Ground Water Monitoring

Continuing to assist the MN DNR with observation well monitoring to provide information on aquifer health and recharge and model long term trends, evaluating the impact of pumping on aquifers and resolve well interference conflicts, supporting private well monitoring efforts to determine quality of drinking water and providing annual cost-free residential water testing are priorities of the *Water Management Plan 2017-2027*.

Total Projected Cost of the Implementation Program

The projected cost to implement the actions contained in the Water Management Plan 2017-2027 is \$20,104,000. This cost includes and assumes continued State grants such as the Natural Resources Block Grant (NRBG), BWSR grants for SWCD for operations, and the Erosion, Sediment Control and Water Quality Cost-Share Program, existing local, state, federal and other programs or fund sources. It is difficult to estimate the costs associated with highly variable USDA Farm Program funding and State and Federal water quality grants, so while these costs were often projected in the budget, they may be subject to fluctuation.

Historical levels of funding will not be adequate to meet State, TMDLs, watershed and County water quality goals. Additional funding will be needed for this work, mainly for SWCD staff and projects. Landowners contributions where needed are assumed throughout and not reflected in estimated costs.

The table on the following page highlights the objectives and estimated costs associated with achieving the goals of the 2017-2027 Becker County Local Water Management Plan.

Implementation Costs (Cont.)

Goal: Protection and Restoration of Surface Water Quality			
	Objective	Timeframe	Total Estimated Cost
A	Objective A: Improve stormwater runoff quality by increased utilization of stormwater management practices throughout the County.	2017-2027	\$ 649,000.00
B	Objective B: Protect or Improve Surface Water Quality through Erosion and Sediment Control on Agricultural Land	2017-2027	\$ 3,305,000.00
C	Objective C: Reduction of Nutrients, Turbidity and/ or Bacteria in impaired watersheds.	2017-2027	\$ 1,305,000.00
D	Objective D: Protect Becker County Lakes from Aquatic Invasive Species.	2017-2027	\$ 3,635,000.00
E	Objective E: Manage Soil Health to reduce delivery of nutrients and sediment to surface waters.	2017-2027	\$ 345,000.00
F	Objective F: Manage surface water hydrology sustainably to foster crop production, improve or protect water quality, achieve flood damage reduction & benefit wildlife habitat.	2017-2027	\$ 530,000.00
G	Objective G: Provide Programs to Protect, Repair or Restore the Shorelines of Becker County	2017-2027	\$ 3,160,000.00
H	Objective H: Protect the wetlands of Becker County to achieve multiple benefits	2017-2027	\$ 427,500.00
I	Objective I: Develop and utilize the lands of Becker County without negative impact to aquatic resources.	2017-2028	\$ 1,382,500.00
J	Objective J: Monitor Surface Water Quality to gage health, target resources, monitor effectiveness, and inform the public.	2017-2027	\$ 305,000.00
Total Estimated Surface Water Implementation Costs:			\$ 15,044,000.00
Goal: Protection and Preservation of Ground Water Quality & Quantity			
	Objective	Timeframe	Total Estimated Cost
A	Objective A: Ensure proper septic system design, maintenance, inspection and compliance	2017-2027	\$ 995,000.00
B	Objective B: Protect wellhead and source water areas to maintain, enhance and improve the quality of public and private drinking water supplies	2017-2027	\$ 519,500.00
C	Objective C: Efficient use of groundwater resources for agricultural irrigation	2017-2027	\$ 300,000.00
D	Objective D: Proper nutrient management in crop and livestock production operations	2017-2027	\$ 3,130,000.00
E	Objective E: Ensure the safe and proper disposal of solid and hazardous waste	2017-2027	\$ 20,000.00
F	Objective F: Assess the health and vitality of domestic and public drinking and groundwater supplies	2017-2027	\$ 95,500.00
Total Estimated Ground Water Implementation Costs:			\$ 5,060,000.00

Recommendations to Achieve Consistency

No specific amendments to plans or official controls have been identified to achieve consistency with other plans or official controls. Local programs will evolve during the planning period and changes expanding water resources protection are expected within five years. Changes in plans and official controls at the State and watershed level are expected but the impact on local government and plan implementation is unknown.

Local Government

The plan includes objectives and County actions to encourage changes in official plans and controls at the local government level to address stormwater runoff and to protect Groundwater.

State, Watershed and Other Plans

As water related plans are developed by other entities, consideration of and consistency with the *Water Management Plan 2017-2027's* local priorities and established programs is recommended. Continuation of existing, locally developed, County- and municipality-based programs and local regulations is the foundation of the Water Management Plan.

The County's existing programs integrate land use, water quality, health, waste management, and other issues protecting the health, safety and welfare of the residents of Becker County. Local programs were

shaped over time in a public process involving meetings and hearings which led to County standards more restrictive than standards prescribed by the State of Minnesota.

Implementation of the plan and local authority for programs related to objectives and actions in the plan should not be delegated, transferred or assumed by other entities or joint powers boards that are not accountable to County residents and lack an understanding of the collective social, environmental and economic needs and priorities in Becker County.

List of Acronyms

AIS- Aquatic Invasive Species
AU- Animal Unit
BWSR – (Minnesota) Board of Water and Soil Resources
BMP – Best management practice(s)
CD – County Ditch
COLA – Coalition of Lake Associations (Becker County)
CREP- Conservation Reserve Enhancement Program
CRP - Conservation Reserve Enhancement Program
CSP - Conservation Stewardship Program
CWI – County Well Index
CWL – Clean Water Legacy (Act)
CWP - Clean Water Partnership, an MPCA-administered water quality grant
DNR – (Minnesota) Department of Natural Resources
EAC – Environmental Advisory Committee
EPA – Environmental Protection Agency
EQIP- Environmental Quality Incentives Program
FEMA – Federal Emergency Management Agency
FSA – Farm Service Agency (Division of the USDA)
GIS- Geographic Information Systems
HEL- Highly erodible land.
ISTS- Individual sewage treatment system (Generally same as SSTS)
JD – Judicial Ditch
LWMP- Local Water Management Plan
MDA- Minnesota Department of Agriculture
MDH- Minnesota Department of Health
MES – University of Minnesota Extension Service
MGS – Minnesota Geological Survey
MNDOT – Minnesota Department of Transportation
MPCA- Minnesota Pollution Control Agency
NPDES – National Pollution Discharge and Elimination Standards
NRBG – Natural Resources Block Grant. (Consolidation of grants from MPCA, DNR and BWSR)
NRCS – Natural Resource Conservation Service (Division of the USDA)
P&Z- Becker County Planning & Zoning
PTM- Prioritize, Target and Measure
RIM- Reinvest in Minnesota Program
RUSLE- Revised Universal Soil Loss Equation
SSTS – Subsurface Soil Treatment System (Generally same as ISTS)
SWCD - Soil and Water Conservation District
SWPPP – Stormwater Pollution Prevention Plan
TEP – Technical Evaluation Panel (Wetlands Conservation Act)
TMDL – Total Maximum Daily Load (Impaired Waters, Clean Water Act)
USDA- United States Department of Agriculture
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
WCA – Wetland Conservation Act
WMA – Wildlife Management Area
WRE/WRP - Wetland Reserve Easement Program
WQDSS- Water Quality Decision Support System

List of Terms

Agricultural Drainage. Improving the productivity of agricultural land by removing excess water from the soil by such means as ditches or subsurface drainage tiles.

Approved Practice. A conservation practice that qualifies for state cost-sharing and that has been approved by the state board.

Best Management Practice (BMP). Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources. “BMPs” means the same as conservation practices.

Conservation Practices. Practices applied to the land for the purpose of controlling or preventing soil erosion, sedimentation, nutrient runoff, or other water pollution to maintain the sustainable use of soil and water and other natural resources.

Conservation Practice Plans. Consists of drawings and specifications. The drawings are a graphical description and the associated specifications are a narrative description of the tasks involved to install the practice.

Cost Sharing. A publicly financed program shares part of the cost of establishing soil and water conservation practices, cultural practices, or pollution control measures with land owners, operators or other entities.

Cultural Practices. Refers to tillage and cultivation activities, or constructed features of terrain such as buildings, canals, boundary lines, i.e., people made structures.

Encumber. To designate funds for a specific practice or purpose. This is accomplished via a motion at an official conservation district board meeting and documented in the approved minutes of the meeting and all applicable forms and ledgers.

Erosion. The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

Established. A conservation practice that has been properly installed and has successfully developed to function properly.

Eutrophication. The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Fecal Coliform Bacteria. Bacteria found in the intestinal tracts of mammals. Their presence in water is used as an indicator of pollution and possible contamination by pathogens.

Ground Water. The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs.

Hazardous Chemical. An EPA designation for any hazardous material requiring an MSDS under OSHA's Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects like cancer and dermatitis. Hazardous chemicals are distinct from hazardous waste.

Hazardous Substance. 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or is otherwise released into the environment.

Hazardous Waste. By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Herbicide. A chemical pesticide designed to control or destroy plants, weeds, or grasses.

High Priority Erosion Problems. “High priority erosion problems” in the Becker County Water Plan means soils identified as “highly erodible” and “potentially highly erodible” in the USDA Soil Survey. It also means areas where erosion from wind or water is occurring equal to, or in excess of, 2 X T tons per acre per year or is occurring on any area that exhibits active gully erosion or is identified as high priority in the comprehensive local water management plan or the conservation district’s comprehensive plan.

High Priority Water Quality Problems. “High priority water quality problems” means areas where sediment, nutrients, chemicals, or other pollutants discharge to DNR designated protected waters or to any high priority waters as identified in a comprehensive local water management plan or the conservation district’s comprehensive plan, or discharge to a sinkhole or groundwater. The pollutant delivery rate to the water source is in amounts that will impair the quality or usefulness of the water resource.

Household Hazardous Waste. Hazardous products used and disposed of by residential as opposed to industrial consumers. Includes paints, stains, varnishes, solvents, pesticides, and other materials or products containing volatile chemicals that can catch fire, react or explode, or that are corrosive or toxic.

Hydrology. The science dealing with the properties, distribution, and circulation of water.

Hydraulic Conductivity. The rate at which water can move through a permeable medium. (i.e. the coefficient of permeability.)

Imminent Threat. A high probability that exposure is occurring.

Land Owner. A person, corporation, or legal entity that holds title to or is in possession of land.

Land Owner / Operator. A person, corporation, or legal entity that holds title to or is in possession of land within a conservation district as an owner, lessee, tenant, or otherwise. It is the same as the term “land occupier” used in the State Cost Share Guide.

Monitoring. Periodic or continuous surveillance or testing to: 1) determine the level of compliance with statutory requirements and/or pollutant levels in water, plants, and animals, 2) observe a situation for any changes which may occur over time using a measurement of some sort, such as the performance of an established conservation practice, an identified erosion problem or biological conditions of surface water.

National Pollutant Discharge Elimination System (NPDES). A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the State of Minnesota as delegated by the EPA.

Nitrate. A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals. A plant nutrient and inorganic fertilizer, nitrate is found in septic systems, animal feed lots, agricultural fertilizers, manure, and industrial waste waters.

Non-Point Sources. Diffuse pollution sources (i.e. without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common non-point sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, and city streets.

Nutrient. Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

Nutrient Pollution. Contamination of water resources by excessive inputs of nutrients. In surface waters, excess algal production is a major concern.

Pathogens. Microorganisms (e.g., bacteria, viruses, or parasites) that can cause disease in humans, animals and plants.

Pesticide. Substances or mixture thereof intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant (herbicide).

Phosphorus. An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

Planning period. 2017-2022 period of time intended for implementation of the Becker County Water Management Plan.

Point Source. A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g. a pipe, ditch, ship, ore pit.

Pollutant. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Pollution. Generally, the presence of a substance in the environment that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effects. Under the Clean Water Act, for example, the term has been defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.

Potable Water. Water that is safe for drinking and cooking.

Recharge Area. A land area in which water reaches the zone of saturation from surface infiltration, e.g., where rainwater soaks through the earth to reach an aquifer.

Run-Off. That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

Sediment. Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt.

Sediment Yield. The quantity of sediment arriving at a specific location.

Sedimentation. Solids settling out of water in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants.

Sewer. A channel or conduit that carries wastewater and storm-water runoff from the source to a treatment plant or receiving stream. "Sanitary" sewers carry household, industrial, and commercial waste. "Storm" sewers carry runoff from rain or snow. "Combined" sewers handle both.

Soil Erodibility. An indicator of a soil's susceptibility to raindrop impact, runoff, and other erosive processes.

Solid Waste. Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Source-Water Protection Area. The area delineated by a state for a Public Water Supply or including numerous such suppliers, whether the source is ground water or surface water or both.

Soil and Water Conservation Practices. Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Stakeholder. Any organization, governmental entity, or individual that has a stake in or may be impacted by a given approach to environmental regulation, pollution prevention, TMDLs, etc.

Storm Sewer. A system of pipes (separate from sanitary sewers) that carries water runoff from buildings and land surfaces.

Subwatershed: Topographic perimeter of the catchment area of a stream tributary.

Surface Runoff. Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of non-point source pollutants in rivers, streams, and lakes..

Suspended Solids. Small particles of solid pollutants that float on the surface or are suspended in water, sewage or other liquids.

SWCD Board. The board of supervisors of a Soil and Water Conservation District as organized under Minnesota Statutes, chapter 103C.

SWCD Technical Representative. A district employee assigned by the conservation district board or other designee who has expertise in the design and application of conservation practices.

Total Suspended Solids (TSS). A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids."

Soil and Water Conservation Practices. Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Technical Approval Authority. The authorization granted to a district technical representative to provide comprehensive technical assistance for individual conservation practices, including associated technical signoff as the district technical representative of record.

Turbidity. A cloudy condition in water due to suspended silt or organic matter.

Urban Runoff. Stormwater from city streets, domestic or commercial properties and other paved impervious surfaces that carries pollutants of various kinds into storm sewer systems and receiving surface waters.

Vegetative Controls. Non-point source pollution control practices that involve vegetative cover to reduce erosion and minimize loss of pollutants.

Water Table. The level of groundwater.

Water Well. An excavation where the intended use is for location, acquisition, development, or artificial recharge of ground water.

Wastewater. The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Water Pollution. The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Quality Criteria. Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards. State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Quality-Based Limitations. Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of water quality standards. Usually applied to discharges into small streams.

Watershed. The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

Watershed Approach. A coordinated framework for environmental management that focuses efforts on the highest priority problems within hydrologically-defined geographic areas taking into consideration both ground and surface water flow.

Becker County Local Water Management Plan 2017-2027

Introduction

Purpose of the Plan

The purpose of the Becker County Water Management Plan 2017-2027 is to identify and assess priority water resource concerns, develop goals and objectives to address priority concerns, and provide direction for Becker County and Becker County Soil and Water Conservation District (SWCD) programs and decision making. Actions to achieve plan objectives are specified along with the necessary financial and staff resources and lead agency for a ten-year period, January 1, 2017 through December 31, 2026.

Pursuant to the requirements of Minn. Stat. 103B.311, this plan fulfills the following five requirements:

1. The plan must cover the entire county.
2. The plan must address problems in the context of watershed units and groundwater systems.
3. The plan must be based upon principles of sound hydrologic management of water, effective environmental protection, and efficient management.
4. The plan must be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or ground water system.
5. This revision of the Becker County Local Water Management Plan covers the period 2017-2027, with an amendment to the implementation schedule to be completed in 2022. In addition work plans and reports will be prepared annually.

Authority

The authority and requirements for preparing County water management plans are defined in the Comprehensive Water Management Act, Minnesota Statutes, Chapter 103B. The *County's Water Management Plan 2017-2022* includes programs implemented under authority of many different State of Minnesota Statutes and Rules. To receive State funding, the County and Soil and Water Conservation District must have current plans approved by the Board of Water and Soil Resources (BWSR).

Historical Plans and Updates

Administration of the Local Water Management Plan has been the responsibility of the Becker Soil and Water Conservation District since 1990. The first revision of the plan was completed in 1997 and expired December 31, 2003. The second update, or third plan was completed in 2005, updated in 2010 and extended in 2014 through December 31 of 2016.

Priority Concerns

A *Priority Concerns Scoping Document* was prepared in order to identify and prioritize problems to be addressed in the *County Water Management Plan*. Preparation of the priority concerns scoping document is a requirement of the Comprehensive Water Management Act which also prescribes a structured local public input process, State agency review and BWSR review and approval..

The steps used to choose the priority concerns were:

1. SWCD staff prepared a list of all priority concerns submitted by LGUs and state agencies.
2. SWCD staff administered and analyzed a public survey and written comments.
3. County and SWCD staff reviewed the list of priority concerns and survey results and had a workshop to discuss all the priority concerns and suggest additional priority concerns. The group recommended all priority concerns submitted be included in the water plan.
4. Portions of the water plan advisory team were convened to review the list of recommended priority concerns to ensure the list was complete and if the recommended priority concerns should be included in the water plan. Following the aforementioned discussions, no additions or changes to the recommended list of priority concerns were made.

List of Priority Concerns Recommended:

- Drinking water and groundwater protection
- Altered hydrology
- Drainage Maintenance
- Stormwater management
- Wetland Protection
- Flood Damage Reduction
- Excess nutrients
- Soil erosion
- Soil health
- Aquatic invasive species
- Development Pressure
- Wildlife Habitat
- Agricultural Runoff
- Shoreline Protection
- Irrigation Water Management

Advisory and technical members and subcommittees met to review various components of proposed priority concerns and ensure input from citizens, local, state and regional entities was considered.

There was some internal dialog as how best to combine or group various concerns and still remain inclusive of all those submitted. The fifteen submitted priority resource concerns and related components were ultimately represented by two overarching primary resource concerns – Surface Water Quality and Groundwater Quality, with related resource concerns addressed as subparts or components of each.

Plan Organization

The plan is organized into sections including the Executive Summary, Introduction, Background and Natural Resources Inventory, Priority Concerns, Implementation Schedule and Appendix.

I. Executive Summary

II. Introduction

III. Background and Natural Resources Inventory: This section describes location, demographic trends, natural resources, soils and expected changes to natural resources. Most of the maps are contained in this section of the plan.

IV. Priority Concerns: This section is divided into subsections to address issues related to the five priority concerns. Each subsection describes why the issue is a concern, applicable existing programs, guiding principles, goals, objectives, and actions. The Priority Concerns and related subsections include the following:

Priority Concern 1 - Surface Water Quality, which includes:

- Stormwater Management
- Erosion & Sediment Control on Agricultural Land
- Nutrient, Turbidity and Bacteria Reductions in impaired watersheds
- Aquatic Invasive Species (AIS) Prevention
- Managing Soil Health
- Managing Hydrology (Water Quantity)
- Shoreland Protection
- Wetland Protection
- Development Pressure and Landuse Change
- Water Quality Monitoring

Priority Concern 2 - Ground Water Quality, which includes:

- Septic System Maintenance, Inspection & Compliance
- Wellhead Protection
- Irrigation Water Management
- Nutrient Management
- Solid & Hazardous Waste Disposal
- Ground Water Monitoring

V. Implementation Plan Schedule: This section is a table summary of the plan objectives and actions with projected budget, timeline and lead agency identified for each action.

VI. Appendix: This section contains the Priority Concerns Scoping Document and MPCA TMDL Fact Sheets and maps.

Roles and Responsibilities

Implementing the *Water Management Plan 2017-2027* will primarily be the responsibility of the County and the Becker Soil and Water Conservation District (SWCD). The *Water Management Plan* is officially adopted by only the County and the SWCD. The plan contains realistic goals and objectives that are practical, measurable and feasible within the planning period.

Municipalities and Townships, State and Federal Agencies, businesses, individuals and non-profit organizations have important roles in plan implementation but are not responsible for implementing the plan. The County encourages and supports sustainable programs with investment in local capacity and local public-private partnerships to achieve long-term, measurable success.

The role and responsibility of land owners, business owners, farmers and citizens of Becker County must be recognized, as they support the tax base, are required to comply with local and State regulations and will pay for many of the water plan implementation projects on their property. Organized wildlife conservation groups, lake associations and others will be involved with implementation of the plan. Land owners, business owners, and citizens of Becker County will ultimately determine the success of water management programs.

State Agencies: Some of the priority concerns are addressed administratively through State programs, regulations and permitting requirements. Projects are funded through State grant programs, mainly from the BWSR, MPCA and DNR. The DNR is also involved with DNR activities and partnerships in Becker County relating to wildlife, fisheries, forestry, and parks. The Minnesota Geologic Survey also works with the County, mostly through the County well program.

Townships and Municipalities: Municipalities and Townships are both regulators and are regulated by State regulations. These local government units, like the County, are in a position to provide leadership related to water quality.

City of Detroit Lakes: The City of Detroit Lakes is subject to higher wastewater treatment and stormwater management standards compared with other municipalities in the County. To effectively manage and operate stormwater and wastewater treatment systems, the City has developed applicable local plans and regulations and continues efforts to upgrade wastewater treatment facilities.

Federal Agencies: The U.S. Fish and Wildlife Service (USFWS) will be involved with implementation projects related mainly to wetland habitat and water retention. The U.S. Army Corps of Engineers (USACE) is involved with implementation related to wetlands and flood control. Implementation activities will continue to include programs and technical assistance afforded by local USDA-NRCS partners.

Watershed Management Organizations: While not all areas of Becker County are within an organized watershed district, Pelican River, Buffalo-Red, Wild Rice and Cormorant lakes watershed districts are important partners in the protection of water resources. Though guided by their own management plans, the common goals and objectives included within the *Water Management Plan* provide opportunities for cooperative successes.

The Becker County *Water Management Plan* is not intended to extend to watershed or joint powers organizations as the plan's purpose and implementation program are based on local authority and with recognition of local needs and the organizational capacity of multiple programs and jurisdictions. The County and SWCD do make the plan available to watershed organizations to ensure consistency with and consideration of County plans and priorities.

About Becker SWCD

Becker Soil and Water Conservation District (SWCD) is a non-regulatory, separate subdivision of State government operated by a board of five Supervisors elected to represent districts within the boundaries of Becker County.

The SWCD is the lead agency related to establishing structural and other agricultural land best management practices to reduce soil erosion and runoff from agricultural land. The SWCD staff also provides technical assistance related to reducing soil erosion and runoff, wetland management, wildlife habitat and shoreland protection. The SWCD works with many partners including Federal, State and local government agencies, land owners/operators and non-profit organizations. The USDA Natural Resources Conservation Service (NRCS) is the SWCD's main partner.

The Minnesota Board of Water and Soil Resources (BWSR) oversees SWCDs, and annually allocates a general services grant to all Minnesota SWCDs for expenditures necessary for operation of the district. The County also allocates funds annually to the SWCD for district operations. Competitive grants are frequently sought from federal, state, non-profit and for profit institutions to cover additional operational costs and provide financial assistance to landowners for the implementation of best management practices.

SWCD Mission and Purpose

Becker SWCD's mission and purpose is consistent with the State of Minnesota soil and water conservation policy.

Becker Soil & Water Conservation District Mission Statement:

"The mission of the Becker SWCD is to develop and promote long range programs that satisfy the conservation needs of the people of the District. With rapidly expanding interests in resource development, it is essential that proper resource management be carried out in the District. The programs will include, but not be limited to proper treatment of each acre of land in Becker County in accordance with its needs. Emphasis will be placed on wind and water erosion and protection practices."

Minnesota Statute 103C.005 Soil and Water Conservation Policy.

Maintaining and enhancing the quality of soil and water for the environmental and economic benefits they produce, preventing degradation, and restoring degraded soil and water resources of this state contribute greatly to the health, safety, economic well-being, and general welfare of this state and its citizens. Soil and water conservation measures implemented on private lands in this state provide benefits to the general public by reducing erosion, sedimentation, siltation, water pollution, and damages caused by floods. The soil and water conservation policy of the state is to encourage land occupiers to conserve soil, water, and the natural resources they support through the implementation of practices that:

- (1) control or prevent erosion, sedimentation, siltation, and related pollution in order to preserve natural resources;
- (2) ensure continued soil productivity;
- (3) protect water quality;
- (4) prevent impairment of dams and reservoirs;
- (5) reduce damages caused by floods;
- (6) preserve wildlife;
- (7) protect the tax base; and
- (8) protect public lands and waters.

Programs and Projects

The SWCD operates many ongoing, well-structured, traditional programs. Some of these programs raise money for the district while providing services to the public. Other projects are temporary, grant funded special projects. SWCD technicians also serve as technical advisors for various committees and departments and provide guidance on site specific situations under WCA or Planning and Zoning Decisions. While by no means an exhaustive list, some of the SWCD programs and projects include:

Aquatic Invasive Species Prevention: In 2015 the SWCD assumed the AIS Prevention program from Becker County. Becker SWCD coordinates and oversees over 30 seasonal watercraft inspectors each year and operates four mobile decontamination units at strategic locations through the boating season. Outreach, education, monitoring and rapid response are also critical parts of the program.

Buffalo River Shallow Lakes and Mainstem Improvement Project: This Clean Water Legacy funded project provides technical and financial assistance for targeted sediment and nutrient reduction practices in and around the 13 impaired lakes in and around the hay creek subwatershed in Southwestern Becker County and a portion of Clay County. Buffalo Red River Watershed District also provides financial support for this effort.

Cost Share and Financial Incentives: The SWCD manages and administers cost share and financial incentive programs for the establishment of soil and water conservation practices. The sources, partners, levels of funding and terms and conditions are variable. The most consistently funded program administered by the SWCD is the BWSR Erosion, Sediment Control and Water Quality Cost-Share Program. Cost share funded through this program does not meet local need and supplemental funding is obtained from watershed districts, competitive grants and other special projects.

Rural Rainfall Monitoring: This program is a cooperative effort between BWSR, SWCDs and the State Climatology Office to monitor precipitation in a statewide network. The SWCD collects and reports rain gauge reader data to the State Climatology Office monthly.

Soil Health Initiative: This program is a Local SWCD led effort to encourage, incentivize, implement and monitor structural, vegetative and cultural management practices that minimize disturbance, increase biological diversity, reduce soil temperature, foster microbial activity, maintain soil cover, intercept rainfall and facilitate infiltration. USDA-NRCS programs such as EQIP provide the majority of financial assistance for program participants.

Targeted Phosphorus Reduction and Lake Protection Project: This Clean Water Legacy funded project provides financial and technical assistance for shoreland stabilizations, native shoreland buffers, raingardens and other site-appropriate structural and vegetative practices to reduce sediment and nutrients from disturbed and/or developed areas of Becker County lakes targeted for their phosphorus sensitivity.

Trees, Shrubs and Native Plant Materials: The SWCD is a MN licensed nursery dealer, and earns money for district programs by selling and planting bare root and potted tree stock to the general public each spring for conservation purposes. The district also offers the public native plants, seed mixes and other materials for buffers, raingardens, habitat improvement and stormwater mitigation projects.

Wetlands and the Wetland Conservation Act (WCA): Becker SWCD assists with developing wetland restoration and replacement plans and serves on the Technical Evaluation Panel (TEP) for both Becker County and the City of Detroit Lakes. The District also has two certified wetland delineators on staff.

Becker County
Local Water Management Plan 2017-2027

**Background and
Natural Resources Inventory**

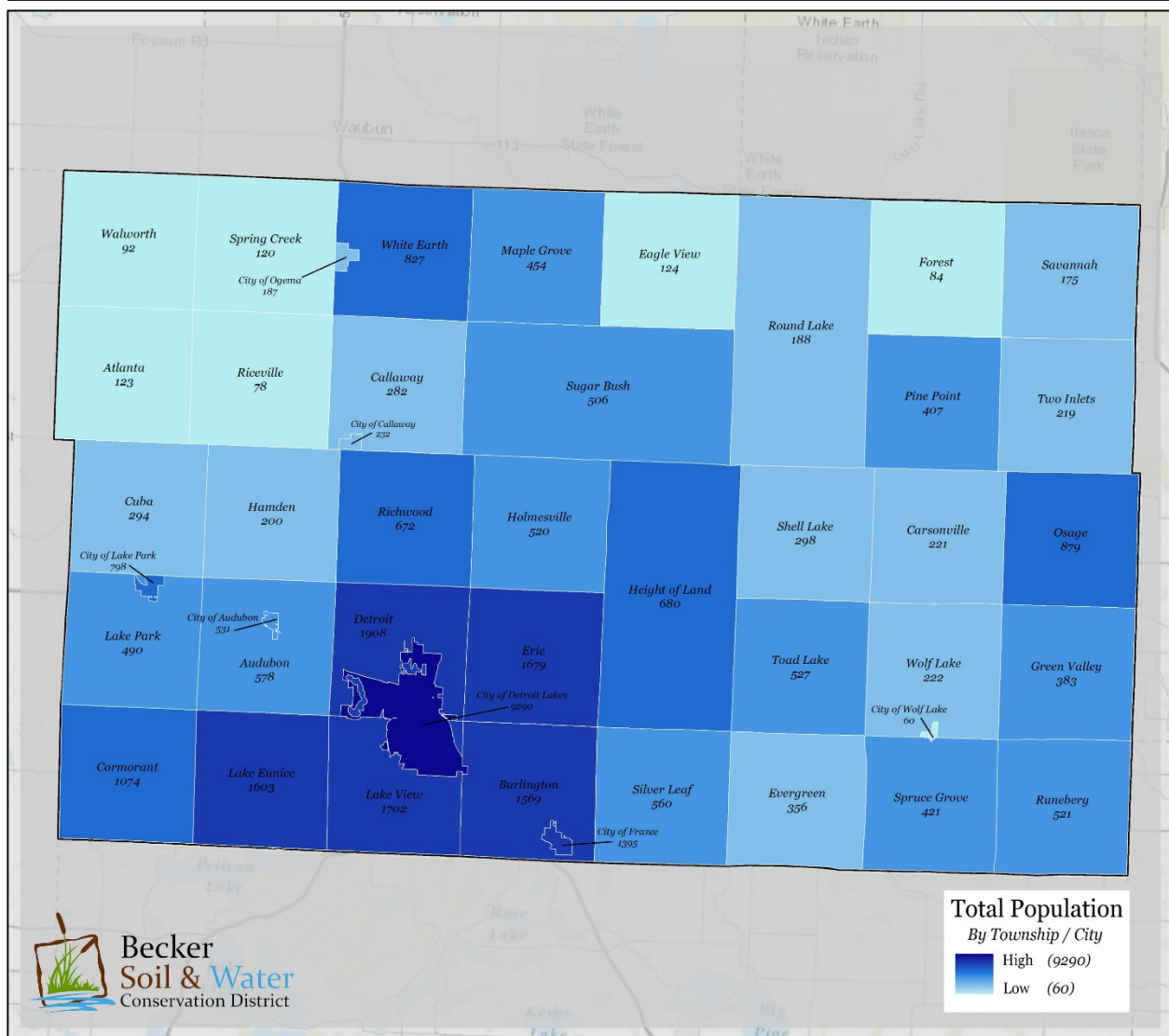
General Characteristics

Becker County is located in west-central Minnesota, 30 miles east of the Fargo/Moorhead metropolitan area, and encompasses an area of approximately 1,440 square miles. Situated in the heart of what is known as Park Region and is considered one of the state’s most beautiful and versatile recreation areas, the County encompasses 37 townships and 11 communities, and stretches 30 miles north to south and 48 miles east to west. Becker County is blessed with an abundance of water resources with 487 named lakes located within its boundaries and is situated in a prime tourist area of Minnesota due to its natural beauty of lakes and forests. According to a 2005 USDA Economic Analysis of the Detroit Lakes area, over 300,000 visitors come to the County each year, drawn largely by the many opportunities for aquatic based recreation.

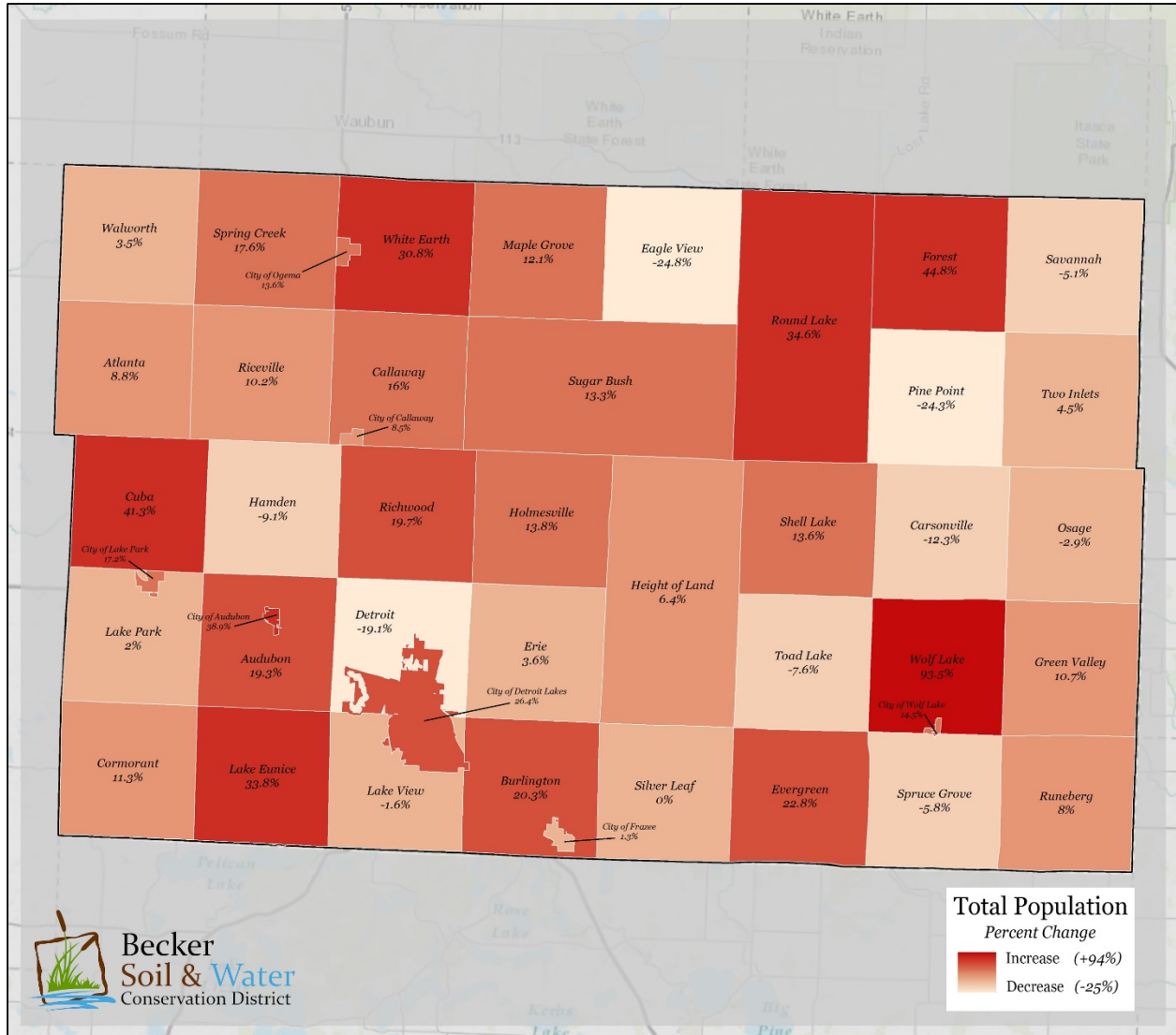
County Population

As documented in the previous U.S. Census data, Becker County lost approximately 5% of its population between 1980 and 1990. In the decades since, Becker County population has been experiencing gradual growth. According to 2015 estimates from the Minnesota Demographic Data Center and U.S. Census data, 34,893 people now reside in Becker County, with 38 percent (12,493 people) living in municipalities. Recent growth has occurred largely in rural townships with an abundance of general and recreational development lakes, though the municipalities of Becker County also saw growth ranging from 9 to 26 percent.

Map 1 – Becker County City and Township Population – 2015 Estimate



Map 2 – Becker County Population Change – 2000- 2015 Estimates

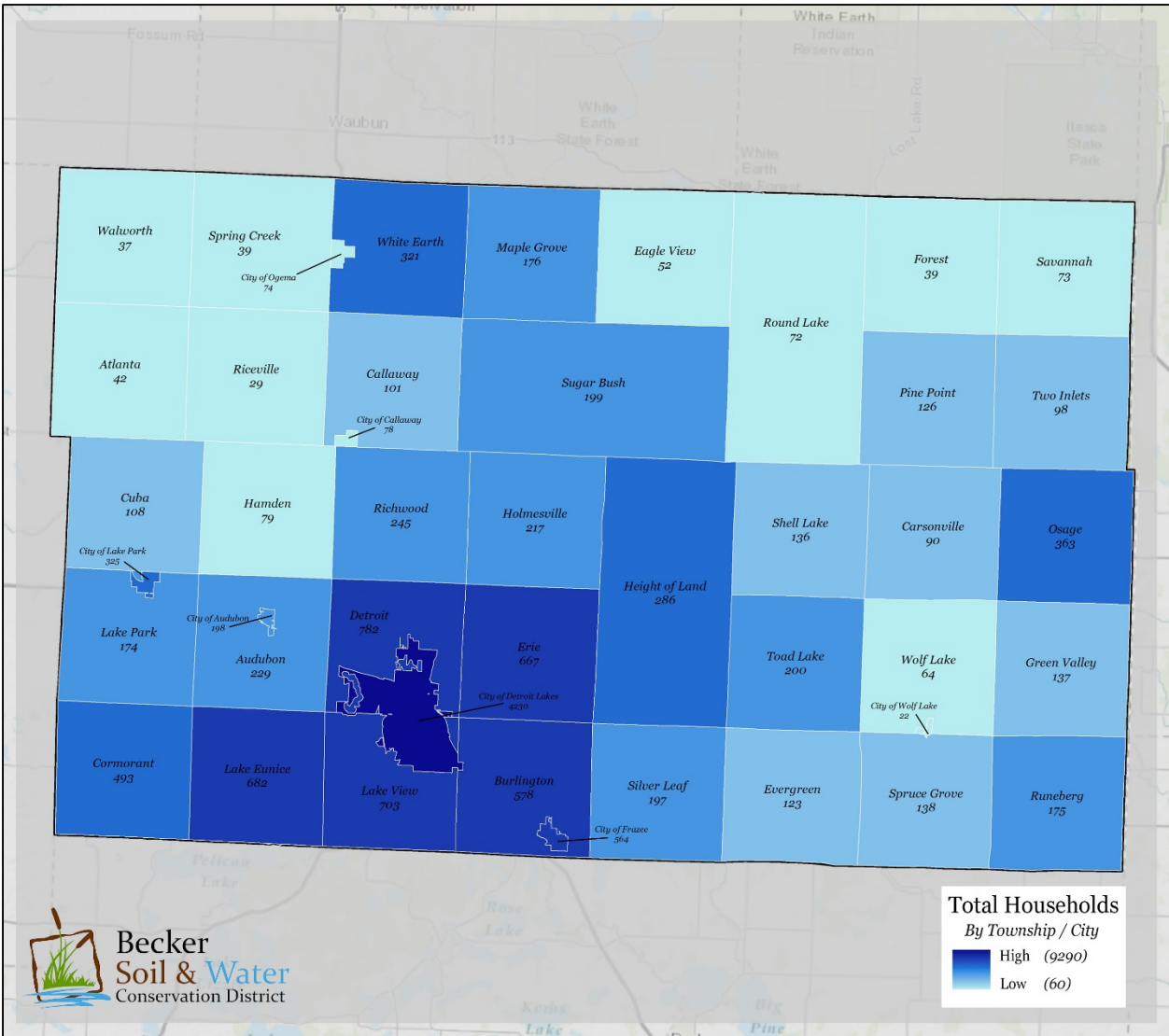


Source: MN Demographic Data Center

The City of Detroit Lakes has been experiencing the greatest actual population increase, while the percent of population increase in the City of Wolf Lake is statistically higher. Detroit Lakes' population has grown from 7,348 in 2000 to an estimated 9,290 according to the State Demographic Data Center and U.S. Census data, which also indicates that the City of Wolf Lake's population grew from 31 in 2000 to an estimated 60 in 2015.

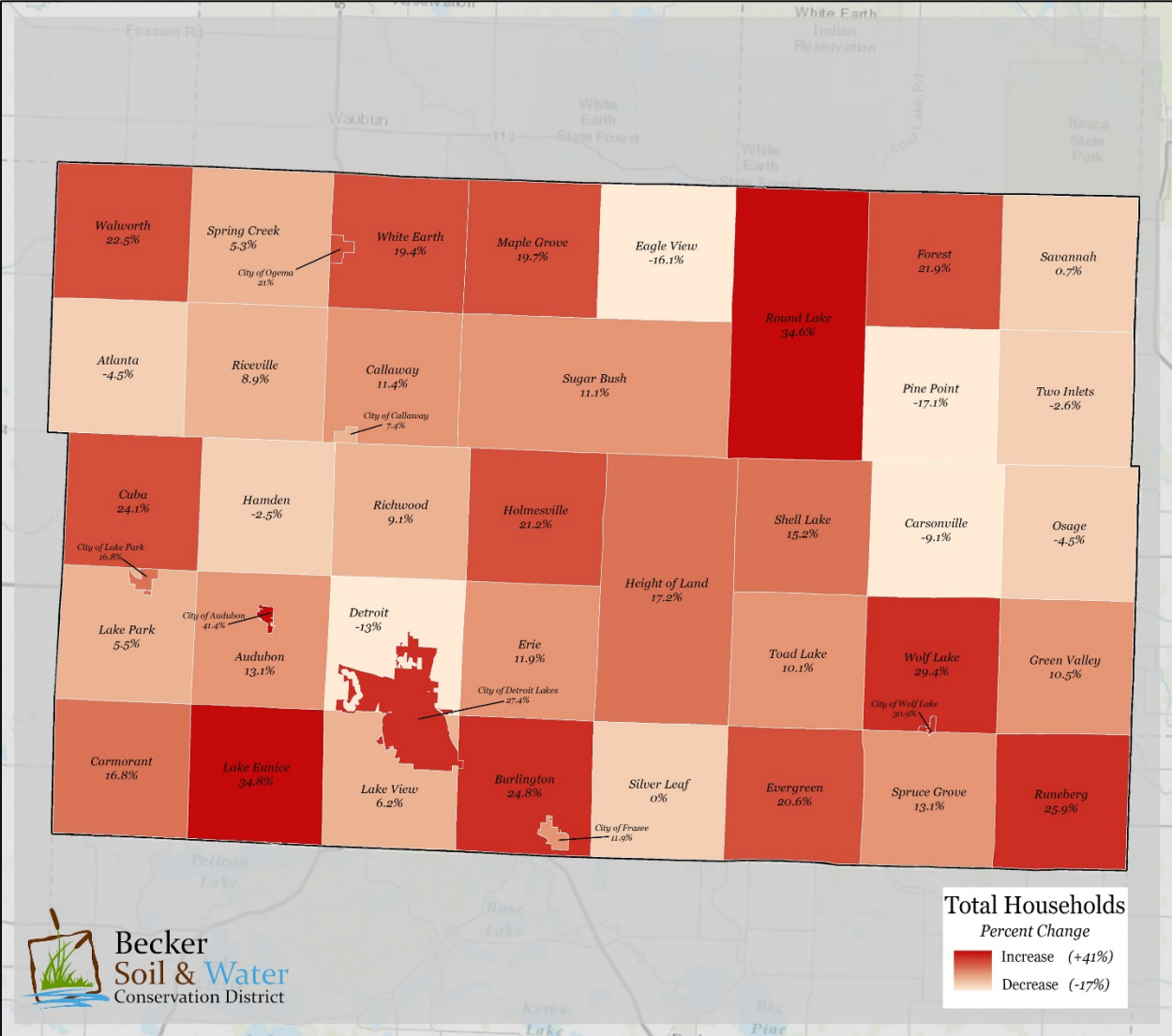
Much of the growth outside of Becker County's seven municipalities has led to an increase in the development of non-farm housing in agricultural areas. Development is similarly cropping up on increasingly remote lakes, and in more intensive development patterns than seen historically.

Map 3 – Becker County City & Township Households - 2015 Estimate



Source: MN Demographic Data Center

Map 4 – Becker County Households Change – 2000- 2015 Estimates



Source: MN Demographic Data Center

Figure 1. – Becker County Township & City Population Statistics – 2000- 2015 Estimates

Name	Population 2015	Households 2015	Population 2000	Households 2000	Population Change	Population Change %	Household Change	Household Change %
Atlanta township	123	42	113	44	10	8.8	(2)	-4.5
Audubon city	531	198	445	175	86	19.3	23	13.1
Audubon township	578	229	416	162	162	38.9	67	41.4
Burlington township	1,569	578	1304	463	265	20.3	115	24.8
Callaway city	232	78	200	70	32	16.0	8	11.4
Callaway township	282	101	260	94	22	8.5	7	7.4
Carsonville township	221	90	252	99	(31)	-12.3	(9)	-9.1
Cormorant township	1,074	493	965	422	109	11.3	71	16.8
Cuba township	294	108	208	87	86	41.3	21	24.1
Detroit township	1,908	782	2359	899	(451)	-19.1	(117)	-13.0
Detroit Lakes city	9,290	4,230	7348	3319	1,942	26.4	911	27.4
Eagle View township	124	52	165	62	(41)	-24.8	(10)	-16.1
Erie township	1,679	667	1621	596	58	3.6	71	11.9
Evergreen township	356	123	290	102	66	22.8	21	20.6
Forest township	84	39	58	32	26	44.8	7	21.9
Frazee city	1,395	564	1377	504	18	1.3	60	11.9
Green Valley township	383	137	346	124	37	10.7	13	10.5
Hamden township	200	79	220	81	(20)	-9.1	(2)	-2.5
Height of Land township	680	286	639	244	41	6.4	42	17.2
Holmesville township	520	217	457	179	63	13.8	38	21.2
Lake Eunice township	1,603	682	1198	506	405	33.8	176	34.8
Lake Park city	798	325	782	308	16	2.0	17	5.5
Lake Park township	490	174	418	149	72	17.2	25	16.8
Lake View township	1,702	703	1730	662	(28)	-1.6	41	6.2
Maple Grove township	454	176	405	147	49	12.1	29	19.7
Ogema city	187	74	143	62	44	30.8	12	19.4
Osage township	879	363	774	300	105	13.6	63	21.0
Pine Point township	407	126	419	132	(12)	-2.9	(6)	-4.5
Riceville township	78	29	103	35	(25)	-24.3	(6)	-17.1
Richwood township	672	245	610	225	62	10.2	20	8.9
Round Lake township	188	72	157	66	31	19.7	6	9.1
Runeberg township	521	175	387	130	134	34.6	45	34.6
Savannah township	175	73	162	58	13	8.0	15	25.9
Shell Lake township	298	136	314	135	(16)	-5.1	1	0.7
Silver Leaf township	560	197	493	171	67	13.6	26	15.2
Spring Creek township	120	39	120	39	-	0.0	-	0.0
Spruce Grove township	421	138	358	131	63	17.6	7	5.3
Sugar Bush township	506	199	537	176	(31)	-5.8	23	13.1
Toad Lake township	527	200	465	180	62	13.3	20	11.1
Two Inlets township	219	98	237	89	(18)	-7.6	9	10.1
Walworth township	92	37	88	38	4	4.5	(1)	-2.6
White Earth township	827	321	799	262	28	3.5	59	22.5
Wolf Lake city	60	22	31	17	29	93.5	5	29.4
Wolf Lake township	260	89	227	68	33	14.5	21	30.9

Sources:

MN State Demographic Center, Metropolitan Council, and U.S. Census Bureau. Released July 2016.

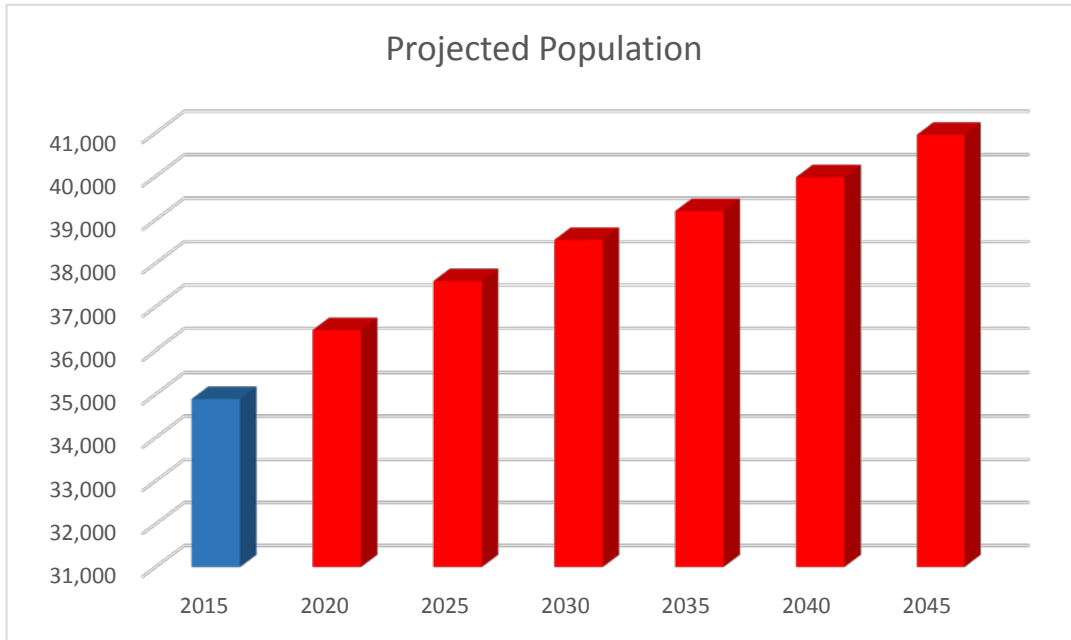
The U.S. Census Bureau conducts the 10-year (decennial) census, and is the source for all data for years ending in "---0".

The Minnesota State Demographic Center and the Metropolitan Council jointly produce population and household estimates for years between the decennial counts.

Population Projections

The Minnesota Demographic Data Center projects the county population will continue to grow at a steady, nearly linear rate. Projections completed in 2015 indicate the county population will reach 40,961 by the year 2045, an increase of approximately 15% from the estimated 2015 population of 34,893 people.

Figure 2. Becker County Population and Population Projection
Minnesota Demographic Center – 2015 to 2045 population projections (2015)



Physiography and Relief

The main geomorphic areas in Becker County include the Alexandria Moraine Area, the Itaska Moraine Area, the Wadena Drumlin Area, the Pelican River Sand Plain, the Park Rapids Sand Plain, and the Mahnomen Till Plain. Nearly half of the 1,440 square miles of the county consists of terminal moraines—the Alexandria Moraine and the Itaska Moraine. The moraine area is in the central part of the county and extends into the southwest and northeast corners. The vertical relief in the moraine ranges to as much as 200 to 300 feet. In places the moraine is more than 20 miles wide.

The Alexandria Moraine runs mainly from north to south in the western part of Becker County and contains the drift of two different ice lobes. The bulk of the moraine was deposited at the terminus of the Wadena Lobe, and its deposits are exposed on the east side of the moraine. The moraine was subsequently overridden from the west by the Des Moines Lobe. Glacial till from the Wadena Lobe typically has a sandy loam texture, and glacial till from the Des Moines Lobe typically has a loam or clay loam texture. A narrow band of glacial till with silty clay loam textures also occurs in the western part of the county. The origin of the very clayey glacial till sediments suggests that ice retreated and then readvanced over lake sediments in the Lake Agassiz basin (Fenton and others, 1983). The Des Moines Lobe contains a higher percentage of shale fragments and is thought to have a more northwesterly source area than the Wadena Lobe (Anderson). Relief is typically rolling to very hilly.

The Itaska Moraine runs mainly from east to west across the northern and central parts of Becker County. The moraine is a deposit of the Wadena Lobe. The Itaska Moraine is characterized by sandy loam glacial till. The glacial till is commonly mixed with pockets of sand and gravel (ice-contact deposits). Relief is typically rolling to very hilly.

The Wadena Drumlin Area is in the southeastern part of Becker County. The Wadena Drumlin Field is the largest drumlin field in Minnesota (Wright, 1962). The drumlins were formed by the Wadena Lobe and consist of sandy loam glacial till. In Becker County the long axis of the drumlins has an east-west orientation (Perkins). Relief is typically undulating to rolling.

The Pelican River Sand Plain is located in the southwestern part of Becker County. The glacial outwash consists of sands and gravels deposited primarily by meltwaters of the Des Moines Lobe. Relief is typically rolling to hilly.

The Park Rapids Sand Plain is located in the eastern part of Becker County. The glacial outwash consists of sands and gravels deposited by meltwaters of the Wadena Lobe as it stood at the Itaska Moraine (Wright, 1972a). Relief is typically nearly level or undulating.

The Mahnomen Till Plain is located in the northwestern part of Becker County. The till plain consists primarily of glacial till from the Des Moines Lobe, but the glacial till is mantled in some areas by silty glacial lacustrine sediments. These silty sediments indicate ponding at elevations considerably above the level of the Herman Beach of Lake Agassiz (Fenton and others, 1983). As the glacial ice retreated northward, water began to pond in low areas between the moraine and the retreating glacial ice. The present-day South Branch of the Wild Rice River and the Buffalo River are former meltwater channels that eventually drained these ponded meltwaters into Glacial Lake Agassiz. Relief is typically nearly level or undulating.

The highest elevation in Becker County is about 1,850 feet. This elevation is in section 16 of Wolf Lake Township. The lowest elevation, about 1,150 feet, is in section 19 of Walworth Township.

Drainage

The rugged topography within the Alexandria and Itaska Moraines prevents good natural drainage throughout a substantial portion of the county. Thus, there are more than 300 lakes that are 40 acres or more in size in these areas. Lakes, rivers, streams, and wetlands cover approximately one-fourth of the surface area of this portion of the county.

Artificial drainage through surface ditches is extensive in the northwestern part of Becker County. Many shallow depressions have been drained with these shallow ditches and are now being used as cropland. While historically not used extensively in Becker County, Subsurface tile drainage is on the rise in the north western portion of the county.

Maximum runoff generally occurs in the spring and early summer. Flooding is generally not a major problem, although periodic high-peak flows do occur and can cause damage to infrastructure and to agricultural production.

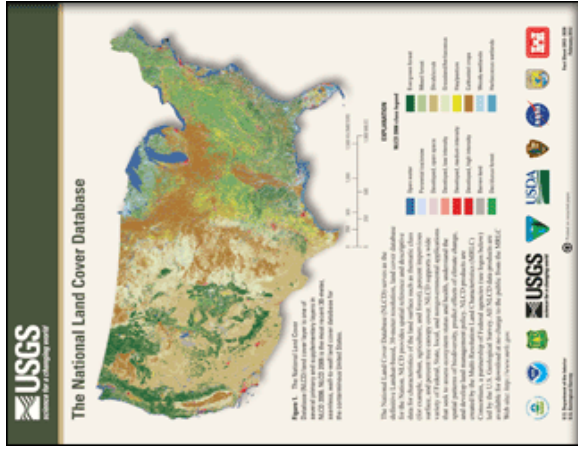
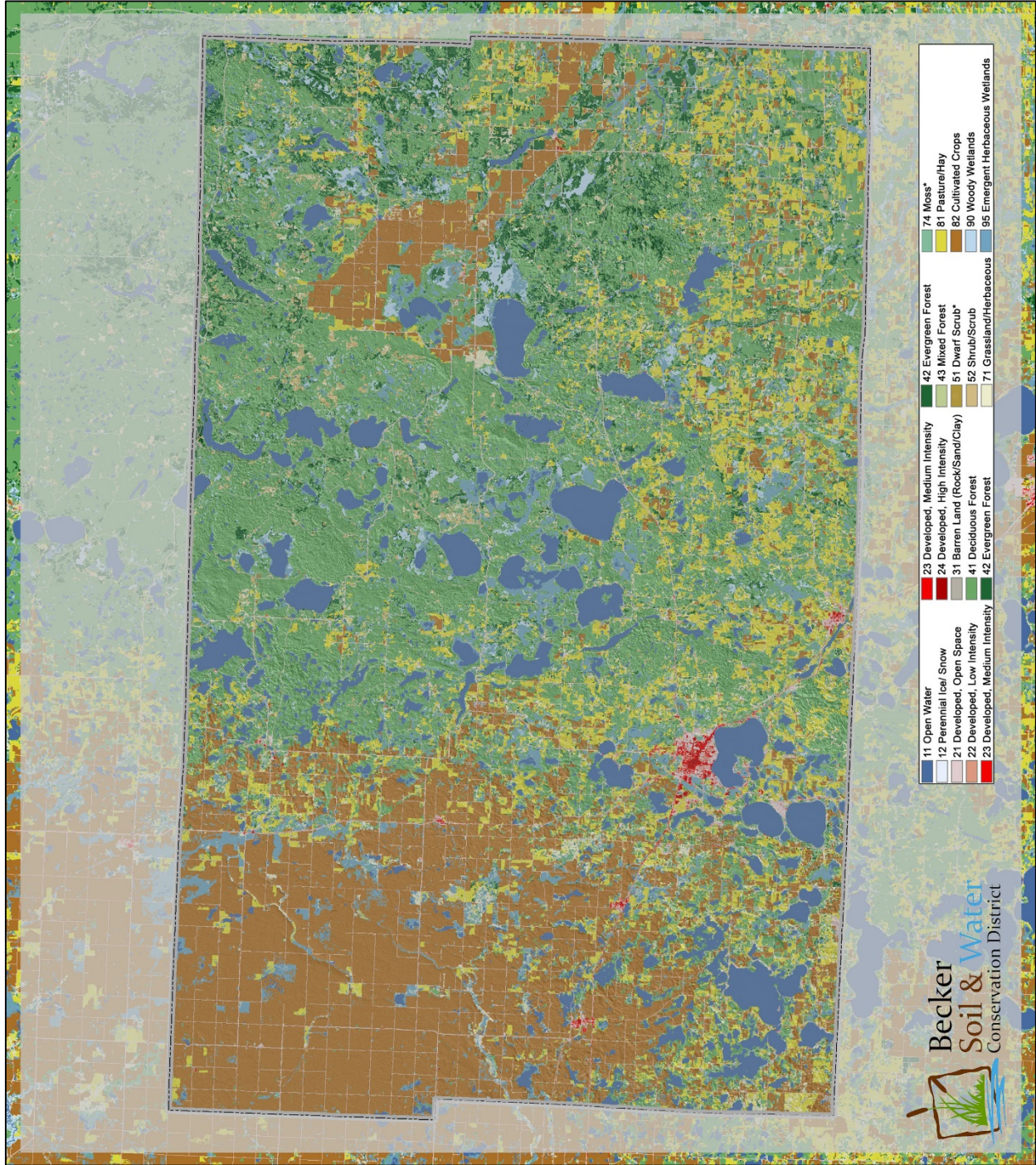
Land Use and Land Cover

The 2011 USGS National Landcover Dataset indicates Becker County's two dominant land uses are forest land (376,393 ac. 41%) and cultivated cropland (307,518 ac. 23%). With an additional 11% of hay/pastureland/grassland designation, agricultural land use accounts for approximately 34% of Becker County's overall area. It should be also be noted that over 17% of Becker County is either open water (85,196 ac. 9%) or wetland (74,203 ac. 8.1%), while only 4.5% is considered developed (41,624 ac.)

Figure 3. Becker County Landcover / Landuse
USGS MLRC National Landcover Database (2011)

Landuse / Landcover	Acres	Percent of County
Open Water	85,196	9.2
Developed, Open Space	36,268	3.9
Developed, Low Intensity	3,537	0.4
Developed, Medium Intensity	1,373	0.1
Developed, High Intensity	445	0.0
Barren Land	788	0.1
Deciduous Forest	326,629	35.3
Evergreen Forest	49,764	5.4
Shrub/Scrub	12,746	1.4
Herbaceous	26,428	2.9
Hay/Pasture	96,857	10.5
Cultivated Crops	210,660	22.8
Woody Wetlands	18,078	2.0
Emergent Herbaceous Wetlands	56,125	6.1

Map 5 – Becker County Landuse / Landcover



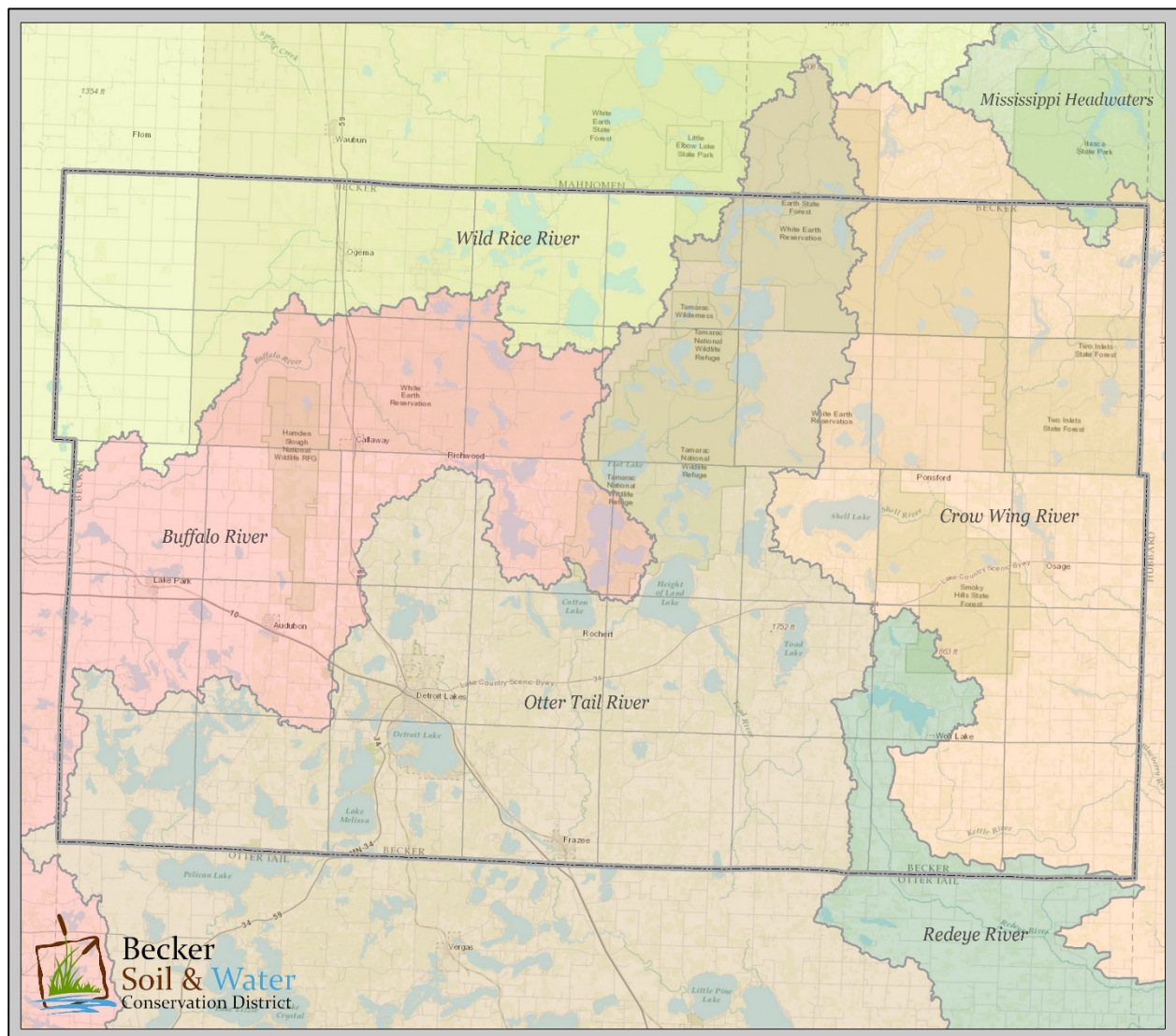
Source: USGS MLRC National Landcover Database (2011)

Major Watersheds

Becker County is located on the watershed divide of North America. The western three-fourths of the county are tributary to the Red River of the North, which flows northward into Hudson Bay. The eastern one-fourth of the county is tributary to the Mississippi River, which flows southward into the Gulf of Mexico.

The county lies at the top of six major watersheds, the Wild Rice River, the Buffalo River, the Otter Tail River, the Crow Wing River, the Red Eye River and the Headwaters of the Mississippi River. Of these six, the Otter Tail covers the largest area in Becker County, 350,636 acres (total watershed size 1,269,120 ac.) and contains a significant number of the 487 lakes located in the county.

Map 6 – Major Watersheds of Becker County

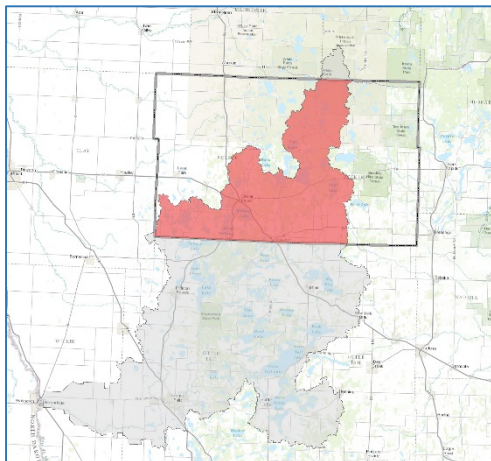


Major Watershed	Total Square Miles	Square Miles in County	Percent of Watershed	Percent of County
Mississippi River - Headwaters	1920	2.8	0.1	0.2
Crow Wing River	1983	360.0	18.2	24.9
Redeye River	894	44.4	5.0	3.1
Otter Tail River	1909	534.5	28.0	37.0
Buffalo River	1131	286.6	25.3	19.8
Wild Rice River	1636	217.1	13.3	15.0

Table 2. Comparison of Major Watersheds

Otter Tail River Watershed – At a Glance

The Otter Tail watershed encompasses three different ecoregions, covering 1,249,541 acres. The southwest portion of the watershed, the mouth of the watershed, is located in the Red River Valley ecoregion. The northeast portion of the watershed, the headwaters of the watershed, is in the Northern Lakes and Forests ecoregion.



The majority of the watershed found between these two areas is characterized by the North Central Hardwood Forest ecoregion. The eastern three-fourths of the watershed contains thousands of lakes and wetlands. The watershed is a drainage basin of the Red River and the major tributaries of the watershed are the Otter Tail and Pelican Rivers. The majority of the lakes in the greater Red River Basin are found in this watershed.

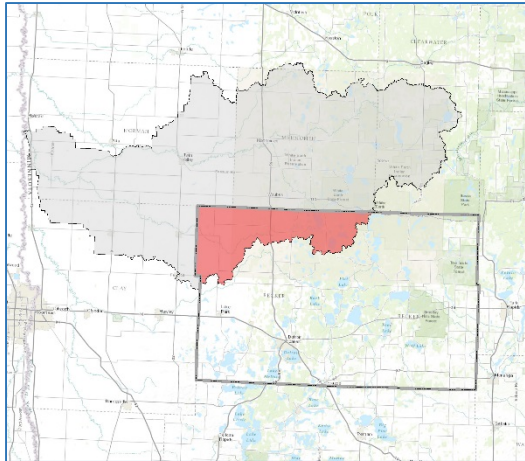
Of all of the watersheds in the Red River Basin, the Otter Tail River watershed is one of the least impacted by flooding. Annual average flood damage in the watershed is estimated at \$457,784 (in 1996 dollars) with 99% being rural.

Frequently cited resource concerns throughout the watershed include wind and water soil erosion, wetland management, surface water quality, stormwater runoff, and wildlife habitat. Many of the resource concerns relate directly to changing land use and increased development in the region, resulting in fragmentation and increased sediment/pollutant (mercury, excess nutrients) loadings to surface waters.

A significant portion of the land within this watershed is considered highly erodible, or potentially highly erodible. Land use within the watershed is largely agricultural, accounting for approximately 45% of the overall watershed acres. Development pressure is moderate to considerable in some areas, with occasional farms, timberland, and lakeshore being parceled out for recreation, lake, or country homes.

Wild Rice River Watershed – At a Glance

The Wild Rice River begins its course at Mud Lake in Minnesota’s Clearwater County, and flows largely to the west through Norman and Mahnommen counties. The river is joined by its two largest tributaries, the South Fork Wild Rice and the White Earth River before converging with the Red River of the North.



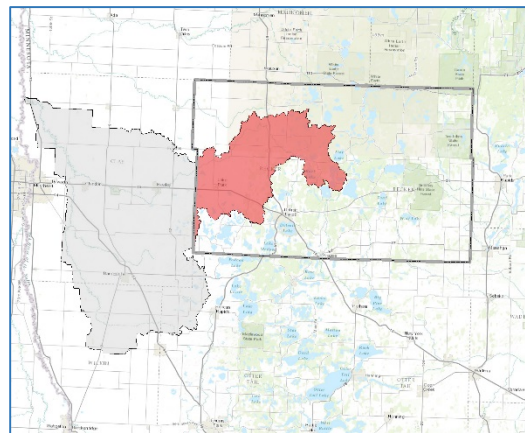
The watershed is part of the Red River Basin in northwestern Minnesota, with portions in Minnesota’s Glacial Lake Agassiz Plain, North Central Hardwoods, and Northern Lakes and Forests Level III ecoregions.

Eastern Wild Rice is, in terms of area, the third largest watershed of the Red River basin in Minnesota, and arguably one of the most ecologically diverse. The watershed includes portions of 9 of the 12 separate agroecoregions identified in the Red River region.

The main threat to the surface water quality in the watershed is non-point sources such as failing septic systems, agricultural runoff of fertilizers and feed lot runoff. However, a more common non-point pollution problem involves increases in turbidity due to wind and water erosion of soil from the land. The sediment entering the streams and lakes originate from upland erosion, stream bank erosion, drainage ditch erosion, and gully and wind erosion.

Buffalo River Watershed – At a Glance

The Buffalo River flows 88 miles from the pine forests around Tamarac Lake in eastern Becker County to the Red River of the North, across the former beach ridges and the lake plain of the Glacial Lake Agassiz land formation. Nearly 1,200 square miles of Clay, Becker, Otter Tail, and Wilkin counties drain to the Buffalo before it’s convergence with the Red River of the North.



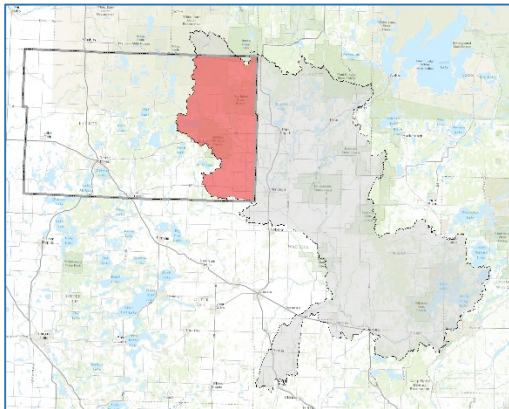
The Buffalo River Watershed spans three ecoregions: the Lake Agassiz Plain, the North Central Hardwood Forests, and the Northern Lakes and Forests. Land use within the BRW is predominantly agricultural (row crops and pasture) in the west and central portions accounting for more than 70% of the overall watershed acres; the eastern portion of the watershed is mostly forested.

Intensive monitoring shows that E.coli and turbidity are the most prevalent factors for rivers and streams within the watershed. Shallow lakes have issues with clarity, chlorophyll and nutrients leading to eutrophication.

Frequently cited resource concerns in the watershed are wind / water soil erosion, wetland management, surface water quality, flood damage reduction, and wildlife habitat. Many of the resource concerns relate directly to landuse practices in the region, resulting in fragmentation and increased sediment and pollutant (E.coli, excess nutrients) loadings to surface waters.

Crow Wing River Watershed – At a Glance

The Crow Wing River Watershed is located in north-central Minnesota and covers approximately 1,946 square miles within Becker, Cass, Clearwater, Crow Wing, Hubbard, Morrison, Otter Tail, Todd, and Wadena Counties. The watershed is located in the Upper Mississippi River Basin and is comprised of two ecoregions: the Northern Lakes and Forests, and North Central Hardwood Forests.

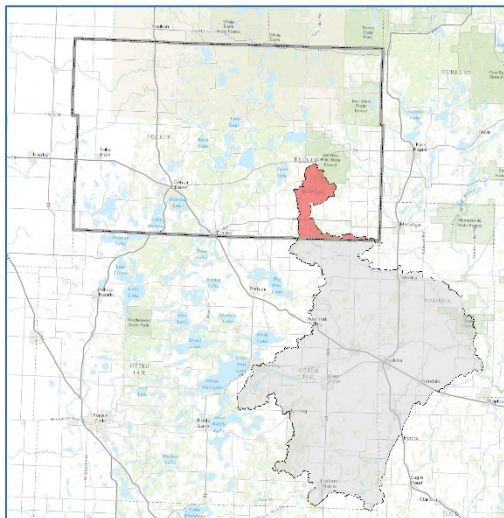


Land use within the watershed is primarily forested/shrub lands, followed by agricultural lands, wetlands, open water, and developed lands. There are a large number of pristine, high-value recreational lakes in the Crow Wing River Watershed and several cold water streams that support trout are located in the watershed.

Commonly cited resource concerns in the basin are excessive soil erosion, woodland management, surface water quality, groundwater quality and quantity, surfacewater management, wetland management, and land conversion issues. Associated with the surfacewater management and land conversion issues are increased sediment and nutrient (namely phosphorus) loading to surface waters, and groundwater contamination. Declining wildlife habitat is also a concern.

Red Eye River Watershed – At a Glance

The Redeye River watershed covers 575,366 acres (899 square miles) and is located the northwestern to north-central part of the Upper Mississippi River Basin in central Minnesota. The watershed encompasses all or parts of Becker, Otter Tail, Todd, and Wadena counties. The Redeye River begins at Wolf Lake and travels south where it joins the Leaf River and eventually joins the Crow Wing River north of Staples.

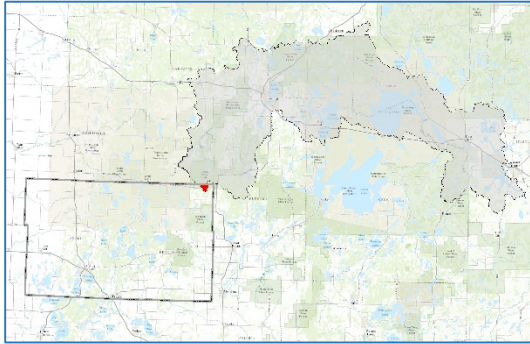


The Redeye River watershed has approximately 633 total river miles, of which 316 miles of rivers are considered perennial. The major rivers within this watershed include the Red Eye, the Leaf, and the Wing. There are 11 creeks and 7 county ditches, as well as numerous smaller flowages. The watershed contains approximately 126 lakes with a total acreage of 8,228.

The dominant land use within the watershed is agricultural (66%), while grasslands and forests make up 14% each, water makes up 2%, and 4% is urban. The majority of the watershed is within the North Central Hardwood Forest with small sections in the Northern Lakes and Forests ecoregion.

Mississippi River Headwaters Watershed – At a Glance

The Mississippi River Headwaters watershed consists of 1,255,105 acres (1,961 square miles) in the far north part of the basin. The watershed contains the headwaters of the Mississippi River at Lake Itasca in Itasca State Park. The watershed includes parts of Becker, Beltrami, Cass, Clearwater, Hubbard and Itasca counties, boasts nearly 685 river miles, and contains more than 1,000 lakes.



The watershed is largely forested and located in the Northern Lakes and Forest ecoregion of Minnesota. As the Mississippi River begins its 2,320-mile journey to the Gulf of Mexico, it runs north to north easterly through the watershed's abundant forest resources and large riverine wetland areas. The forest resources are a vital component to the economy of the area and provide habitat for a variety of wildlife species.

Approximately 44% of the land in this watershed is privately owned, with the remaining portion of land state, county or federal public land, or held by tribal land owners. Agricultural land use within the watershed is moderate, accounting for approximately 10% of the available acres.

Commonly cited concerns in the watershed include loss of shoreline and aquatic habitat due to development, increased sedimentation due to forest management practices, increased nutrient, contaminant, and sediment loading from stormwater runoff, and loss of biodiversity due to competition from invasive species.

Public waters

Minnesota Statutes, Section 103G.005 sets forth criteria for public water basins and watercourses. According to this statute, Public Waters mean:

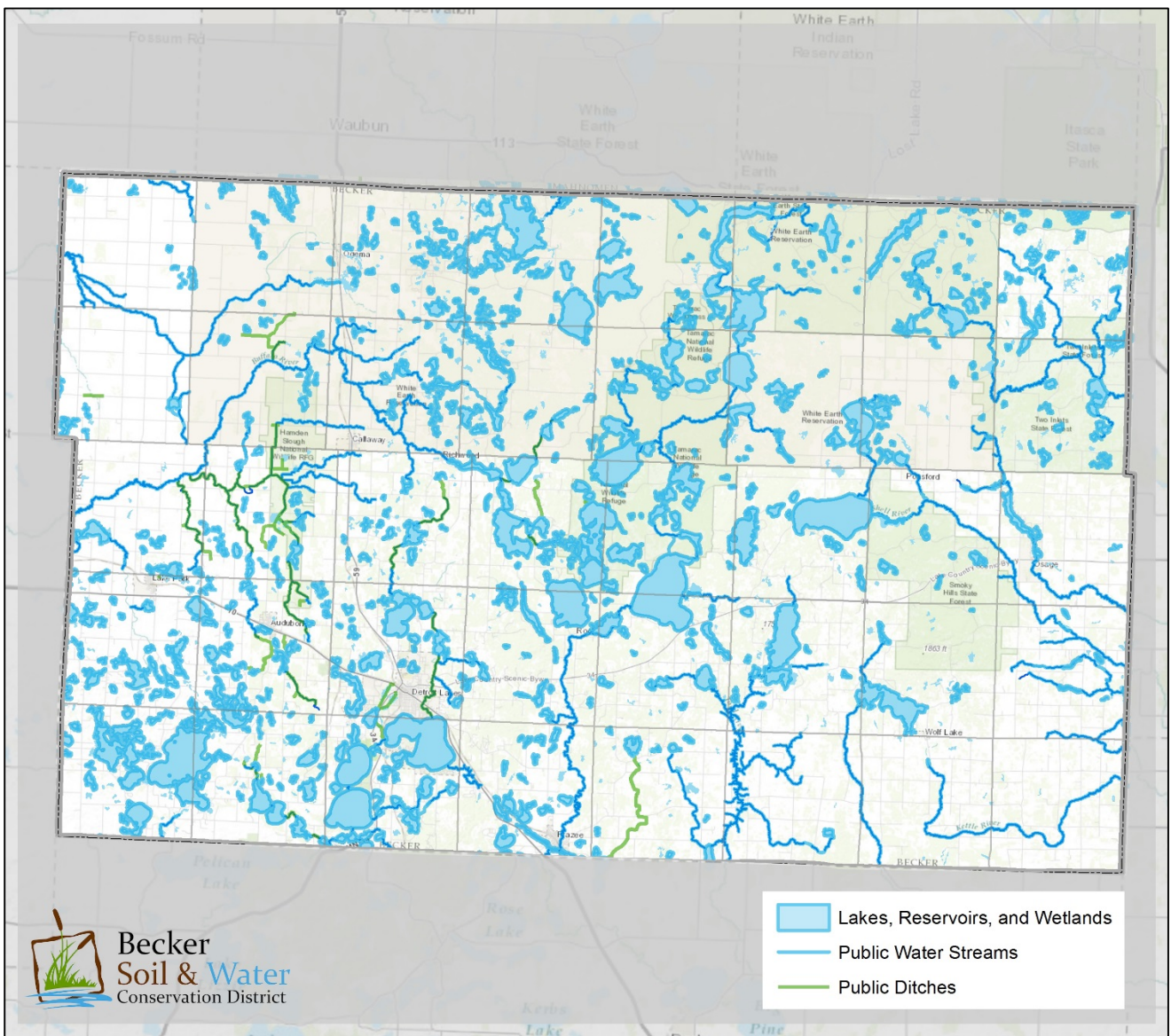
- (1) water basins assigned a shoreland management classification by the commissioner under sections 103F.201 to 103F.221;
- (2) waters of the state that have been finally determined to be public waters or navigable waters by a court of competent jurisdiction;
- (3) meandered lakes, excluding lakes that have been legally drained;
- (4) water basins previously designated by the commissioner for management for a specific purpose such as trout lakes and game lakes pursuant to applicable laws;
- (5) water basins designated as scientific and natural areas under section 84.033;
- (6) water basins located within and totally surrounded by publicly owned lands;
- (7) water basins where the state of Minnesota or the federal government holds title to any of the beds or shores, unless the owner declares that the water is not necessary for the purposes of the public ownership;
- (8) water basins where there is a publicly owned and controlled access that is intended to provide for public access to the water basin;
- (9) natural and altered watercourses with a total drainage area greater than two square miles;
- (10) natural and altered watercourses designated by the commissioner as trout streams;
- (11) public waters wetlands, unless the statute expressly states otherwise.

The Minnesota DNR oversees these waters and regulates activities below the Ordinary High Water Level (OHWL). Activities such as dredging, filling, excavating, constructing bridges, culverts, or water level control structures are examples that are regulated by the DNR under the Public Waters Program. The DNR maintains a Public Waters Inventory Map.

Protected Waters

Activities above the OHWL of public waters are regulated by the County or municipalities. The Shoreland Section of the County Code identifies the lakes, wetlands and streams which are Protected Waters under County regulations. The Protected Waters in the County Code is nearly identical to the State Public Waters map with the exception of a few Public Water Wetlands that are not listed as Protected Waters in the County Code. Map 7 displays the Public and Protected Waters in Becker County.

Map 7 – Becker County Public & Protected Waters



Impaired Waters – Excess Nutrients, Turbidity, Biological Integrity

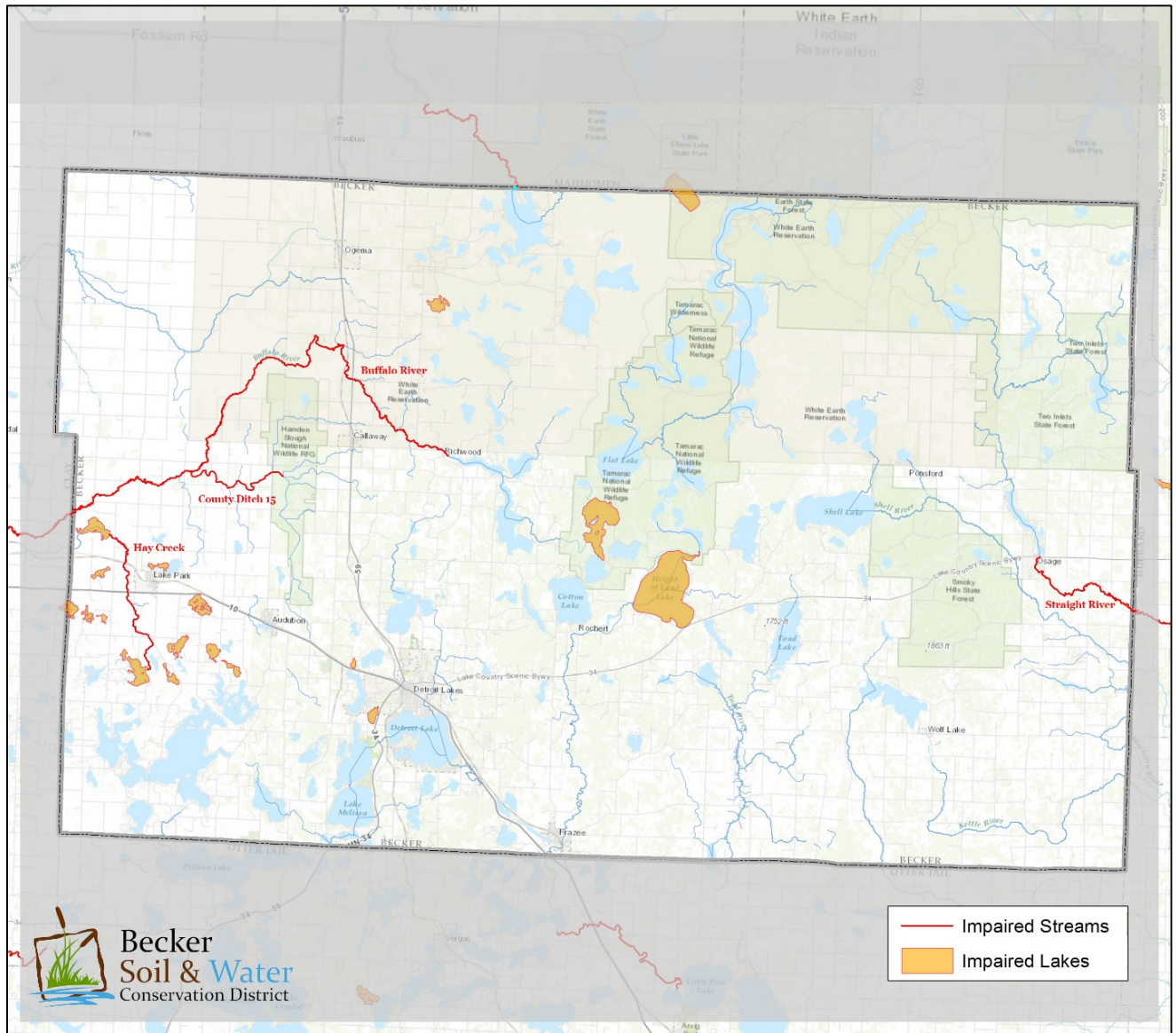
Minnesota, in accordance with federal Clean Water Act provisions, uses water quality data from citizen monitoring programs, and other sources, to determine whether lakes are not suitable for certain purposes, especially aquatic life, fish consumption, and aquatic recreation. While water quality as a whole in Becker County is generally good, there are a number of lakes and stream reaches that are listed by the Minnesota Pollution Control Agency (MPCA) as impaired for excess nutrients, turbidity or low index of biological integrity.

The criteria for certifying surface water “impairment” is based upon regional standards, and result in impairment designations for six stream reaches and 18 lakes. Waters with fish consumption advisories due to mercury are not included in the tables below, as the impairments tie directly to atmospheric deposition rather than watershed conditions.

Watercourse	Impairment	Watershed	Impaired Miles
Buffalo River	E.coli, Turbidity	Buffalo-Red River	9.4
White Earth River	Turbidity	Wild Rice	0.1
Straight River	Low DO	Crow Wing	8.4
Unnamed ditch (Becker County Ditch 15)	E.coli	Buffalo-Red River	6.3
Buffalo River	E.coli, Turbidity, IBI	Buffalo-Red River	25.8
Hay Creek	E.coli	Buffalo-Red River	8.9

Waterbody	Impairment	Watershed	Affected Use
Height of Land Lake	Excess Nutrients, Mercury	Otter Tail	Aquatic Recreation
Mission Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Marshall Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Gottenberg Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Boyer Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Talac Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Forget-Me-Not Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Sorenson Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Stakke (Stake) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Gourd Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
West LaBelle (Duck) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Lime (Norby, Selvine) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Stinking Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Sand (Stump) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
North Tamarack Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Tulaby Lake	Excess Nutrients	Wild Rice	Aquatic Recreation
Wine Lake	Excess Nutrients	Pelican River / Otter Tail	Aquatic Recreation
St Clair Lake	Excess Nutrients	Pelican River / Otter Tail	Aquatic Recreation

Map 8 – Becker County Impaired Waters - 2012



Source: MN Pollution Control Agency, 2012 Approved TMDL List

Wetland Resources

Like many other counties in agricultural regions of Minnesota, a significant portion of the pre-settlement wetlands in Becker County were drained to allow for the production of crops and the development of communities. While it is difficult to quantify the loss of wetlands in the County, The DNR's "*Minnesota Wetlands Conservation Plan*" from 1997 estimated that approximately 55 percent of the County's presettlement wetlands remained in 1981.

For regulatory purposes of the Wetland Conservation Act (WCA), the County falls within a group of counties for which 50 to 80 percent of the pre-settlement wetlands are intact.

Definition of a Wetland

Minnesota Statutes, Chapter 8420.0010, Subp. 52 defines wetlands as: "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water." It also states that a wetland must:

1. Have a predominance of hydric soils;
2. Be inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation adapted for life in saturated soil conditions; and
3. Under normal circumstances, support a prevalence of hydrophytic vegetation.

Wetland Inventory

A comprehensive inventory of existing wetlands is not available. The U.S. Fish and Wildlife Service and DNR have inventories of wetlands.

Minnesota Protected Waters: The State Public Waters law, Minnesota Statutes, Section 103G.005, designates some wetlands as public waters, including:

- Water basins are assigned a shoreland management classification, including wetlands. Wetlands less than 80 acres in size are classified as natural environment lakes.
- Water basins designated for management for a specific purpose such as a trout lake and game lake;
- All types 3, 4 and 5 wetlands as defined in U.S. Fish and Wildlife Service (USFWS) Circular No. 39 not included within the definition of public waters, not included in the definition of public waters, that are ten or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

National Wetlands Inventory: The purpose of the NWI was to provide better information on the location and type of wetlands that were shown on the U.S. Geological Survey topographical maps. The NWI was compiled based on interpretation of aerial photos from 1980. Map 9 shows the NWI wetlands in the County. It was not the intent of the NWI to provide exact wetland boundaries and the NWI does not depict all wetlands. Many wetlands under an acre in size and wetlands in areas such as forests where wetlands are not identifiable using photos are not shown on the maps. In Becker County, there are many wetlands that do not appear on the NWI maps for those reasons, and there are also wetlands which are identified on the NWI that are currently farmed or developed. The NWI provides information, but on-site delineations or investigations are necessary when wetland determinations are made under WCA.

Wetland Types

Wetlands vary in depth, flow, proximity to other water bodies and vegetation. The U.S. Fish and Wildlife Service developed a classification of wetlands which includes many types of wetlands, according to Wetlands of the United States, U.S. Fish and Wildlife Service Circular 39 (1971 edition).

These types of wetlands include:

Type 1 wetlands are seasonally flooded basins or flats in which soil is covered with water or is waterlogged during variable seasonal periods but usually is well-drained during much of the growing season. Type 1 wetlands are located in depressions and in overflow bottomlands along watercourses, and in which vegetation varies greatly according to season and duration of flooding and includes bottomland hardwoods as well as herbaceous growths.

Type 2 wetlands are inland fresh meadows in which soil is usually without standing water during most of the growing season but is waterlogged within at least a few inches of surface. Vegetation includes grasses, sedges, rushes, and various broadleafed plants. Meadows may fill shallow basins, sloughs, or farmland sags, or these meadows may border shallow marshes on the landward side.

Type 3 wetlands are inland shallow fresh marshes in which soil is usually waterlogged early during a growing season and often covered with as much as six inches or more of water. Vegetation includes grasses, bulrushes, spike rushes, and various other marsh plants such as cattails, arrowheads, pickerelweed, and smartweeds. These marshes may nearly fill shallow lake basins or sloughs, or may border deep marshes on the landward side and are also common as seep areas on irrigated lands.

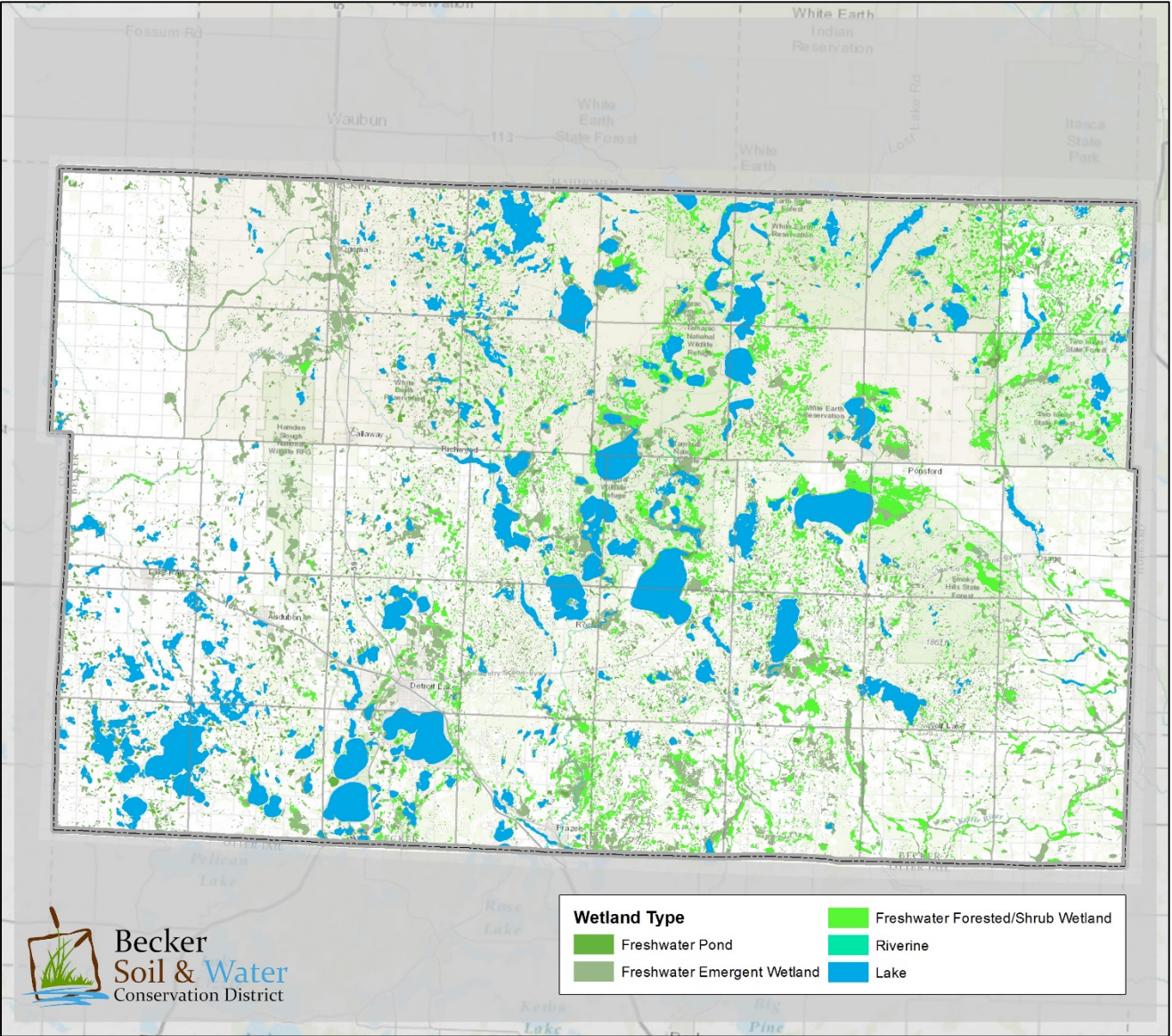
Type 4 wetlands are inland deep fresh marshes in which soil is usually covered with six inches to three feet or more of water during the growing season. Vegetation includes cattails, reeds, bulrushes, spike rushes, and wild rice. In open areas, pondweeds, naiads, coontail, water milfoils, waterweeds, duckweeds, water lilies, or spatterdocks may occur. These deep marshes may completely fill shallow lake basins, potholes, limestone sinks, and sloughs, or they may border open water in such depressions.

Type 5 wetlands are inland open fresh water, shallow ponds, and reservoirs in which water is usually less than ten feet deep and is fringed by a border of emergent vegetation similar to open areas of type 4 wetland.

Type 6 wetlands are shrub swamps in which soil is usually waterlogged during growing season and is often covered with as much as six inches of water. Vegetation includes alders, willows, buttonbush, dogwoods, and swamp-privet. This type occurs mostly along sluggish streams and occasionally on floodplains.

Type 7 wetlands are wooded swamps in which soil is waterlogged at least to within a few inches of the surface during growing season and is often covered with as much as one foot of water. This type occurs mostly along sluggish streams, on floodplains, on flat uplands, and in shallow basins. Trees include red maple, and black ash. Deciduous swamps frequently support beds of duckweeds and smartweeds.

Map 9 –National Wetland Inventory



Soils of Becker County

The landscape of Becker County was shaped by the Ice Age, when a series of glaciers spread over the county and deposited glacial drift. Glacial drift is a general term that applies to all rock material, including clay, silt, sand, gravel, and boulders, that has been transported by the glacier and deposited by melting ice or by meltwater flowing from the ice. The pattern of soils is complex because more than one glacial lobe is exposed at the surface in Becker County. The lobes came from different source areas, and they brought with them materials of different physical and chemical properties. The debris remaining after the glaciers had melted provided the parent material in which most of the soils in Becker County formed.

Till is material that was deposited directly by glacial ice with little or no water action. It typically has particles that vary in size, including sand, silt, clay, and larger particles, such as gravel, cobbles, and boulders. The till was deposited in moraines whose topography ranges from nearly level plains (ground moraines) to steeply sloping hills (end moraines or terminal moraines). Approximately 50 percent of the soils in Becker County formed in till sediments.

Since the last glacial period ended between 10,000 and 20,000 years ago the soils in Becker County are geologically young. Young soils generally are more fertile than older soils because leaching and other soil-forming processes have not altered the parent material as much.

Even though the soils are geologically young, enough time has elapsed for the parent material to weather into soils that have distinct horizons. In many of the forested soils, including Nebish, Snellman, and Rockwood soils, carbonates have been leached to a depth of 2 to 4 feet, clay has been translocated from the surface and subsurface layers to the subsoil, and organic matter has accumulated in the surface layer.

The youngest soils in Becker County, such as Lamoure and Fordum soils, formed in recent alluvium. These soils may be stratified and have weakly expressed horizons because the soil-forming processes are interrupted with each new deposition.

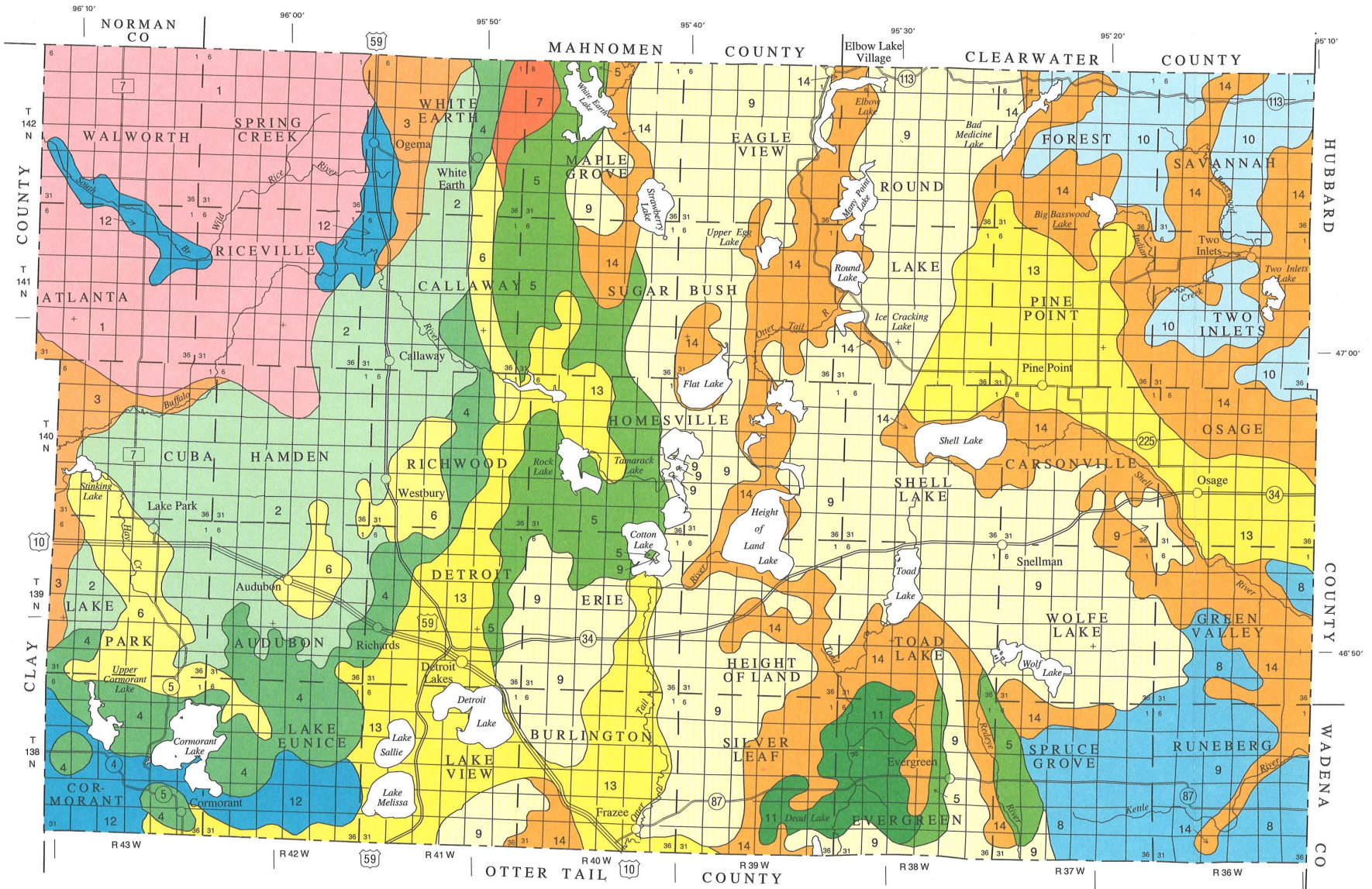
Two types of vegetation, prairie and forest, have strongly influenced the formation of the soils in Becker County. Prairie vegetation occupied about one-fourth of the area at the time the county was settled, mainly in the northwestern part of the county. Soils that formed under prairie vegetation have a thicker, darker surface layer than soils that formed under forest vegetation. Fire has had some effect on limiting tree growth in this area. Soils that formed under forest vegetation characteristically have a thinner, lighter colored surface layer than soils that formed under prairie vegetation and have an accumulation of clay in the subsoil.

Human activities have significantly influenced soil formation. Native forests have been cleared and developed for farming and other uses. Cultivation has accelerated the rate of erosion of the surface layer in the more sloping areas. The surface layer of some of the well-drained soils has become browner as a result of mixing with the subsoil and reduction of the content of organic matter. Cultivation has affected soil structure and compaction and has reduced the content of organic matter. Fertilizer applications have increased the fertility of many soils. The drainage of wet soils has prevented further accumulations of organic and limnic sediments in many depressions.

Soil Types

The Natural Resources Conservation Service (NRCS) soils survey breaks the major soil types into 14 groups in Becker County. The categories describe soils, relief, and drainage that allows an assessment of large areas for different general land uses. A brief description of each group is provided below.

1. Hamerly-Winger-Vallers Association: Nearly level to moderately steep, well drained to somewhat poorly and poorly drained soils that formed in glacial till and glacial lacustrine sediments on ground moraines.
2. Formdale-Langhie-Lom Association: Nearly level to moderately steep, well drained and poorly drained soils formed in glacial till on ground moraines and lateral moraines.
3. Barnes-Langhie-Vallers Association: Nearly level to moderately steep, well drained and poorly drained soils formed in glacial till on ground moraines and lateral moraines.
4. Waukon-Forman-Cathro Association: Nearly level to moderately steep, well drained and poorly drained soils formed in glacial till and organic deposits on lateral moraines.
5. Nebish-Seelyeville Association: Nearly level to moderately steep, well drained and very poorly drained soils formed in glacial till and organic deposits on lateral moraines.
6. Birchlake-Audubon-Foxlake Association: Nearly level to moderately steep, moderately well drained and poorly drained soils formed in glacial till on lateral moraines.
7. Naytahwaush-Seelyeville Association: Nearly level to moderately steep, well drained and very poorly drained soils formed in glacial till and organic deposits on lateral moraines.
8. Blowers-Paddock-Rockwood Association: Nearly level to moderately steep, well drained, moderately well drained and poorly drained soils formed in dense glacial till on drumlins.
9. Snellman-Rifle-Sugarbush Association: Nearly level to steep, well drained, well drained and poorly drained soils formed in dense glacial till, glacial outwash and organic deposits on end moraines.
10. Sol-Lumpton-Sugarbush Association: Nearly level to moderately steep, well drained, well drained and very poorly drained soils formed in glacial till, glacial outwash and organic deposits on end moraines.
11. Eagleview-Seelyeville-Snellman Association: Nearly level to moderately steep, somewhat excessively drained, well drained and very poorly drained soils formed in dense glacial outwash, glacial till and organic deposits on ground moraines.
12. Arvilla-Sandberg Association: Gently sloping to moderately steep, somewhat excessively drained and excessively, well drained soils formed in glacial outwash on outwash plains and valley trains.
13. Verndale-Dorset-Corliss Association: Nearly level to steep, well drained soils formed in glacial outwash on outwash plains and valley trains.
14. Sugarbush-Graycalm-Two Inlets Association: Gently sloping to moderately steep, well drained and somewhat excessively drained soils formed in glacial outwash on outwash plains and valley trains.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

- 1** Hamerly-Winger-Vallers association
- 2** Formdale-Langhei-Flom association
- 3** Barnes-Langhei-Vallers association
- 4** Waukon-Forman-Cathro association
- 5** Nebish-Seelyville association
- 6** Birchlake-Audubon-Foxlake association
- 7** Naytahwaush-Seelyville association

- 8** Blowers-Paddock-Rockwood association
- 9** Snellman-Rifle-Sugarbush association
- 10** Sol-Lupton-Sugarbush association
- 11** Eagleview-Seelyville-Snellman association

- 12** Arvilla-Sandberg association
- 13** Verndale-Dorset-Corliss association
- 14** Sugarbush-Graycalm-Two Inlets association

*The units on this legend are described in the text under the heading "General Soil Map Units."

**GENERAL SOIL MAP
BECKER COUNTY, MINNESOTA**

Scale 1:253440

Compiled 1991

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
MINNESOTA AGRICULTURAL EXPERIMENT STATION

Mineral Resources

Large, marketable deposits of sand and gravel occur primarily in the outwash plains in the eastern, southern and north central parts of the Becker County. Becker County is net exporter of aggregate, primarily to other nearby counties for road maintenance and construction projects. The demand for this sand and gravel is enhanced due to the lack of merchantable quantities in areas further to the west. The aggregate resource is becoming more important, as aggregate reserves are depleted or covered in areas experiencing heavy development pressure. With fairly large aggregate reserves, Becker County can be reasonably protected from a shortage of aggregate for its own needs, and can look to the aggregate as an economic resource with increasing value.

A number of environmental issues are associated with aggregate mining, largely due to historic mining procedures and inappropriate buffering from residential and some commercial land uses. Aggregate mining has created pits and overburden piles in those areas of the County with significant aggregate resources. Becker County now requires all mining operations to file a Mining Plan, an Operations Plan, and a Reclamation Plan. The Minnesota Pollution Control Agency (PCA) requires new or reopened pits of 40 acres to complete an Environmental Assessment Worksheet, and pits of more than 160 acres to complete a detailed Environmental Impact Statement. Becker County has also adopted a gravel pit certification program which the SWCD administers to ensure compliance with the MN Noxious weed law and minimize the transport & spread of terrestrial invasive species.

Forest Resources

Becker County has over 360,000 acres of forestland, much of it in public control, but including substantial private woodlands as well. Proper forest management helps contribute to the long-term sustainability of forested lands by taking into account the resource needs, public priorities, site capabilities, current regulations, and economics. The forests of Becker County provide a source of income to area loggers and mill operators, as well as providing the raw materials needed for growing communities. These lands also provide a range of public recreation opportunities, wildlife habitat, and tourism resources.

The Becker County Natural Resources Management Office manages nearly 74,000 acres of tax-forfeited lands. Approximately 80 percent is considered commercial forestland or land capable of producing a crop of forest products. Of the 74,000 acres, 36,000 acres (nearly 49 percent) is primarily aspen cover type. Northern hardwoods comprise almost 12 percent, and wet soils areas comprise nearly 17 percent of the total; the remaining 22 percent consists of various individual cover types.

In recent years there has been increasing pressure on private forest land in portions of North Eastern Becker County where soils, topography and available groundwater are suitable for row crop production, chiefly with center pivot irrigation. This change in landuse can alter groundwater flow and the amount of groundwater available, while the use of pesticides, fertilizers and herbicides in coarse grained soils can place groundwater quality at risk.

Becker County
Local Water Management Plan 2017-2027

**Implementation
Schedule**

Priority Concern: Surface Water Quality

Goal: Protection and Restoration of Surface Water Quality

Objective A. Improve stormwater runoff quality by increased utilization of stormwater management practices throughout the County.

Action 1. Promote management practices that facilitate, foster or increase infiltration of stormwater runoff in rural, urban, recreational and agricultural settings throughout the county.

Partners: SWCD, NRCS

Funding: Estimated Cost \$1,250/year

Timeline: 2017-2027

5 year Benchmark: Continued Education and Outreach to Local Citizens

Action 2. Develop and implement new and existing measures to minimize the contribution of storm water from new subdivisions and development to surface waters.

Partners: SWCD, P&Z, WD's

Funding: Estimated Cost \$5,000

Timeline: 2017-2027

5 year Benchmark: Impacts of any new development effectively mitigated

Action 3. Increase compliance with stormwater rules and ordinances through additional education of landowners, prospective homebuyers, developers and contractors on ordinances and the use of BMPs that reduce runoff.

Partners: SWCD, P&Z, WD's

Funding: Estimated Cost \$5,000

Timeline: 2017-2027

5 year Benchmark: Promotion of sustainable development in all parts of county

Action 4. Synchronize and improve the development, administration, data sharing and public accessibility of permitting programs in Becker County, the City of Detroit Lakes, Pelican River and Cormorant Lakes Watershed Districts in regards to stormwater control and impervious surfaces in the shore impact zone.

Partners: SWCD, P&Z, WD's, MPCA, City of Detroit Lakes, Municipalities

Funding: Estimated Cost \$84,000

Timeline: 2017-2022

5 year Benchmark: Creation & utilization of internal/public electronic permitting system

Action 5. Work with contractors/developers on understanding and fulfilling the requirements of County, Watershed, Local & the NPDES permitting programs for controlling stormwater runoff during land alteration activities.

Partners: SWCD, P&Z, WD's, Municipalities, MPCA

Funding: Estimated Cost \$15,000

Timeline: 2017-2027

5 year Benchmark: Continuation and expansion of contractor certification program

Objective A. (Cont.)

Action 6. Provide information and technical assistance to County landowners implementing BMPs during development; seek sources of financial assistance for retrofit-related BMP's to alleviate pre-existing stormwater management issues.

Partners: SWCD, WD's, MDA, NRCS, WD's

Funding: Estimated Cost \$12,500/year

Timeline: 2017-2027

5 year Benchmark: County wide awareness of BMPs and available assistance

Action 7. Disconnect impervious surfaces from public waters by the adoption of suitable BMP's, promoted through civic engagement, incentives and technical assistance.

Partners: SWCD, WD's, MPCA, municipalities

Funding: Estimated Cost \$15,000/year

Timeline: 2017-2027

5 year Benchmark: Increased public awareness; prioritization of municipal opportunities

Action 8. Identify, target and assist landowners with stormwater/retrofit BMP's, such as infiltration/filtration basins, grassed waterways, rain gardens, etc., including cost-share assistance and/or technical assistance. Projects with a direct connection to surface waters or that reduce the impacts of stormwater from impervious surfaces are high priorities.

Partners: SWCD, NRCS, WD's

Funding: Estimated Cost \$250,000

Timeline: 2017-2027

5 year Benchmark: Continued public outreach; Conduct at least 4 community education events showcasing stormwater-related BMPs.

Action 9. Seek funding from agencies such as BWSR, MDA, MDH, DNR, MPCA and Watershed Districts as well as local businesses, private organizations and non-profits to compliment other cost-share programs to assist in the installation of stormwater control measures.

Partners: SWCD

Funding: \$2,500

Timeline: 2017-2027

5 year Benchmark: securing of additional funds to provide technical and financial assistance for priority stormwater management projects.

Objective A. (Cont.)

Goal: Protection and Restoration of Surface Water Quality					
Objective A: Improve stormwater runoff quality by increased utilization of stormwater management practices throughout the County.					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Promote management practices that facilitate, foster or increase infiltration of stormwater runoff in rural, urban, recreational and ag settings throughout the county	SWCD, NRCS	\$ 12,500.00	2017-2027	County - Wide
2	Develop and implement new and existing measures to minimize the contribution of storm water from new subdivisions and development to surface waters	SWCD, P&Z, WD's	\$ 5,000.00	2017-2027	PRWD, Otter Tail, Crow Wing
3	Increase compliance with stormwater rules and ordinances through additional education of landowners, prospective homebuyers, developers and contractors on ordinances and the use of BMPs that reduce runoff.	SWCD, P&Z, WD's	\$ 5,000.00	2017-2027	PRWD, Otter Tail
4	Synchronize and improve the development, administration, data sharing and public accessibility of permitting programs in Becker County, the City of Detroit Lakes, Pelican River and Cormorant Lakes Watershed Districts in regards to stormwater control and impervious surfaces in the shore impact zone.	SWCD, P&Z, WD's, MPCA, City of Detroit Lakes, Municipalities	\$ 84,000.00	2017-2022	County - Wide
5	Work with contractors/developers on understanding and fulfilling the requirements of County, Watershed, Local & NPDES permitting programs for controlling stormwater runoff during land alteration activities.	SWCD, P&Z, WD's, Municipalities, MPCA	\$ 15,000.00	2017-2027	County - Wide
6	Provide information and technical assistance to County landowners implementing BMPs during development; seek sources of financial assistance for retrofit-related BMP's to alleviate pre-existing stormwater management issues.	SWCD, WD's, MDA, NRCS, WD's	\$ 125,000.00	2017-2027	County - Wide
7	Disconnect impervious surfaces from public waters by the adoption of suitable BMP's, promoted through civic engagement, incentives and technical assistance	SWCD, WD's, MPCA, municipalities	\$ 150,000.00	2017-2027	County - Wide
8	Identify, target and assist landowners with stormwater/retrofit BMP's, such as infiltration/filtration basins, grassed waterways, rain gardens, etc., including cost-share assistance and/or technical assistance.	SWCD, NRCS, WD's	\$ 250,000.00	2017-2027	Otter Tail, Buffalo, Wild Rice
9	Seek funding from agencies such as BWSR, MDA, MDH, DNR, MPCA and Watershed Districts as well as local businesses, private organizations and non-profits to compliment other cost-share programs to assist in the installation of stormwater control measures	SWCD	\$ 2,500.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 649,000.00

Objective B: Protect or Improve Surface Water Quality through Erosion and Sediment Control on Agricultural Land

Action 1. Identify and target critical erosion areas in the Buffalo, Ottertail and Wild Rice Watersheds to target and promote the use of erosion control measures such as perennial cover, conservation tillage, residue management and structural practices to reduce overland erosion and sediment entering our ditches and watercourses.

Partners: SWCD, NRCS, WD's, BWSR

Funding: Estimated Cost \$235,000

Timeline: 2017-2027

5 year Benchmark: 12.5% nutrient/sediment load reduction in agricultural watersheds

Action 2. Promote and incentivize no-till, minimum till, strip till and other conservation tillage methods to minimize soil disturbance, increase soil cover and crop residue while decreasing erosion from sheet, rill and concentrated flow on agricultural land.

Partners: SWCD, NRCS

Funding: Estimated Cost \$25,000/year

Timeline: 2017-2027

5 Year Benchmark: 5,000 additional acres of no-till or conservation tillage

Action 3. Provide Technical assistance to Landowners and Agricultural producers to establish and/or maintain stream, ditch, lake and field edge vegetative buffers in accordance with the state of Minnesota's Water resources riparian protection requirements on public waters and public drainage systems.

Partners: SWCD

Funding: Estimated Cost \$26,000/year

Timeline: 2017-2019

5 Year Benchmark: Full compliance with MN Law Chapter 85

Objective B. (Cont.)

Action 4. Demonstrate the benefits and encourage use of conservation crop rotations to reduce soil erosion by wind and water and manage excess nutrients on cultivated cropland.

Partners: SWCD, NRCS

Funding: Estimated Cost \$3,500/year

Timeline: 2017-2019

5 Year Benchmark: 5,000 additional acres of conservation crop rotations

Action 5. Provide Technical and Financial assistance for the targeted placement, design and implementation of structural BMPs such as Water and Sediment Control Basins, Grade Stabilizations, Side Water Inlets, Drainage Water Management Structures, Grassed Waterways, Diversions and other site-specific solutions to treat, reduce or eliminate classic and ephemeral gully erosion.

Partners: SWCD, NRCS, WD's, BWSR

Funding: Estimated Cost \$250,000/year

Timeline: 2017-2027

5 Year Benchmark: Implementation of 100 WASCBs, 10 Grade Stabilizations, 5 Grassed Waterways and other structures as sites warrant.

Action 6. Promote conservation drainage best management practices such as saturated buffer strips, woodchip bioreactors, side-inlet controls and two-stage ditches by utilizing existing research and promoting through existing local programs.

Partners: SWCD, NRCS, WD's

Funding: Estimated Cost \$2,500/year

Timeline 2017-2027

5 year Benchmark: BMPs utilized on all new conservation drainage systems

Goal: Protection and Restoration of Surface Water Quality					
Objective B: Protect or Improve Surface Water Quality through Erosion and Sediment Control on Agricultural Land					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Identify and target critical erosion areas in the Buffalo, Ottertail and Wild Rice Watersheds to target and promote the use of erosion control measures such as perennial cover, conservation tillage, residue management and structural practices to reduce overland erosion and sediment entering our ditches and watercourses.	SWCD, NRCS, WD's, BWSR	\$ 235,000.00	2017-2027	Otter Tail, Crow Wing, Redeye, Wild Rice, Buffalo
2	Promote and incentivize no-till, minimum till, strip till and other conservation tillage methods to minimize soil disturbance, increase soil cover and crop residue while decreasing erosion from sheet, rill and concentrated flow on agricultural land.	SWCD, NRCS	\$ 250,000.00	2017-2027	County - Wide
3	Provide Technical assistance to Landowners and Agricultural producers to establish and/or maintain stream, ditch, lake and field edge vegetative buffers in accordance with the state of Minnesota's Water resources riparian protection requirements on public waters and public drainage systems	SWCD	\$ 260,000.00	2017-2027	County - Wide
4	Demonstrate the benefits and encourage use of conservation crop rotations to reduce soil erosion by wind and water and manage excess nutrients on cultivated cropland.	SWCD, NRCS	\$ 35,000.00	2017-2027	County - Wide
5	Provide Technical and Financial assistance for the targeted placement, design and implementation of structural BMPs such as Water and Sediment Control Basins, Grade Stabilizations, Side Water Inlets, Drainage Water Management Structures, Grassed Waterways, Diversions and other site-specific solutions to treat, reduce or eliminate classic and ephemeral gully erosion.	SWCD, NRCS, WD's, BWSR	\$ 2,500,000.00	2017-2027	County - Wide
6	Promote conservation drainage best management practices such as saturated buffer strips, woodchip bioreactors, side-inlet controls and two-stage ditches by utilizing existing research and promoting through existing local programs.	SWCD, NRCS	\$ 25,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 3,305,000.00

Objective C: Reduction of Nutrients, Turbidity and/ or Bacteria in impaired watersheds.

Action 1. Support and cooperate with Watershed Districts, the MPCA and BWSR on ongoing TMDL assessments, plans or projects.

Partners: SWCD, WD’s, MPCA, DNR
 Funding: Estimated Cost \$5,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Effective development and timely approval of TMDL plans

Action 2. Pursue additional funding to assist landowners with voluntary efforts to reduce turbidity, nutrients or bacteria delivered to surface waters in or upstream of impaired watersheds or stream reaches

Partners: SWCD, WD’s, MPCA, DNR
 Funding: Estimated Cost \$5,000
 Timeline: 2017-2027
 5 Year Benchmark: Securing of additional federal and state funding for BMPs in impaired watersheds.

Action 3. Implement reduction measures identified in TMDL plans or WRAPS documents for Buffalo River Watershed, Crow Wing Watershed, Redeye Watershed and others as they are developed and approved.

Partners: SWCD, NRCS, WD’s, MPCA, DNR
 Funding: Estimated Cost \$75,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Continue to work with watershed districts and LGUs to implement the actions prescribed in WRAPS and TMDLs

Goal: Protection and Restoration of Surface Water Quality					
Objective C: Reduction of Nutrients, Turbidity and/ or Bacteria in impaired watersheds.					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Support and cooperate with Watershed Districts, the MPCA and BWSR on ongoing TMDL assessments, plans or projects	SWCD, WD’s, MPCA, DNR	\$ 50,000.00	2017-2027	County - Wide
2	Pursue additional funding to assist landowners with voluntary efforts to reduce turbidity, nutrients or bacteria delivered to surface waters in or upstream of impaired watersheds or stream reaches.	SWCD	\$ 5,000.00	2017-2027	Buffalo, Otter Tail
3	Implement reduction measures identified in TMDL plans or WRAPS documents for Buffalo River Watershed, Crow Wing Watershed, Redeye Watershed and others as they are developed and approved.	SWCD, NRCS, WD’s, MPCA, DNR	\$ 1,250,000.00	2017-2027	Buffalo, Otter Tail, Wild Rice
Total Estimated Implementation Costs:					\$ 1,305,000.00

Objective D: Protect Becker County Lakes from Aquatic Invasive Species.

Action 1. Continue to provide citizens and visitors to Becker County with a Watercraft Inspection and Mobile Decontamination Program to prevent the transport of AIS.

Partners: SWCD, County
 Funding: Estimated Cost \$327,000/year
 Timeline: 2017-2027
 5 Year Benchmark: 20,000 inspections annually; violation rates below 1%

Action 2. Develop and disseminate accurate, effective signage, print, web and social media to convey technical information for lake oriented events and organizations, anglers, boaters, lake service providers and others utilizing the public waters of Becker County.

Partners: SWCD, County
 Funding: Estimated Cost \$10,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% engagement with lake oriented businesses; increased awareness amongst visitors to Becker County

Action 3. Secure funding and devote staff resources to conduct intensive, systematic monitoring of area lakes for new infestations of AIS using tactile and biological methods.

Partners: SWCD, WD's, DNR
 Funding: Estimated Cost \$10,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Regular monthly monitoring through open water season at high-risk and high-priority public access sites

Action 4. Develop protocols, plans and fund sources for "rapid response" treatment to newly discovered infestations where treatment methods are deemed viable.

Partners: SWCD, County, WD's, DNR
 Funding: Estimated Cost \$25,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Funds and plans in place for Rapid Response treatment

Goal: Protection and Restoration of Surface Water Quality					
Objective D: Protect Becker County Lakes from Aquatic Invasive Species.					
Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area	
1	Continue to provide citizens and visitors to Becker County with a Watercraft Inspection and Mobile Decontamination Program to prevent the transport of AIS.	SWCD, County	\$ 3,270,000.00	2017-2027	County - Wide
2	Develop and disseminate accurate, effective signage, print, web and social media to convey technical information for lake oriented events and organizations, anglers, boaters, lake service providers and others utilizing the public waters of Becker County.	SWCD, County	\$ 105,000.00	2017-2027	Otter Tail, Crow Wing
3	Secure funding and devote staff resources to conduct intensive, systematic monitoring of area lakes for new infestations of AIS using tactile and biological methods.	SWCD, County, WD's, DNR	\$ 10,000.00	2017-2027	PRWD, Otter Tail
4	Develop protocols, plans and fund sources for "rapid response" treatment to newly discovered infestations where treatment methods are deemed viable.	SWCD, County, WD's, DNR	\$ 250,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 3,635,000.00

Objective E: Manage Soil Health to reduce delivery of nutrients and sediment to surface waters.

Action 1. Demonstrate the benefits and encourage use of conservation crop rotations to increase microbial activity and scavenge nutrients in cultivated cropland.

Partners: SWCD, NRCS
 Funding: Estimated Cost \$6,000/year
 Timeline: 2017-2019
 5 Year Benchmark: On-going demonstration projects in each agro-ecoregion of Becker County

Action 2. Work with agricultural producers to increase the adoption and implementation of cover crops to increase organic matter and soil cover, foster infiltration, scavenge and retain nutrients and increase residue on cultivated cropland.

Partners: SWCD, NRCS
 Funding: Estimated Cost \$5,000/year
 Timeline: 2017-2027
 5 Year Benchmark: On-going demonstration projects on irrigated & dry-land operations; 5,000 additional acres of cover-crops

Action 3. Provide technical and financial assistance to producers to shift to conservation tillage methods such as to-till, minimum till, strip-till, ridge-till practices, particularly on erosion prone slopes and soils.

Partners: SWCD, NRCS
 Funding: Estimated Cost \$20,000/year
 Timeline: 2017-2027
 5 Year Benchmark: 5,000 additional acres of no-till minimum till fields

Action 4. Encourage Nutrient and Pest management techniques that are, at a minimum, in accordance with USDA, MPCA, MDA, University of Minnesota or other recommendations to foster nutrient balance, minimize pest pressure and reduce nutrient loss from the soil profile.

Partners: SWCD, NRCS, MDA
 Funding: Estimated Cost \$3,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% of interviewed producers reporting application within recommended rates

Goal: Protection and Restoration of Surface Water Quality					
Objective E: Manage Soil Health to reduce delivery of nutrients and sediment to surface waters.					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Demonstrate the benefits and encourage use of conservation crop rotations to increase microbial activity and scavenge nutrients in cultivated cropland.	SWCD, NRCS	\$ 60,000.00	2017-2027	County - Wide
2	Work with agricultural producers to increase the adoption and implementation of cover crops to increase organic matter and soil cover, foster infiltration, scavenge and retain nutrients and increase residue on cultivated cropland.	SWCD, NRCS	\$ 50,000.00	2017-2027	County - Wide
3	Provide technical and financial assistance to producers to shift to conservation tillage methods such as to-till, minimum till, strip-till, ridge-till practices, particularly on erosion prone slopes and soils.	SWCD, NRCS	\$ 200,000.00	2017-2027	County - Wide
4	Encourage Nutrient and Pest management techniques that are, at a minimum, in accordance with USDA, MPCA, MDA, University of Minnesota or other recommendations to foster nutrient balance, minimize pest pressure and reduce nutrient loss from the soil profile.	SWCD, NRCS, MDA	\$ 35,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 345,000.00

Objective F: Manage surface water hydrology sustainably to foster crop production, improve or protect water quality, achieve flood damage reduction and benefit wildlife habitat.

Action 1. Provide technical assistance, permitting guidance and referral to additional authority (where applicable) for maintenance of public and private ditch systems.

Partners: SWCD, NRCS, DNR, WD's, County
Funding: Estimated Cost \$7,500/year
Timeline: 2017-2027
5 Year Benchmark: 100% response rate to drainage maintenance requests

Action 2. Provide technical assistance regarding culvert and conveyance sizing to minimize upstream/downstream landowner impacts, adequately control velocities, prevent impediments to aquatic life, and realize potential flood damage reduction values.

Partners: SWCD, DNR, WD's
Funding: Estimated Cost \$5,000/year
Timeline: 2017-2027
5 Year Benchmark: Deficient culverts replaced/resized as roads are maintained

Action 3. Target and implement the restoration or enhancement of wetland basins that offer multiple water quality, water quantity and wildlife habitat benefits.

Partners: SWCD, NRCS, DNR, WD's, USFWS, BWSR
Funding: Estimated Cost \$250,000/year
Timeline: 2017-2027
5 Year Benchmark: Restoration/enhancement of 1,000 acres of wetlands

Action 4. Assist or direct affected landowners to resources for nonstructural floodplain management solutions such as relocation, easements, acquisitions and restoration of wetlands.

Partners: SWCD, NRCS, DU, WD's, DNR, USFWS, BWSR
Funding: Estimated Cost \$4,000/year
Timeline: 2017-2027
5 Year Benchmark: 100% response rate to requests for assistance with nonstructural floodplain management activities

Action 5. Assist with the implementation of conservation projects consistent with the Goals of Red River Basin Flood Reduction Strategies.

Partners: SWCD, NRCS, WD's
Funding: Estimated Cost \$10,000/year
Timeline: 2017-2027
5 Year Benchmark: Continued support of flood damage reduction projects with natural resource enhancement benefits

Objective F. (Cont.)

Action 6. Encourage wetland restorations or enhancements where conservation drainage practices are being utilized as possible through existing local, state and federal programs.

Partners: SWCD, NRCS, WD's

Funding: Estimated Cost \$1,500/year

Timeline: 2017-2027

5 Year Benchmark: Incorporation of wetland restorations as possible with the implementation of any new conservation drainage project

Goal: Protection and Restoration of Surface Water Quality					
Objective F: Manage surface water hydrology sustainably to foster crop production, improve or protect water quality, achieve flood damage reduction & benefit wildlife					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Provide technical assistance, permitting guidance and referral to additional authority (where applicable) for maintenance of public and private ditch systems.	SWCD, NRCS, DNR, WD's, County	\$ 75,000.00	2017-2027	County - Wide
2	Provide technical assistance regarding culvert and conveyance sizing to minimize upstream/downstream landowner impacts, adequately control velocities, prevent impediments to aquatic life, and realize potential flood damage reduction values	SWCD, DNR, WD's	\$ 50,000.00	2017-2027	County - Wide
3	Target and implement the restoration or enhancement of wetland basins that offer multiple water quality, water quantity and wildlife habitat benefits.	SWCD, NRCS, DNR, WD's, USFWS, BWSR	\$ 250,000.00	2017-2027	County - Wide, Prairie-Core Area Focus, RRB FDR Focus
4	Assist or direct affected landowners to resources for nonstructural floodplain management solutions such as relocation, easements, acquisitions and restoration of wetlands.	SWCD, NRCS, DU, WD's, DNR, USFWS, BWSR	\$ 40,000.00	2017-2027	County - Wide
5	Assist with the implementation of conservation projects consistent with the Goals of Red River Basin Flood Reduction Strategies	SWCD, NRCS, WD's	\$ 100,000.00	2017-2027	Buffalo, Otter Tail, Wild Rice
6	Encourage wetland restorations or enhancements where conservation drainage practices are being utilized as possible through existing local, state and federal programs.	SWCD, NRCS	\$ 15,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 530,000.00

Objective G: Provide Programs to Protect, Repair or Restore the Shorelines of Becker County

Action 1. Continue to administer and expand the Becker County Shoreland Program, providing technical and financial assistance to shoreland property owners for the planning, placement, implementation and maintenance of BMPs protecting and enhancing the shores of Becker County lakes.

Partners: SWCD, County

Funding: Estimated Cost \$139,000/yearly

Timeline: 2017-2027

5 Year Benchmark: Continued and expanded array of technical assistance available for ecological and engineered shoreland and streambank protection practices

Action 2. Encourage low-impact development of shoreland parcels in accordance with local and state ordinances and best practice recommendations. When occurring, redevelopment of non-conforming parcels should be a special area of focus.

Partners: SWCD, P&Z, City of Detroit Lakes, WD's

Funding: Estimated Cost \$2,500/yearly

Timeline: 2017-2027

5 Year Benchmark: Shoreland BMP information provided to all shoreland residents

Objective G. (Cont.)

Action 3. Promote and provide technical assistance for measures to minimize impervious area adjacent to lakes and mitigate storm water where opportunities exist.

Partners: SWCD, P&Z

Funding: Estimated Cost \$2,500/yearly

Timeline: 2017-2027

5 Year Benchmark: Non-compliant parcels mitigated equivalent to 15% imperviousness

Action 4. Pursue and provide funding to provide technical and financial assistance to Becker County landowners for the implementation of BMPs on shoreland parcels that establish perennial native vegetation, decrease stormwater runoff, stabilize shorelines and enhance or protect aquatic habitat.

Partners: SWCD

Funding: Estimated Cost \$125,000/yearly

Timeline: 2017-2027

5 Year Benchmark: Funding secured and 30 projects implemented each season

Action 5. Continue efforts to emphasize the significance of factors such as lot width, near-shore disturbance and building setbacks on environmental lakes in ordinance review and development.

Partners: SWCD, P&Z, WD's, DNR

Funding: Estimated Cost \$2,000/yearly

Timeline: 2017-2027

5 Year Benchmark: Additional science based protections for natural environment lakes incorporated into Becker county ordinances

Action 6. Provide sufficient support to enact, enforce and monitor compliance with city, local and state shoreland ordinances.

Partners: P&Z, WD's, DNR

Funding: Estimated Cost \$50,000/yearly

Timeline: 2017-2027

5 Year Benchmark: 100% compliance of existing ordinance violations; annual Monitoring plans developed and implemented by local permitting agencies.

Objective G. (Cont.)

Goal: Protection and Restoration of Surface Water Quality					
Objective G: Provide Programs to Protect, Repair or Restore the Shorelines of Becker County					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Continue to administer and expand the Becker County Shoreland Program, providing technical and financial assistance to shoreland property owners for the planning, placement, implementation and maintenance of BMPs protecting and enhancing the shores of Becker County lakes.	SWCD, County	\$ 1,390,000.00	2017-2027	County - Wide
2	Encourage low-impact development of shoreland parcels in accordance with local and state ordinances and best practice recommendations. When occurring, redevelopment of non-conforming parcels should be a special area of focus.	SWCD, P&Z, City of Detroit Lakes, WD's	\$ 25,000.00	2017-2027	Otter Tail, Crow Wing
3	Promote and provide technical assistance for measures to minimize impervious area adjacent to lakes and mitigate storm water where opportunities exist.	SWCD, P&Z	\$ 25,000.00	2017-2027	PRWD, Otter Tail
4	Pursue and provide funding to provide technical and financial assistance to Becker County landowners for the implementation of BMPs on shoreland parcels that establish perennial native vegetation, decrease stormwater runoff, stabilize shorelines and enhance or protect aquatic habitat.	SWCD	\$ 1,200,000.00	2017-2027	County - Wide
5	Continue efforts to emphasize the significance of factors such as lot width, near-shore disturbance and building setbacks on environmental lakes in ordinance review and development.	SWCD, P&Z, WD's, DNR	\$ 20,000.00	2017-2027	County - Wide
6	Provide sufficient support to enact, enforce and monitor compliance with city, local and state shoreland ordinances.	P&Z, WD's, DNR	\$ 500,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 3,160,000.00

Objective H: Protect the wetlands of Becker County to achieve multiple benefits

Action 1. Continue to administer the Minnesota Wetland Conservation Act (WCA), including the Technical Evaluation Panel (TEP) and work with the MN DNR to provide effective WCA enforcement and ensure no net loss of wetlands in Becker County.

Partners: SWCD, DNR, BWSR, USACOE
 Funding: Estimated Cost \$32,000/yearly
 Timeline: 2017-2027
 5 Year Benchmark: No net loss of wetlands in Becker County

Action 2. Collaborate with partner agencies to identify, assess, prioritize and target drained basins and degraded wetlands that benefit wildlife habitat, provide water retention, treat stormwater runoff, protect public infrastructure and reduce risks of erosion or flood damage.

Partners: SWCD, NRCS, DNR, WD's, BWSR, USFWS
 Funding: Estimated Cost \$5,000/yearly
 Timeline: 2017-2027
 5 Year Benchmark: Development and utilization of county-wide drained basin inventory

Action 3. Continue to work with regulatory agencies to streamline permitting processes and increase public awareness of laws and ordinances regarding creation, alteration or enhancement of wetlands.

Partners: SWCD, DNR, WD's, BWSR, USACOE
 Funding: Estimated Cost \$1,250/year
 Timeline: 2017-2027
 5 Year Benchmark: Increased public and agency awareness of local, state and federal laws and ordinances

Objective H. (Cont.)

Action 4. Market existing local state and federal programs and pursue additional funding sources to provide financial incentives for wetland restoration and enhancement activities.

Partners: SWCD, NRCS, DU
 Funding: Estimated Cost \$4,500/yearly
 Timeline: 2017-2027
 5 Year Benchmark: 1,000 acres of restored/enhanced wetlands in Becker County

Goal: Protection and Restoration of Surface Water Quality					
Objective H: Protect the wetlands of Becker County to achieve multiple benefits					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Continue to administer the Minnesota Wetland Conservation Act (WCA), including the Technical Evaluation Panel (TEP) and work with the MN DNR to provide effective WCA enforcement and ensure no net loss of wetlands in Becker County.	SWCD, DNR, BWSR, USACOE	\$ 320,000.00	2017-2027	County - Wide
2	Collaborate with partner agencies to identify, assess, prioritize and target drained basins and degraded wetlands that benefit wildlife habitat, provide water retention, treat stormwater runoff, protect public infrastructure and reduce risks of erosion or flood damage.	SWCD, NRCS, DNR, WD's, BWSR, USFWS	\$ 50,000.00	2017-2027	Otter Tail, Crow Wing
3	Continue to work with regulatory agencies to streamline permitting processes and increase public awareness of laws and ordinances regarding creation, alteration or enhancement of wetlands	SWCD, DNR, WD's, BWSR, USACOE	\$ 12,500.00	2017-2027	PRWD, Otter Tail
4	Market existing local state and federal programs and pursue additional funding sources to provide financial incentives for wetland restoration and enhancement activities.	SWCD, NRCS, DU	\$ 45,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 427,500.00

Objective I: Develop and utilize the lands of Becker County without negative impact to aquatic resources.

Action 1. Support and encourage landuse patterns that protect agricultural land, forests, lakes, rivers and wetlands and promote low impact development strategies.

Partners: SWCD, County, P&Z, City of Detroit Lakes, WD's, Municipalities, Townships
 Funding: Estimated Cost: Existing Staff Time
 Timeline: 2017-2027
 5 Year Benchmark: Consistent information and resources provided to all persons seeking information or permits for development, construction or land alterations

Action 2. Require stormwater management plans for all riparian development and redevelopment.

Partners: P&Z, City of Detroit Lakes, WD's, Municipalities, Townships
 Funding: Estimated Cost: Existing Staff Time
 Timeline: 2017-2027
 5 Year Benchmark: Requirements incorporated into local rules and ordinances; sufficient plans provided for all riparian development/redevelopment activity

Objective I. (Cont.)

Action 3. Require lot sizes on natural environment lakes that afford adequate protection for water quality and wildlife habitat, taking in to concern existing and emerging modeling and research regarding watershed disturbance, phosphorus sensitivity, near-shore development and habitat fragmentation.

Partners: SWCD, County, DNR

Funding: Estimated Cost: Existing Staff Time

Timeline: 2017-2018

5 Year Benchmark: Additional science based protections for natural environment lakes incorporated into Becker county ordinances

Action 4. Educate landowners on the importance of maintaining or restoring natural, native shoreline vegetation for maintaining water quality and aquatic habitat when developing or redeveloping shoreline properties.

Partners: SWCD, County, WD's, City of Detroit Lakes, COLA

Funding: Estimated Cost: \$1,500/yearly

Timeline: 2017-2027

5 Year Benchmark: Benefits of shoreland BMPs communicated to all parties interested in developing or redeveloping shoreland properties

Action 5. Continue to enforce existing ordinances, requesting assistance from appropriate agencies for ordinance revisions and updates annually or as needed. Review and incorporate MN DNR's Alternative Shoreland Standards as developed.

Partners: P&Z, WD's, DNR

Funding: Estimated Cost: Existing Staff Time

Timeline: 2017-2027

5 Year Benchmark: Consistent enforcement of existing ordinances; All agencies providing input to zoning ordinance review process

Action 6. Assist in the development of technical changes to the Becker County P&Z Ordinances for clarification, enforcement and understanding.

Partners: SWCD, WD's, DNR

Funding: Estimated Cost: \$2,500/year

Timeline: 2017-2027

5 Year Benchmark: Continued involvement with zoning ordinance advisory committee

Action 7. Work cooperatively with local units of government for the purpose of minimizing development impacts and standardizing the specifications of individual SWPPP's.

Partners: SWCD, P&Z, WD's, City of Detroit Lakes

Funding: Estimated Cost: \$2,500/year

Timeline: 2017-2027

5 Year Benchmark: Continued collaboration and cooperation to streamline SWPPPs

Objective I. (Cont.)

Action 8. Educate contractors and developers on construction stormwater management, low impact development, and lake friendly landuse. Offer a contractor certification program to ensure awareness of local and state rules and ordinances and knowledge of the planning and placement of best management practices.

Partners: SWCD, P&Z, WD's

Funding: Estimated Cost: 3,500/year

Timeline: 2017-2027

5 Year Benchmark: Continuation and Growth of contractor certification program; Annual training events

Action 9. Assess the riparian and upland areas of all lakesheds, especially those with greatest likelihood of development, to provide a baseline, resource risk analysis and general information for the County Planning Commission and the affected townships or municipalities.

Partners: SWCD, DNR, WD's, MPCA

Funding: Estimated Cost: \$25,000

Timeline: 2017-2021

5 Year Benchmark: Development/utilization of lakeshed analysis for public water basins

Action 10. Identify Private Forest Land with soils exhibiting a medium to high crop productivity index, aquifer sensitivity, suitable land classification, slope, proximity, infrastructure or other combined characteristics indicating potential for conversion to agriculture.

Partners: SWCD

Funding: Estimated Cost: \$7,500

Timeline: 2017-2021

5 Year Benchmark: Development & utilization of land conversion risk indices

Action 11. Provide financial assistance through existing and developing programs providing for the permanent protection of sensitive habitats.

Partners: SWCD, NRCS, DNR, BWSR, WD's

Funding: Estimated Cost: \$1,250,000

Timeline: 2017-2021

5 Year Benchmark: 1,000 additional acres of permanently protected sensitive habitat

Objective I. (Cont.)

Goal: Protection and Restoration of Surface Water Quality					
Objective I: Develop and utilize the lands of Becker County without negative impact to aquatic resources.					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Support and encourage landuse patterns that protect agricultural land, forests, lakes, rivers and wetlands and promote low impact development strategies.	SWCD, County, P&Z, City of Detroit Lakes, WD's, Municipalities, Townships	\$ -	2017-2027	County - Wide
2	Require stormwater management plans for all riparian development and redevelopment.	P&Z, City of Detroit Lakes, WD's, Municipalities, Townships	\$ -	2017-2027	County - Wide
3	Require lot sizes on natural environment lakes that afford adequate protection for water quality and wildlife habitat, taking in to concern existing and emerging modeling and research regarding watershed disturbance, phosphorus sensitivity, near-shore development and habitat fragmentation.	SWCD, P&Z, DNR	\$ -	2017-2027	County - Wide
4	Educate landowners on the importance of maintaining or restoring natural, native shoreline vegetation for maintaining water quality and aquatic habitat when developing or redeveloping shoreline properties.	SWCD, County, WD's, City of Detroit Lakes, COLA	\$ 15,000.00	2017-2027	County - Wide
5	Continue to enforce existing ordinances, requesting assistance from appropriate agencies for ordinance revisions and updates annually or as needed. Review and incorporate MN DNR's Alternative Shoreland Standards as developed.	P&Z, WD's, DNR	\$ -	2017-2027	County - Wide
6	Assist in the development of technical changes to the Becker County P&Z Ordinances for clarification, enforcement and understanding.	SWCD, P&Z, DNR	\$ 25,000.00	2017-2027	County - Wide
7	Work cooperatively with local units of government for the purpose of minimizing development impacts and standardizing the specifications of individual SWPPP's.	SWCD, P&Z, WD's, City of Detroit Lakes	\$ 25,000.00	2017-2027	County - Wide
8	Educate contractors and developers on construction stormwater management, low impact development, and lake friendly landuse. Offer a contractor certification program to ensure awareness of local and state rules and ordinances and knowledge of the planning and placement of best management practices.	SWCD, P&Z, WD's	\$ 35,000.00	2017-2027	County - Wide
9	Assess the riparian and upland areas of all lakesheds, especially those with greatest likelihood of development, to provide a baseline, resource risk analysis and general information for the County Planning Commission and the affected townships or municipalities.	SWCD, DNR, WD's, MPCA	\$ 25,000.00	2017-2022	County - Wide
10	Identify Private Forest Land with soils exhibiting a medium to high crop productivity index, aquifer sensitivity, suitable land classification, slope, proximity, infrastructure or other combined characteristics indicating potential for conversion to agriculture.	SWCD	\$ 7,500.00	2017-2022	Crow Wing, Mississippi Headwaters, Otter Tail
11	Provide financial assistance through existing and developing programs providing for the permanent protection of sensitive habitats.	SWCD, NRCS, DNR, BWSR, WD's	\$ 1,250,000.00	2017-2022	County - Wide
Total Estimated Implementation Costs:					\$ 1,382,500.00

Objective J: Monitor Surface Water Quality to gage health, target resources, monitor effectiveness, and inform the public.

Action 1. Coordinate, track and support water monitoring efforts for the entire County.

Partners: SWCD, WD's, COLA, MPCA
 Funding: Estimated Cost \$100,000
 Timeline: 2017-2027 (MPCA Intensive Monitoring Program will accomplish portions.)
 5 Year Benchmark: Data gaps identified; data readily available to public; increased volunteer monitoring

Action 2. Develop and annually review a priority list of lake, river and stream monitoring for each year's monitoring. Create monitoring plans of waters.

Partners: SWCD, WD's, COLA, MPCA
 Funding: Estimated Cost \$5,000
 Timeline: 2017-2027
 5 Year Benchmark: Prioritized plan in place; Annual monitoring of priority waters

Objective J. (Cont.)

Action 3. Seek funding for lake, river and stream monitoring and assessment; Promote, coordinate and support volunteer monitoring efforts.

Partners: SWCD, WD’s, COLA
 Funding: Estimated Cost \$1,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Additional funds secured to increase water quality monitoring

Action 4. Carry out monitoring programs as needed for priority waters. Areas that have water quality concerns will be targeted by subwatershed, if possible, for monitoring, assessment and either protection or restoration.

Partners: SWCD, WD’s, MPCA
 Funding: Estimated Cost \$150,000
 Timeline: 2017-2027
 5 Year Benchmark: Consistent annual monitoring of waters approaching or exceeding impairment thresholds

Action 5. Submit surface water quality data to the MPCA annually to be entered into EQUIS and prepare annual summary of surface and ground water quality monitoring data.

Partners: SWCD, WD’s
 Funding: Estimated Cost \$4,000/Year
 Timeline: 2017-2022
 5 Year Benchmark: Consistent reporting of 100% of data collected within Becker County

Goal: Protection and Restoration of Surface Water Quality					
Objective J: Monitor Surface Water Quality to gage health, target resources, monitor effectiveness, and inform the public.					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Coordinate, track and support water monitoring efforts for the entire County.	SWCD, WD’s, COLA, MPCA	\$ 100,000.00	2017-2027	County - Wide
2	Develop and annually review a priority list of lake, river and stream monitoring for each year’s monitoring. Create monitoring plans of waters.	SWCD, WD’s, COLA, MPCA	\$ 5,000.00	2017-2027	Otter Tail, Crow Wing
3	Seek and secure funding for lake, river and stream monitoring and assessment; Promote, coordinate and support volunteer monitoring efforts.	SWCD, WD’s	\$ 10,000.00	2017-2027	PRWD, Otter Tail
4	Carry out monitoring programs as needed for priority waters. Areas that have water quality concerns will be targeted by subwatershed, if possible, for monitoring, assessment and either protection or restoration.	SWCD, WD’s, MPCA	\$ 150,000.00	2017-2027	County - Wide
5	Submit surface water quality data to the MPCA annually to be entered into EQUIS and prepare annual summary of surface and ground water quality monitoring data.	SWCD, WD’s	\$ 40,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 305,000.00

Priority Concern 2: Ground Water Quality and Quantity

Goal: Protection and Preservation of Ground Water Quality & Quantity

Objective A. Ensure proper septic system design, maintenance, inspection and compliance

Action 1. Encourage landowners to conduct proper septic system maintenance at a minimum of every three years.

Partners: SWCD, P&Z

Funding: Estimated Cost: \$500/year

Timeline: 2017-2027

5 Year Benchmark: All rural landowners informed of proper septic system maintenance

Action 2. Continue to manage decentralized wastewater treatment with the County SSTS program while maintaining and updating the County Ordinance as needed to meet or exceed State Statutes.

Partners: P&Z, BWSR, MPCA

Funding: Estimated Cost: \$26,000/year

Timeline: 2017-2027

5 Year Benchmark: Ordinance maintained/updated/enforced to meet/exceed Statutes.

Action 3. Continue efforts to inventory and monitor ISTS system compliance on a lake-wide basis around Becker County to minimize risks to surface and groundwater quality. Explore options for incorporating point-of sale inspections into existing ordinances.

Partners: P&Z, BWSR

Funding: Estimated Cost: \$26,000/year

Timeline: 2017-2027

5 Year Benchmark: All Inspected SSTS systems in or brought to compliance

Action 4. Provide financial assistance for septic system upgrades, repair, replacement and installation through the MDA Ag BMP Loan program.

Partners: SWCD, MDA

Funding: Estimated Cost: \$150,000/year

Timeline: 2017-2027

5 Year Benchmark: Assistance provided to 100% of eligible applicants

Action 5. Explore options of County or other LGU serving as Lender via Ag BMP Loan Program to accommodate individuals and families with limited income, credit or means.

Partners: SWCD, County, MDA

Funding: Estimated Cost: Existing staff time

Timeline: 2017-2027

5 Year Benchmark: Financial assistance available to 100% of those in need

Objective A. (Cont.)

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective A: Ensure proper septic system design, maintenance, inspection and compliance					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Encourage landowners to conduct proper septic system maintenance at a minimum of every three years.	SWCD, P&Z	\$ 5,000.00	2017-2027	County - Wide
2	Continue to manage decentralized wastewater treatment with the County SSTS program while maintaining and updating the County Ordinance as needed to meet or exceed State Statutes.	P&Z, BWSR, MPCA	\$ 260,000.00	2017-2027	County - Wide
3	Continue efforts to inventory and monitor ISTS system compliance on a lake-wide basis around Becker County to minimize risks to surface and groundwater quality. Explore options for incorporating point-of sale inspections into existing ordinances.	P&Z, BWSR, MPCA	\$ 260,000.00	2017-2027	County - Wide
4	Provide financial assistance for septic system upgrades, repair, replacement and installation through the MDA Ag BMP Loan program.	SWCD, MDA	\$ 470,000.00	2017-2027	County - Wide
5	Explore options of County or other LGU serving as Lender via Ag BMP Loan Program to accommodate individuals and families with limited income, credit or means.	SWCD, County, MDA	\$ -	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 995,000.00

Objective B. Protect wellhead and source water areas to maintain, enhance and improve the quality of public and private drinking water supplies

Action 1. Identify, assess and prioritize areas of the County to target BMPs and other measures that can reduce the potential for nutrient leaching in sensitive areas.

Partners: SWCD, NRCS, MDA, BWSR
 Funding: Estimated Cost: \$18,500
 Timeline: 2017-2022
 5 Year Benchmark: Development and utilization of leaching vulnerability indices

Action 2. Provide technical assistance to water suppliers and others developing and implementing wellhead or source water protection plans.

Partners: SWCD
 Funding: Estimated Cost: \$12,000/year
 Timeline: 2017-2027
 5 Year Benchmark: Participation in all regional source water protection planning

Action 3. Seek funding to provide financial incentives or cost share for the implementation of BMP's including cover crops, conservation tillage, nutrient management, forest stewardship, establishment of perennial vegetation and other protective measures in identified priority areas.

Partners: SWCD
 Funding: Estimated Cost: \$1,500/year
 Timeline: 2017-2022
 5 Year Benchmark: Additional funds secured to accelerate implementation of BMPs demonstrating a direct benefit to groundwater resources

Objective B. (Cont.)

Action 4. Conduct trial plots to evaluate, demonstrate and communicate the benefits and practicalities of implementing groundwater protection measures.

Partners: SWCD, NRCS
 Funding: Estimated Cost: \$2,600/year
 Timeline: 2017-2027
 5 Year Benchmark: Trial plots established, annual field demonstrations

Action 5. Work with existing and emerging programs to provide technical and financial assistance for well decommissioning and replacement.

Partners: SWCD, NRCS, MDA
 Funding: Estimated Cost: \$20,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% of abandoned wells sealed

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective B: Protect wellhead and source water areas to maintain, enhance and improve the quality of public and private drinking water supplies					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Identify, assess and prioritize areas of the County to target BMPs and other measures that can reduce the potential for nutrient leaching in sensitive areas.	SWCD, NRCS, MDA, BWSR	\$ 18,500.00	2017-2027	County - Wide
2	Provide technical assistance to water suppliers and others developing and implementing wellhead or source water protection plans.	SWCD	\$ 120,000.00	2017-2027	County - Wide
3	Seek and allocate funding to provide financial incentives or cost share for the implementation of BMPs including cover crops, conservation tillage, nutrient management, forest stewardship, establishment of perennial vegetation and other protective measures in identified priority areas	SWCD	\$ 150,000.00	2017-2022	County - Wide
4	Conduct trial plots to evaluate, demonstrate and communicate the benefits and practicalities of implementing groundwater protection measures.	SWCD, NRCS	\$ 26,000.00	2017-2027	County - Wide
5	Implement existing and emerging programs for technical and financial assistance for well decommissioning and replacement.	SWCD, NRCS, MDA	\$ 205,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 519,500.00

Objective C. Efficient use of groundwater resources for agricultural irrigation

Action 1. Increase local awareness of available resources and technology for soil moisture monitoring and management of irrigated land and encourage their utilization.

Partners: SWCD, NRCS, MDA
 Funding: Estimated Cost: \$2,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% of Irrigated operations informed of available resources

Objective C. (Cont.)

Action 2. Work with landowners and producers to track and maintain planting, weather and irrigation data throughout the growing season to evaluate crop water use and scheduling of water applications.

Partners: SWCD, NRCS, MDA

Funding: Estimated Cost: \$2,500/year

Timeline: 2017-2027

5 Year Benchmark: 50% of county irrigators using irrigation water management

Action 3. Assist area landowners and producers with converting remaining high pressure irrigation systems to low pressure and increasing pump efficiency through existing and emerging technical and financial assistance programs.

Partners: SWCD, NRCS

Funding: Estimated Cost: \$20,000/year

Timeline: 2017-2027

5 Year Benchmark: 20% measured increase in county-wide irrigation efficiency

Action 4. Provide comments and technical evaluations for MN DNR groundwater appropriation permits as they are requested.

Partners: SWCD, DNR

Funding: Estimated Cost: \$1,500/year

Timeline: 2017-2027

5 Year Benchmark: Comments provided on 100% of applications with significant risk of interference or depletion

Action 5. Support the maintenance and expansion of the Central MN Ag Weather Network to inform producers, agronomists and technical staff of local weather and crop specific evapotranspiration through the growing season.

Partners: SWCD, MDA

Funding: Estimated Cost: \$2,500/year

Timeline: 2017-2027

5 Year Benchmark: Expansion and continued public access to Ag Weather Network

Action 6. Host and support local and regional irrigator meetings that highlight existing BMPs, emerging trends and producers experiences.

Partners: SWCD, NRCS

Funding: Estimated Cost: \$1,000/year

Timeline: 2017-2027

5 Year Benchmark: Annual forums targeting irrigators and owners of irrigated cropland

Objective C. (Cont.)

Priority will be given to irrigation water management efforts within the Straight River Groundwater Management Area to address, compliment, meet or exceed the goals of existing and emerging studies and plans. Priority will also be given to efforts that can reduce hydrologic or thermal effects on groundwater fed designated trout waters or historical trout fisheries.

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective C: Efficient use of groundwater resources for agricultural irrigation					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Increase local awareness of available resources and technology for soil moisture monitoring and management of irrigated land and encourage their utilization.	SWCD, NRCS, MDA	\$ 25,000.00	2017-2027	Otter Tail, Crow Wing, Redeye
2	Work with landowners and producers to track and maintain planting, weather and irrigation data throughout the growing season to evaluate crop water use and scheduling of water applications	SWCD, NRCS, MDA	\$ 25,000.00	2017-2027	Otter Tail, Crow Wing, Redeye
3	Assist area landowners and producers with converting remaining high pressure irrigation systems to low pressure and increasing pump efficiency through existing and emerging technical and financial assistance programs.	SWCD, NRCS	\$ 200,000.00	2017-2027	Otter Tail, Crow Wing
4	Provide comments and technical evaluations for MN DNR groundwater appropriation permits as they are requested.	SWCD, DNR	\$ 15,000.00	2017-2027	County - Wide
5	Support the maintenance and expansion of the Central MN Ag Weather Network to inform producers, agronomists and technical staff of local weather and crop specific evapotranspiration through the growing season.	SWCD, MDA	\$ 25,000.00	2017-2027	County - Wide, Special Focus on Straight River GWMA
6	Host and support local and regional irrigator meetings that highlight existing BMPs, emerging trends and producers experiences.	SWCD, NRCS	\$ 10,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 300,000.00

Objective D. Proper nutrient management in crop and livestock production operations

Action 1. Work with producers to evaluate, apply and document fertilizer application rates to ensure they are, at minimum, at or below U of M recommended rates.

Partners: SWCD, NRCS
 Funding: Estimated Cost: \$2,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% of reviewed operations applying at/below recommended rates

Action 2. Provide financial assistance for the design, construction and utilization of adequate ag waste storage facilities through existing, emerging and future sources or programs.

Partners: SWCD, NRCS, BWSR
 Funding: Estimated Cost: \$2,500,000
 Timeline: 2017-2027
 5 Year Benchmark: Construction of 2 Ag Waste facilities annually

Action 3. Offer training and technical assistance to conduct on-farm nutrient management planning.

Partners: SWCD, NRCS
 Funding: Estimated Cost: \$2,500/year
 Timeline: 2017-2027
 5 Year Benchmark: All County livestock producers informed of available assistance

Objective D. (Cont.)

Action 4. Encourage and support the use of practices, technology, implements and services that facilitate precision or split applications of nutrients, chiefly nitrogen.

Partners: SWCD, NRCS, MDA

Funding: Estimated Cost: \$3,500/year

Timeline: 2017-2027

5 Year Benchmark: 50% of producers in coarse soils implementing precision nitrogen applications

Action 5. Promote, cost-share and incentivize the use of practices such as nitrogen scavenging cover crops, rotational or prescribed grazing, split nutrient applications and others through new and existing programs.

Partners: SWCD, NRCS

Funding: Estimated Cost: \$55,000/year

Timeline: 2017-2027

5 Year Benchmark: 1,000 additional acres of cover crops; 50% of producers making split applications; increased use of prescribed grazing

Priority will be given to practices or projects within the Pelican River and Park Rapids Sand Plains, with particular focus on activities occurring in the Straight River Groundwater Management Area.

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective D: Proper nutrient management in crop and livestock production operations					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Work with producers to evaluate, apply and document fertilizer application rates to ensure they are, at minimum, at or below U of M recommended rates.	SWCD, NRCS	\$ 20,000.00	2017-2027	County - Wide
2	Provide financial assistance for the design, construction and utilization of adequate ag waste storage facilities through existing, emerging and future sources or programs.	SWCD, NRCS, BWSR	\$ 2,500,000.00	2017-2027	County - Wide
3	Offer training and technical assistance to conduct on-farm nutrient management planning.	SWCD, NRCS	\$ 25,000.00	2017-2027	County - Wide
4	Encourage and support the use of practices, technology, implements and services that facilitate precision or split applications of nutrients, chiefly nitrogen.	SWCD	\$ 35,000.00	2017-2027	County - Wide
5	Promote, cost-share and incentivize the use of practices such as nitrogen scavenging cover crops, rotational or prescribed grazing, split nutrient applications and others through new and existing programs.	SWCD, NRCS	\$ 550,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 3,130,000.00

Objective E. Ensure the safe and proper disposal of solid and hazardous waste

Action 1. Provide the infrastructure, equipment, space, staff and resources necessary for environmentally sound solid waste management.

Partners: County

Funding: Estimated Cost: Existing Staff & Services

Timeline: 2017-2027

5 Year Benchmark: Continued operation/expansion of the Becker County Solid Waste management program

Objective E. (Cont.)

Action 2. Increase public awareness of available hazardous waste programs through additional media outlets.

Partners: SWCD, County
 Funding: Estimated Cost: \$1,500/year
 Timeline: 2017-2027
 5 Year Benchmark: 100% of Becker County residents and visitors informed of available facilities and services

Action 3. Pursue funding and resources to offer additional locations / dates for hazardous waste collection.

Partners: County
 Funding: Estimated Cost: \$500/year
 Timeline: 2017-2027
 5 Year Benchmark: Funding secured and additional rural locations available

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective E: Ensure the safe and proper disposal of solid and hazardous waste					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Provide the infrastructure, equipment, space, staff and resources necessary for environmentally sound solid waste management.	County	\$ -	2017-2027	County - Wide
2	Increase public awareness of available hazardous waste programs through additional media outlets.	SWCD, County	\$ 15,000.00	2017-2027	County - Wide
3	Pursue funding and resources to offer additional locations / dates for hazardous waste collection.	SWCD, County	\$ 5,000.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 20,000.00

Objective F. Assess the health and vitality of domestic and public drinking and groundwater supplies

Action 1. Continue to participate in the MN DNR Groundwater Level Monitoring Program and take regular readings of observation wells throughout the county.

Partners: SWCD, DNR
 Funding: Estimated Cost: \$4,100/year
 Timeline: 2017-2027
 5 Year Benchmark: Regular monitoring/reporting of all observation wells in county

Action 2. Provide or direct resources to landowners and renters interesting in assessing/monitoring private well water quality.

Partners: SWCD, County, MDH
 Funding: Estimated Cost: \$1,500/year
 Timeline: 2017-2027
 5 Year Benchmark: All Becker County residents informed of available resources for assessing drinking water quality

Objective F. (Cont.)

Action 3. Offer nitrate testing to the members of the public annually at no cost.

Partners: SWCD, MDA
 Funding: Estimated Cost: \$2,200/year
 Timeline: 2017-2027
 5 Year Benchmark: Annual Nitrate testing clinics; Targeted testing of high-risk wells

Action 4. Continue to assist the MDA with targeted township and other nitrate monitoring and provide technical assistance as emerging studies and plans emerge.

Partners: SWCD, MDA, White Earth Natural Resources
 Funding: Estimated Cost: \$17,500
 Timeline: 2017-2019
 5 Year Benchmark: All wells in targeted townships tested; resources provided to owners of any domestic well exceeding drinking water standards

Goal: Protection and Preservation of Ground Water Quality & Quantity					
Objective F: Assess the health and vitality of domestic and public drinking and groundwater supplies					
	Action Item	Partners or Responsible Agencies	Estimated Cost	Timeframe	Watershed or Focus Area
1	Continue to participate in the MN DNR Groundwater Level Monitoring Program and take regular readings of observation wells throughout the county.	SWCD, DNR	\$ 41,000.00	2017-2027	County - Wide
2	Provide or direct resources to landowners and renters interesting in assessing/monitoring private well water quality.	SWCD, County, MDH	\$ 15,000.00	2017-2027	County - Wide
3	Offer nitrate testing to the members of the public annually at no cost.	SWCD	\$ 22,000.00	2017-2027	County - Wide
4	Continue to assist the MDA with targeted township and other nitrate monitoring and provide technical assistance as emerging studies and plans emerge.	SWCD, MDA, White Earth Natural Resources	\$ 17,500.00	2017-2027	County - Wide
Total Estimated Implementation Costs:					\$ 95,500.00

Total Estimated Costs of Implementation

The projected cost to implement the actions contained in the Water Management Plan 2017-2027 is \$20,104,000. This cost includes and assumes continued State grants such as the Natural Resources Block Grant (NRBG), BWSR grants for SWCD for operations, the Erosion, Sediment Control and Water Quality Cost-Share Program, existing local, state, federal and other programs or fund sources. It is difficult to estimate the costs associated with highly variable USDA Farm Program funding and State and Federal water quality grants, so while these costs were often projected in the budget, they may be subject to fluctuation.

Historical levels of funding will not be adequate to meet State, TMDLs, watershed and County water quality goals. Additional funding will be needed for this work, mainly for SWCD staff and projects. Landowners contributions where needed are assumed throughout and not reflected in estimated costs.

Goal: Protection and Restoration of Surface Water Quality			
	Objective	Timeframe	Total Estimated Cost
A	Objective A: Improve stormwater runoff quality by increased utilization of stormwater management practices throughout the County.	2017-2027	\$ 649,000.00
B	Objective B: Protect or Improve Surface Water Quality through Erosion and Sediment Control on Agricultural Land	2017-2027	\$ 3,305,000.00
C	Objective C: Reduction of Nutrients, Turbidity and/ or Bacteria in impaired watersheds.	2017-2027	\$ 1,305,000.00
D	Objective D: Protect Becker County Lakes from Aquatic Invasive Species.	2017-2027	\$ 3,635,000.00
E	Objective E: Manage Soil Health to reduce delivery of nutrients and sediment to surface waters.	2017-2027	\$ 345,000.00
F	Objective F: Manage surface water hydrology sustainably to foster crop production, improve or protect water quality, achieve flood damage reduction & benefit wildlife habitat.	2017-2027	\$ 530,000.00
G	Objective G: Provide Programs to Protect, Repair or Restore the Shorelines of Becker County	2017-2027	\$ 3,160,000.00
H	Objective H: Protect the wetlands of Becker County to achieve multiple benefits	2017-2027	\$ 427,500.00
I	Objective I: Develop and utilize the lands of Becker County without negative impact to aquatic resources.	2017-2028	\$ 1,382,500.00
J	Objective J: Monitor Surface Water Quality to gage health, target resources, monitor effectiveness, and inform the public.	2017-2027	\$ 305,000.00
Total Estimated Surface Water Implementation Costs:			\$ 15,044,000.00
Goal: Protection and Preservation of Ground Water Quality & Quantity			
	Objective	Timeframe	Total Estimated Cost
A	Objective A: Ensure proper septic system design, maintenance, inspection and compliance	2017-2027	\$ 995,000.00
B	Objective B: Protect wellhead and source water areas to maintain, enhance and improve the quality of public and private drinking water supplies	2017-2027	\$ 519,500.00
C	Objective C: Efficient use of groundwater resources for agricultural irrigation	2017-2027	\$ 300,000.00
D	Objective D: Proper nutrient management in crop and livestock production operations	2017-2027	\$ 3,130,000.00
E	Objective E: Ensure the safe and proper disposal of solid and hazardous waste	2017-2027	\$ 20,000.00
F	Objective F: Assess the health and vitality of domestic and public drinking and groundwater supplies	2017-2027	\$ 95,500.00
Total Estimated Ground Water Implementation Costs:			\$ 5,060,000.00

Measuring Progress and Effectiveness

While five year benchmarks were set for each action item within the Local Water Management Plan, to truly gauge progress towards the goals and objectives of the plan and the effectiveness of actions taken, an additional number of periodic, annual and on-going assessment methods will be employed.

Through these methods and metrics the SWCD and partners will work to track any marked increase, decrease or resiliency in surface and groundwater quality or quantity over the course of the planning period. It is hoped these efforts will serve to track private and public investment, document watershed activity and conditions, inform partners and the public of local resource conditions, assist with acquiring future funding, and add additional transparency to conservation delivery activities.

1. Record, Map and Report the implementation of local, state and federally funded conservation projects and other water plan implementation activities.
2. Observe, Model, or Calculate Physical Effects and/or pollution reductions of implemented conservation activities.
3. Work with Partners and Volunteers to monitor surface water quality for priority, targeted or impaired lake, streams, ditches and/or subwatersheds.
4. Work with Partners to monitor ground water quality and quantity in priority, targeted or vulnerable ground or source water areas of the county.
5. Produce Annual Summaries of Surface Water Conditions and distribute to partners and the public.
6. Produce Annual Summaries of Investments in local conservation activities and distribute to partners and the public.
7. Produce Annual Summaries of physical effects or pollution reductions of local conservation activities and distribute to partners and the public.
8. Annually review current or emerging studies, plans and implementation summaries with Advisory Team and Partners to determine progress toward implementation the action items assigned to each objective within the local water plan.
9. Measure progress towards each goal and objective, revisit implementation strategy and schedule to meet or exceed goals of the 2017-2027 Local Water Management Plan.

Measuring Progress and Effectiveness (Cont.)

	Action Item	Timeframe	Scale
1	Record, Map and Report the implementation of local, state and federally funded conservation activities	Ongoing	Field, County, Watershed
2	Observe, Model, or Calculate Physical Effects and/or pollution reductions of implemented conservation activities	Ongoing	Field & Watershed
3	Work With Partners and Volunteers to monitor surface water quality for priority, targeted or impaired lake, streams, ditches and/or subwatersheds	Annually	Waterbody, Reach & Watershed
4	Work With Partners to monitor ground water quality and quantity in priority, targeted or vulnerable ground or source water areas of the county	Ongoing	County
5	Produce Annual Summaries of Surface Water Conditions and distribute to partners and the public	Annually	County, Watershed
6	Produce Annual Summaries of Investments in local conservation activities and distribute to partners and the public	Annually	County, Watershed
7	Produce Annual Summaries of physical effects or pollution reductions of local conservation activities and distribute to partners and the public	Annually	County, Watershed
8	Annually review current or emerging studies, plans and implementation summaries with Advisory Team and Partners to determine progress toward implementation the action items assigned to each objective within the local water plan.	Annually	County
9	Measure progress towards each goal and objective, revisit goals and implementation strategies to meet or exceed goals of the 2017-2027 Local Water Management Plan.	2022	County

Becker County Local Water Management Plan 2017-2027

Water Plan Administration

Purpose

The following pages contain information on administering the Becker County Local Water Management Plan for 2017-2027, including plan coordination, implementation, schedule, role of the County in implementation, role of other agencies in implementation, recommended changes to State programs, intergovernmental conflicts/resolution process, major plan amendment procedure, minor plan amendment procedure and general information.

Plan Coordination

Managing Becker County's water resources involves cooperation with many local, State and Federal agencies, as well as private citizens and special interest groups. For any water planning activity to be successful, a well-coordinated effort is needed. Becker County is committed to working with each of these entities to ensure proper management of its water resources.

Throughout the Water Plan, County departments, local government units, special interest groups, and State and Federal agencies are listed pertaining to specific water planning topics. In addition, each action step found under the Plan Goals and Objectives identifies the potential stakeholders involved with implementing each Action listed. It is hoped that the valuable cooperation that has been established in the past years will continue and be enhanced through properly implementing this Water Plan.

Implementation Program

Becker County will ensure coordination and implementation of its Comprehensive Local Water Plan through continued delegation of authority to the Soil and Water Conservation District and its established Local Water Management Advisory team. The team will meet as needed to review progress, identify emerging problems, discuss opportunities, and to continue to direct the overall implementation of the Water Plan with the support of the SWCD & County Boards. The SWCD will administer the implementation portion of the Plan, coordinate the Advisory team activities, write grant proposals, prepare annual work plans and reports, and other activities as needed.

Implementation Schedule

Coordination of Water Plan activities will commence with the County Board adoption of the Plan. These activities will be conducted throughout the planning period identified as 2017-2027. Section 5 of the Water Plan shall serve as the County's Water Plan Implementation Schedule, and covers the entire planning period (2017-2027). By the end of 2022, Section 5 will need to be updated to cover the years 2022-2027.

Types and Sources of Water Plan Funds

The SWCD recognizes the importance of comprehensive local water planning and the key role the County, township and city government must play in water planning decisions that impact water resources. The Water Plan's Goals, Objectives and Action Steps are a reflection of the water resource concerns in the County. Implementation will be based on current needs, funding and availability of staff. Consideration will be given to changes in State initiatives and regulations. The annual work plan provides basic information on the actions intended to be implemented.

The SWCD realizes that completion of all Goals and Objectives requires staff and funds beyond the District or County's budget. It is also understood that State funding cannot provide the funding for all Goals and Objectives, therefore total stakeholder cooperation will be required. The County, through various sources, will pursue outside funding opportunities as they become available.

To properly fund the implementation of the Water Plan and related activities, Becker County will rely on a combination of the following types and sources of funding:

Natural Resource Block Grant Funds, including but not limited to:

Local Water Management Program - The Comprehensive Local Water Management Program is a voluntary program that requires counties to use local input to develop and implement water plans based on their priorities.

DNR Shoreland Management Program - the State Shoreland Management Program was established to promote the wise development of shoreland in order to preserve and enhance the quality of surface waters, preserve the economic values of shoreland, and ensure the wise use of water and related resources.

Wetland Conservation Act (WCA) Implementation - The purpose of the Wetland Conservation Act (WCA) is to maintain and protect Minnesota's wetlands and the benefits they provide. The Board of Water and Soil Resources requires that under this grant program, a county must provide matching funds to the Soil and Water Conservation District for the implementation of Wetland Conservation Act activities.

State, Local, and Federal Grants: Numerous grant funds and programs are made available to implement local water plan or related initiatives, including but not limited to Minnesota's Clean Water Fund.

Local Governmental Unit (LGU) Funds/In-Kind: Some water planning initiatives will require funds spent by the various LGUs involved. This will include cities, townships, and watershed districts, along with Becker County. Numerous programs count time spent by LGU representatives as an In-Kind expense.

Becker County Staff: Becker County will continue to maintain a trained staff to properly implement the various Water Plan initiatives. This expense is normally considered as a cash contribution towards implementing various State and Federal Grant Programs.

Landowner Expenses: Although many Water Plan Action Steps can be completed at no cost to landowners, some projects may require landowners to contribute a portion of the overall costs.

Stakeholder Participation: The various stakeholders involved with implementing the Water Plan will also contribute funds and staffing, as available.

Recommended State Cooperation

In order to implement the goals and objectives set forth in the Becker County Water Plan, continued cooperation between the SWCD, County and various State agencies is necessary. In an effort to increase coordination in this effort, the County makes the following recommendations:

1. Counties should continue to be notified of State agency program changes and the availability of funding; and
2. Data collected by State agencies should be readily shared with the County and other water plan stakeholders to avoid duplicative efforts; and
3. State agencies should continue to provide local and/or regional staff to assist local officials with agency programs; and
4. Fees collected at the County level should be allowed to remain within the County to administer and implement water-related programs; and
5. An annual listing of State agency staff that are assigned to water management planning should be created to facilitate increased coordination between local officials and agency staff; and
6. State agencies should provide greater flexibility to counties in setting annual work plan priorities. Priorities should be based upon current needs, funding, availability of staff and changes in State initiatives and regulations.

Water Plan Amendment Procedure

The Becker County Comprehensive Local Water Plan is intended to extend through the year 2027, with an update to the implementation plan and schedule to be produced, approved and included in 2022.

2. If the County needs to revise the Plan for any reason prior to a new Plan being developed, the County will need to follow Minnesota Statute 103B.314, Subdivision 6. In summary, copies of the proposed amendments (along with the date of the public hearing) need to be sent to BWSR, and local governmental units, and the State agencies for review. After the public hearing, BWSR must approve the amendments and copies shall be sent to the various stakeholders identified by State Statute.

Key Stakeholders

The success of the County's Water Plan depends upon the collaborative efforts of multiple water plan stakeholders. This section briefly outlines some of Becker County's key Water Plan Stakeholders, including a link to the stakeholder's current website.

Becker County Planning & Zoning

The Becker County Planning and Zoning Department is responsible for planning and managing programs to protect health and the environment. This department is involved in enforcing a variety of ordinances, guiding future development, and providing educational information to the citizens. The Planning and Zoning Department manages the creation and application of size and use restrictions imposed upon land owners in the county in accordance with the Becker County Zoning Ordinance.

http://www.co.becker.mn.us/dept/planning_zoning/

Becker Soil and Water Conservation District

Becker SWCD is a local unit of government established under state law to carry out conservation programs at the local level. Under the direction of the board of 5 locally elected supervisors the SWCD works with Becker County landowners to help them manage and protect land and water resources on all private land and also assist with a variety of natural resource concerns. The Becker SWCD is co-located with the USDA Natural Resource Conservation Service (NRCS). Both the SWCD staff and NRCS staff work cooperatively on Federal Farm Bill Programs.

<http://www.beckerswcd.org/>

Natural Resource Conservation Service

The Natural Resources Conservation Service (NRCS) draws on a long history of helping people help the land. For more than 75 years, NRCS and its predecessor agencies have worked in close partnerships with farmers and landowners, local and state governments, and other federal agencies to maintain healthy and productive working landscapes. The main connection to the Water Plan is the NRCS administers many of the Farm Bill's conservation initiatives. The Becker County NRCS is co-located with the Becker SWCD.

<http://www.mn.nrcs.usda.gov/>

Becker County Coalition of Lake Associations (COLA)

Becker County COLA advocates on several issues that directly impact lake protection in Becker County. COLA meets regularly to discuss lake management issues, share resources (including water monitoring data).

<http://www.beckercola.org/>

Watershed Management Organizations

While not all areas of Becker County fall within organized watershed districts, there are four organized districts whose input, support and efforts are highly crucial to successful implementation of the Water Management Plan.

Buffalo-Red River Watershed District: The Buffalo-Red River Watershed District (BRRWD), located in northwest Minnesota, covers an area of 1,785 square miles. All or parts of three major (8-digit HUC) watersheds are located within the legal boundary of the BRRWD: the Buffalo River, the upper Red River, and the Otter Tail River downstream from Orwell Dam.

<http://www.brrwd.org/>

Wild Rice Watershed District: The Wild Rice Watershed District exists to manage water flow in the drainage area of the Wild Rice River in northwestern Minnesota. The Wild Rice Watershed District includes areas of Norman, Mahnommen, Clay, Polk, Clearwater, and Becker counties.

<http://www.wildricewatershed.org/>

Pelican River Watershed District: The Pelican River Watershed District lies in the upper western reaches of the Otter Tail River Basin and encompassing the City of Detroit Lakes. The mission of the Pelican River Watershed District is to enhance the quality of water in the lakes within its jurisdiction through rules & permitting, stormwater management, water resource improvement, education & outreach and technical assistance.

<http://www.prwd.org>

Cormorant Lakes Watershed District: The Cormorant Lakes Watershed District (CLWD) was established to protect and enhance the quality of waters within its jurisdiction, and to ensure that appropriate decisions are made concerning management of streams, wetlands, lakes, groundwater and related land resources that impact these waters.

<http://clwd.org/>

State Agencies

Many of Minnesota's State Agencies are involved with some form of environmental protection efforts, especially when it pertains to protecting Minnesota's water resources. A brief synopsis of their major water planning efforts are summarized below.

Board of Water and Soil Resources (BWSR): In 2012, the Minnesota Board of Water and Soil Resources is celebrating its 25th anniversary. BWSR was created in 1987, when the Legislature combined the Soil and Water Conservation Board with two other organizations with local government and natural resource ties: the Water Resources Board and the Southern Minnesota Rivers Basin Council. Upon inception, its membership included 17 members: representing soil and water conservation districts; watershed management organizations, counties, citizen members, agency members (University of Minnesota Extension Service, the Minnesota Department of Natural Resources, the Minnesota Department of Agriculture, the Minnesota Department of Health, and the Minnesota Pollution Control Agency). BWSR provides oversight on Water Plans.

<http://www.bwsr.state.mn.us/>

Minnesota Department of Natural Resources (DNR): The DNR is a key water plan stakeholder in many ways. They assist with monitoring ground and surface water quantity, they are the permitting agency for water appropriations, and they are the main agency working with preventing the spread of Aquatic Invasive Species. In addition, they work with a variety of stakeholders, including the general public, on providing a vast amount of water resource education.

<http://www.dnr.state.mn.us/water/index.html>

Minnesota Pollution Control Agency (MPCA): The Minnesota Pollution Control Agency helps protect our water by monitoring its quality, setting standards and controlling what may go into it. They assist with water surface and groundwater quality monitoring, stormwater management, municipal wastewater permitting, identifying Impaired Waters, and animal feedlot registration and enforcement. They also provide a vast amount of technical and educational assistance on Best Management Practices (BMPs) related to water quality protection and land use practices.

<http://www.pca.state.mn.us/index.php/water/index.html>

Minnesota Department of Health (MDH): The Minnesota Department of Health is the primary State agency involved with monitoring and protecting ground and drinking water supplies. They have a vast amount of ground water quality data, and take the lead in developing Wellhead Protection Plans for public water suppliers. They also provide information on the importance of sealing abandoned wells and testing household wells for a variety of contaminants.

<http://www.health.state.mn.us/macros/topics/environment.html>

Minnesota Department of Agriculture (MDA): As a leading agricultural state with more surface waters than any other of the 48 contiguous states, and an abundance of clean drinking water, Minnesota is committed to helping farmers, homeowners, and industry protect these water resources. The MDA is responsible for or involved in many water quality programs and initiatives.

<http://www.mda.state.mn.us/en/protecting/waterprotection/waterplanning.aspx>

Becker County

Local Water Management Plan 2017-2027

Priority Concerns Scoping Document

Submitted to the Minnesota Board of Water and Soil Resources – November 29, 2016

Introduction

Purpose of the Priority Concerns Scoping Document

Becker Soil and Water Conservation District is coordinating the preparation of the Becker County Comprehensive Water Management Plan in accordance with the “Comprehensive Local Water Management Act,” Minnesota Statute 103B.301 to 103B.315. Before writing the water management plan, the county must identify priority local water management concerns and prepare a Priority Concerns Scoping Document.

As defined by Minnesota Statute 103B.305, ““Priority concerns” means issues, resources, subwatersheds, or demographic areas that are identified as a priority by the plan authority.”

The process for identifying the county’s priority water management concerns involved 1) notifying local units of government in the county and region and state review agencies that the county is updating the water management plan and inviting those interested to submit lists of priority concerns, 2) a public survey and meeting, 3) meetings with local stakeholders, and the 4) water plan task force.

In accordance with Minnesota Statute 103B.312, the Priority Concerns Scoping Document must contain (1) a list of proposed priority concerns the plan will address, and 2) a description of how the priority concerns were chosen.

Priority Concerns Scoping Document Review and Approval

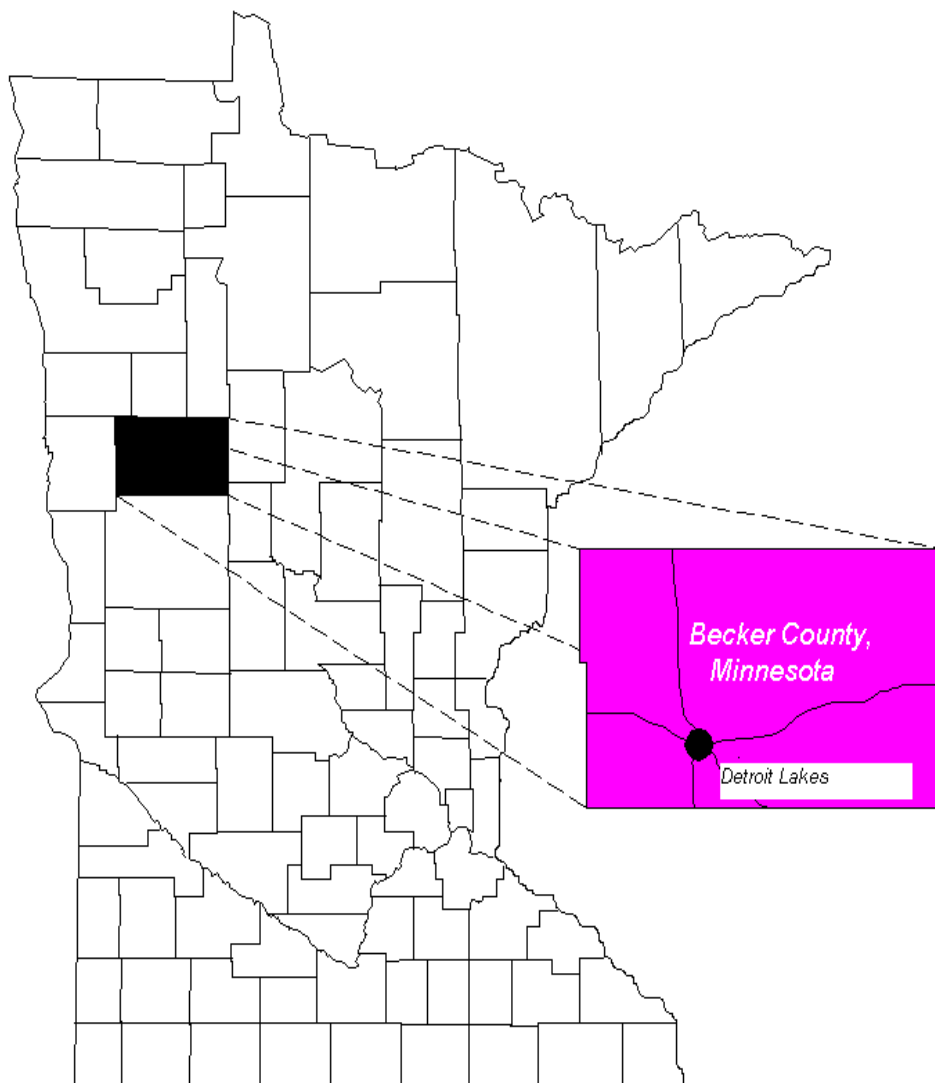
The Priority Concerns Scoping Document is submitted to the Minnesota Board of Water and Soil Resources (BWSR) for review and approval. The BWSR requests all counties’ Priority Concerns Scoping Documents use the same format and outline.

General Description

Becker County is located in west-central Minnesota, 30 miles east of the Fargo/Moorhead metropolitan area, and encompasses an area of approximately 1,440 square miles. From 2000 to 2010 Becker County experienced steady growth in population, and current estimates indicate the number of residents is nearing 35,000. In reviewing previous Minnesota State Demographers census projections it appears Becker County's population growth is slightly exceeding previous estimations.

Of the 921,000 acres that make up Becker County the two predominant land cover types are forestland (376,393 ac. 41%) and agricultural land. Agricultural land is comprised of cultivated crop land (307,518 ac. 23%), and other agricultural land comprised of grass, pasture and hay (96,857 ac. 11%). Becker County is blessed with 487 named lakes within its boundaries and is situated in a prime tourist area of Minnesota due to its natural beauty.

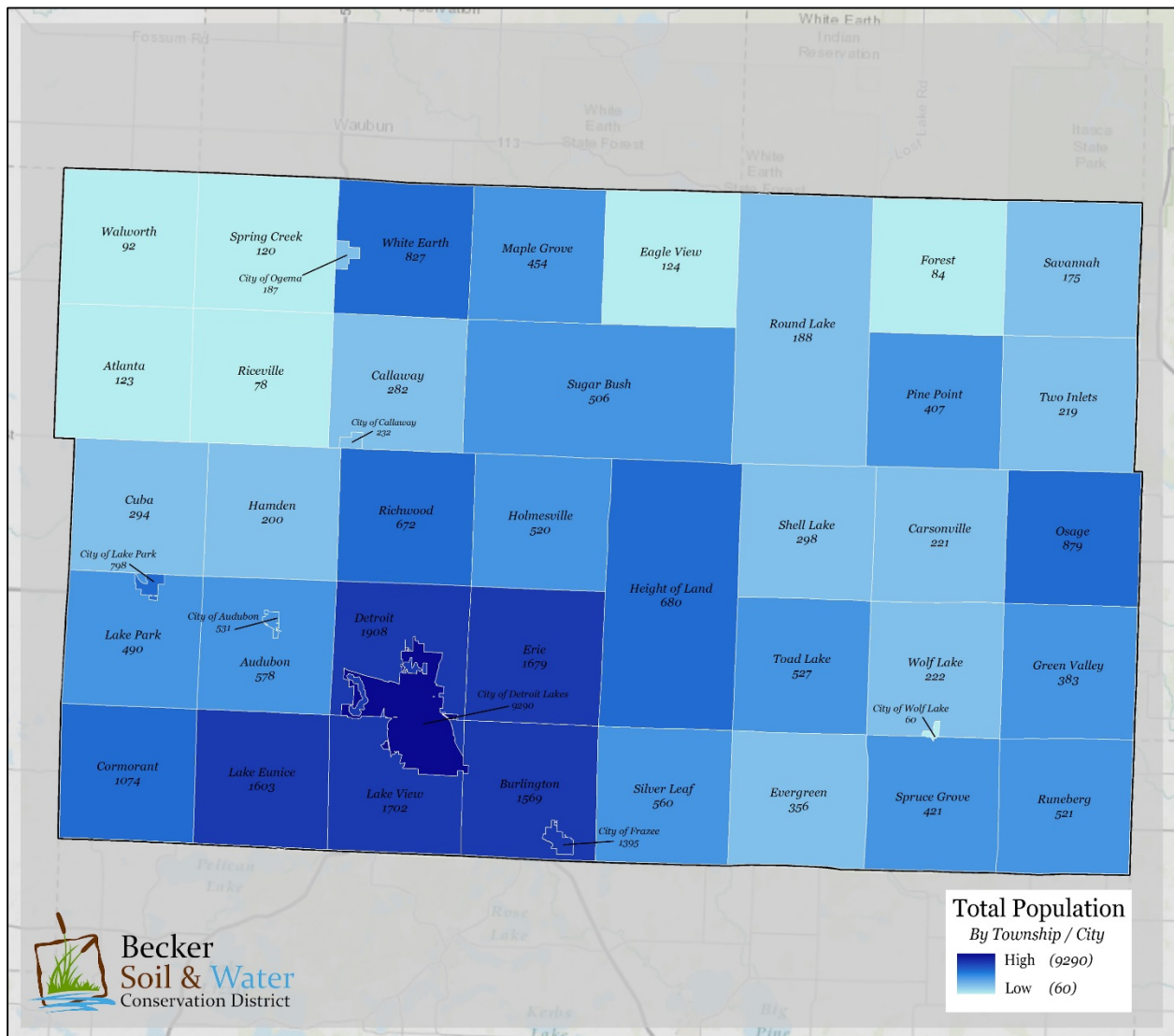
General Location



County Population

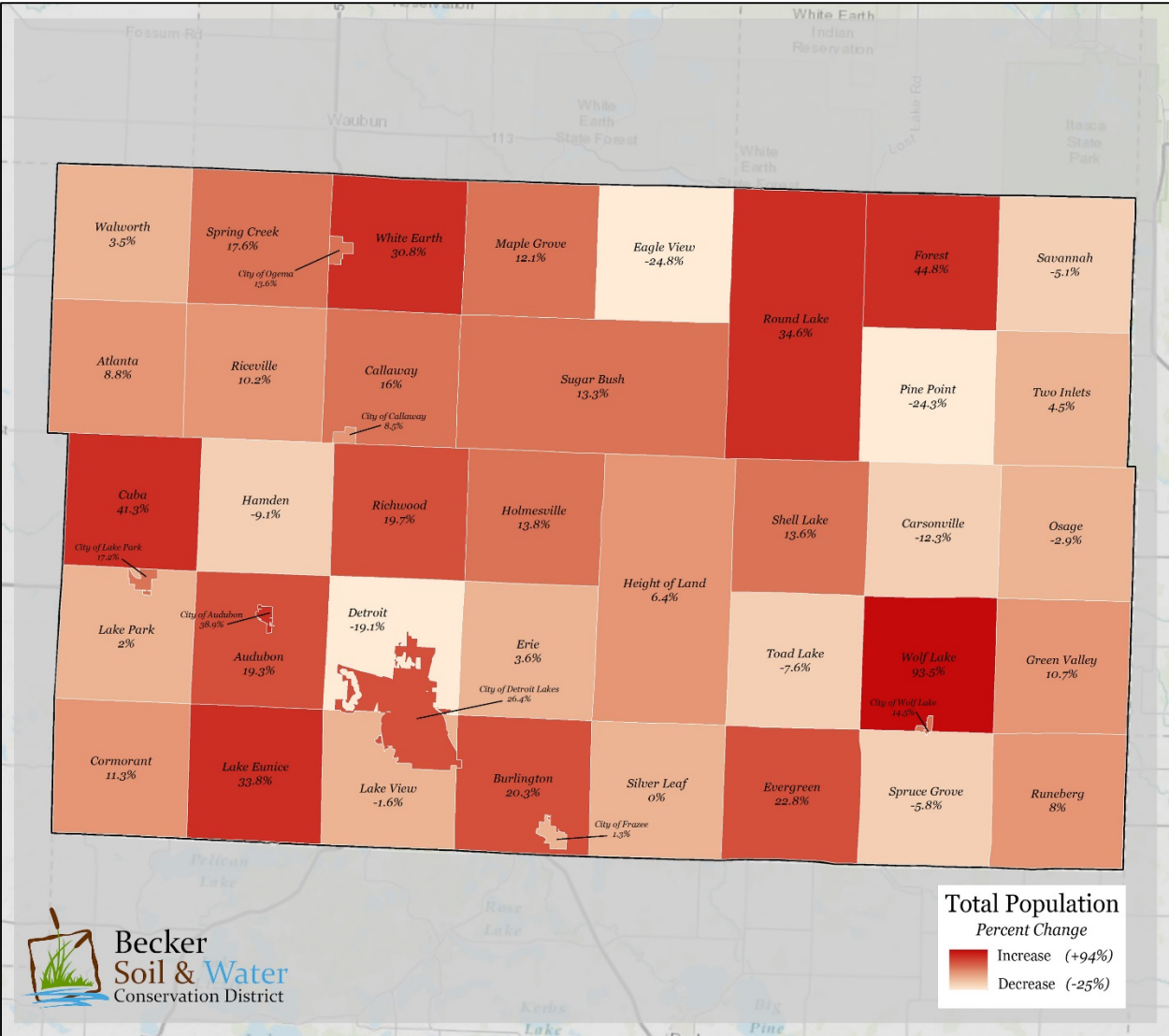
As documented in the previous U.S. Census data, Becker County lost approximately 5% of its population between 1980 and 1990. In the decades since, Becker County population has been experiencing gradual growth. According to 2015 estimates from the Minnesota Demographic Data Center and U.S. Census data, 34,893 people now reside in Becker County, with 38 percent (12,493 people) living in municipalities. Recent growth has occurred largely in rural townships with an abundance of general and recreational development lakes, though the municipalities of Becker County also saw growth ranging from 9 to 26 percent.

Map 2 – Becker County City and Township Population – 2015 Estimate



Source: MN Demographic Data Center

Map 3 – Becker County Population Change – 2000- 2015 Estimates

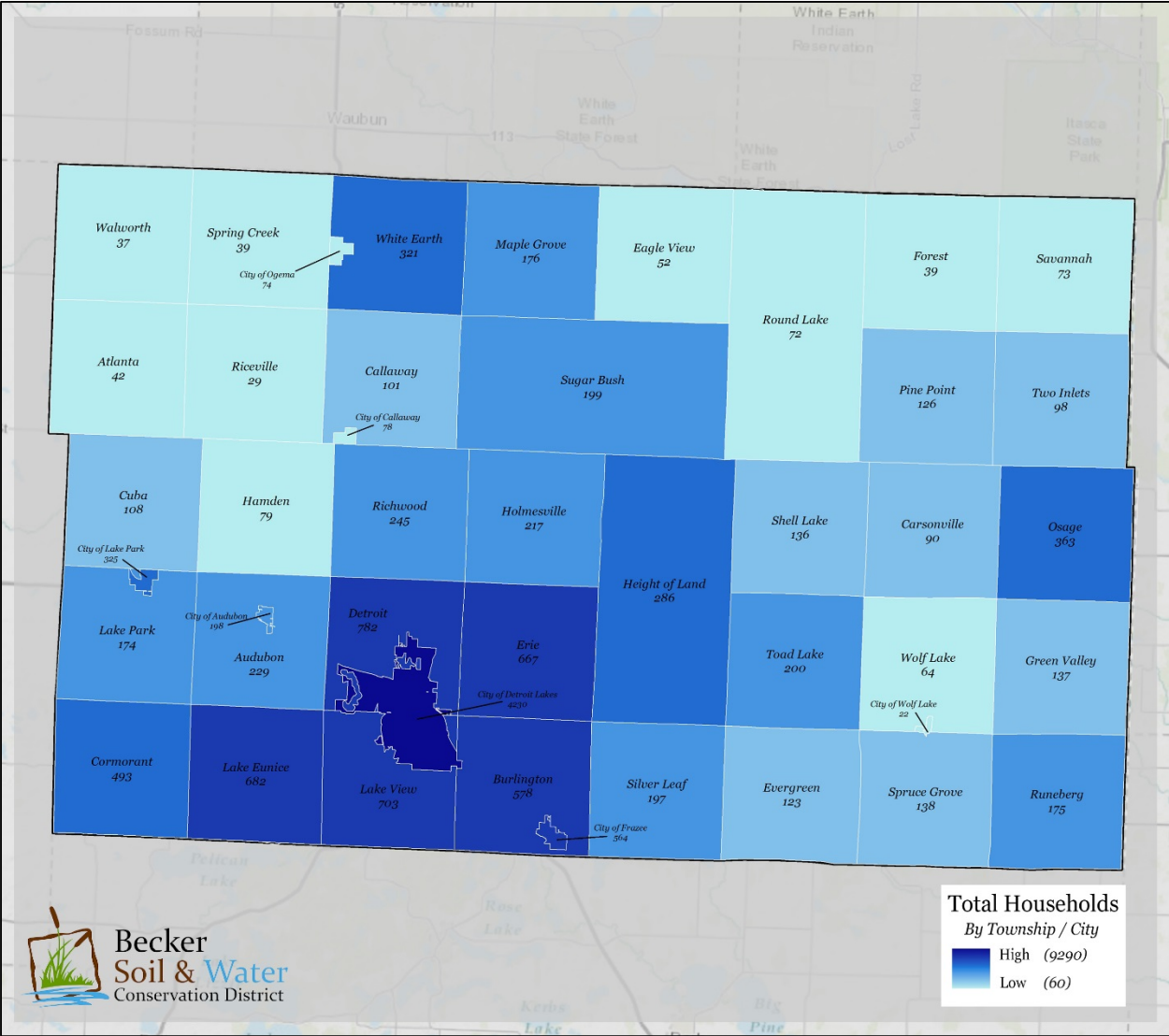


Source: MN Demographic Data Center

The City of Detroit Lakes has been experiencing the greatest actual population increase, while the percent of population increase in the City of Wolf Lake is statistically higher. Detroit Lakes’ population has grown from 7,348 in 2000 to an estimated 9,290 according to the State Demographic Data Center and U.S. Census data, which also indicates that the City of Wolf Lake’s population grew from 31 in 2000 to an estimated 60 in 2015.

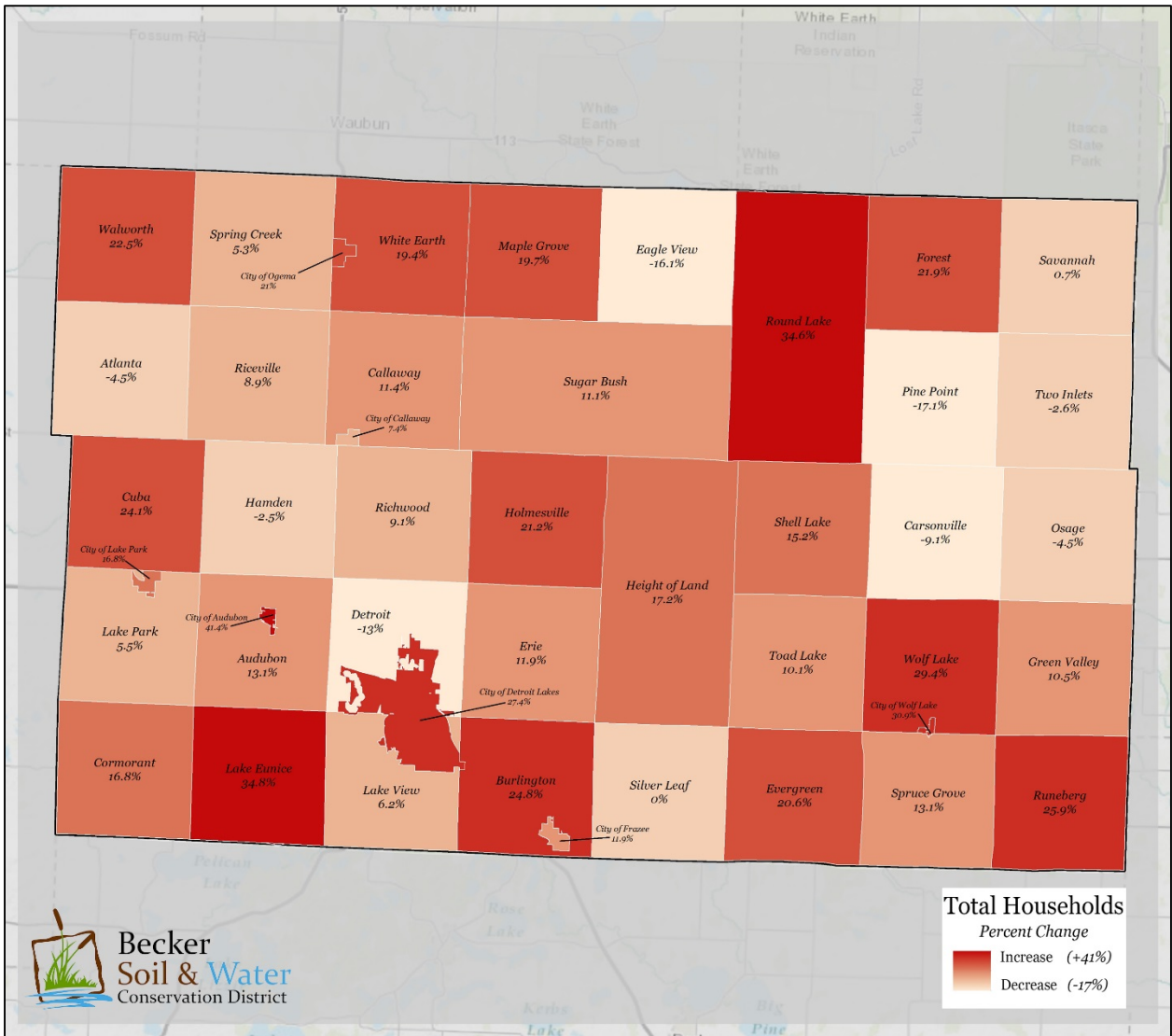
Much of the growth outside of Becker County’s seven municipalities has led to an increase in the development of non-farm housing in agricultural areas. Development is similarly cropping up on increasingly remote lakes, and in more intensive development patterns than seen historically.

Map 4 – Becker County City & Township Households - 2015 Estimate



Source: MN Demographic Data Center

Map 5 – Becker County Households Change – 2000- 2015 Estimates



Source: MN Demographic Data Center

Figure 1. – Becker County Township & City Population Statistics – 2000- 2015 Estimates

Name	Population 2015	Households 2015	Population 2000	Households 2000	Population Change	Population Change %	Household Change	Household Change %
Atlanta township	123	42	113	44	10	8.8	(2)	-4.5
Audubon city	531	198	445	175	86	19.3	23	13.1
Audubon township	578	229	416	162	162	38.9	67	41.4
Burlington township	1,569	578	1304	463	265	20.3	115	24.8
Callaway city	232	78	200	70	32	16.0	8	11.4
Callaway township	282	101	260	94	22	8.5	7	7.4
Carsonville township	221	90	252	99	(31)	-12.3	(9)	-9.1
Cormorant township	1,074	493	965	422	109	11.3	71	16.8
Cuba township	294	108	208	87	86	41.3	21	24.1
Detroit township	1,908	782	2359	899	(451)	-19.1	(117)	-13.0
Detroit Lakes city	9,290	4,230	7348	3319	1,942	26.4	911	27.4
Eagle View township	124	52	165	62	(41)	-24.8	(10)	-16.1
Erie township	1,679	667	1621	596	58	3.6	71	11.9
Evergreen township	356	123	290	102	66	22.8	21	20.6
Forest township	84	39	58	32	26	44.8	7	21.9
Frazee city	1,395	564	1377	504	18	1.3	60	11.9
Green Valley township	383	137	346	124	37	10.7	13	10.5
Hamden township	200	79	220	81	(20)	-9.1	(2)	-2.5
Height of Land township	680	286	639	244	41	6.4	42	17.2
Holmesville township	520	217	457	179	63	13.8	38	21.2
Lake Eunice township	1,603	682	1198	506	405	33.8	176	34.8
Lake Park city	798	325	782	308	16	2.0	17	5.5
Lake Park township	490	174	418	149	72	17.2	25	16.8
Lake View township	1,702	703	1730	662	(28)	-1.6	41	6.2
Maple Grove township	454	176	405	147	49	12.1	29	19.7
Ogema city	187	74	143	62	44	30.8	12	19.4
Osage township	879	363	774	300	105	13.6	63	21.0
Pine Point township	407	126	419	132	(12)	-2.9	(6)	-4.5
Riceville township	78	29	103	35	(25)	-24.3	(6)	-17.1
Richwood township	672	245	610	225	62	10.2	20	8.9
Round Lake township	188	72	157	66	31	19.7	6	9.1
Runeberg township	521	175	387	130	134	34.6	45	34.6
Savannah township	175	73	162	58	13	8.0	15	25.9
Shell Lake township	298	136	314	135	(16)	-5.1	1	0.7
Silver Leaf township	560	197	493	171	67	13.6	26	15.2
Spring Creek township	120	39	120	39	-	0.0	-	0.0
Spruce Grove township	421	138	358	131	63	17.6	7	5.3
Sugar Bush township	506	199	537	176	(31)	-5.8	23	13.1
Toad Lake township	527	200	465	180	62	13.3	20	11.1
Two Inlets township	219	98	237	89	(18)	-7.6	9	10.1
Walworth township	92	37	88	38	4	4.5	(1)	-2.6
White Earth township	827	321	799	262	28	3.5	59	22.5
Wolf Lake city	60	22	31	17	29	93.5	5	29.4
Wolf Lake township	260	89	227	68	33	14.5	21	30.9

Sources:

MN State Demographic Center, Metropolitan Council, and U.S. Census Bureau. Released July 2016.

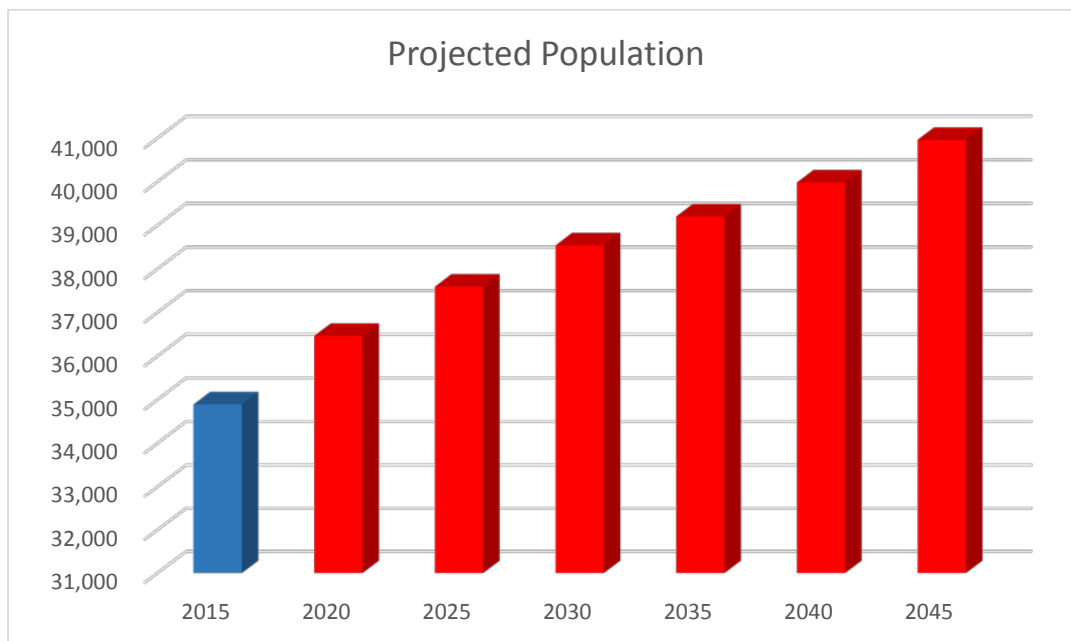
The U.S. Census Bureau conducts the 10-year (decennial) census, and is the source for all data for years ending in "---0".

The Minnesota State Demographic Center and the Metropolitan Council jointly produce population and household estimates for years between the decennial counts.

Population Projections

The Minnesota Demographic Data Center projects the county population will continue to grow at a steady, nearly linear rate. Projections completed in 2015 indicate the county population will reach 40,961 by the year 2045, an increase of approximately 15% from the estimated 2015 population of 34,893 people.

Figure 2. Becker County Population and Population Projection
Minnesota Demographic Center – 2015 to 2045 population projections (2015)



General Characteristics

Becker County is located in west-central Minnesota, 30 miles east of the Fargo/Moorhead metropolitan area, and encompasses an area of approximately 1,440 square miles. Situated in the heart of what is known as Park Region and is considered one of the state's most beautiful and versatile recreation areas, the County encompasses 37 townships and 11 communities, and stretches 30 miles north to south and 48 miles east to west.

Becker County is blessed with an abundance of water resources with 487 lakes located within its boundaries and is situated in a prime tourist area of Minnesota due to its natural beauty of lakes and forests. According to a 2005 USDA Economic Analysis of the Detroit Lakes area, over 300,000 visitors come to the County each year, drawn largely by the many opportunities for aquatic based recreation.

Physiography and Relief

The main geomorphic areas in Becker County include the Alexandria Moraine Area, the Itaska Moraine Area, the Wadena Drumlin Area, the Pelican River Sand Plain, the Park Rapids Sand Plain, and the Mahnomen Till Plain. Nearly half of the 1,440 square miles of the county consists of terminal moraines—the Alexandria Moraine and the Itaska Moraine. The moraine area is in the central part of the county and extends into the southwest and northeast corners. The vertical relief in the moraine ranges to as much as 200 to 300 feet. In places the moraine is more than 20 miles wide (Anderson).

The Alexandria Moraine runs mainly from north to south in the western part of Becker County and contains the drift of two different ice lobes. The bulk of the moraine was deposited at the terminus of the Wadena Lobe, and its deposits are exposed on the east side of the moraine. The moraine was subsequently overridden from the west by the Des Moines Lobe. Glacial till from the Wadena Lobe typically has a sandy loam texture, and glacial till from the Des Moines Lobe typically has a loam or clay loam texture. A narrow band of glacial till with silty clay loam textures also occurs in the western part of the county. The origin of the very clayey glacial till sediments suggests that ice retreated and then readvanced over lake sediments in the Lake Agassiz basin (Fenton and others, 1983). The Des Moines Lobe contains a higher percentage of shale fragments and is thought to have a more northwesterly source area than the Wadena Lobe (Anderson). Relief is typically rolling to very hilly.

The Itaska Moraine runs mainly from east to west across the northern and central parts of Becker County. The moraine is a deposit of the Wadena Lobe. The Itaska Moraine is characterized by sandy loam glacial till. The glacial till is commonly mixed with pockets of sand and gravel (ice-contact deposits). Relief is typically rolling to very hilly.

The Wadena Drumlin Area is in the southeastern part of Becker County. The Wadena Drumlin Field is the largest drumlin field in Minnesota (Wright, 1962). The drumlins were formed by the Wadena Lobe and consist of sandy loam glacial till. In Becker County the long axis of the drumlins has an east-west orientation (Perkins). Relief is typically undulating to rolling.

The Pelican River Sand Plain is located in the southwestern part of Becker County. The glacial outwash consists of sands and gravels deposited primarily by meltwaters of the Des Moines Lobe. Relief is typically rolling to hilly.

The Park Rapids Sand Plain is located in the eastern part of Becker County. The glacial outwash consists of sands and gravels deposited by meltwaters of the Wadena Lobe as it stood at the Itaska Moraine (Wright, 1972a). Relief is typically nearly level or undulating.

The Mahnomen Till Plain is located in the northwestern part of Becker County. The till plain consists primarily of glacial till from the Des Moines Lobe, but the glacial till is mantled in some areas by silty glacial lacustrine sediments. These silty sediments indicate ponding at elevations considerably above the level of the Herman Beach of Lake Agassiz (Fenton and others, 1983). As the glacial ice retreated northward, water began to pond in low areas between the moraine and the retreating glacial ice. The present-day South Branch of the Wild Rice River and the Buffalo River are former meltwater channels that eventually drained these ponded meltwaters into Glacial Lake Agassiz. Relief is typically nearly level or undulating.

The highest elevation in Becker County is about 1,850 feet. This elevation is in section 16 of Wolf Lake Township. The lowest elevation, about 1,150 feet, is in section 19 of Walworth Township.

Drainage

The rugged topography within the Alexandria and Itaska Moraines prevents good natural drainage throughout a substantial portion of the county. Thus, there are more than 300 lakes that are 40 acres or more in size in these areas. Lakes, rivers, streams, and wetlands cover approximately one-fourth of the surface area of this portion of the county.

Artificial drainage through surface ditches is extensive in the northwestern part of Becker County. Many shallow depressions have been drained with these shallow ditches and are now being used as cropland. While historically not used extensively in Becker County, Subsurface tile drainage is on the rise in the north western portion of the county.

Maximum runoff generally occurs in the spring and early summer. Flooding is generally not a major problem, although periodic high-peak flows do occur and can cause damage to infrastructure and to agricultural production.

Land Use and Land Cover

The 2011 USGS National Landcover Dataset indicates Becker County’s two dominant land uses are forest land (376,393 ac. 41%) and cultivated cropland (307,518 ac. 23%). With an additional 11% of hay/pastureland/grassland designation, agricultural land use accounts for approximately 34% of Becker County’s overall area. It should be also be noted that over 17% of Becker County is either open water (85,196 ac. 9%) or wetland (74,203 ac. 8.1%), while only 4.5% is considered developed (41,624 ac.)

Figure 3. Becker County Landcover / Landuse
USGS MLRC National Landcover Database (2011)

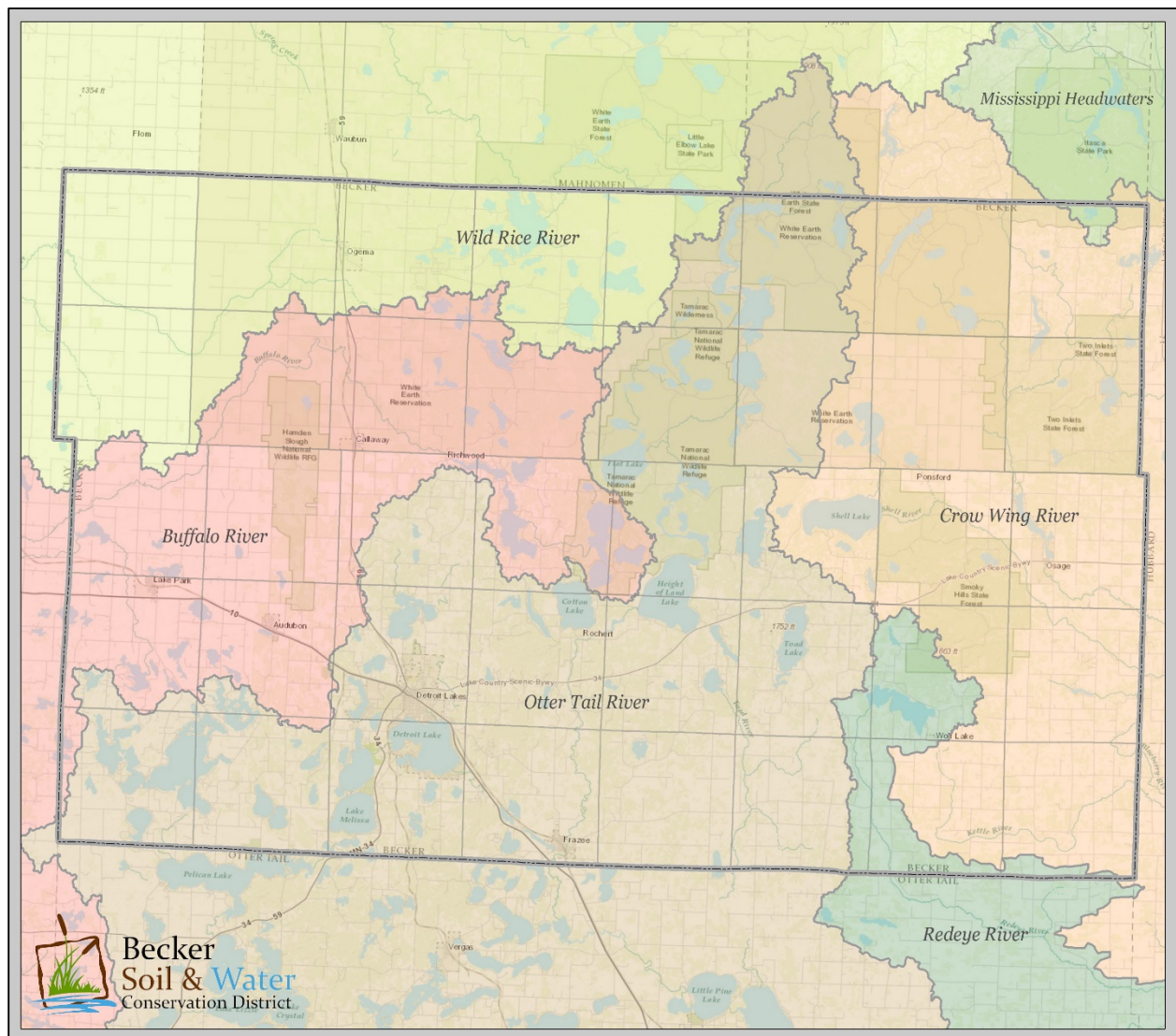
Landuse / Landcover	Acres	Percent of County
Open Water	85,196	9.2
Developed, Open Space	36,268	3.9
Developed, Low Intensity	3,537	0.4
Developed, Medium Intensity	1,373	0.1
Developed, High Intensity	445	0.0
Barren Land	788	0.1
Deciduous Forest	326,629	35.3
Evergreen Forest	49,764	5.4
Shrub/Scrub	12,746	1.4
Herbaceous	26,428	2.9
Hay/Pasture	96,857	10.5
Cultivated Crops	210,660	22.8
Woody Wetlands	18,078	2.0
Emergent Herbaceous Wetlands	56,125	6.1

Major Watersheds

Becker County is located on the watershed divide of North America. The western three-fourths of the county are tributary to the Red River of the North, which flows northward into Hudson Bay. The eastern one-fourth of the county is tributary to the Mississippi River, which flows southward into the Gulf of Mexico.

The county lies at the top of six major watersheds, the Wild Rice River, the Buffalo River, the Otter Tail River, the Crow Wing River, the Red Eye River and the Headwaters of the Mississippi River. Of these six, the Otter Tail covers the largest area in Becker County, 350,636 acres (total watershed size 1,269,120 ac.) and contains a significant number of the 487 lakes located in the county.

Map 7 – Major Watersheds of Becker County

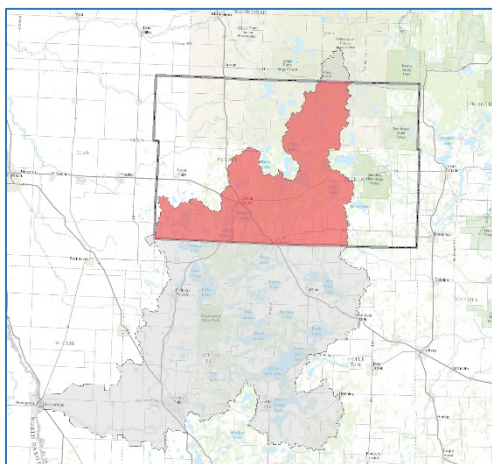


Major Watershed	Total Square Miles	Square Miles in County	Percent of Watershed	Percent of County
Mississippi River - Headwaters	1920	2.8	0.1	0.2
Crow Wing River	1983	360.0	18.2	24.9
Redeye River	894	44.4	5.0	3.1
Otter Tail River	1909	534.5	28.0	37.0
Buffalo River	1131	286.6	25.3	19.8
Wild Rice River	1636	217.1	13.3	15.0

Table 2. Comparison of Major Watersheds

Otter Tail River Watershed – At a Glance

The Otter Tail watershed encompasses three different ecoregions, covering 1,249,541 acres. The southwest portion of the watershed, the mouth of the watershed, is located in the Red River Valley ecoregion. The northeast portion of the watershed, the headwaters of the watershed, is in the Northern Lakes and Forests ecoregion.



The majority of the watershed found between these two areas is characterized by the North Central Hardwood Forest ecoregion. The eastern three-fourths of the watershed contains thousands of lakes and wetlands. The watershed is a drainage basin of the Red River and the major tributaries of the watershed are the Otter Tail and Pelican Rivers. The majority of the lakes in the greater Red River Basin are found in this watershed.

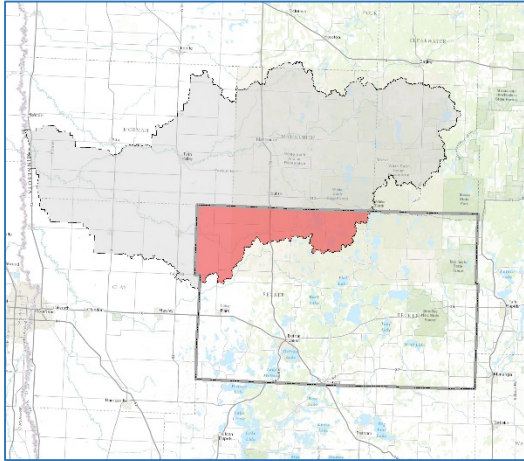
Of all of the watersheds in the Red River Basin, the Otter Tail River watershed is one of the least impacted by flooding. Annual average flood damage in the watershed is estimated at \$457,784 (in 1996 dollars) with 99% being rural.

Frequently cited resource concerns throughout the watershed include wind and water soil erosion, wetland management, surface water quality, stormwater runoff, and wildlife habitat. Many of the resource concerns relate directly to changing land use and increased development in the region, resulting in fragmentation and increased sediment/pollutant (mercury, excess nutrients) loadings to surface waters.

A significant portion of the land within this watershed is considered highly erodible, or potentially highly erodible. Land use within the watershed is largely agricultural, accounting for approximately 45% of the overall watershed acres. Development pressure is moderate to considerable in some areas, with occasional farms, timberland, and lakeshore being parceled out for recreation, lake, or country homes.

Wild Rice River Watershed – At a Glance

The Wild Rice River begins its course at Mud Lake in Minnesota’s Clearwater County, and flows largely to the west through Norman and Mahnomen counties. The river is joined by its two largest tributaries, the South Fork Wild Rice and the White Earth River before converging with the Red River of the North.



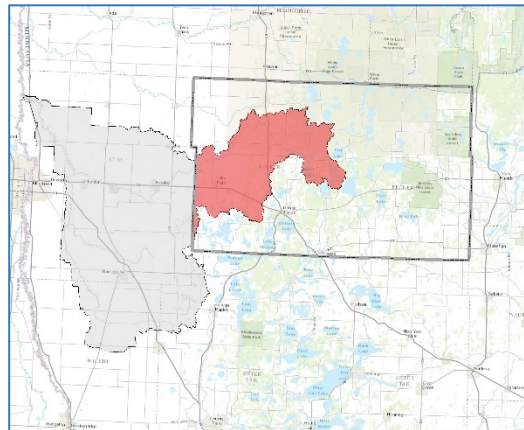
The watershed is part of the Red River Basin in northwestern Minnesota, with portions in Minnesota’s Glacial Lake Agassiz Plain, North Central Hardwoods, and Northern Lakes and Forests Level III ecoregions.

Eastern Wild Rice is, in terms of area, the third largest watershed of the Red River basin in Minnesota, and arguably one of the most ecologically diverse. The watershed includes portions of 9 of the 12 separate agroecoregions identified in the Red River region.

The main threat to the surface water quality in the watershed is non-point sources such as failing septic systems, agricultural runoff of fertilizers and feed lot runoff. However, a more common non-point pollution problem involves increases in turbidity due to wind and water erosion of soil from the land. The sediment entering the streams and lakes originate from upland erosion, stream bank erosion, drainage ditch erosion, and gully and wind erosion.

Buffalo River Watershed – At a Glance

The Buffalo River flows 88 miles from the pine forests around Tamarac Lake in eastern Becker County to the Red River of the North, across the former beach ridges and the lake plain of the Glacial Lake Agassiz land formation. Nearly 1,200 square miles of Clay, Becker, Otter Tail, and Wilkin counties drain to the Buffalo before it’s convergence with the Red River of the North.



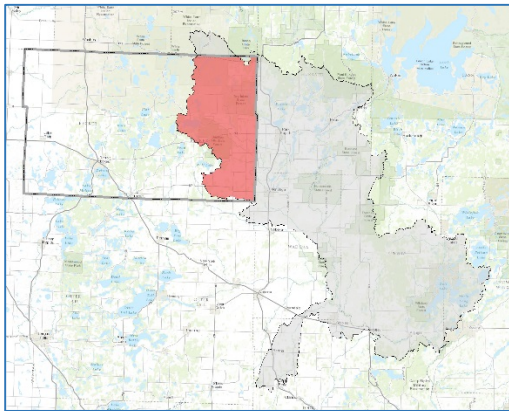
The Buffalo River Watershed spans three ecoregions: the Lake Agassiz Plain, the North Central Hardwood Forests, and the Northern Lakes and Forests. Land use within the BRW is predominantly agricultural (row crops and pasture) in the west and central portions accounting for more than 70% of the overall watershed acres; the eastern portion of the watershed is mostly forested.

Intensive monitoring shows that E.coli and turbidity are the most prevalent factors for rivers and streams within the watershed. Shallow lakes have issues with clarity, chlorophyll and nutrients leading to eutrophication.

Frequently cited resource concerns in the watershed are wind / water soil erosion, wetland management, surface water quality, flood damage reduction, and wildlife habitat. Many of the resource concerns relate directly to landuse practices in the region, resulting in fragmentation and increased sediment and pollutant (E.coli, excess nutrients) loadings to surface waters.

Crow Wing River Watershed – At a Glance

The Crow Wing River Watershed is located in north-central Minnesota and covers approximately 1,946 square miles within Becker, Cass, Clearwater, Crow Wing, Hubbard, Morrison, Otter Tail, Todd, and Wadena Counties. The watershed is located in the Upper Mississippi River Basin and is comprised of two ecoregions: the Northern Lakes and Forests, and North Central Hardwood Forests.

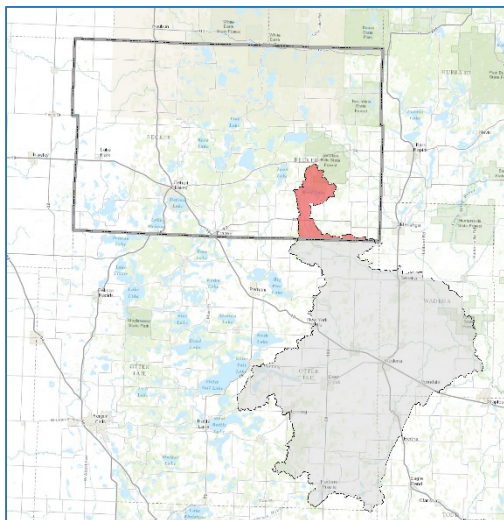


Land use within the watershed is primarily forested/shrub lands, followed by agricultural lands, wetlands, open water, and developed lands. There are a large number of pristine, high-value recreational lakes in the Crow Wing River Watershed and several cold water streams that support trout are located in the watershed.

Commonly cited resource concerns in the basin are excessive soil erosion, woodland management, surface water quality, groundwater quality and quantity, surfacewater management, wetland management, and land conversion issues. Associated with the surfacewater management and land conversion issues are increased sediment and nutrient (namely phosphorus) loading to surface waters, and groundwater contamination. Declining wildlife habitat is also a concern.

Red Eye River Watershed – At a Glance

The Redeye River watershed covers 575,366 acres (899 square miles) and is located the northwestern to north-central part of the Upper Mississippi River Basin in central Minnesota. The watershed encompasses all or parts of Becker, Otter Tail, Todd, and Wadena counties. The Redeye River begins at Wolf Lake and travels south where it joins the Leaf River and eventually joins the Crow Wing River north of Staples.

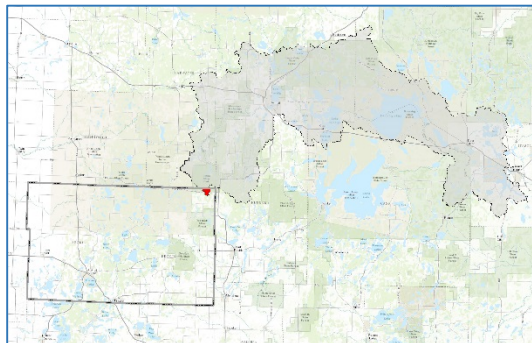


The Redeye River watershed has approximately 633 total river miles, of which 316 miles of rivers are considered perennial. The major rivers within this watershed include the Red Eye, the Leaf, and the Wing. There are 11 creeks and 7 county ditches, as well as numerous smaller flowages. The watershed contains approximately 126 lakes with a total acreage of 8,228.

The dominant land use within the watershed is agricultural (66%), while grasslands and forests make up 14% each, water makes up 2%, and 4% is urban. The majority of the watershed is within the North Central Hardwood Forest with small sections in the Northern Lakes and Forests ecoregion.

Mississippi River Headwaters Watershed – At a Glance

The Mississippi River Headwaters watershed consists of 1,255,105 acres (1,961 square miles) in the far north part of the basin. The watershed contains the headwaters of the Mississippi River at Lake Itasca in Itasca State Park. The watershed includes parts of Becker, Beltrami, Cass, Clearwater, Hubbard and Itasca counties, boasts nearly 685 river miles, and contains more than 1,000 lakes.



The watershed is largely forested and located in the Northern Lakes and Forest ecoregion of Minnesota. As the Mississippi River begins its 2,320-mile journey to the Gulf of Mexico, it runs north to north easterly through the watershed's abundant forest resources and large riverine wetland areas. The forest resources are a vital component to the economy of the area and provide habitat for a variety of wildlife species.

Approximately 44% of the land in this watershed is privately owned, with the remaining portion of land state, county or federal public land, or held by tribal land owners. Agricultural land use within the watershed is moderate, accounting for approximately 10% of the available acres.

Groundwater springs are present throughout much of the river channel throughout this watershed. These springs are especially common above Lake Bemidji where groundwater contributes approximately two-thirds of the Mississippi River's flow in this section.

Commonly cited concerns in the watershed include loss of shoreline and aquatic habitat due to development, increased sedimentation due to forest management practices, increased nutrient, contaminant, and sediment loading from stormwater runoff, and loss of biodiversity due to competition from invasive species.

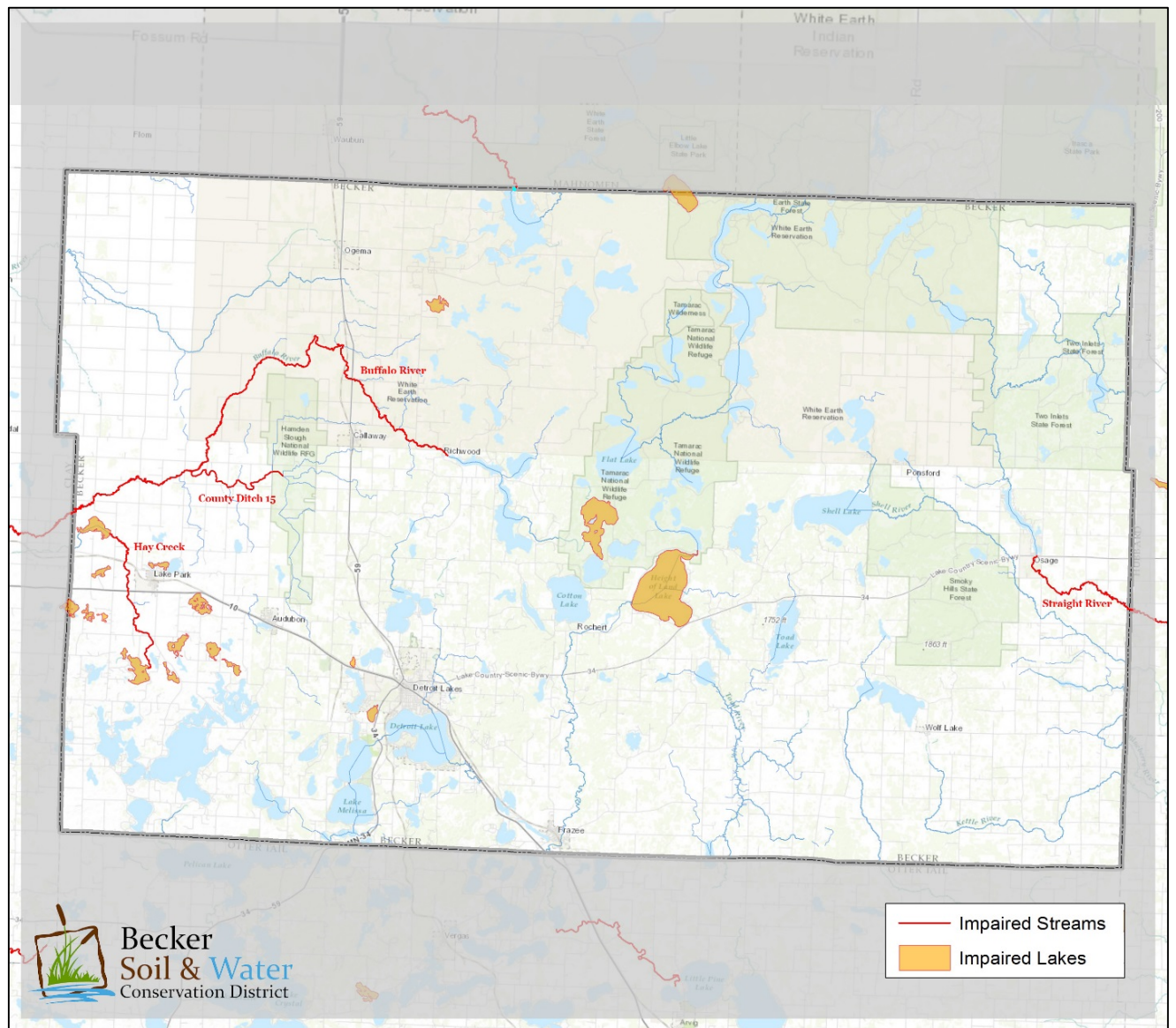
Impaired Waters – Excess Nutrients, Turbidity, Biological Integrity

Watercourse	Impairment	Watershed	Impaired Miles
Buffalo River	E.coli, Turbidity	Buffalo-Red River	9.4
White Earth River	Turbidity	Wild Rice	0.1
Straight River	Low DO	Crow Wing	8.4
Unnamed ditch (Becker County Ditch 15)	E.coli	Buffalo-Red River	6.3
Buffalo River	E.coli, Turbidity, IBI	Buffalo-Red River	25.8
Hay Creek	E.coli	Buffalo-Red River	8.9

Waterbody	Impairment	Watershed	Affected Use
Height of Land Lake	Excess Nutrients, Mercury	Otter Tail	Aquatic Recreation
Mission Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Marshall Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Gottenberg Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Boyer Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Talac Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Forget-Me-Not Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation

Waterbody	Impairment	Watershed	Affected Use
Sorenson Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Stakke (Stake) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Gourd Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
West LaBelle (Duck) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Lime (Norby, Selvine) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Stinking Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Sand (Stump) Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
North Tamarack Lake	Excess Nutrients	Buffalo-Red River	Aquatic Recreation
Tulaby Lake	Excess Nutrients	Wild Rice	Aquatic Recreation
Wine Lake	Excess Nutrients	Pelican River / Otter Tail	Aquatic Recreation
St Clair Lake	Excess Nutrients	Pelican River / Otter Tail	Aquatic Recreation

Map 8 – Becker County Impaired Waters - 2012



Source: MN Pollution Control Agency, 2012 Approved TMDL List

Water Management Plan Information

Local Government Units – County/SWCD/Municipalities and Townships

Becker County has delegated the responsibility of coordinating preparation of the comprehensive local water management plan to the Becker Soil and Water Conservation District. The county, area watershed management organizations, partner agencies and concerned members of the public are participating in development of the plan. Much of the plan implementation will be the responsibility of the county and SWCD. Municipalities and townships are also responsible for some plan objectives related to their jurisdiction.

Original Plans and Updates

The Comprehensive Water Management Plan 2017-2027 will be the fourth water management plan or update prepared for the county, the third update to the first water plan. The current plan expires December 31, 2016. The following is a list of the county's water plans.

1. Comprehensive Water Plan 1990-1997 (first plan)
2. Comprehensive Water Plan 1998-2004 (first update/second plan)
3. Local Water Management Plan 2005-2014/2015/2016 (second update/third plan)

List of Priority Concerns 2017-2027

The purpose of the priority concerns scoping document and the priority concerns identified herein is to provide Becker County, related entities and various stakeholders with guidance and direction for water planning and implementation activities over the course of the next ten years.

Priority Concern Selection

Participants in the local water plan survey, workgroups, stakeholder forums and public meetings were asked to consider what resources they felt were most threatened and prioritize corresponding resource concerns. Neighboring and local water management plans, Total Maximum Daily Load (TMDL) plans, Watershed Restoration and Protection Strategy Reports (WRAPS), the Becker County Comprehensive Plan, and land use ordinances from Becker County and the City of Detroit Lakes were also reviewed to ensure consistency between plans.

Based on available data, local expertise, survey responses and public input, two main priority water management concerns were selected for inclusion in the water plan update. Each of these priority concerns has several subparts, related objective and identified or suggested actions.

Priority Concern 1

Surface Water Quality, which includes:

- Stormwater Management
- Erosion & Sediment Control on Agricultural Land
- Nutrient, Turbidity and Bacteria Reductions in impaired watersheds
- Aquatic Invasive Species (AIS) Prevention
- Managing Soil Health
- Managing Hydrology (Water Quantity)
- Shoreland Protection
- Wetland Protection
- Development Pressure and Landuse Change
- Water Quality Monitoring

Priority Concern 2

Ground Water Quality, which includes:

- Septic System Maintenance, Inspection & Compliance
- Wellhead Protection
- Irrigation Water Management
- Nutrient Management
- Solid & Hazardous Waste Disposal
- Ground Water Monitoring

The main priority concerns and their subparts are summarized in the following sections.

Priority Concern: Surface Water Quality

Goal: Protection and Restoration of Surface Water Quality

With six major watersheds, nearly 500 lakes and countless wetlands Becker County has an abundance of surface water area. Rivers, streams, lakes wetlands and marshes account for over 17% of Becker County's total surface area. The opportunities for aquatic recreation and water-oriented living draw over 300,000 visitors annually and comprise a significant portion Becker County's local economy and tax base.

Development pressure, land use conversion, municipal stormwater, agricultural runoff, invasive species and changing climate trends are contributing factors to water quality changes in local watersheds. These changes can affect the health of aquatic life as well as the public use and enjoyment of property and local surface water bodies.

Managing land, water and soil to adapt to increased overall annual precipitation, larger rainfall events, existing and potential impacts of development, stormwater runoff, land use conversion and the growing threats posed by aquatic invasive species can restore, protect or enhance the health of our local surface waters and their corresponding watersheds.

Areas of related concern to be addressed are as follow:

Surface Water Quality - Stormwater Management

"Stormwater is an all-inclusive term that refers to any of the water running off of the land's surface after a rainfall or snowmelt event." -Minnesota Stormwater Manual

Stormwater is a term used to describe all water that isn't able to soak into the ground and runs off into storm drains, ponds, lakes, rivers, and streams. Historically, this did not happen regularly since rainwater or snowmelt was able to infiltrate the ground. Now, with increased amounts of impervious surface, like parking lots, streets, and rooftops, more and more water from rain and snow simply runs straight to water bodies. This has the potential to negatively impact our local water resources, like increased flooding of streams and the pollution of our lakes and ponds.

Identified Actions include:

- Increasing Infiltration
- Temporary Erosion and Sediment Control
- Minimization / Mitigation of Impervious Area
- Reduction of Nutrients from Upstream Sources

Surface Water Quality - Erosion & Sediment Control on Agricultural Land

Soil erosion involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. Soil erosion on cropland is of particular interest because of its on-site impacts on soil quality and crop productivity, and its off-site impacts on water quantity and quality, biological activity and overall watershed health.

Specific Erosion and sedimentation issues in Becker County include:

- Sheet, Rill and Wind Erosion: Detachment and transportation of soil particles caused by rainfall runoff/splash, irrigation runoff or wind that degrades soil quality
- Concentrated Flow Erosion: Concentrated flow erosion processes are distinguished from sheet and rill processes in their enhanced ability to mobilize and transport large amounts of soil, water and dissolved elements.
- Excessive bank erosion from streams shorelines or water conveyance channels: Sediment from banks or shorelines threatens to degrade water quality and limit use for intended purposes.

Eroded soils leaving agricultural landscapes pose risks of water quality degradation in a variety of ways, including turbidity (decreased water clarity), excess nutrient loading and delivery of excess pathogens and chemicals from manure, biosolids, compost or chemical applications.

Identified Actions include:

- Conversion to no-till operations or reduced tillage
- Increased Crop Residue Management
- Compliance with the requirements of Minnesota's 2015 Buffer Law
- Conservation Crop Rotations
- Structural Best Management Practices

Surface Water Quality - Nutrient, Turbidity and/ or Bacteria Reductions in impaired watersheds.

Becker County is fortunate in that few lakes, rivers or streams in the county are on the Minnesota Impaired Waters List maintained by the Minnesota Pollution Control Agency (MPCA). While the majority of surface waters meet or exceed federal and state water quality thresholds, there are some streams and lakes listed as impaired for turbidity, excess nutrients, bacteria, and low biological integrity.

Specific goals and milestones have been set for the majority of affected watercourses and water bodies, either in an approved Total Maximum Daily Load (TMDL) plan or a Watershed Restoration and Protection Strategy Report (WRAPS).

Identified actions include:

Turbidity:

- Installation of Sediment Controls and Buffers
- Residue management - conservation tillage
- Flow Reduction Strategies / Retention Projects

Nutrients:

- 75% Sediment Control within Watershed
- Installation of Sediment Controls and Buffers
- Timing of nutrient application (spring or split applications)

Bacteria / Pathogens:

- 100% compliance of existing septic systems
- Rotational grazing and livestock exclusion
- Improved field manure (nutrient) management

Biological:

- Removal of Connectivity Barriers
- Planting and improving perennial vegetation in riparian areas
- Accurately size bridges and culverts to improve stream stability

Surface Water Quality - Aquatic Invasive Species (AIS) Prevention

Invasive species are defined as a nonnative species that: (1) causes or may cause economic or environmental harm or harm to human health; or (2) threatens or may threaten natural resources or the use of natural resources in the state. It is generally recognized that the most effective strategy against invasive species is to prevent their introduction and establishment. Preventive measures typically offer the most cost-effective means to minimize or eliminate environmental, societal, and economic impacts. Prevention relies on a diverse set of tools and methods, including inspections, outreach, regulations, and enforcement.

Management of water bodies in a way to decrease their susceptibility to invasion by invasive species (e.g., maximizing diversity and reducing disturbance of in-lake and near shore vegetation) may also constitute an element of prevention. There is a growing need to examine how we can increase our understanding of managing ecosystems with invasive species as part of the picture. Management should focus on maintaining resilient systems that can act to slow the establishment, spread, and dominance of invasive species. This could lead to a basic shift from focusing solely on control, by adding management of the site to limit invasion as a part of the whole management package.

Identified Actions include:

- Watercraft Inspection & Decontamination
- Education and Outreach
- Intensive monitoring of area lakes
- Rapid Response to new infestations

Surface Water Quality - Managing Soil Health

According to the USDA NRCS, “Managing for soil health is one of the most effective ways for farmers to increase crop productivity and profitability while improving the environment.”

“Healthy soils hold more available water. The soil’s water-holding capacity reduces runoff that can cause flooding, and increases the availability of water to plants during droughts. Good infiltration and less need for fertilizers and pesticides keep nutrients and sediment from loading into lakes, rivers, and streams. Groundwater is also protected because there is less leaching from healthy soils.”

Identified actions or management systems include:

- Conservation Crop Rotation
- Cover Crops
- No Till
- Mulch Tillage
- Mulching
- Nutrient Management
- Pest Management

Conservation practices such as grassed waterways, filter strips, vegetated buffers, etc. help retain topsoil and agricultural productivity during extreme weather events. Wetland restoration and similar practices can provide water treatment, reducing nitrogen and other pollutants.

Surface Water Quality - Managing Hydrology (Water Quantity)

The natural hydrologic cycle is altered by removal of wetlands, perennial vegetation, ponds and depressions, draining soils, impervious surfaces, and collecting or conveying stormwater runoff from land to ditches, channels and storm sewers in urban, rural and agricultural landscapes. These activities affect the way that the landscape stores and releases water. The result is increased peak flows, lower base flows, and increased nutrient and sediment concentrations in streams, rivers, and lakes. Water quality is usually degraded when storage is removed, and improved when storage is added.

Drainage systems managed under Minnesota Statute 103E as well as tile drainage systems can consider environmental, land use and multipurpose drainage opportunities and alternatives before establishing drainage projects. Use of alternative drainage practices can help make working lands, as well as artificial and natural drainage systems, more resilient to extreme weather events and improve water quality.

Water storage in municipalities, shoreland areas and small developments can improve water and resiliency to extreme weather events. Some municipalities and townships stormwater systems are regulated by the MPCA through the Municipal stormwater (MS4) permitting process. In Becker County, the City of Detroit Lakes has a Storm Water Pollution Prevention Plan (SWPPP) and a general storm water permit for the collection and discharge of municipal storm water.

Perched at the top of numerous watersheds and with over 70 percent of our land mass draining to the Red River Basin, retention projects are also a crucial part of managing local hydrology and achieving regional goals for peak flow reductions.

Identified Actions include:

- Maintenance of Public and Private Ditch Systems
- Culvert / Conveyance Sizing
- Restoration & Enhancement of Wetlands
- Nonstructural floodplain management
- Regional / Distributed Retention Projects

Surface Water Quality - Shoreland Protection

Protecting natural shorelines is important for water quality, wildlife and the use and enjoyment of public lakes and rivers by all. Shoreland areas of lakes, rivers, streams and wetlands are critical habitat for most aquatic and many terrestrial wildlife species. Natural vegetation in shoreland areas is important for wildlife and for protecting from erosion caused by waves and ice.

Runoff to lakes and rivers from development is a concern in shoreland areas. Runoff from lawns and impervious surfaces typically contains more nutrients per acre compared with farmland. Enforcement of shoreland development regulations and treating stormwater runoff are important for protecting water quality.

Identified Actions include:

- Encourage shoreland development patterns that protect resources
- Limit amount of impervious surface & increase infiltration
- Establish perennial vegetation adjacent to lakes
- Provide incentives for private shoreland restoration
- Protect sensitive shores and natural environment lakes
- Stronger enforcement of local and state ordinances

Surface Water Quality – Wetland Protection for Multiple Benefits

In essence, the composition of a wetland allows it to act as both a sponge and filter for surface water. Once deemed wasteland, wetlands are now regarded as key components to maintaining water quality, and also a very important tool in efforts to reduce peak flows and reduce associated flood damage.

Wetlands throughout Becker County have varying amounts of protection enforced by different government regulations, such as the federal Clean Water Act, the Minnesota Wetlands Conservation Act and local ordinances adopted by watershed districts, municipalities and the County. While these varying protective mechanisms exist, they largely only regulate direct impacts to wetlands. Indirect impacts such as altered hydrology, increased pollutant loadings and encroachment can limit or compromise the functionality of wetland complexes and affect overall watershed health – including water quality and the integrity of biological communities.

Identified Actions include:

- Maintain no-net loss of wetlands in Becker County
- Restore wetlands to provide water storage and treatment
- Simplify regulatory processes and achieve consistency
- Provide Financial incentives for wetland restoration and enhancement

Surface Water Quality – Development Pressure and Landuse Change

Becker County's natural resources have long provided both economic sustenance and a high quality of life for Becker County residents. The county agricultural production and its varied lakeshore environment continue to offer economic and quality-of-life benefits to county residents and visitors.

In recent years Becker County has seen increasing pressures on the county's agricultural and lake resources. Traditional agricultural areas have seen an increase in the development of non-farm housing, including those areas designated agricultural. Development is similarly cropping up on increasingly remote lakes, and in more intensive development patterns than historically seen. This development pressure may be attributed to economic incentives to sell and divide property due to high land values, potential investment returns, demand for riparian properties, and diminishing agricultural returns. Development pressure and impacts are a concern due to high growth rates and the cumulative effects of development on surface as well as groundwater resources.

Additional concern has been raised over increasing conversion of forested land to irrigated agricultural production. Portions of the County that have historically been forested and have coarse grained sandy soils (such as those of the Park Rapids (or Pineland) Sand Plain have a high potential of contributing to surface and groundwater quality issues when converted to agricultural production without proper management.

Identified Actions Include:

- Support landuse patterns that protect agricultural land, forests, lakes, rivers and wetlands

- Require stormwater management plans for all riparian development and redevelopment
- Require lot sizes on natural environment lakes that afford the greatest protection for water quality and wildlife habitat.
- Educate landowners on the importance of natural, native shoreline vegetation for maintaining water quality and aquatic habitat
- Educate contractors, realtors and Developers on low impact, lake friendly development and landscaping
- Identify Forest Land with vulnerable soils and potential for conversion to agriculture
- Provide financial assistance or tax incentives for permanent protection of native and/or forested habitats

Surface Water Quality – Water Quality Monitoring

Stakeholders and workgroup members agree: To truly be effective in assessing, preventing or addressing issues relating to surface water quality useful data must be available. Consistent, relevant and timely acquisition and sharing of water quality data will enable the identification of potential threats, evaluation of management actions, and measurement of the effectiveness of the actions taken.

Identified Actions Include:

- Support and streamline citizen monitoring programs and collection of water quality data
- Establish and maintain organized countywide surface water quality data storage
- Monitor targeted and/or Impaired waters annually

Priority Concern 2: Ground Water Quality and Quantity

Goal: Protection and Preservation of Ground Water Quality & Quantity

Becker County has an abundant groundwater resource in its surficial and buried drift aquifers located throughout the county. All of Becker County's citizens depend on the ground water for their drinking water, and maintaining a supply of high quality drinking water continues to rank as a high priority for local stakeholders. Since the first water management plan was adopted in 1990, protecting groundwater from contamination has always been high on the list for water plan implementation activities.

Private water wells are regulated by the County in accordance with the State Well Code under a delegation agreement with the Minnesota Department of Health. Public water supply wells are regulated and monitored by the Minnesota Department of Health (MDH). Several municipalities across the county are in various stages of developing wellhead protection plans with the MDH.

Areas of related concern to be addressed are as follow:

Ground Water Quality/Quantity - Septic System Maintenance, Inspection & Compliance

Septic systems both complying and non-complying with management regulations, have the potential to impact groundwater quality. Failing sewage systems discharge untreated waste water into the environment where it contaminates groundwater supplies, degrades surface waters, or poses a serious pathogenic health threat on the ground surface. Failing septic systems continue to be a problem throughout Becker County based on unacceptable failure rates. The Becker Planning and Zoning office estimates that the countywide failure rate could exceed 50%.

Identified Actions include:

- Encourage septic system maintenance every 3 years
- Conduct lake-wide SSTS compliance inspections
- Provide financial assistance for septic system upgrades

Ground Water Quality/Quantity – Wellhead Protection

Wellhead Protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area which supplies water to a public well. Much can be done to prevent pollution, such as the wise use of land and chemicals. Public health is protected and expense of treating polluted water or drilling new wells is avoided through wellhead protection efforts.

Specific wellhead protection requirements vary for the different classifications of public water systems in Minnesota which include transient non-community water systems (such as resorts, restaurants, and churches) and Community water systems. Few protective requirements are in

place for private domestic wells, though those that are abandoned or in disrepair pose risks for groundwater contamination.

Identified Actions include:

- Assist water suppliers with developing & implementing Well Head Protection Plans
- Incentives for perennial vegetation in Drinking Water Supply Management Areas
- Financial assistance for well decommissioning and replacement
- Permanent protective measures such as easements for sensitive areas

Ground Water Quality/Quantity – Irrigation Water Management

Irrigation water management primarily aims to control the volume and frequency of irrigation water applied to crops, so as to meet crop needs while conserving water resources. Competition for water resources for agricultural and other uses is increasing—even in portions of the state like Becker County that have abundant water. This makes it all the more essential to use irrigation water as efficiently as possible.

Another objective of irrigation management is to prevent irrigation-induced soil and water quality problems such as salinity, soil erosion or leaching of nutrients or pesticides into groundwater. Crop managers must understand the potential for these problems to occur and address them as needed. Irrigation water management can be significantly enhanced by practices that increase soil health, particularly those increasing the soil's moisture-holding capacity or decreasing evaporation.

Identified Actions include:

- Soil moisture monitoring and management
- Scheduled irrigation applications
- Increase Crop Residue Management
- Financial assistance to increase irrigation efficiency
- Prioritize efforts within the Straight River Groundwater Management Area

Ground Water Quality/Quantity – Nutrient Management

Nutrient management is using crop nutrients as efficiently as possible to improve productivity while protecting the environment. Nutrients that are not effectively utilized by crops have the potential to leach into groundwater or enter nearby surface waters via overland runoff or subsurface agricultural drainage systems. Too much nitrogen or phosphorus can impair water quality.

The storage and application of livestock waste poses similar risks to water quality, making the guiding principles of nutrient management safe storage and preventing over-application of nutrients.

Identified Actions include:

- Apply manure and fertilizer at or below U of M recommended rates
- Provide financial assistance for adequate ag waste storage facilities
- Offer technical assistance for on-farm nutrient management planning
- Encourage split applications of nutrients, chiefly nitrogen
- Promote use of nitrogen scavenging cover crops
- Prioritize efforts within the Straight River Groundwater Management Area

Ground Water Quality/Quantity – Solid & Hazardous Waste Disposal

Household hazardous waste, pesticides and herbicides, business and electronic waste, old prescription drugs, used oils, and many other common products should be properly disposed of, rather than simply dumping them into the environment or down the drain. If disposed of inappropriately, they may contaminate soil, ground water or surface water, and air quality. The first option should always be to reduce, reuse, or recycle it; if no other options are available then they must be properly disposed of. Many of these items are banned from landfills.

In Becker County the Environmental Services department offers a household hazardous waste program, as well as the VSQG (Very Small Quantity Generator) program which manages businesses hazardous waste upon request. The county is also a participant in the Minnesota Department of Agriculture’s “Clean Sweep Program”, which provides safe disposal of waste pesticides at no cost.

Identified Actions include:

- Provide environmentally sound solid waste management
- Increase public awareness of available hazardous waste programs
- Offer additional locations / dates for hazardous waste collection

Ground Water Quality/Quantity – Groundwater Monitoring

To evaluate aquifer functions, groundwater quantity and the overall health of our drinking water supply it is crucial to regularly assess our groundwater supplies. Overall the quality of the groundwater in Becker County continues to be good, though elevated nitrate levels have been discovered in portions of the Park Rapids (or Pineland) Sand Plain located in the eastern part of Becker County, and elevated arsenic levels have been detected in pockets of the Pelican River Sand Plain located in the southwestern portion of the County. Since 1995 the Becker SWCD has conducted free well water testing clinics annually.

Identified Actions include:

- Continue to participate in the MN DNR Groundwater Level Monitoring Program
- Continue to support private well water quality monitoring efforts
- Offer nitrate testing to the public at no cost

Priority Concerns Identification Process

1. Notice of Plan Revision and Invitation to Submit Priority Concerns

As required by Minnesota Statutes 103B.313, Becker Soil and Water Conservation sent notification of the plan update and invitation to submit priority concerns to the following:

- All 45 local government units, including Becker County, 7 municipalities and 37 townships
- Each of the 4 organized watershed districts within Becker County
- The six adjacent counties (Clay, Norman, Mahnomon, Hubbard, Wadena and Otter Tail)
- The five state review agencies, including the Board of Water and Soil Resources (BWSR), the Department of Agriculture (MDA), the Department of Health (MDH), the Department of Natural Resources (DNR), and the Pollution Control Agency (MPCA)
- Becker County Coalition of Lake Associations (COLA)

Four of the five state review agencies submitted priority concerns or related comments. MPCA did not supply any information.

One municipality in the county, the City of Detroit Lakes, indicated priority concerns would be identified in the City's pending ordinance revisions, and further information could be found in the Detroit Lakes Stormwater Pollution Prevention Plan. Eagle view township was the only township to reply, citing controlling invasive species and erosion of lakeshore as priorities.

Buffalo Red Watershed district and the Pelican River Watershed District both responded that they are currently in the process of updating their respective revised management plans and referenced priorities and objective outlined in their existing plans, as well as the draft Buffalo Red River WRAPs. No comments or submissions were received from Wild Rice or Cormorant Lakes Watershed District.

List of Priority Concerns Recommended:

- Drinking water and groundwater protection
- Altered hydrology
- Drainage Maintenance
- Stormwater management
- Wetland Protection
- Flood Damage Reduction
- Excess nutrients
- Soil erosion
- Soil health
- Aquatic invasive species
- Development Pressure
- Wildlife Habitat
- Agricultural Runoff
- Shoreline Protection
- Irrigation Water Management

2. Local Water Plan Survey

To help determine priority concerns to address in the water plan, the SWCD administered a fifteen question online survey using Survey Monkey in March of 2016. The survey was promoted using the county website, press releases, radio interviews and emails to drainage authorities, lake associations, partner agencies and to county, township or city officials.

Survey Questions, responses and results are included in the following attachment.

3. Local Work Sessions, Internal & Public Forums

June 3, 2015: PRAP Follow up and water plan scoping session

SWCD/NRCS: Peter Mead, Ed Clem, Ed Musielwicz;
Becker County: Eric Evenson,
BWSR: Don Buchout, Brett Arne

Priority Issues Identified:

- Effective Communication and Coordination between entities
- Consistency Between Planning Documents & Components
- Stages of various plans – WRAPS, TMDLS, LWPs, RWMPs
- Common Resource Concerns Between Plans

January 5, 2016 – Scoping Session

SWCD: Peter Mead & Ed Clem, Becker SWCD
Pelican River Watershed District: Tera Guetter
Buffalo Red Watershed District: Bruce Albright
Wild Rice Watershed District: Kevin Ruud
Cormorant Lakes Watershed District: Elis Peterson

Priority Issues Identified:

- Compliance with MN's 2015 Buffer & Soil Loss Laws
- Shoreland Protection & Stabilization
- Soil Erosion in the Buffalo-Red & Wild Rice Watersheds
- Increasing Phosphorus in the Pelican Chain of Lakes
- Targeting conservation with PTMApp, WQDSA & Similar
- AIS Prevention

January 21, 2016: Landowner Forum, Lake Park, MN

Priority Issues Identified:

- Compliance with MN's 2015 Buffer & Soil Loss Laws
- Shoreland Protection & Stabilization
- Incentives for compliance / stewardship
- Private and Public Ditch Maintenance

January 29, 2016: AIS Scoping Session

SWCD: Peter Mead, Karl Koenig
SWCD Supervisor: Kathy Stenger
Pelican River Watershed District: Tera Guetter
Becker COLA: Barb Fishberg-Hallbakken, John Postovit, Dick Heckock

Priority Issues Identified:

- Regionalized Watercraft decontamination
- Increase / Target Watercraft Inspections
- Increased monitoring
- Additional Public Outreach & Education
- “Rapid Response” treatment for new infestations

February 8, 2016: Water Quality Scoping Session

SWCD: Peter Mead, Karl Koenig
Pelican River Watershed District: Tera Guetter
Becker COLA: Dick Heckock
RMB Laboratories: Moriaya Rufer
Lowell Deede, Retired USFWS

Priority Issues Identified:

- Available data, collection methods and existing TSS & Nutrient Trends
- Support and streamline citizen monitoring programs and collection of water quality data
- Establish and maintain organized countywide surface water quality data storage
- Monitor targeted and/or Impaired waters annually

February 10, 2016: Lake Development Subcommittee Meeting

SWCD: Peter Mead
Becker County: Commissioner Larry Knutson
Becker County: Roy Smith, Surveyor
MN DNR: Donna Dustin & Mandy Erickson

Priority Issues Identified:

- Phosphorus Loading and Lake Sensitivity
- Near-Shore Disturbance and Habitat Fragmentation
- Lot-Width/Size Thresholds for Aquatic Health
- Stormwater Management and Mitigation

February 18, 2016: Landowner Forum, Wolf Lake, MN

Priority Issues Identified:

- Increasing Irrigation / Irrigation Water Management
- Soil Health (Cover Crops, Rotational Grazing)
- Nutrient Management
- Wildlife Habitat Enhancement

March 17, 2016: Landowner Forum, Callaway, MN

Priority Issues Identified:

- Simplification of Regulatory / Permitting Processes
- Soil Loss & Sedimentation
- Private and Public Ditch Maintenance
- Compliance with MN’s 2015 Buffer & Soil Loss Laws

June 16, 2016: Local Workgroup Meeting

SWCD: Peter Mead, Aaron Salo
SWCD Supervisors: Tony Beck, Travis Schauer
NRCS: Ed Musielwicz, Ray Hummel
BWSR: Brett Arne
MN DNR: Rob Baden, Roger Hemphill, Phil Doll
Wild Rice Watershed District: Kevin Ruud
Bill Zurn, Producer

Priority Issues Identified:

- Soil Erosion & Water Quality in the Buffalo Red and South Branch Wild Rice Watersheds
- Increased phosphorous in the Pelican River Watershed District and greater Otter Tail Basin.
- Irrigation, cover crops, nutrient & pest management on irrigated lands in central sands region
- Soil Health practices (no-till, residue management cover crops, rotational grazing, etc.)
- Compliance with MN's 2015 Buffer & Soil Loss Laws.

4. Local Water Management Advisory team

An advisory team was assembled to work on or inform various components of the water management plan.

Advisory Members:

Barry Nelson, Becker County Commissioner
Peter Mead, Soil and Water Conservation District Administrator
Jerome Flottemesch, Soil and Water Conservation District Supervisor
Eric Evenson, Becker County Planning and Zoning Administrator
Kasey Klem, Detroit Lakes City Administrator
Jake Hein, MN Farm Bureau, Local Producer
Carrie Johnston, Detroit Lakes Chamber of Commerce
Tera Guetter, Pelican River Watershed District Administrator
Bruce Albright, Buffalo Red Watershed District Administrator
Kevin Ruud, Wild Rice Watershed District Administrator
Richard Hecock, Becker County Coalition of Lake Associations

Technical Members:

Ed Clem, Soil and Water Conservation District Technician
Karl Koenig, Soil and Water Conservation District AIS/WQ Coordinator
Ed Musielwicz, USDA-NRCS District Conservationist
Brett Arne, BWSR Board Conservationist
Donna Dustin, MN DNR Fisheries Biologist
Roger Hemphill, MN DNR Area Hydrologist
Rob Baden, MN DNR Area Wildlife Manager
Leticia Kiehl, Ducks Unlimited Restoration Specialist
Moriya Rufer, RMB Laboratories

Summary of Proceedings and Supporting Data:

Advisory and technical members and subcommittees met to review various components of proposed priority concerns and ensure input from citizens, local, state and regional entities was considered.

There was some internal dialog as how best to combine or group various concerns and still remain inclusive of all those submitted. The fifteen submitted priority resource concerns and related

components were ultimately represented by two overarching primary resource concerns – Surface Water Quality and Groundwater Quality, with related resource concerns addressed as subparts or components of each.

Priority Concern 1 - Surface Water Quality, which includes:

- Stormwater Management
- Erosion & Sediment Control on Agricultural Land
- Nutrient, Turbidity and Bacteria Reductions in impaired watersheds
- Aquatic Invasive Species (AIS) Prevention
- Managing Soil Health
- Managing Hydrology (Water Quantity)
- Shoreland Protection
- Wetland Protection
- Development Pressure and Landuse Change
- Water Quality Monitoring

Priority Concern 2 - Ground Water Quality, which includes:

- Septic System Maintenance, Inspection & Compliance
- Wellhead Protection
- Irrigation Water Management
- Nutrient Management
- Solid & Hazardous Waste Disposal
- Ground Water Monitoring

There was additional discussion as to whether suggestion of addressing fish passage/barriers and culvert replacement were included in the identified resource concerns, and it was deemed to be accommodated in the recommended goals or actions under Nutrient, Turbidity and Bacteria Reductions in impaired watersheds. Following scoping and sessions and final review, the list of priority concerns presented by local staff was accepted.

5. Public Meeting

Date: A public meeting was held from 1:00 pm to 3:00 pm, on Tuesday, April 12th in the Commissioners room of the Becker County Courthouse. The meeting was publicly noticed 15 days prior in the Detroit lakes tribune on Wednesday, March 30th, 2016 and featured in a Detroit Lakes Tribune news article on Friday, April 1, 2016

Participants:

The Becker Soil and Water Conservation District staff conducted the meeting. Two citizens, both permanent residents of Becker County, attended the open house.

Meeting Summary:

The meeting was a two-hour open house. The citizens who attended were concerned about water management issues in the county in general, including drainage system maintenance, water quality monitoring, wetland protection and the amount of sediment being delivered to both the South Branch of the Wild Rice and The upper reaches of the Buffalo River.

6. Consideration of current state and local watershed, water management and other local plans and planning efforts

Becker SWCD staff reviewed other local, regional and state studies and plans and evaluated the priority concerns, action items and goals included in each. Reviewed plans include:

Becker County Comprehensive

Plan: http://www.co.becker.mn.us/dept/planning_zoning/PDFs/CompPlan.pdf

Becker County Comprehensive Local Water Management Plan:

http://www.co.becker.mn.us/dept/soil_water/PDFs/LWMP.pdf

Pelican River Watershed District Revised Watershed Management Plan:

<http://www.prwd.org/about-prwd/revised-mgt-plan/>

St. Clair Lake TMDL Study:

<https://www.pca.state.mn.us/sites/default/files/wq-iw5-07b.pdf>

Buffalo Red River Watershed District Revised Watershed Management Plan:

<http://www.brrwd.org/revised-watershed-management-plan-update/>

Buffalo River Watershed TMDL Study:

<https://www.pca.state.mn.us/sites/default/files/wq-iw5-06e.pdf>

Buffalo River Watershed Restoration and Protection Strategy Report

<https://www.pca.state.mn.us/sites/default/files/wq-ws4-11a.pdf>

Buffalo-Red River Rapid Watershed Assessment

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023629

Crow Wing Watershed Restoration and Protection Strategy Report

<https://www.pca.state.mn.us/sites/default/files/wq-ws4-09a.pdf>

Crow Wing Watershed TMDL Study:

<https://www.pca.state.mn.us/sites/default/files/wq-iw8-45e.pdf>

Crow Wing River Rapid Watershed

Assessment https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023587

Red Eye River Watershed Restoration and Protection Strategy Report:

<https://www.pca.state.mn.us/sites/default/files/wq-ws4-17a.pdf>

Red Eye River Watershed TMDL Study:

<https://www.pca.state.mn.us/sites/default/files/wq-iw8-48e.pdf>

Red Eye River Rapid Watershed Assessment

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023588

Mississippi River Headwaters Rapid Watershed Assessment

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023582

Otter Tail River Rapid Watershed Assessment:

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023627

Wild Rice River Rapid Watershed Assessment

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/dma/rwa/?cid=nrcs142p2_023631

Straight River Groundwater Management Area Draft Plan

http://files.dnr.state.mn.us/waters/gwmp/area-sr/sr_draft-plan_PAT.pdf

Long Term Flood Solution Strategies for the Red River Basin:

http://www.redriverbasincommission.org/Comprehensive_Report_12-15-11_FINAL.pdf

Hubbard County Local Water Management Plan

<http://www.co.hubbard.mn.us/Environmental/Forms/2016%20Hubbard%20County%20LWMP.pdf>

Clay County Local Water Management Plan

<http://claycountymn.gov/DocumentCenter/View/470>

Otter Tail County Local Water Management Plan

<http://eotswcd.fatcow.com/EOT/Documents/Plans/OTC%20Water%20Plan%20Update.pdf>

Wadena County Local Water Management Plan

http://www.wadenaswcd.org/WadenaCtyLocalWaterMgmtPlanAmended5.3.20112006_2016.pdf

Norman County Local Water Management Plan

<http://www.normancountyswcd.org/uploads/3/5/3/2/3532157/5yearwaterplan.pdf>

Minnesota Nitrogen Fertilizer Management Plan

<http://www.mda.state.mn.us/~media/Files/chemicals/nfmp/nfmp2015.pdf>

Minnesota Non-Point Priority Funding Plan

http://www.bwsr.state.mn.us/planning/npfp/2016_NPFP_Final.pdf

Priority Concern Selection Process

The steps used to choose the priority concerns were:

1. County staff prepared a list of all priority concerns submitted by LGUs and state agencies.
2. County staff analyzed the survey results and written comments.
3. County and Soil and Water Conservation District staff reviewed the list of priority concerns and survey results and had a workshop to discuss all the priority concerns and suggest additional priority concerns. The group recommended all priority concerns submitted be included in the water plan.
4. Portions of the water plan advisory team were convened to review the list of recommended priority concerns to ensure the list was complete and if the recommended priority concerns should be included in the water plan. Following the aforementioned discussions, no additions or changes to the recommended list of priority concerns were made.

All priority concerns were addressed.

There were no differences between the plan's priority concerns and other state, local, and regional concerns.

Attachment

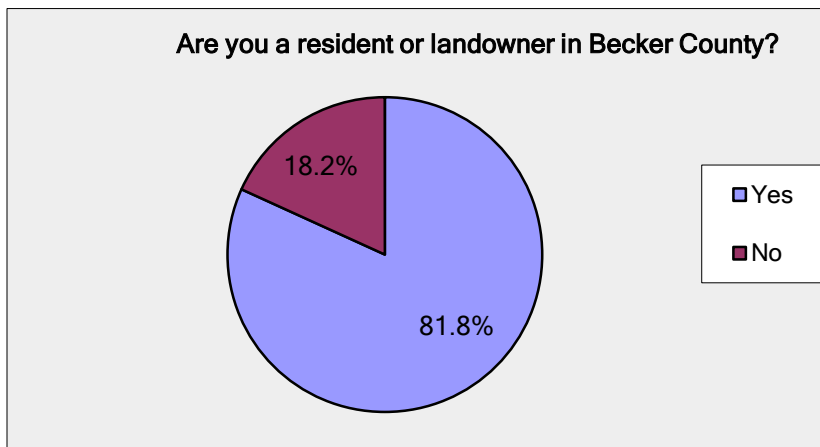
A summary of the water plan survey results is attached.

Becker County Local Water Management Plan Public Survey & Results – Spring 2016

Background

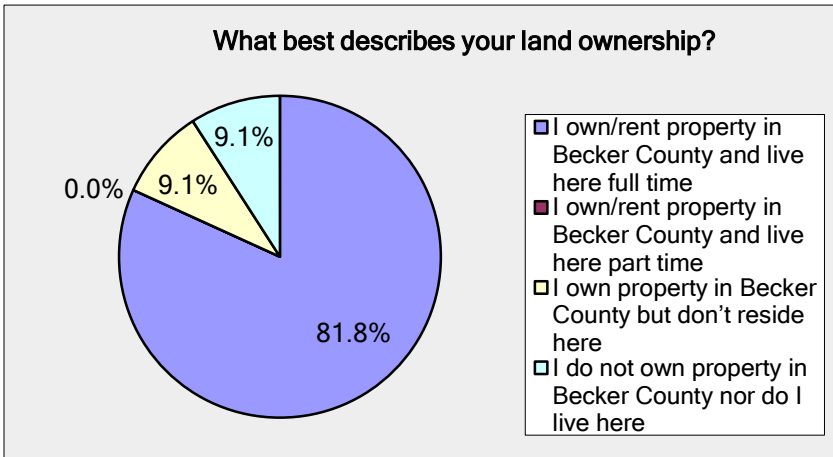
In 2015 Becker SWCD initiated the process of updating Becker County’s Comprehensive Local Water Management Plan. To help determine public attitudes relating to water management and establish priority concerns to address in the plan, the SWCD administered an 11 question online survey using Survey Monkey Beginning in March of 2016. The survey was promoted using the county website, press releases, newspaper articles, radio segments and emails to township and city officials. There were 46 survey respondents. The survey and results are summarized in this document.

1. Are you a resident or landowner in Becker County?	
Answer Options	Response Percent
Yes	81.8%
No	18.2%



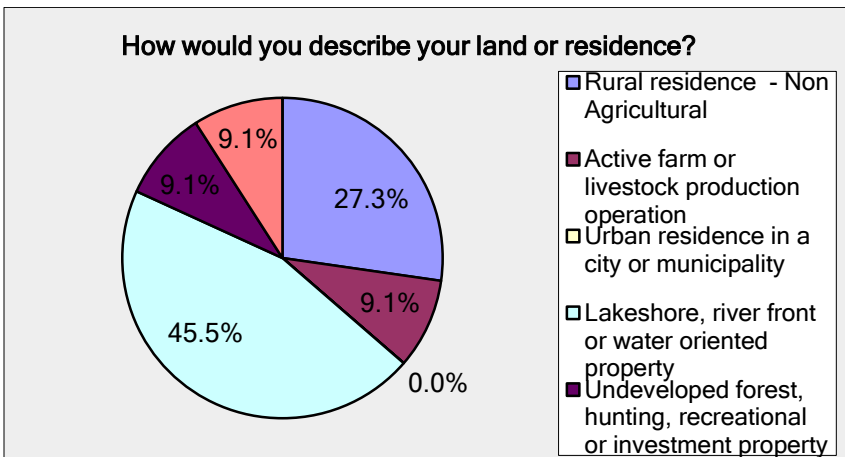
2. What best describes your land ownership?

Answer Options	Response Percent
I own/rent property in Becker County and live here full time	81.8%
I own/rent property in Becker County and live here part time	0.0%
I own property in Becker County but don't reside here	9.1%
I do not own property in Becker County nor do I live here	9.1%



3. How would you describe your land or residence?

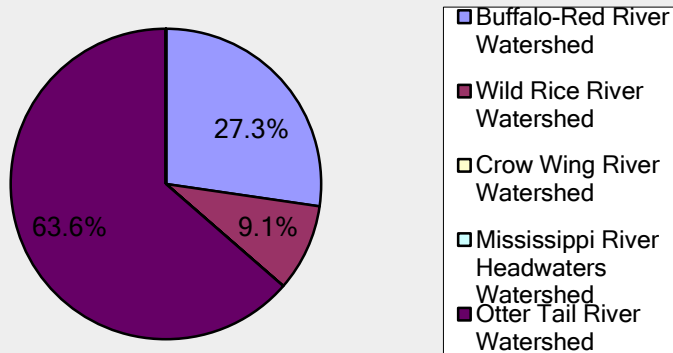
Answer Options	Response Percent
Rural residence - Non Agricultural	27.3%
Active farm or livestock production operation	9.1%
Urban residence in a city or municipality	0.0%
Lakeshore, river front or water oriented property	45.5%
Undeveloped forest, hunting, recreational or investment property	9.1%
I do not own property in Becker County nor do I live here	9.1%



4. What major watershed is your land primarily in?

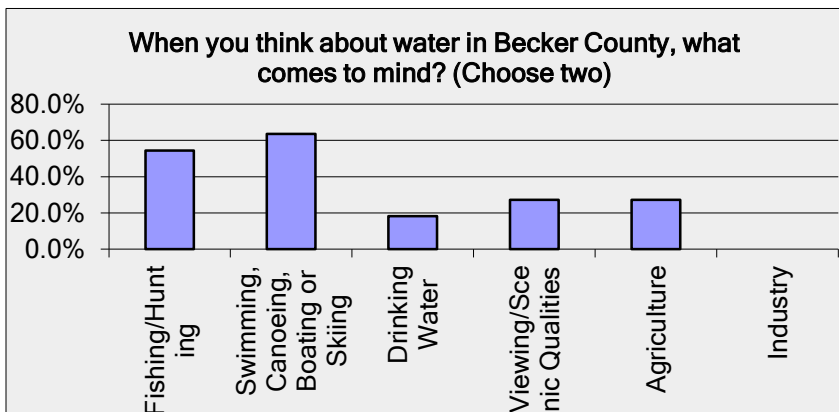
Answer Options	Response Percent
Buffalo-Red River Watershed	27.3%
Wild Rice River Watershed	9.1%
Crow Wing River Watershed	0.0%
Mississippi River Headwaters Watershed	0.0%
Otter Tail River Watershed	63.6%
Redeye River Watershed	0.0%
I do not own property in Becker County nor do I live here	0.0%

What major watershed is your land primarily in?

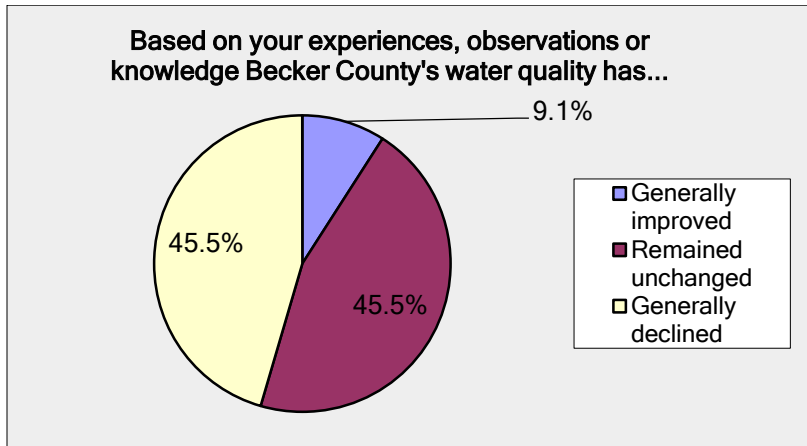


5. When you think about water in Becker County, what comes to mind? (Choose two)

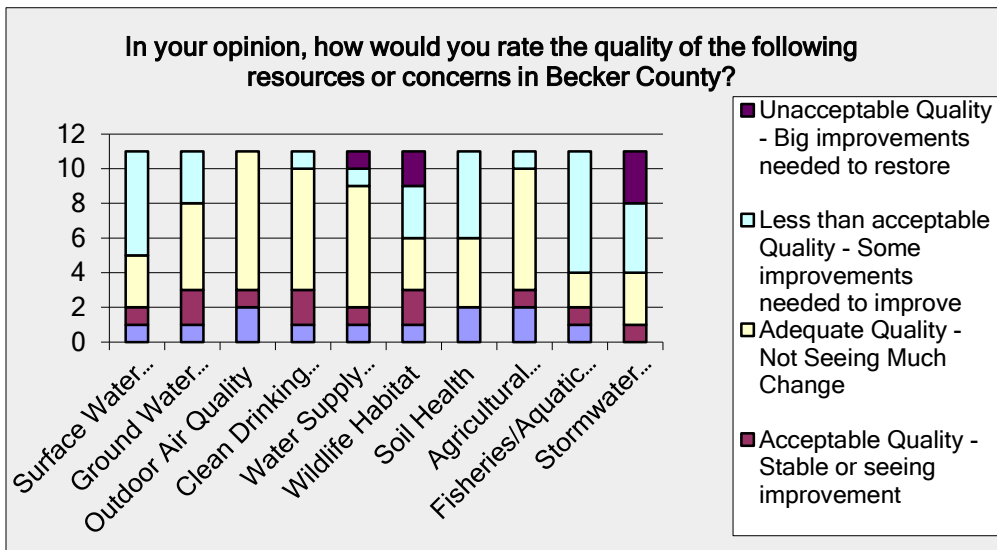
Answer Options	Response Percent
Fishing/Hunting	54.5%
Swimming, Canoeing, Boating or Skiing	63.6%
Drinking Water	18.2%
Viewing/Scenic Qualities	27.3%
Agriculture	27.3%
Industry	0.0%



6. Based on your experiences, observations or knowledge Becker County's water quality has...	
Answer Options	Response Percent
Generally improved	9.1%
Remained unchanged	45.5%
Generally declined	45.5%

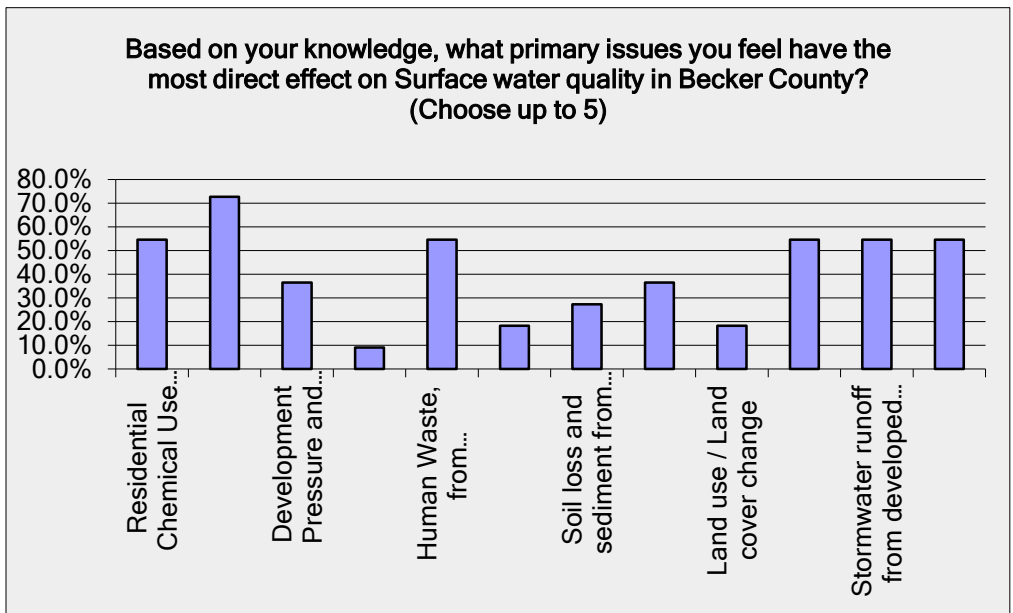


7. In your opinion, how would you rate the quality of the following resources or concerns in Becker County?					
Answer Options	Unacceptable Quality - Big improvements needed to restore	Less than acceptable Quality - Some improvements needed to improve	Adequate Quality - Not Seeing Much Change	Acceptable Quality - Stable or seeing improvement	Good to Excellent - Need to protect existing quality
Surface Water Quality	0	6	3	1	1
Ground Water Quality	0	3	5	2	1
Outdoor Air Quality	0	0	8	1	2
Clean Drinking Water	0	1	7	2	1
Water Supply (Amount)	1	1	7	1	1
Wildlife Habitat	2	3	3	2	1
Soil Health	0	5	4	0	2
Agricultural Productivity	0	1	7	1	2
Fisheries/Aquatic Habitat	0	7	2	1	1
Stormwater Management	3	4	3	1	0



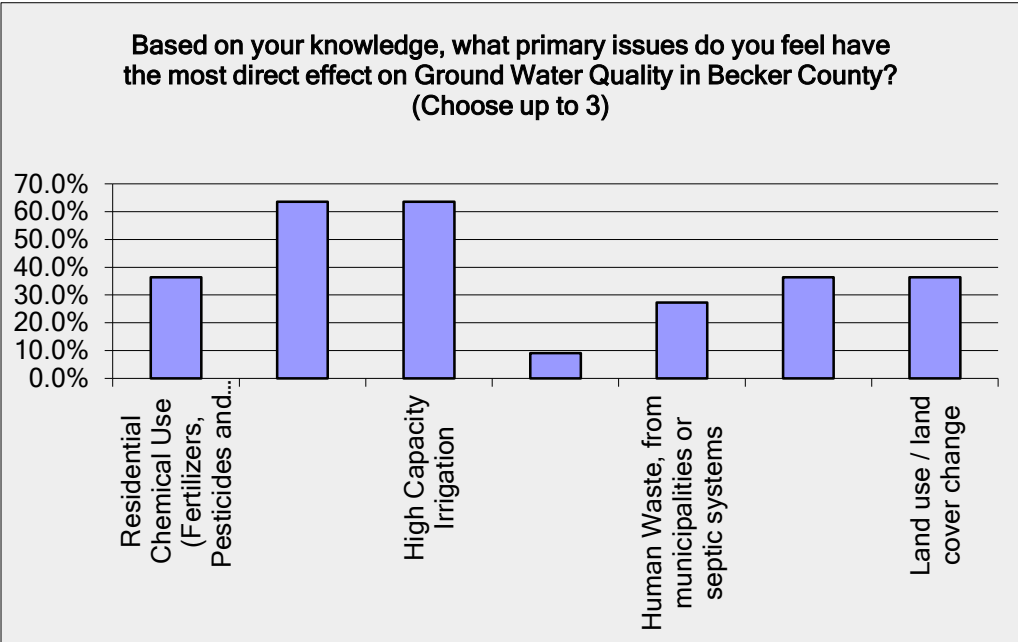
8. Based on your knowledge, what primary issues you feel have the most direct effect on Surface water quality in Becker County? (Choose up to 5)

Answer Options	Response Percent
Residential Chemical Use (Fertilizers, Pesticides and Pharmaceuticals)	54.5%
Agricultural Chemical Use (Fertilizers, Herbicides and Pesticides)	72.7%
Development Pressure and related impacts	36.4%
Animal Manure, feedlots and field spreading	9.1%
Human Waste, from municipalities or septic systems	54.5%
Commercial logging and forestry operations	18.2%
Soil loss and sediment from over-land erosion	27.3%
Boats, Docks and Water related equipment	36.4%
Land use / Land cover change	18.2%
Aquatic Invasive Species	54.5%
Stormwater runoff from developed areas	54.5%
Loss of Shoreline/Riparian vegetation	54.5%



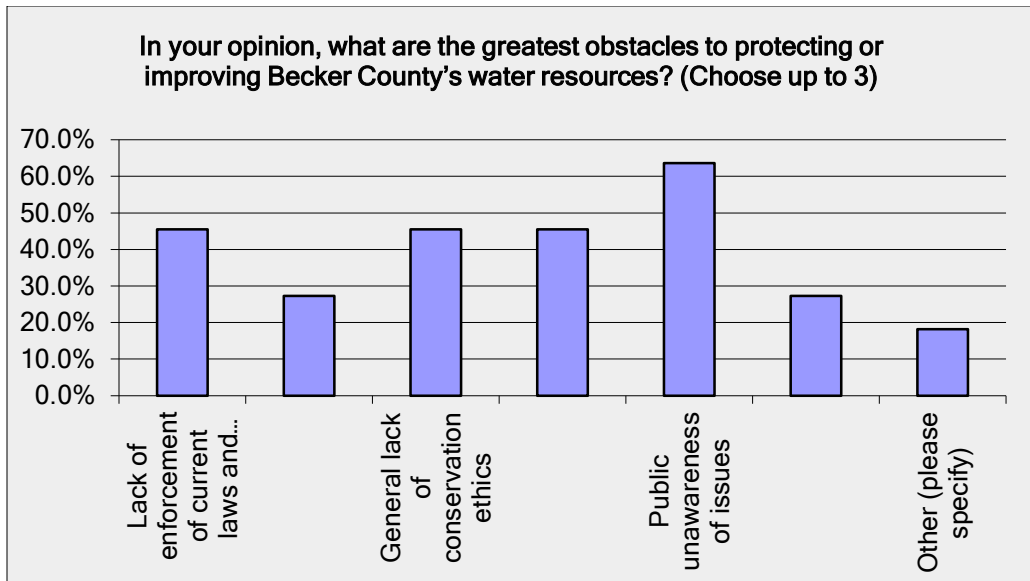
9. Based on your knowledge, what primary issues do you feel have the most direct effect on Ground Water Quality in Becker County? (Choose up to 3)

Answer Options	Response Percent
Residential Chemical Use (Fertilizers, Pesticides and Pharmaceuticals)	36.4%
Agricultural Chemical Use (Fertilizers, Herbicides and Pesticides)	63.6%
High Capacity Irrigation	63.6%
Mining/Gravel Operations	9.1%
Human Waste, from municipalities or septic systems	27.3%
Failing/Abandoned private wells	36.4%
Land use / land cover change	36.4%



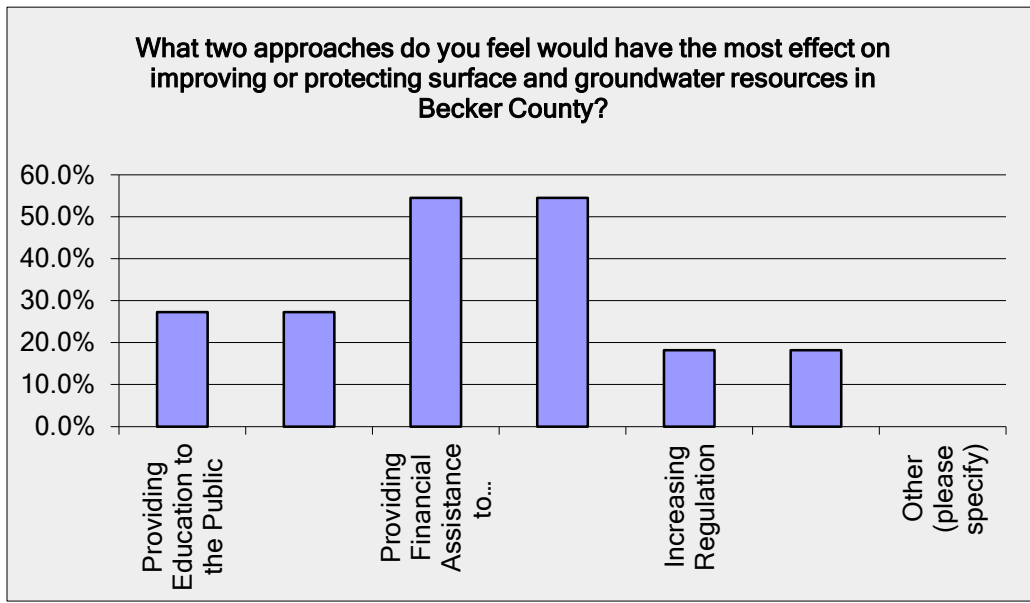
10. In your opinion, what are the greatest obstacles to protecting or improving Becker County's water resources? (Choose up to 3)

Answer Options	Response Percent
Lack of enforcement of current laws and rules	45.5%
Confusing or conflicting environmental rules	27.3%
General lack of conservation ethics	45.5%
Not enough funding to fix existing problems	45.5%
Public unawareness of issues	63.6%
Inadequate ordinances or regulations	27.3%
Other (please specify)	18.2%



11. What two approaches do you feel would have the most effect on improving or protecting surface and groundwater resources in Becker County?

Answer Options	Response Percent
Providing Education to the Public	27.3%
Providing Technical and Planning Assistance	27.3%
Providing Financial Assistance to Landowners	54.5%
Enforcing Existing Laws	54.5%
Increasing Regulation	18.2%
Reducing Government Involvement	18.2%
Other (please specify)	0.0%



Individual additional comments:

“We have enough laws. Promoting awareness/education such as informing lake shore owners of the detrimental effects of lawn fertilization and promoting better stewardship. Implementing cost sharing programs is a much more effective and less intrusive approach than making more rules, regulations and red tape that foster more red tape and negativity.”

“ There is a Lack of knowledge about natural resources by our State and local government officials.”

“The City of Detroit Lakes is not being responsible with their authority to administer the the shoreline ordinance. Detroit Lakes is being negatively impacted because of that.”

Resource Assessment, Prioritization and Targeting

Assessing, prioritizing and targeting areas for implementation efforts of water quality projects in Becker County requires an understanding of existing conditions, projected changes, nutrient and sediment sources and potential effects to water quality within the watersheds.

Risks or indicators of risks include but are not limited certain soil characteristics, geomorphology, land disturbance, potential for landuse change, existing & historic nutrient levels, proximity to surface or ground water and other factors.

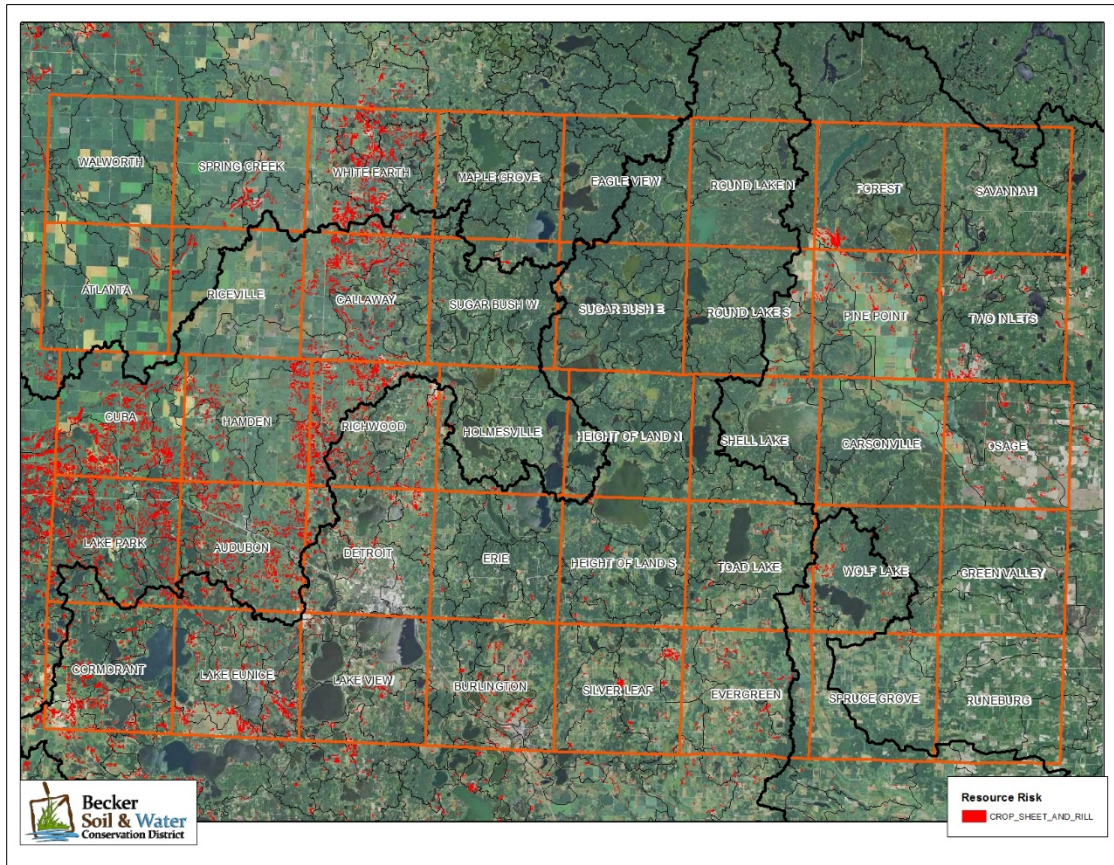
While not an exhaustive list of resource inventories, tools or methodologies, the following examples are intended to provide an overview of some of the tools and information that have been used in the past, are currently in use or are in development as of the creation of the 2017-2027 Local Water Management Plan to target and prioritize implementation activities. Individual Maps, data, methodologies and further information are available upon request.

Soil Map Unit Assessment

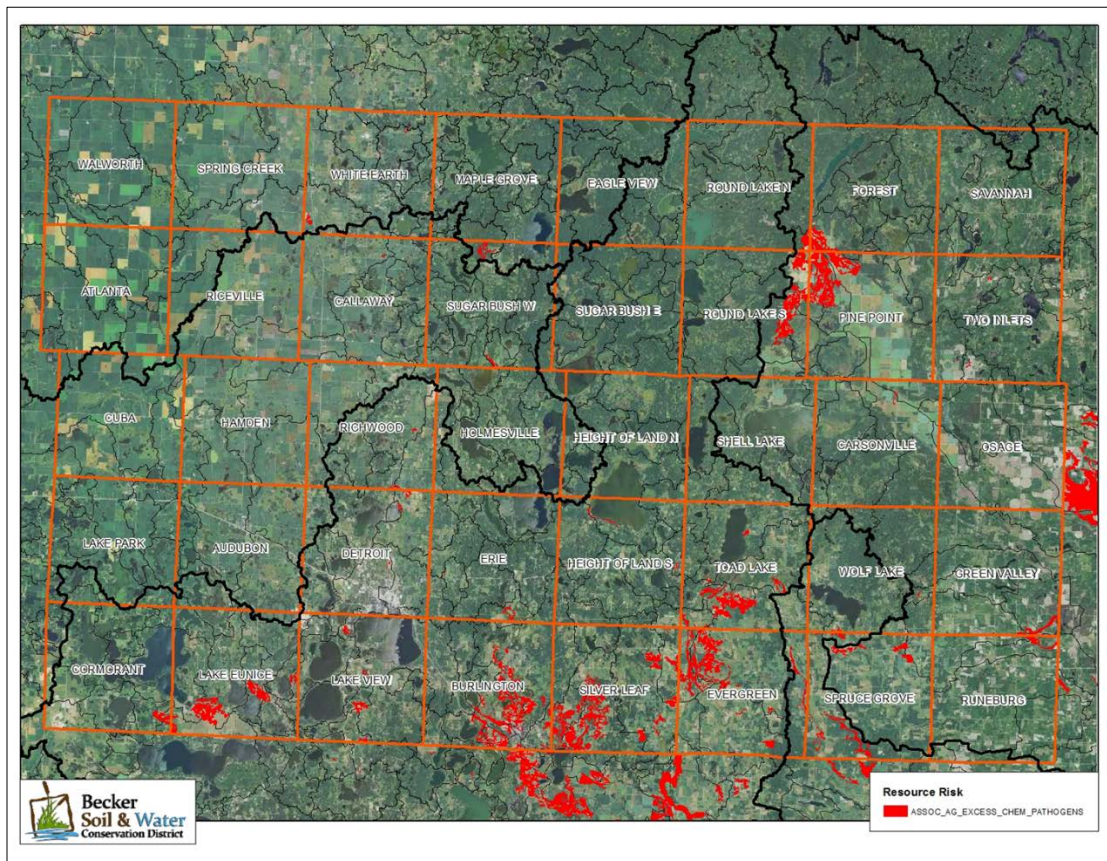
USDA-NRCS SSURGO Geospatial Soils data was used in conjunction with other ancillary data to assess soil vulnerability for 18 risk factors that could pose risks to local water quality on agricultural, forest and pasture land, as well as associated ag land (farmyards, stock yards, headlands). Selected map units are flagged as indicators of portions of the landscape where protective or restorative measures may have a positive effect towards water quality goals.

Resource Risk	Metric
Sheet and Rill erosion	Limiting EI of 5 or greater
Concentrated flow erosion	Limiting EI of 8 or greater
Wind erosion	Wind Erodibility Groups 1,2,4L
Compaction	Somewhat poorly drained, or poorly drained, or very poorly drained soils and texture IS NOT sandy, coarse or not used
Organic Matter Depletion	Moderately well or well drained soils with equal to or greater than 2% organic matter
Ponding, flooding, high water table	Limiting Flood Class is occasional, frequent or very frequent, or limiting pond class is frequent or very frequent
Excess nutrients in surface/ground waters	Sensitive Soil Features
Pesticides transported to surface/ground waters	Pesticide Runoff Potential equals moderate or severe or Pesticide Leaching Potential equals severe
Excess pathogens/chemicals from manure, biosolids or compost	Surface Septage Application equals Limited or Very Limited
Excess pathogens/chemicals from manure, biosolids or compost	Aquifer Assessment equals sensitive
Excessive sediment in surface waters	Limiting EI of 8 or greater, limiting flood calss equals occasional, frequent or very frequent
Elevated water temperature	100 ft Riparian Buffer Contains Designated Trout stream AND Areas where LU ISNOT 'forest' or HUC12 intersects 303d listing for TEMP
Undesirable plant productivity and health	Aspen Productivity Index equal to or less than 35
Undesirable plant productivity and health	MN Forage Suitability Groups 4,8,12,17,18,22, or 24
Excessive plant pest pressure	50% of forested Acres, 50% of Prairie
Habitat degradation	5% Cropland, 5% Forest, 20% Pasture, 25% Associated Ag Lands OR Areas w/in 500ft of TE Species or Species of Biologic Significance
Inadequate feed and forage	Crop Productivity Index less than or equal to 50
Emissions of particulate matter (PM) and PM precursors	Wind Erodibility Groups 1,2,or 4L intersecting permitted feedlots

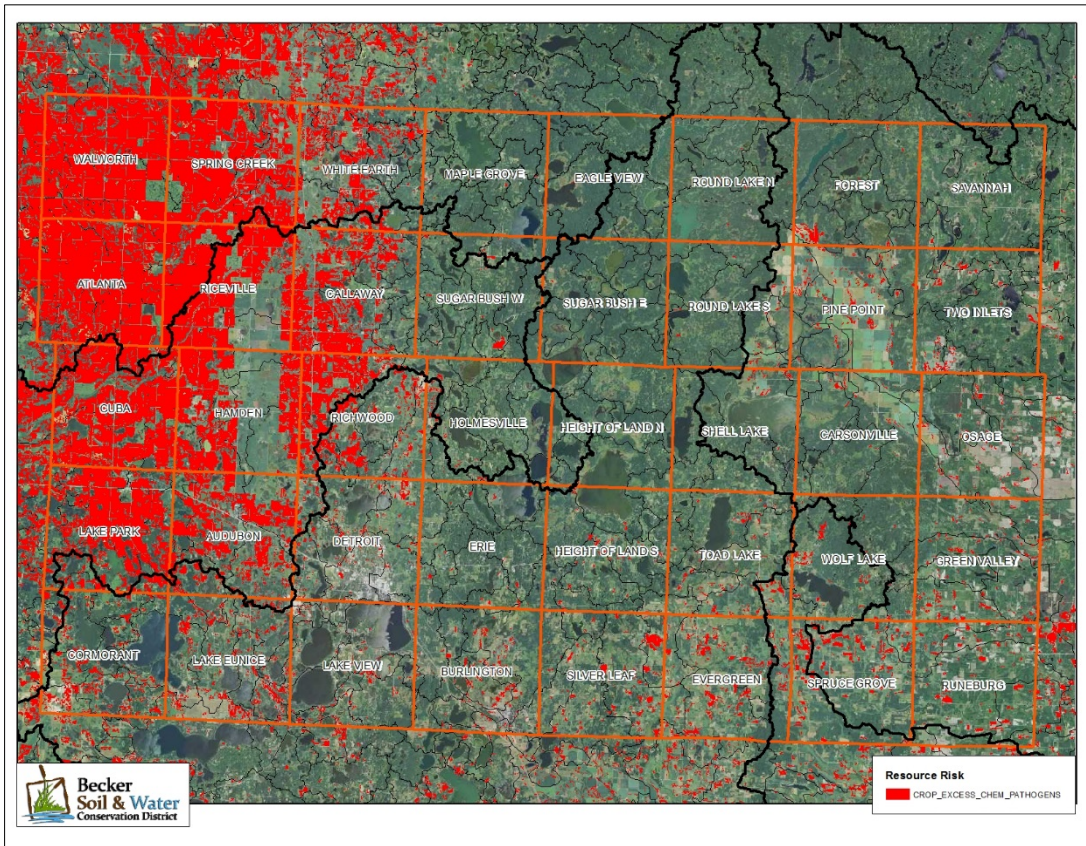
Example 1. Cultivated Cropland with Soil Map Units at Risk for Sheet and Rill Erosion



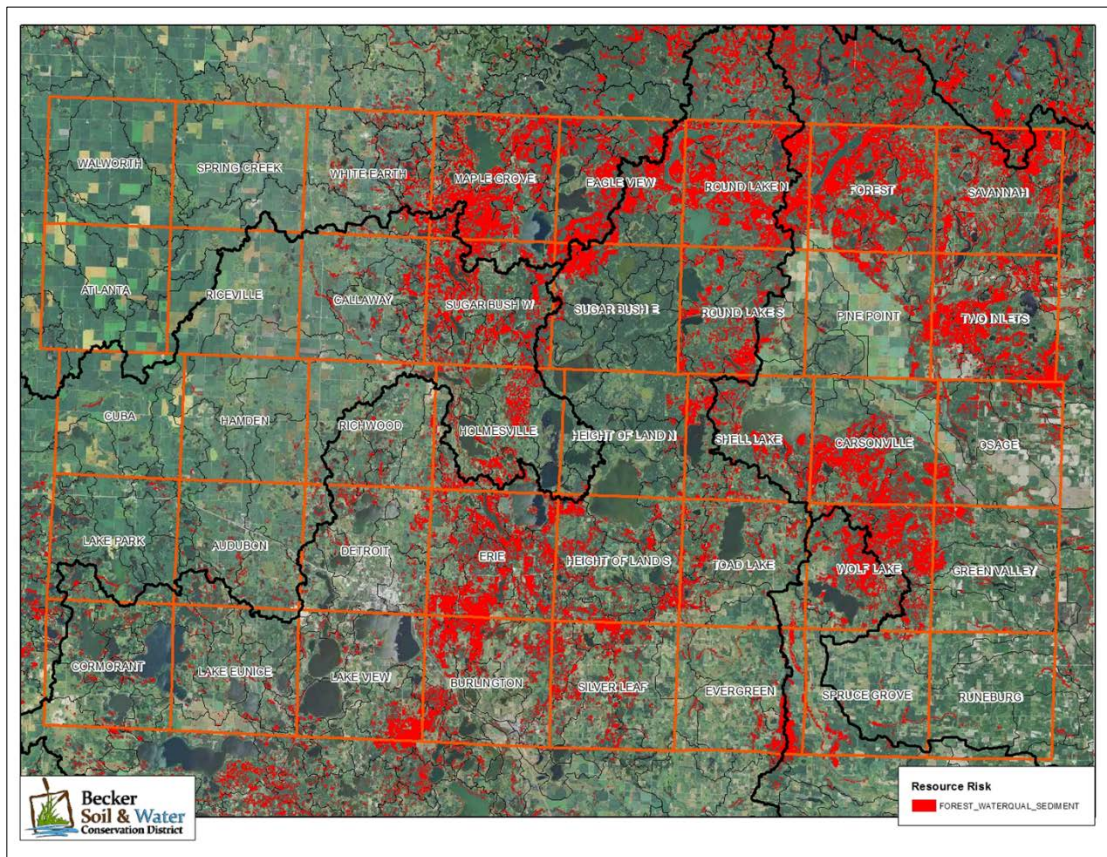
Example 2. Associated Ag Lands with Soil Map Units at Risk for Excess Chemical Delivery to Groundwater



Example 3. Cultivated Cropland with potential to contribute excess nutrients and chemicals to surface waters



Example 4. Forested lands with potential to contribute excess sediment to surface waters

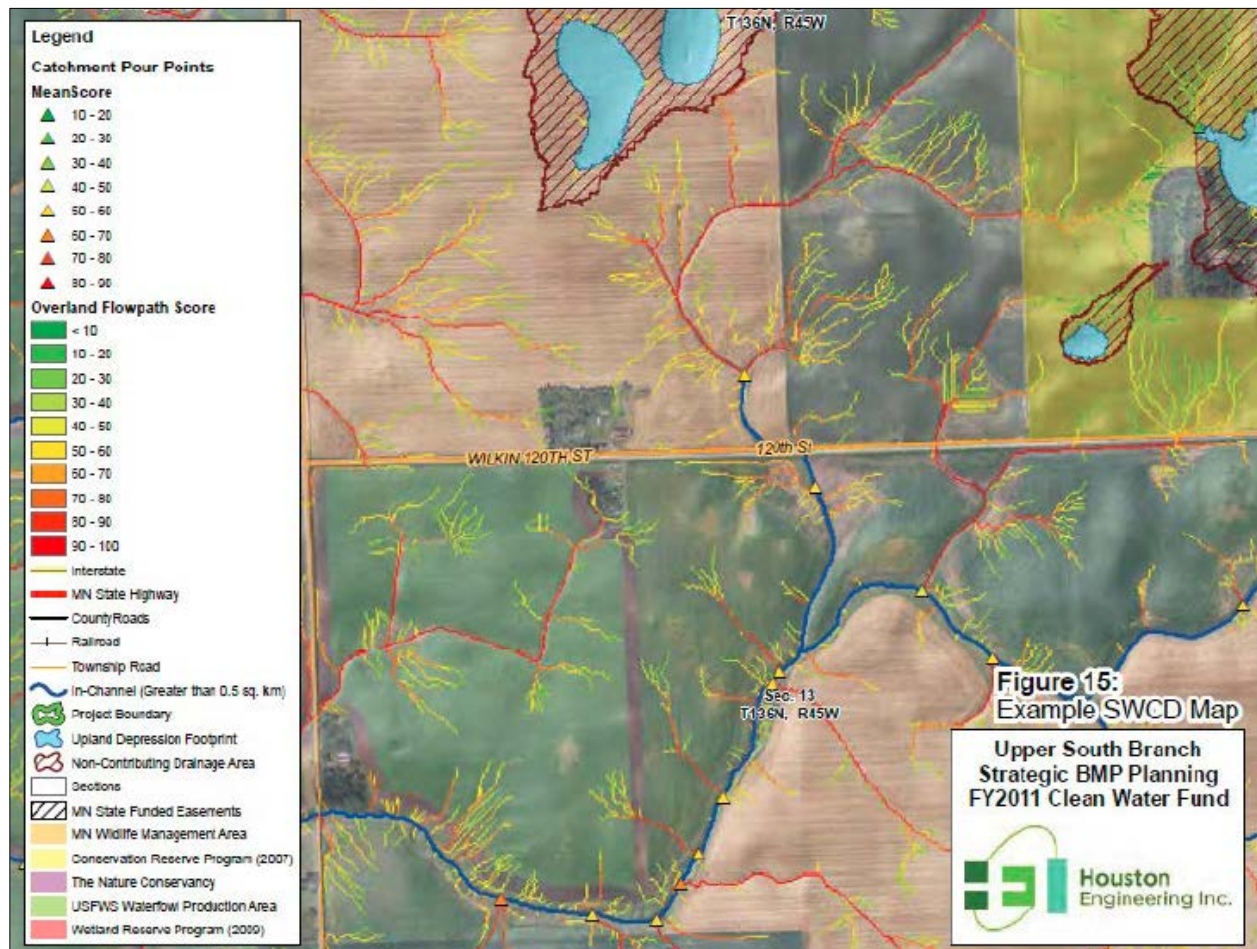


LiDAR Terrain Analysis

Light Detection and Radar (LiDAR) is a remote sensing technology that uses laser light to detect and measure surface features on the earth. The resulting data can be converted into elevation data and used to create a digital elevation model (DEM) for GIS analysis. The general mapping and analysis of elevation/terrain has been used for erosion analysis, water storage and flow analysis, siting and design of BMPs, wetland mapping, and flood control mapping. A specific application of the data set is to delineate small catchments.

As part of local planning in the Buffalo Red, Otter Tail and Wild Rice watersheds, advanced GIS techniques utilizing LiDAR topography and soils and land cover data have been used to rank and classify highly erosive portions of the watershed. This methodology ranks basins within the watershed by analyzing and scoring the results of the Stream Power Index (SPI) and a spatial application of the Revised Universal Soil Loss Equation (RUSLE). This methodology can be used to identify critical management areas to prioritize the implementation of BMPs and provides a relative indication of the erosive power of the overland, concentrated, surface water runoff at locations across the landscape.

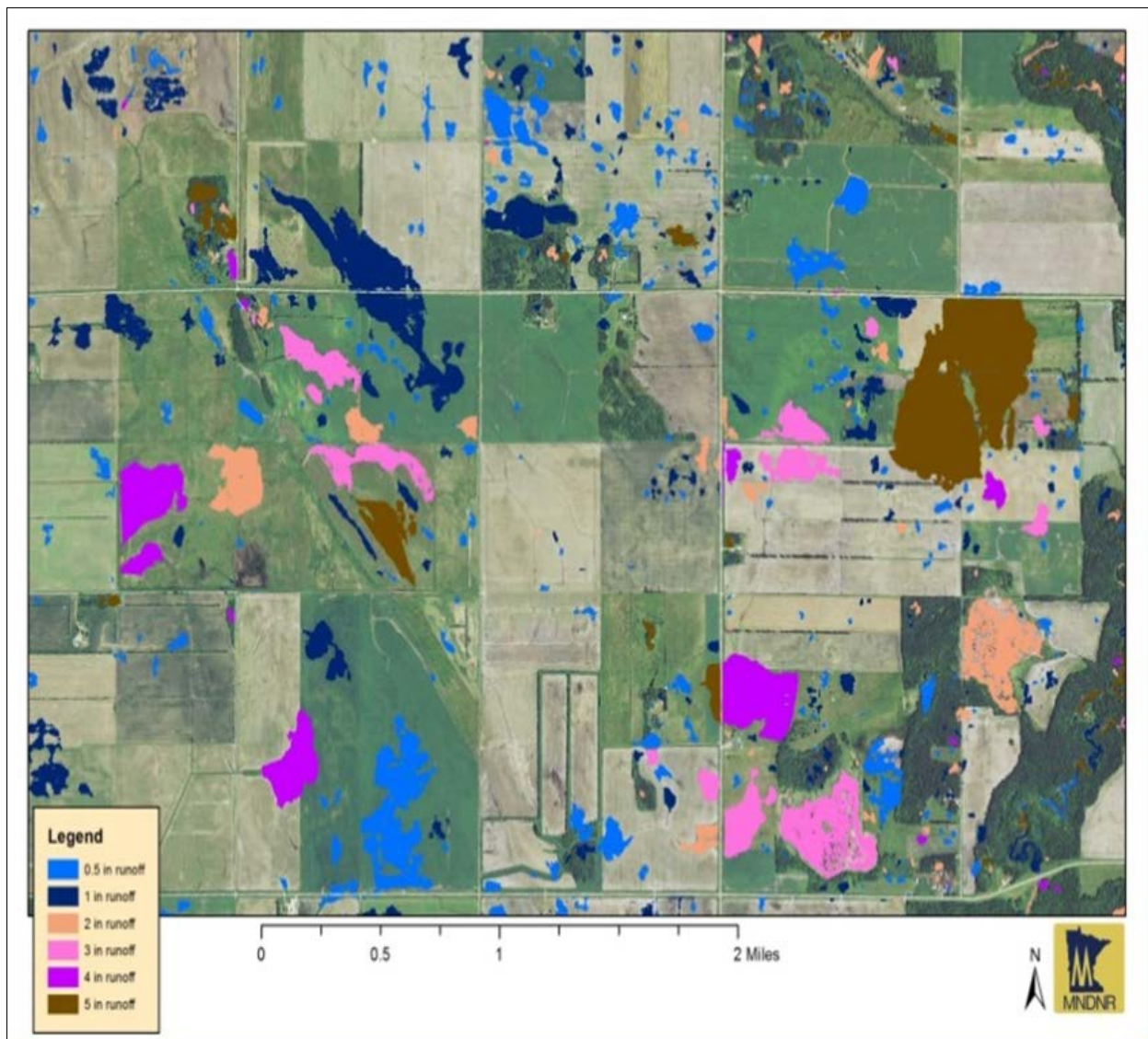
Example 5. LiDAR Terrain Analysis mapping in the Buffalo River Watershed



LiDAR Terrain Analysis (Cont.)

Another useful dataset has been derived through LiDAR-based terrain analysis, using a topography based model that reflects existing conditions and estimates pre-settlement elevations prior to hydrological alterations and the construction of infrastructure including roads, railroads and other altered surfaces. This model produces an indication of the spatial extent, depth and volume of drained depressional area or basins – potential sites to evaluate for flood damage reduction, water quality or habitat related projects.

Example 6. LiDAR Terrain Analysis mapping drained basins



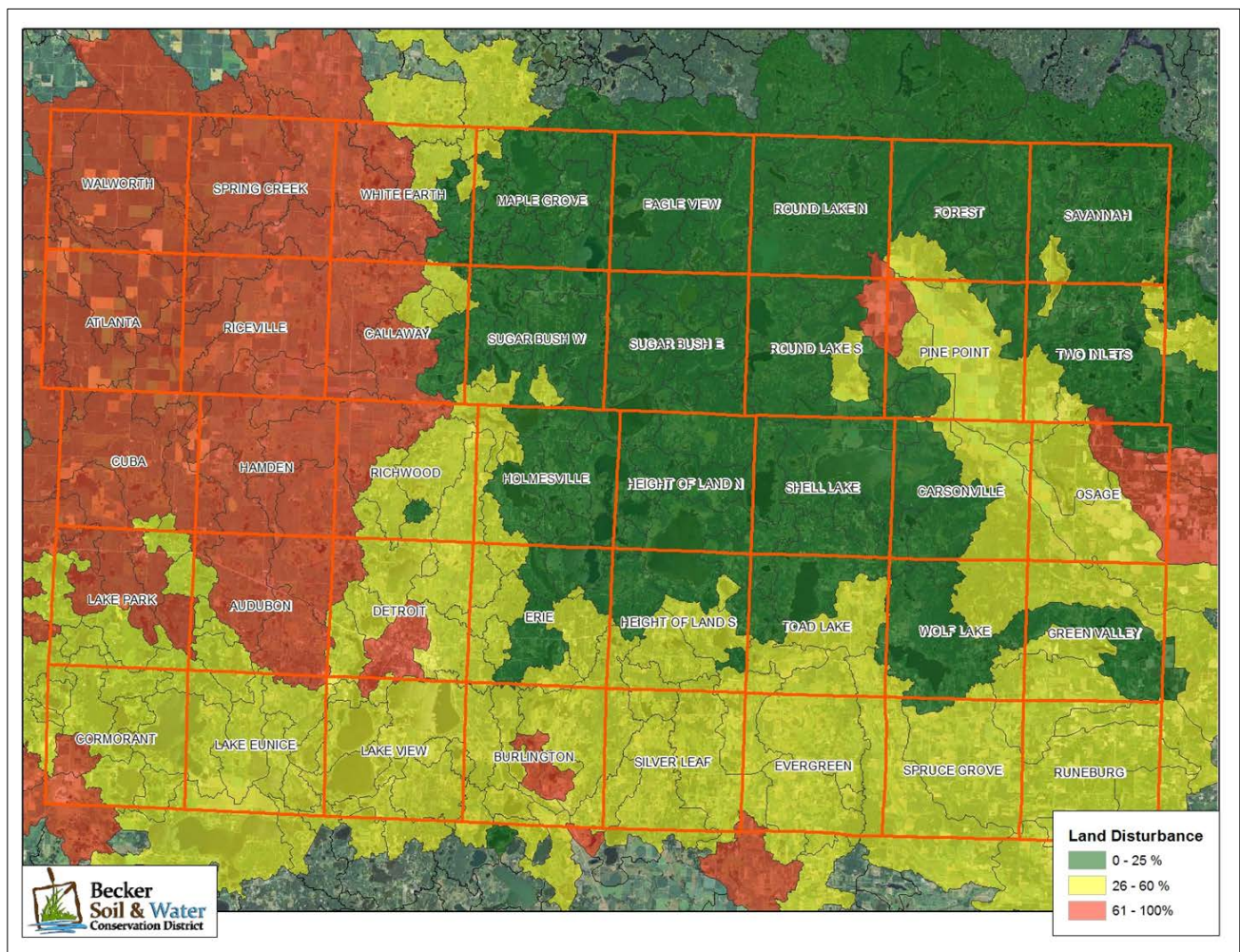
Future use of LiDAR terrain analysis in restoration and protection efforts will include the identification of field-scale priority management areas within the covered watersheds, expanding as more data becomes available.

Land Disturbance

A key factor in determining an appropriate water quality approach is the proportion of a stream or lake's watershed that is undisturbed or protected from land use disturbance. For example, many lands in Becker County are protected by extensive public ownership. Lakes in that part of the county benefit from extensive forests, parks, and wildlife areas held by the county, the MN DNR, the US Fish and Wildlife Service and others. These publicly owned lands are generally managed with relatively undisturbed forests, shrubs, grass, and wetlands. Lakes with undisturbed watersheds and high levels of protection should maintain good water quality. Considerably less public land exists in the southern and western, agricultural portion of the County.

Based on specified classifications from the 2011 National Landcover Dataset (NLCD) Developed - open space; developed - Low intensity; Developed-medium intensity; Developed-high intensity; Grassland-herbaceous; Pasture-Hay; Cultivated crops, the following map summaries % land disturbance at the lakeshed/ catchment level.

Example 7. Land Disturbance at the Catchment or Lakeshed Level.

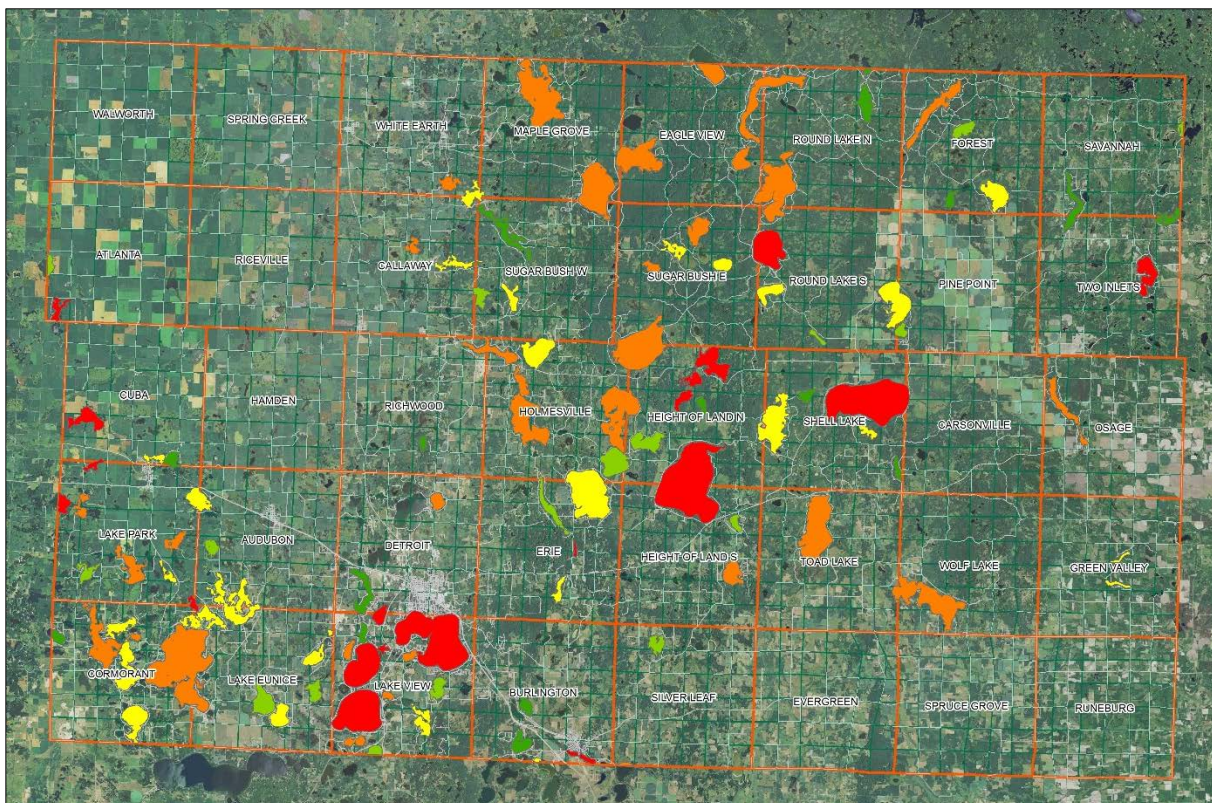


Phosphorus Sensitivity

No two Minnesota lakes are alike, and similarly no two lakes will have the same response to additional phosphorus loading. Utilizing work on the subject by MN DNR's Paul Radomski, phosphorus sensitivity was estimated for each lake by predicting how much water clarity would be reduced with additional phosphorus loading to the lake.

A phosphorus sensitivity significance index was formulated to rank lakes as they relate to the policy objective of focusing on "high quality, unimpaired lakes at greatest risk of becoming impaired." The phosphorus sensitivity significance index is a function of phosphorus sensitivity, lake size, lake total phosphorus concentration, proximity to PCA's phosphorus impairment thresholds, and watershed disturbance.

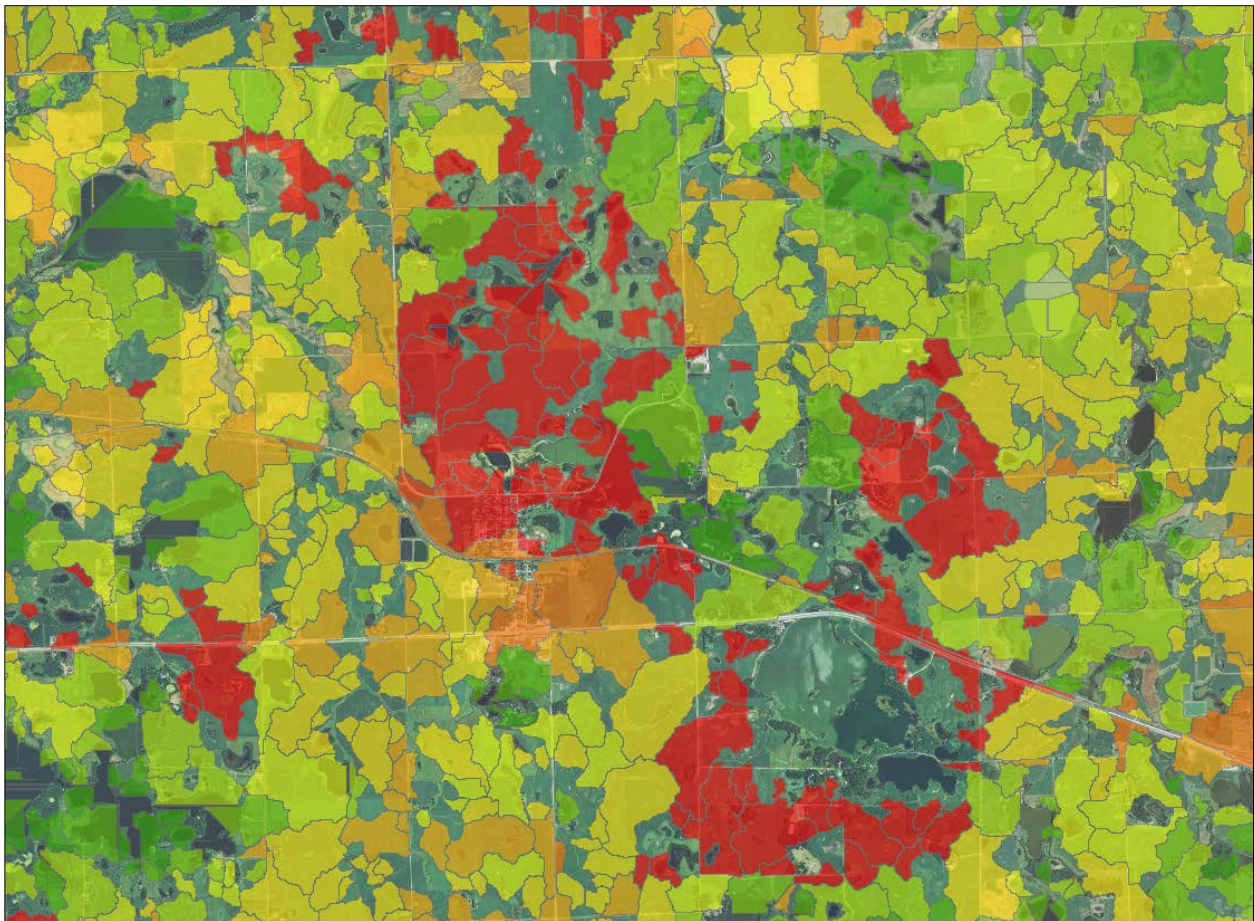
Example 8. Ranked Phosphorus Sensitivity of Assessed lakes



Water Quality Decision Support Application

The Water Quality Decision Support Application (WQDSA) is a shared vision among a diverse group of stakeholders lead by the International Water Institute (IWI). The WQDSA provides land and water managers with geospatial data and online tools to prioritize, target, and measure conservation practices on the landscape to achieve water quality objectives identified in local and state plans and ensure that decisions to spend public funds are strategic, defensible and transparent. The application allow users to 1) identify the water quality problems, 2) establish goals and objectives, 3) reference planning documents, 4) interactively create maps of projects for demonstration and marketing, 5) save projects in a database for future refinement, and 6) potentially export relevant information in a format suited to existing planning and reporting tools.

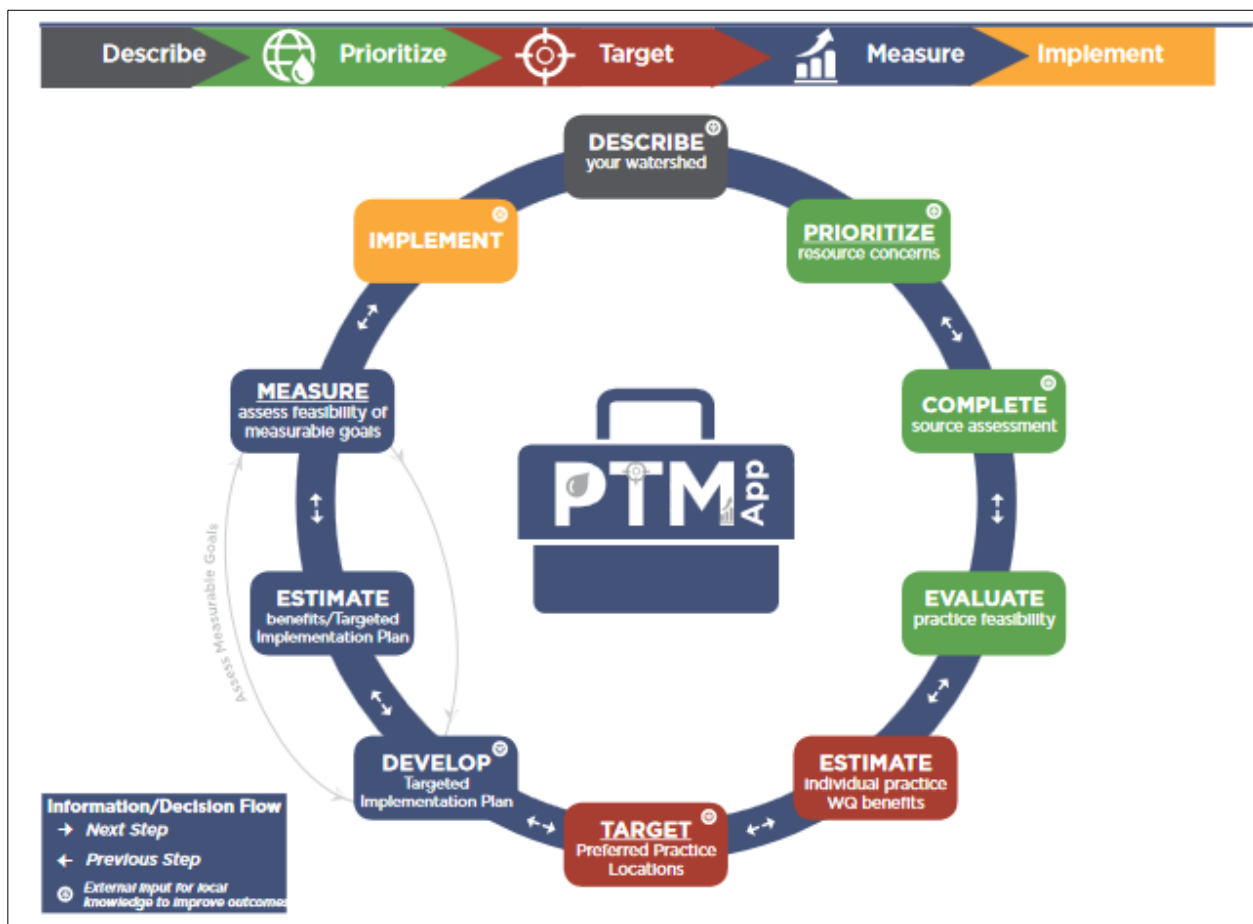
Example 8. WQDSA Overland Catchments reflecting total Phosphorus Loss Rates



PTM App

The Prioritize, Target, Measure Application (PTMApp) is an innovative new tool that aids users with aspects of surface water quality planning from describing the watershed to developing implementation plans. The PTM App enables users to identify and describe important resources, features, and other factors, prioritize resource concerns, complete a source assessment, evaluate practice feasibility, estimate field and watershed scale effects and measure load reductions as they relate to local goals.

Example 8. PTM App Process and Workflow



By running various scenarios in PTMApp, users can identify scenarios to implement the best, targeted solutions. PTMApp can analyze various practices and estimate the largest load reductions for specific areas within a given watershed. This information helps users implement the best possible practices in the most effective locations

