Kanabec County Water Plan 2019 – 2028

KANABEC COUNTY
COMPREHENSIVE LOCAL WATER PLAN

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WATER PLAN TECHNICAL STAFF

Teresa Wickeham	Environmental Services Director
Deanna Pomije	Kanabec Soil & Water Conservation District

TABLE OF FIGURES

EXECUTIVE SUMMARY

The Kanabec County Comprehensive Local Water Plan update was coordinated with the assistance of a committee of eight members. Information obtained through the scoping document process dictated priority concerns for the county.

AUTHORITY

The authority to prepare comprehensive local water plans was granted to counties in 1986 when the Minnesota Legislature passed the Comprehensive Local Water Management Act. The legislature recognized the need to manage the State's surface and ground waters in a comprehensive manner and determined that water resource planning should occur at the county level as local residents are in the position to recognize problems and identify and carry out needed actions to effectively address local water resource issues.

PURPOSE OF PLAN

The purpose of Kanabec County's Comprehensive Local Water Plan is:

- To identify existing and potential challenges or opportunities for the protection, management, and development of water resources and related land resources in Kanabec County and the Snake River Watershed.
- To develop and implement an action plan to promote sound water management decisions.
- To use the plan in seeking funds for implementation of our planned action items.
- To achieve effective environmental protection of Kanabec County's water and land resources.

Based on the understanding of existing conditions, county officials can then decide:

- What water resources are necessary and desired for future growth and development;
- And determine a course of action to achieve and maintain the quality of life desired in Kanabec County.

Kanabec County recognized that counties must develop their own local plan for managing water resources. If not, they will eventually lose the opportunity to make intelligent, local choices that anticipate or prevent water resource problems in the future.

Kanabec County also recognizes that a well-developed comprehensive water plan can also integrate local initiatives with existing state and federal water related programs and funding sources. This integration also allows more effective management of all programs developed for the protection of water resources and the general environment.

SCOPE OF PLAN

This comprehensive local water plan addresses the physical, surface water, ground water and related land resources. The plan utilizes existing data and local public input.

Discussion within the plan addresses primarily water quality. Although water quantity is also addressed, quality is a more prominent problem within Kanabec County.

PLANNING PROCESS

The Kanabec County Board of Commissioners passed a resolution on June 13, 1990, to engage in this water planning process and enter into an agreement with the Minnesota Board of Water and Soil Resources. On August 24th, 2005, the Kanabec County Board of Commissioners passed a resolution, indicating their intent to update the 2001 plan. The Kanabec County Board of Commissioners delegated the task of coordinating water planning to the Kanabec County Water Plan Administrator. In addition, the Water Planning Committee was charged with the task of updating the comprehensive local water plan for Kanabec County.

FUTURE PLANNING

The Snake River Watershed Restoration and Protection Strategies (WRAPS) report is anticipated to be re-written or updated in 2019. This is after the completion of the cycle two surface water quality monitoring project (2017-18). The water quality monitoring results will be reviewed for any improvements or added impairments to our surface waters of the Snake River Watershed.

Currently under development (through the summer of 2018) is a Snake Watershed Landscape Stewardship Plan. This is a plan that will assist in prioritizing protection strategies and practices that address our local resource concerns. It will entail a lot of forestry strategic options to protect our existing good water quality. Protection practices are generally less expensive than working to clean up impaired waters. This plan is due to be completed in 2018.

Discussion has started with the Snake River Watershed Management Board on the proposed ‘One Watershed One Plan’ process is anticipated to commence soon, possibly 2020. The planning process may take about two years. This new ‘One Watershed One Plan’ will eventually replace this Water Plan. The Snake River Watershed Management Board is an appropriate group to start down this planning process as they already meet regularly and represent the Snake River Watershed major four county area.

PAST ACCOMPLISHMENTS
2011 - 2018

Since approval of the current Kanabec County Comprehensive Local Water Plan, the following items have been funded. Several of these are on-going items that will continue to be addressed in this updating of the plan.

Education and Information

The Kanabec SWCD and the NRCS have worked with local schools to establish a water quality education program called "River Watch". The program is conducted each spring and fall and includes Mora and Ogilvie schools.

In 2016 and 2017, the Kanabec SWCD hosted a booth at the Mora Area Home Show for further outreach on Aquatic Invasive Species and on the completed Mora Stormwater Study. Every year 2012-2015, the Water Plan Committee hosted a booth at the Kanabec County Fair. This reached a more diverse group of people than the Home Show. As part of these outreach events in 2016 and 2017 private well water was tested for nitrate levels. This provided a service to the residence of Kanabec County with a better understanding their drinking water quality. The data collected from nitrate well water testing will continue to be collected and eventually compiled spatially. Our intent is that the spatial data, over time may show trends to where high nitrates are occurring in the county for future targeting of conservation best management practices to prevent continued nitrates from entering our aquifers.

Inventory and Mapping

In 2005, the Water Plan Committee started funding the county ditch inventory. This ongoing mapping of the ditches will help access the county ditches for future water projects.
Water Plan funds have been used to assist with the completion of a soil survey for Kanabec County. In 2005, the survey was completed. This is the first detailed soil survey of Kanabec County.

During 2000, septic system compliance inspections were completed for several residences around Lewis Lake. Water Plan funds were used to complete the inspections. By 2001, all participants made the required repairs or replacements.

Land and Water Treatment

Feedlot Improvements – Water Plan funds have been used to provide technical assistance for feedlot improvements. This has been ongoing and will continue throughout the upcoming years.

Manure Management Plans – Water Plan funds have been used to provide technical assistance for manure management plans. This includes calculating application rates to best protect water quality and provide proper crop nutrients. Additional manure management plans are underway and will continue in the upcoming years.

Shoreline Erosion Control – Water Plan funds have been used to provide technical assistance and cost sharing for development and installation of shoreline erosion control plans. The emphasis on natural vegetative buffers will be ongoing through the upcoming years.

Water Monitoring and Data Collection

Well testing for families with new babies is another project, where Water Plan money has been used. This on-going program is a valuable tool in preventing health risks to newborn infants. The SWCD is planning to offer well nitrate testing annually at the Fair. The results are being spatially represented in order to see if trends develop, where there are vulnerable groundwater areas are in the county.

A summary of recent water monitoring by the SWCD follows:

2012: A Clean Water Partnership, phase I protection grant allowed for 6 streams and 3 lakes to be sampled.
2013: A Clean Water Partnership, phase I protection grant allowed for 6 streams and 3 lakes to be sampled. In preparation for a Mora Stormwater Report on the city of Mora's runoff, 5 stormwater outlets were sampled using a YSI monitoring probe.
2014: A Clean Water Partnership, phase I protection grant allowed for 6 streams and 3 lakes to be sampled. The Mora stormwater 5 sites continued to be sampled.
2015: A Clean Water Partnership, phase I protection grant allowed for 6 streams and 3 lakes to be sampled half way through this summer. The Mora stormwater 5 sites continued to be sampled.
Spring Lake, just northeast of Mora was sampled upstream and downstream for the Mora Stormwater report.
2016: A Clean Water Partnership, phase II protection grant allowed for 6 streams and 3 lakes to be sampled.
2017: A Clean Water Partnership, phase II protection grant allowed for 6 streams and 3 lakes to be sampled. Under a MN PCA Surface Water Assessment Grant the 2nd cycle of sampling was started in the Snake River Watershed in preparation for a rewrite of the Snake WRAPS report. This involved sampling 11 stream sites and 5 lakes. Lake volunteers are being utilized.
2018: The second and final year of the Surface Water Assessment Grant sampling continues.

Water quality monitoring of Knife Lake has been done since the initial water plan in 1992.

Average summer water quality characteristics for lakes in Kanabec County can be classified in two ecoregions: Northern Lakes and Forests, and North Central Hardwood Forests. The boundary between these two regions is north of Ann Lake and through the Knife River watershed heading east. Parameters for the two ecoregions are recommended by the MPCA as follows:

Parameter	Northern Lakes & Forests	North Central Hardwood Forest
Total Phosphorus (mg/l)	.014 - .017	.023 - .050
Secchi Disk (feet)	8 – 15	4.9 – 10.5
Chlorophyll-a (mg/l)	<10	5 – 22
Nitrate + Nitrate (mg/l)	<.01	<.01
Total Suspended Solids (mg/l)	<1 – 2	2 – 6

The monitoring of lakes within Kanabec County has also been established using Water Plan funds. Water samples are collected on area lakes from May through September. Samples are tested for levels of nitrates, phosphorous, chlorophyll and other parameters as needs arise. The SWCD continues to be called upon by concerned citizens in regards to testing for water quality both surface and ground water. The SWCD assists with monitoring were feasible, practical and when funding is available, otherwise they will refer citizens toward the needed resources.

The Water Plan Committee will meet regularly at least twice per year to coordinate and plan activities. A detailed plan of action will be prepared annually to adequately fund and assign responsibility for completing the necessary priority items to achieve the desired goals. This will provide flexibility and allow for better management of funds and personnel to achieve the water plan's goals.

PLANS - LOCAL

Land uses and development activity affect water resources. For this reason, the State rules for the preparation of comprehensive local water plans require the submission of any existing water and related land resources plans and official controls. Existing water and related land resources plans must be fully utilized in preparing the comprehensive water plan.

This correlation between local plans and controls and the local comprehensive water plan continues after the preparation and adoption of the plan. The Water Planning Act states that local unit of government shall amend existing water and related land resource plans and official controls as necessary to conform them to the applicable, approved comprehensive water plan.

It is therefore important to evaluate local plans to determine what types of plans and controls exist, their consistency throughout the hydrologic system, and their effectiveness in addressing existing and potential problems.

Existing Reports and Controls
Existing local plans and controls related to and evaluated in this water planning process are:

Ann Lake Internal Load Study, 2018
http://www.kanabecswcd.org/2017/09/26/ann-lake-nutrient-internal-load-study-presentation/
Ann River Stressor ID, Sept. 2011
Ann River TMDL 2013
Ann River Watershed TMDL Implementation Plan, July 2013
East Central Landscape Management Plan, March 2005
http://mn.gov/frc/regional-landscape-plans.html
Fish Lake Assessment, 1993
https://www.pca.state.mn.us/water/tmdl/ann-river-watershed-multiple-impairments-tmdl-project
Geologic Atlas of Kanabec County, Geology completed 2016, Hydrogeology in progress
https://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/kanacga.html
Groundhouse River Watershed TMDL 2009
Groundhouse Stressor ID 2004
https://www.pca.state.mn.us/water/tmdl/groundhouse-river-bacteria-and-biota-tmdl-project
Kanabec COLA Aquatic Invasive Species 2017 Plan, (included here page 40-41)
Kanabec County Ordinances:
- Ann Lake, No.28
- Comprehensive Plan, Ordinance No.22, May 2002
- Flood Plain Ordinance No.9
- Individual Sewer System Ordinance No.6
- Knife Lake, No.21
- Knife Lake Archeological Sites Ordinance No.12
- Shorelands Management Ordinance No.5, June 2012
- Sewage Treatment, No.6
- Solid Waste, No. 14
- Subdivision Regulations No.4
- Waste Tire, No.11

http://www.kanabeccounty.org/departments/county_ordinances.php
No Burn Resolution, Kanabec County
http://www.kanabeccounty.org/departments/environmental_services/solid_waste_management.php
Kettle River Watershed Landscape Stewardship Plan 2014
https://mn.gov/frc/docs/KettleRiverWatershed_LSP_April2014.pdf
Kettle River Watershed WRAPS Report Draft
https://www.pca.state.mn.us/water/watersheds/kettle-river#restoration
Knife River Stressor Identification, Feb 2012 (thesis by Bethany Lynn Blick)
https://conservancy.umn.edu/bitstream/handle/11299/122091/Blick_Bethany_February2012.pdf;sequence=1
Lake St.Croix TMDL, 2015
https://www.pca.state.mn.us/water/tmdl/lake-st-croix-excess-nutrients-tmdl-project
Implementation Plan for the Lake St. Croix Nutrient TMDL, Feb 2013
www.pca.state.mn.us/sites/default/files/wq-iw6-04c.pdf
MN Wildlife Action Plan, 2015-2025
https://www.dnr.state.mn.us/mnwap/index.html

Mora Stromwater Study, 2018
http://www.kanabecswcd.org/2017/05/12/mora-stormwater-study/
Mud Creek Stressor ID, May 2013
www.pca.state.mn.us/sites/default/files/wq-iw6-11n.pdf
Rum River Stressor ID, Aug. 2016
Rum River TMDL, Sept. 2017
Rum River Watershed WRAPS Report, July 2017
https://www.pca.state.mn.us/water/watersheds/rum-river
Snake River Watershed Landscape Stewardship Plan (under development, due summer 2018)
Mud Creek Stressor ID, May 2013
Snake River Watershed TMDL 2013
Snake River Watershed WRAPS Report, Aug. 2014
https://www.pca.state.mn.us/water/watersheds/snake-river-st-croix-basin
St.Croix River Basin Aquatic Invasive Species Strategic Plan 2016
https://www.stcroixriverassociation.org/invasive-species/ais-strategic-plan/
Township and Municipal comprehensive plans
Township and Municipal Zoning Ordinances
http://www.kanabeccounty.org/community/township_information/arthur_township_information.php

SNAKE RIVER WATERSHED

Location, Size -
The Snake River Watershed is one of eighty one (81) major watershed in Minnesota, covering 986 square miles in parts of Aitkin, Chisago, Isanti, Kanabec, Mille Lacs, and Pine counties. The table below shows the area within each county.

County	Area in Square Miles	% of Total Area in County
Kanabec County	479.7	48.7
Aitkin	201.5	20.4
Pine	199.5	20.2
Mille Lacs	88.1	9.0
Isanti	15.3	1.6
Chisago	1.4	.1
TOTAL	985.5	100%

Since nearly all of Kanabec County is considered within the Snake River watershed, nearly every priority concern of this plan applies to the Snake River Watershed and should be considered as an action to be carried out within the watershed.

There are certain actions related to the Snake River watershed which Kanabec County is proposing to be common actions of all the watershed counties and to be carried out in a joint or coordinated manner. These actions can be more effective if carried out in a coordinated or joint manner rather than carried out individually. This is true of the water quality monitoring outlined in the SRWMB water monitoring plan.

The four major counties within the watershed have formed a joint powers agreement to coordinate the water plans of Aitkin, Kanabec, Mille Lacs, and Pine Counties. This coordinating body has developed and coordinates the Snake River watershed plan. These plans have been amended into the individual county plans.

The Snake River Watershed Management Board consists of one commissioner from each of the four counties. This board has all administrative and project approval authority. The SRWMB has one full-time coordinator that reports to the Board. There is a Citizens Advisory Committee consisting of one SWCD supervisor, one lake association member, and one private citizen from each of the four counties. There is also a Technical Advisory Committee, which consists of one technician from each SWCD office in the four counties.

The SRWMB funding source will be extremely helpful for the landowners throughout the watershed in improving the water quality.

The Snake River Watershed Management Board, SRWMB, adopted a long term Water Quality Monitoring Plan 1998 – 2008. This was adopted and implemented by the Board in 1988, this is a long term monitoring plan. Data has been collected, with analysis, yearly. The data will be run through models to further develop the information's usability. Attempts have been made to collect and standardize historic data collected by various agencies in the past, to give us a long term look. The large amount of data that has been collected and submitted is being reviewed, time permitting. Kanabec County through its Comprehensive Water Plan has developed an additional lake monitoring program and reimburses the SRWMB for part of its sampling program in Kanabec County. Pine and Aitkin Counties also participate in the long term sampling program.

The SRWMB and the Minnesota Pollution Control Agency (MPCA) have just completed an intensive one year sampling project on the Groundhouse River to do a Total Maximum Daily Load (TMDL) study. This sampling project not only included collecting water samples, but also flow data, biological data and analysis of stressors. The TMDL study on the Groundhouse River will result in a project implementation plan to address the identified impairments. The SRWMB and MPCA are looking at completing work plans to start TMDL studies on all of the Impaired Waters in the watershed. The Minnesota Department of Natural Resources (DNR), Division of Fisheries is completing detailed stream analysis on each stream in the Watershed. The Minnesota Pollution Control Agency staff is physically reviewing each stream for impairments and stressors.

The Snake River Watershed Management Board has also approved an expansion of our monitoring program to include the recruitment of Volunteer Stream and Lake Monitors to give

us more people looking at each stream and lake. The SRWMB will work with each volunteer with training and reimbursement of the initial application costs to MPCA. The SRWMB is also working with School Districts to set up additional monitoring programs for students.

PRIORITY CONCERNS

1. **Surface Water Quality and Quantity – Priority Concern**

'Protection and restoration of Kanabec County surface water quality and quantity'

2. **Ground Water Quality and Quantity – Priority Concern**

'Protect groundwater resources from impairments and develop a sustainable framework for groundwater users'

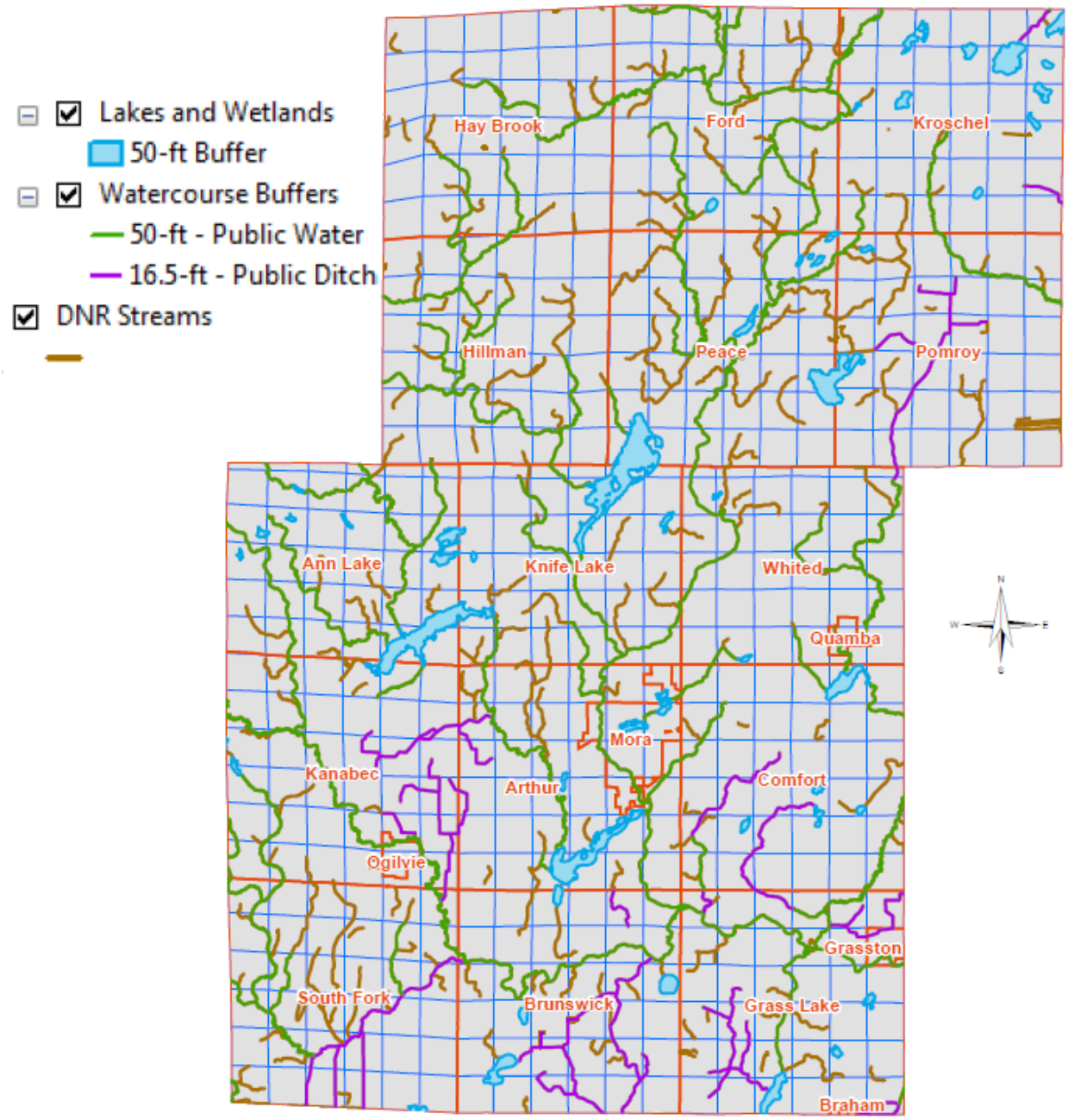
3. **Land Use – Priority Concern**

'Promote land use management beneficial to the county's natural resources'

TOPICS OF CONCERN:

AGRICULTURE

Buffer Protection Map



+Buffers

The MN Buffer Law came into effect in 2015 with revisions in 2016. The intent of the buffer law is to require vegetative filtering of cropland runoff, adjacent to public waters and public ditches. The MN DNR created the buffer map with input from the county which shows all the waters requiring buffers.

The deadlines for buffer implementation are:

+Public Waters:	50' buffers	due Nov. 1, 2017
+Public Ditches :	16.5' buffers	due Nov. 1, 2018

The Kanabec SWCD is responsible for annually inventorying the progress of implementation of the buffers, outreach to individuals affected by the buffer law, providing technical resources for buffer implementation, refer cases of non-compliance to the enforcing authority and make decisions on available alternative practices for buffers. As funding is available the SWCD may provide funding for buffer establishment.

As part of the Buffer Law the Kanabec SWCD in June of 2017 passed an; 'Other Waters Resolution' or additional waters where vegetation buffering would be beneficial and recommended. This is attached on the following page for your reference.

Progress on buffers was started in full force in 2017 in Kanabec County with a mailing to about 120 land owners informing them of the law and their requirements. Outreach has continued with these individuals through 2017 and 2018 as the deadlines approached.

Kanabec Other Waters – Local Water Resources Riparian Protection

Resolution # 2017-06-13

WHEREAS Minnestoa Statues 103F.48, Subd.4 requires Soil and Water Conservation Districts (SWCD)s in consultation with local water management authorities, to develop, adopt and submit to each local water management authority within its' boundary a summary of watercourses for inclusion in the local water management plan.

WHEREAS The Board of Water and Soil Resources has adopted Buffer Law Implementation Policy #6 'Local Water Resources Riparian Protection ("Other Watercourses") which identifies steps SWCDs are required to take in developing said inventory.

WHEREAS The Kanabec SWCD in meeting with local water management authorities within its jurisdiction in June, 2017 to discuss watershed data, water quality data and land use information as a criteria in development of this list.

WHEREAS The Kanabec SWCD recognizes that the health of our lakes and streams have the potential to be greatly influenced by surface water runoff conveyed via perennial streams, private ditches and other sources of concentrated flow.

WHEREAS The Kanabec SWCD has reviewed numerous map options and determined that producing a map of all the watercourses meeting the eligibility criteria would be time consuming and would not be inclusive of all watercourses where water quality would benefit from the voluntary installation of a buffer strip or alternative practice.

WHEREAS The SWCD determined that the rational for inclusion of "other watercourses" is to be inclusive of all watercourses where water quality would benefit from the installation of a voluntary buffer strip or alternative practice.

THEREFORE BE IT RESOLVED the summary of watercourses of "other watercourses" for Kanabec County shall be descriptive in format instead of in map format.

Be it further resolved that, to comply with MS 103F.48, the following shall describe "other watercourses" in Kanabec County for the purpose of inclusion in future local water management authorities updates within Kanabec County and to guide Kanabec SWCD decision making in order to further the goal of protecting riparian areas:

1. Any water course where water flow concentrates (permanent) and water quality from the contributing watershed would benefit from a vegetative buffer or alternative riparian water quality practice installed voluntarily by the landowner and for which the Kanabec SWCD will seek incentives to assist the landowner(s) to install and maintain a vegetative buffer in order to:
    a. slow the rate of water runoff and overland flows in order to maintain the stability and environmental integrity of the watercourse,
    b. sustain the existing land use of the contributing drainage are by maintaining or improving water quality,
    c. reduce water runoff by encouraging infiltration,
    d. reduce the rate of soil loss from the contributing watershed to the rate of tolerable soil loss ("T" rate) or below,
    e. provide complementary values of water quality, hydrologic stability, soil conservation, fish and wildlife habitat and ecological protection,
    f. improve the quality of downstream receiving waters and
    g. other values as may be mutually determined by the Kanabec SWCD and the landowner.

2. The following describes the circumstances under which an 'Other Water' vegetative buffer shall be installed voluntarily:
    a. any water course area within the 'DNR 24K Hydrography Map' not already required to have a buffer under the Buffer Law,
    b. and the water course is classified as a perennial water course according to a determination by Kanabec SWCD staff,
    c. the buffer width installed shall be determined according to the NRCS Filter Strip standard (393), with the current average minimum at 30' wide and
    d. all open tile intakes shall have a vegetative buffer unless the outlet provides an adequate buffer as determined by the Kanabec SWCD staff.

Be it further resolved that, it is the policy of the Kanabec SWCD that watercourses may be identified by a variety of mapping and remote sensing methods which may change over time but may be verified as needed or requested on site field investigation conducted by the Kanabec SWCD in cooperation with the landowner.

Approval:

_____ _____

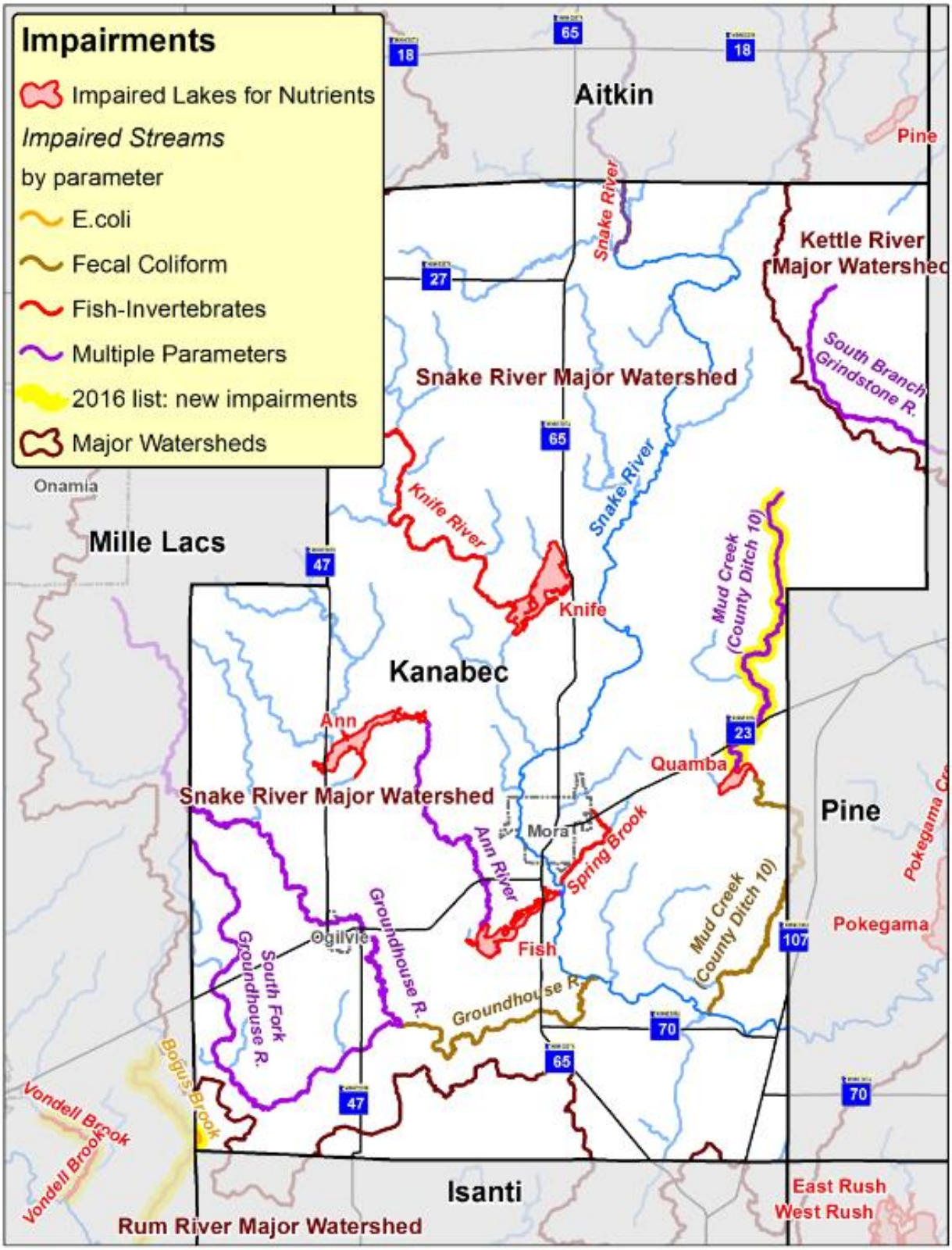
Paul Hoppe, Chair Kanabec SWCD Date

+Erosion Control

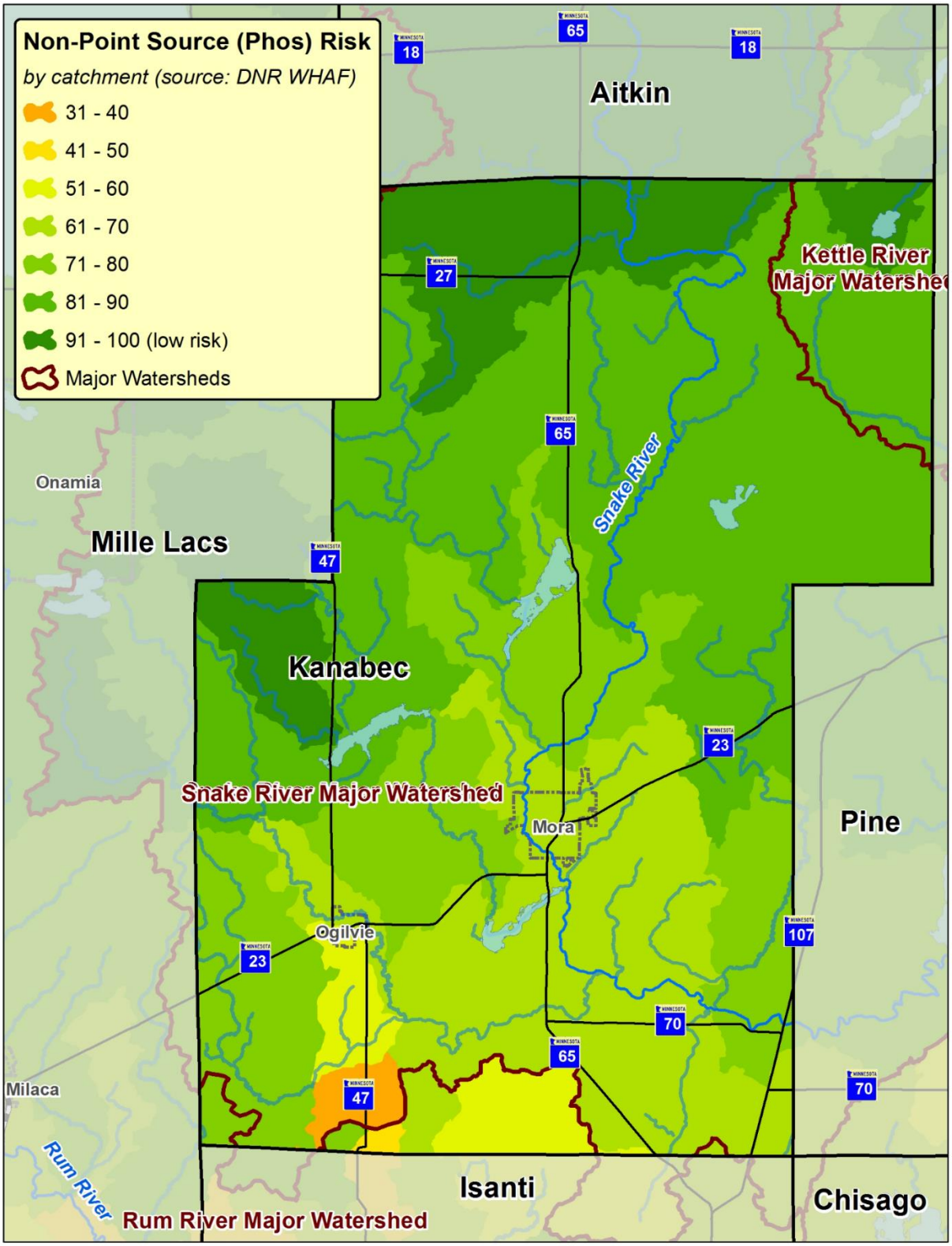
Documented data on the extent and severity of eroding lands and associated sedimentation problems does not exist for Kanabec County. The data that is presented in this section is based on visual observations of SWCD and NRCS staff and local residents, who notify the SWCD of erosion problems on their land.

In recent years, the SWCD has had a growing concern from shore land owners, regarding erosion problems. The SWCD along with other conservation agency partners, such as NRCS IMPACK 6 and Joint Powers Board, provides conservation assistance to landowners for these types of projects. Prioritizing, planning, surveying, and designing erosion control practices are a major part of their programs.

The majority of erosion control problems reported have come from shoreland property owners. These areas include the Snake River, Groundhouse River, Knife Lake, Knife River, Fish Lake, Lewis Lake, and Quamba Lake. Other areas reported have been on cropland areas in the southern half of the County. Sedimentation problems may also be problems created by construction projects. The projects may be short term but the sedimentation problems created can have a long-term impact.



Detailed water impairments are listed in Appendix C at the end of this document.


Non-Point Source (Phos) Risk
by catchment (source: DNR WHAF)
31 - 40
41 - 50
51 - 60
61 - 70
71 - 80
81 - 90
91 - 100 (low risk)
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River
Kanabec
Snake River Major Watershed
Mora
Pine
Ogilvie
Milaca
Rum River
Rum River Major Watershed
Isanti
Chisago
18
65
27
47
23
107
70

Feedlots

According to Minnesota Rule Chapter 7020 an animal feedlot is a lot or building or combination of lots and buildings intended for the confined feeding, breeding, raising, or holding of animals and specifically designed as a confinement area in which manure may accumulate, or where the concentration of animals is such that a vegetative cover cannot be maintained within the enclosure. For purposes of these parts, open lots used for the feeding and rearing of poultry (poultry ranges) shall be considered to be animal feedlots. Pastures shall not be considered animal feedlots under these parts.

The Minnesota Pollution Control Agency (MPCA) requires that an owner of a proposed or existing animal feedlot apply for a permit when:

a) An animal feedlot capable of holding 50 or more animal units or a manure storage area capable of holding the manure produced by 50 or more animal units; and

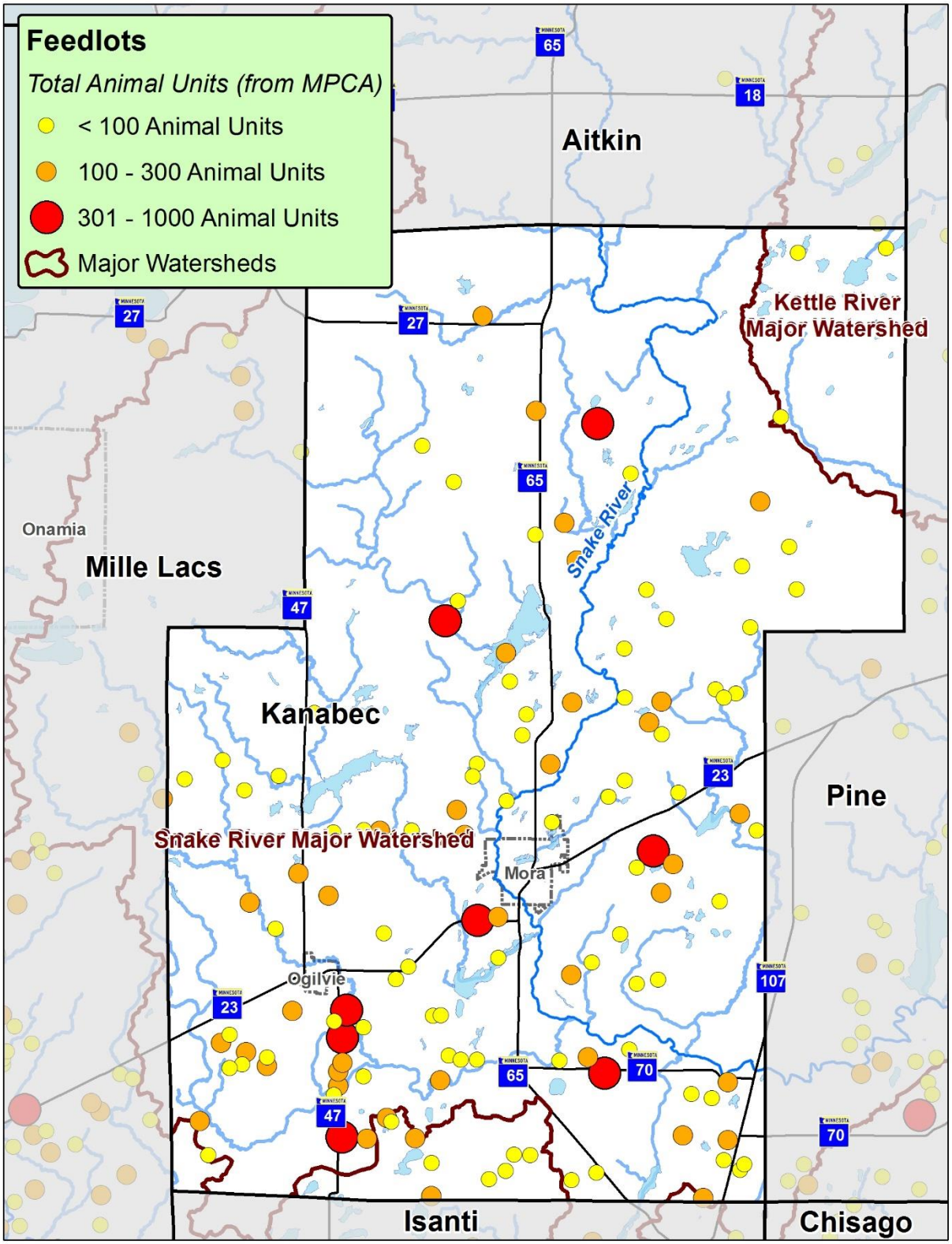
b) An animal feedlot capable of holding ten or more and fewer than 50 animal units or a manure storage area capable of holding the manure produced by ten or more and fewer than 50 animal units that is located within shore land.

Animal units are a standardized way to calculate the size of a group of animals of different kinds of livestock in a given area. For example in cattle, an animal unit is measured by the total number of animal's total weight in pounds divided by 1000. Thus an 800-pound steer would to the equivalent to 0.8 animal units.

In October, 2000, a major revision of the feed lot rules went into effect. The goals for the feed lot rules are registration of all feedlots capable of holding 50 animal units or more (10 in shore land). Focus on animal feed lots and manure storage areas that have the greatest potential for environmental impact.

Kanabec County is not a feedlot designated county. There about 125 livestock operations in the county. Some yet with feedlot runoff issues and other erosion or runoff issues. This is still a priority and maybe even more so, due to the lack of being a designated county. Currently there is a trend of dairy operations in the county going out of business, thus eliminating nutrient runoff concerns for that specific site. However there are still feedlot sites that pose a concern to our water quality. Historically farmsteads were located near a water source for the benefit of a good water source for the livestock. However, this now causes runoff issues where there is a concentration of manure. We propose that both the SWCD and the partnering agency continue to provide technical assistance to these livestock operations to address these resource concerns. Grants will be sought as willing operations are found willing to install conservation runoff practices.

Additionally, technical expertise if being provided mostly by the Natural Resources Conservation Service (NRCS) in promoting rotational grazing and those grazing practices that go along with them. Part of rotational grazing is calculating the appropriate and sustainable number of animals for a given acreage. A good rule-of-thumb stocking rate stocking is 1.8 acres per cow. This number can be further specified considering the exact number and size of animal, the average yield of the forage and the number of days the animals are on a given pasture. Funding for rotational grazing may be available through the Environmental Quality Incentives Program (EQIP) with NRCS. The SWCD staff also assists in rotational grazing and its' component practices. Component practices may include such things as pasture planting, fencing, fencing exclusion, livestock crossings, watering pipeline and watering facilities.


Feedlots
Total Animal Units (from MPCA)
< 100 Animal Units
100 - 300 Animal Units
301 - 1000 Animal Units
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River
Kanabec
Pine
Snake River Major Watershed
Mora
Ogilvie
Isanti
Chisago
65
18
27
65
47
23
107
70
47
70

Kanabec County

The 341,120 acres of Kanabec County are home to 15,837 people.

- The 5 largest agricultural inventory items for Kanabec County are forage land (hay and haylage, grass silage, greenchop), corn for grain, soybeans, corn for silage, and wheat for grain (all).
- The 5 largest livestock inventories are cattle and calves, layers, horses and ponies, sheep and lambs, and turkeys.
- Kanabec County is ranked 6th in the state for horses, ponies, mules, burros, and donkey sales.

Source: USDA 2012 Census

Kanabec County has...

- 341,120 acres total
- 128,790 acres in farms
- 648 farms

Source: U.S. Census Bureau 2012

38% of Kanabec County is farms.

Farm Land Use
51.1% in Cropland - 22.1% in Woodland
17.7% in Pastureland - 9.1% in Other

A **watershed** is an area or ridge of land that separates waters flowing to different rivers, basins, or seas.

Watersheds in the County (% of the County)

1. Snake River (90%)
2. Kettle River (6%)
3. Rum (Wahkon) River (4%)

Source: NRCS, USDA, and MPCA, 2007

Practices that farmers in Kanabec County implement to protect natural resources include:

- Field buffers, windbreaks, and reduced tillage to protect against soil erosion.
- Nutrient management best management practice techniques, including soil sampling, precision application, and split applications.
- Proper rates and timing of fertilizer application and integrated pest management to address groundwater concerns.

CLIMATE CHANGE

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions (i.e., more or fewer extreme weather events). As science has proven the effects of climate change are vast with a large contribution coming from the increased greenhouse gas emissions caused by human activities.

A probable effect locally of climate change may have been the extreme rain fall event from July 11, 2016. The event resulted in widespread 10+ inches of rain north and west of Kanabec County. Downstream flooding in Kanabec County ensued. The worst flooding occurred in and around the Fish Lake area. This is where the watershed flattens out and the water flow slows. Fish Lake takes water coming in from Ann Lake via the Ann River and takes backs-up water from the Snake River outlet to the east. A second severe rain event occurred about two years later, on July 12, 2018. This event effected the City of Mora and Mora Lake severely. This is currently causing the City of Mora to consider improvement to the outlet of Mora Lake through the city as it drains to the Snake River. Both events resulted in state emergency assistance and much coordinated local assistance to those directly affected.

As climate change effects continue, we would encourage the promotion and adoption of practices that lessen or prevent the increased output of greenhouse gas emissions. Specific practices to promote resiliency against climate change are listed in the next section under flooding.

Flooding

Severe rain events, as detailed above under climate change are having an impact on Kanabec County. Repair work after floods is budgeted for, as best as possible. Much of the repair work has involved road infrastructure repairs, or drainage and storm water repairs. Infrastructure is being increased in size to allow more flow through the system.

Another approach is through proactive planning. This generally involves creating a landscape that offers more resiliency to severe rains.

Promote better landscape resiliency through promotion of the following practices:

- Increased or preservation of forest land
- Increased or preservation of native vegetation, provides deeper roots, more infiltration
- Preservation of existing wetlands
- Increased water storage on the landscape
- Soil Health Improvement
- Less agriculture tillage
- More crop residue
- Incorporation of livestock manure
- More plant diversity in the agriculture sector
- Increased cover crop usage

Many of these practices help to keep more carbon in place on the landscape, instead of releasing greenhouse gases into the atmosphere.

The Ordinary High Water Level (OHWL) is a state delineated line of equal elevation surrounding a lake basin which defines where the lake bed ends and where the upland begins. The OHWL location serves as the point of reference for certain property and water rights. Shoreland management ordinances establish land use restrictions within certain distances landward from the OHWL. The DNR also uses the OHWL for determining whether permits are needed for work done on protected waters or wetlands.

The following table lists the lakes and the determined OHWL's.

Lake Name (lake #)	Township	Elevation
Eleven (33-1)	Kroschel	1114.4
Fish (33-36)	Arthur	950.2
Knife (33-28)	Knife Lake & Peace	1045.8
Ann (33-40)	Ann Lake & Kanabec	1043.5
Mora (33-34)	Arthur	983.4
Pomroy (33-9)	Peace & Pomroy	1099.2
Quamba (33-15)	Whited	998.2
Loon (33-42)	Kroschel	1138.8
Lewis (33-32)	Brunswick	970.1

The larger, developed lakes in the County have established OHWL's. On lakes without OHWL's, the County Environmental Services Office determines the OHWL by locating where the vegetative cover changes from aquatic (hydrophytic) to terrestrial.

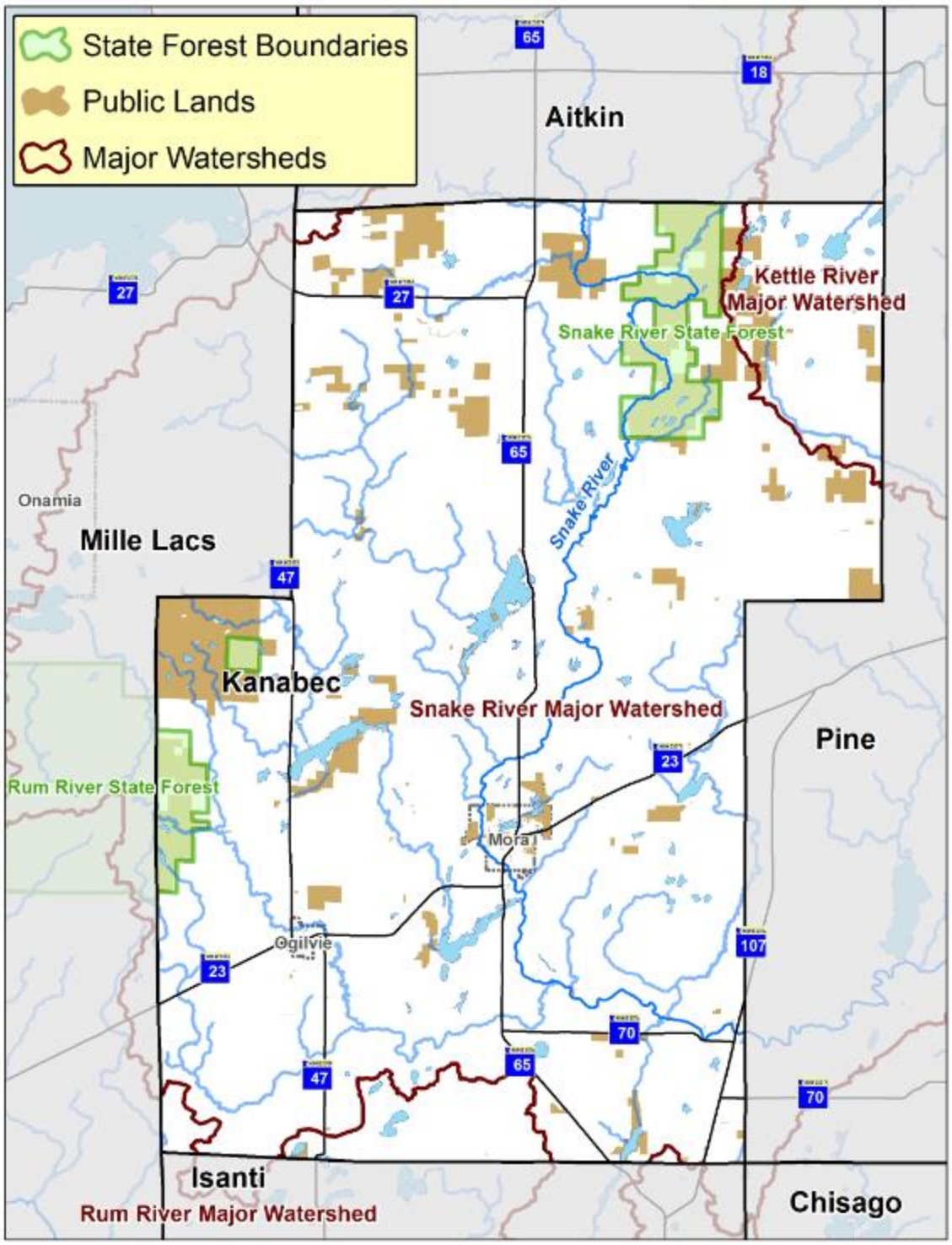
FORESTRY

Here in the northeast part of the state the forest land predominantly consists of a dense of pine, spruce, fir, aspen and birch forest. The northern half (45%) of Kanabec County is predominately forested and mostly in private ownership. The estimated breakdown of forest land is 82% in private ownership and 18% in public ownership. The map on the following page highlights the public lands throughout Kanabec County. Minnesota is ranked 12th in the nation in forest industry value added product per capita. Statewide forest products equates to $458 million in state and local tax payments. The Minnesota forest product industry equals about 64,000 jobs in in total employment effect. Given the higher proportion of private ownership over public; managing our private forest lands are critical.

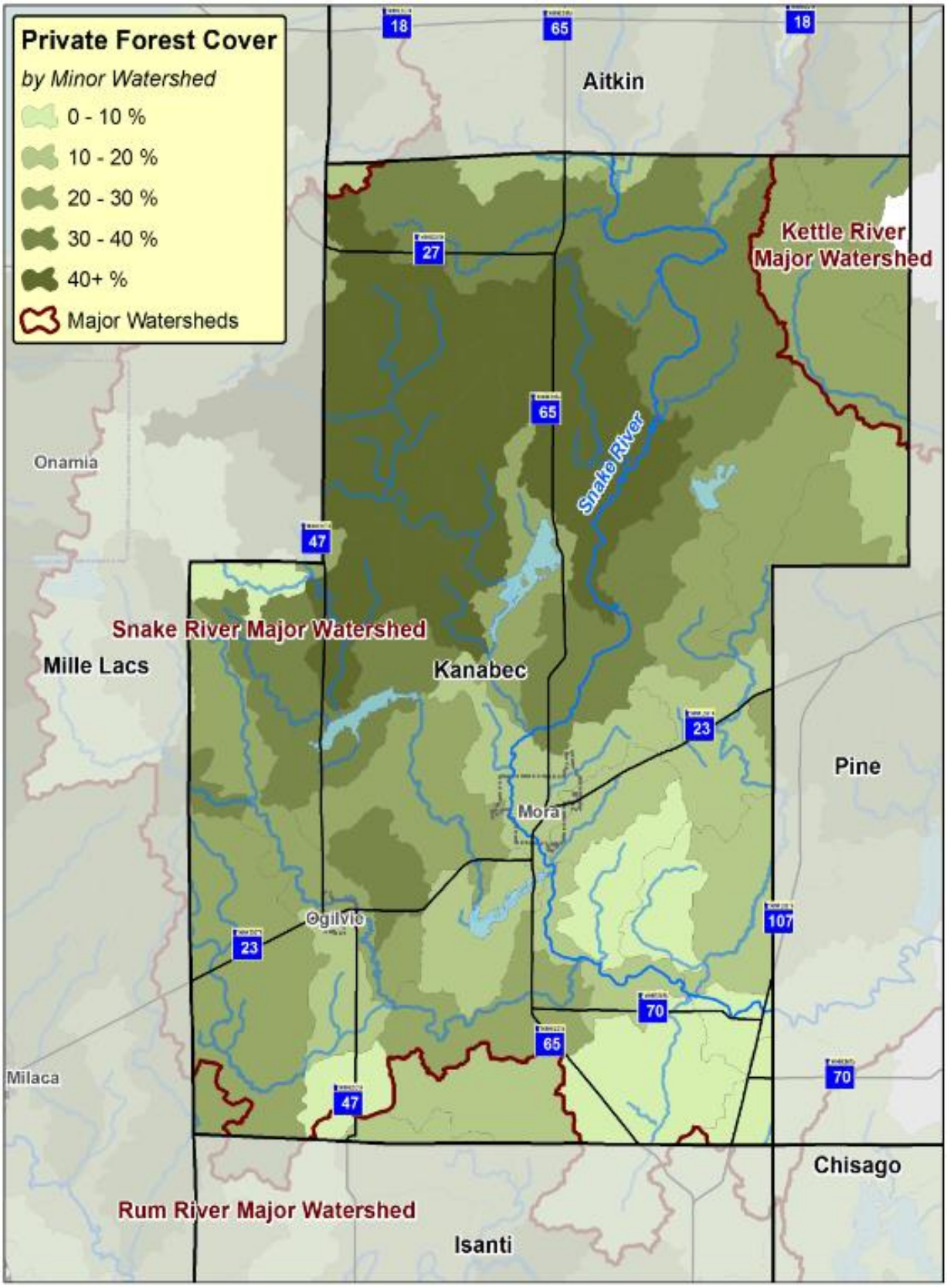
Issues that face our forest land are many. There is the normal onslaught of pests and disease such as oak wilt, white pine blister rust, forest tent caterpillars, gypsy moths and root rots, to name a few. Other issues affecting our forest lands are invasive species, habitat loss & fragmentation, declining water quality and changing climate.

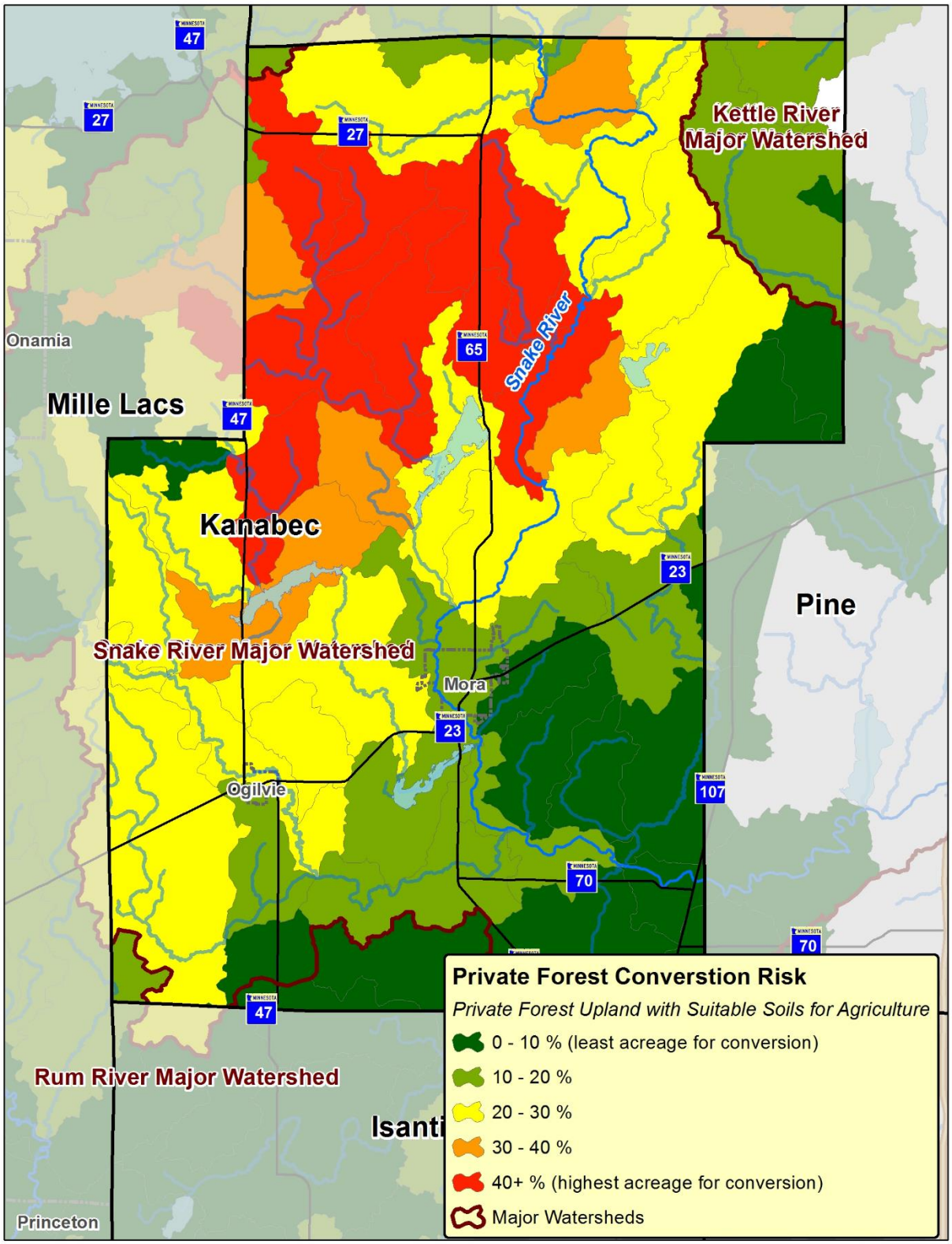
Planning of our forest lands helps to address many of the concerns listed above. Woodland Stewardship Plans are being written by many agency staff and private sector foresters. Woodland Stewardship Plans are specific forestry plans for forest land owners. The plans include an inventory of the woodlot, lists land owner objectives and proposed activities to meet the land owner's woodland objectives. The plans provide the land owners a better understanding and appreciation of their forestry resources. The idea is that forestlands with Woodland Stewardship Plans have more specific resources available to properly managing their woodlands sustainably. This will help ensure future generations will continue to appreciate and protect woodlands for their diverse resources.

In 2016-17 the MN Department of Natural Resources has been able to offer and assist private land owners with more woodland planning and management resources. This has resulted in an increase in land owner requests for forestry planning and management assistance. The Kanabec SWCD and the Natural Resources Conservation Service (NRCS) currently lack the staff and capacity to provide the needed forestry assistance to woodland land owners in Kanabec County. The Kanabec SWCD continues to look for avenues to bring on staff expertise in forestry to provide these needed services to the woodland landowners in Kanabec County. By offering forestry management and planning expertise we are providing more sustainable forestry management resources, thus protecting this land resource from degradation. In essence good forest planning equates to protection of our good water quality resources in Kanabec County. Generally speaking protection strategies are generally less expensive to implement than working to restore already impaired water resources.



Public Lands Map


Private Forest Cover
by Minor Watershed
0 - 10 %
10 - 20 %
20 - 30 %
30 - 40 %
40+ %
Major Watersheds
Aitkin
Kettle River
Major Watershed
Snake River
Onamia
Snake River Major Watershed
Mille Lacs
Kanabec
Pine
Mora
Ogilvie
Milaca
Chisago
Rum River Major Watershed
Isanti
18
65
27
47
23
107
70


47
27
27
Kettle River
Major Watershed
Onamia
65
Snake River
Mille Lacs
47
Kanabec
23
Pine
Snake River Major Watershed
Mora
23
Ogilvie
107
70
70
47
Rum River Major Watershed
Isanti
Princeton
Private Forest Converstion Risk
Private Forest Upland with Suitable Soils for Agriculture
0 - 10 % (least acreage for conversion)
10 - 20 %
20 - 30 %
30 - 40 %
40+ % (highest acreage for conversion)
Major Watersheds

GROUND WATER

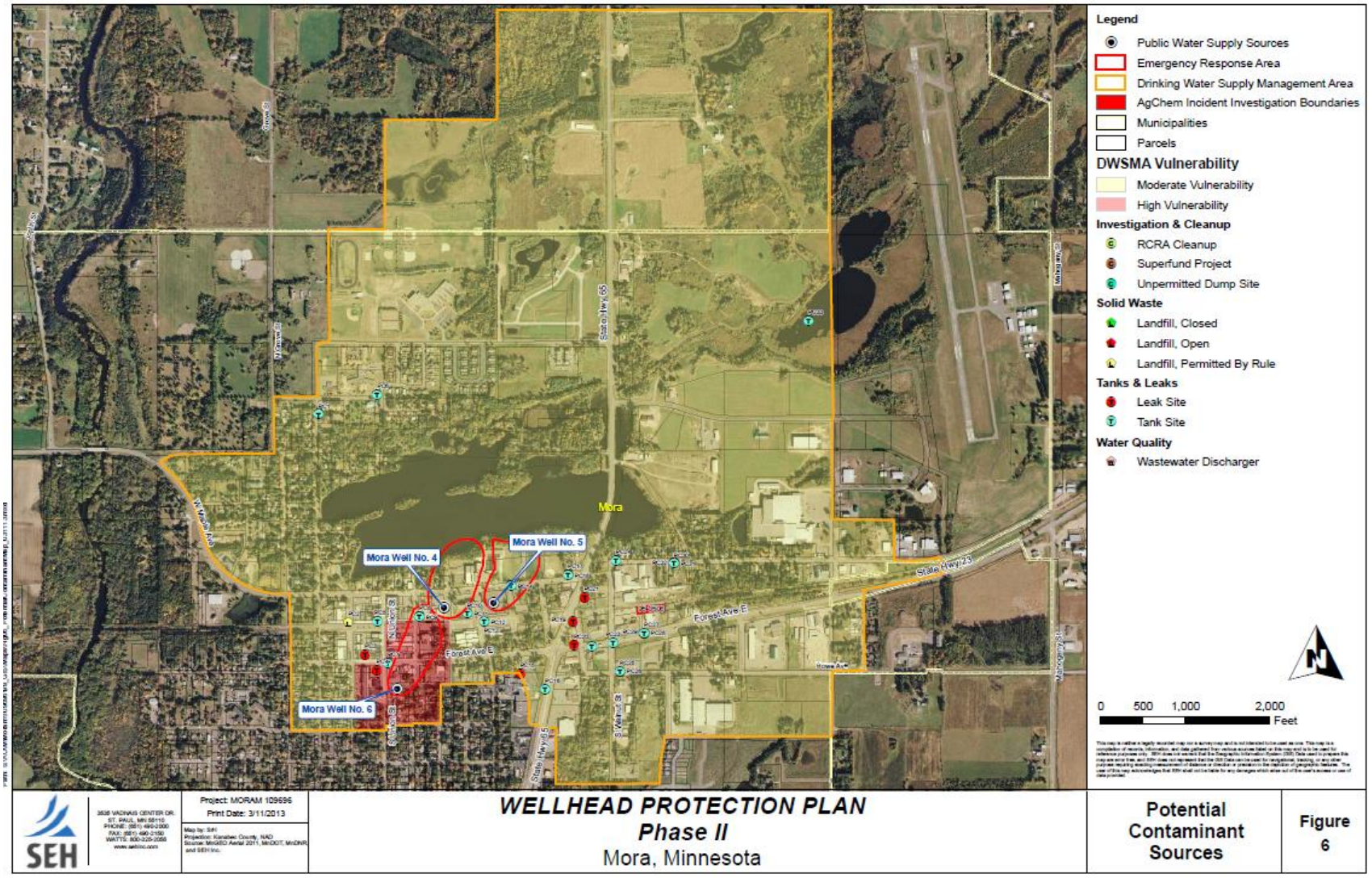
Wellhead Protection

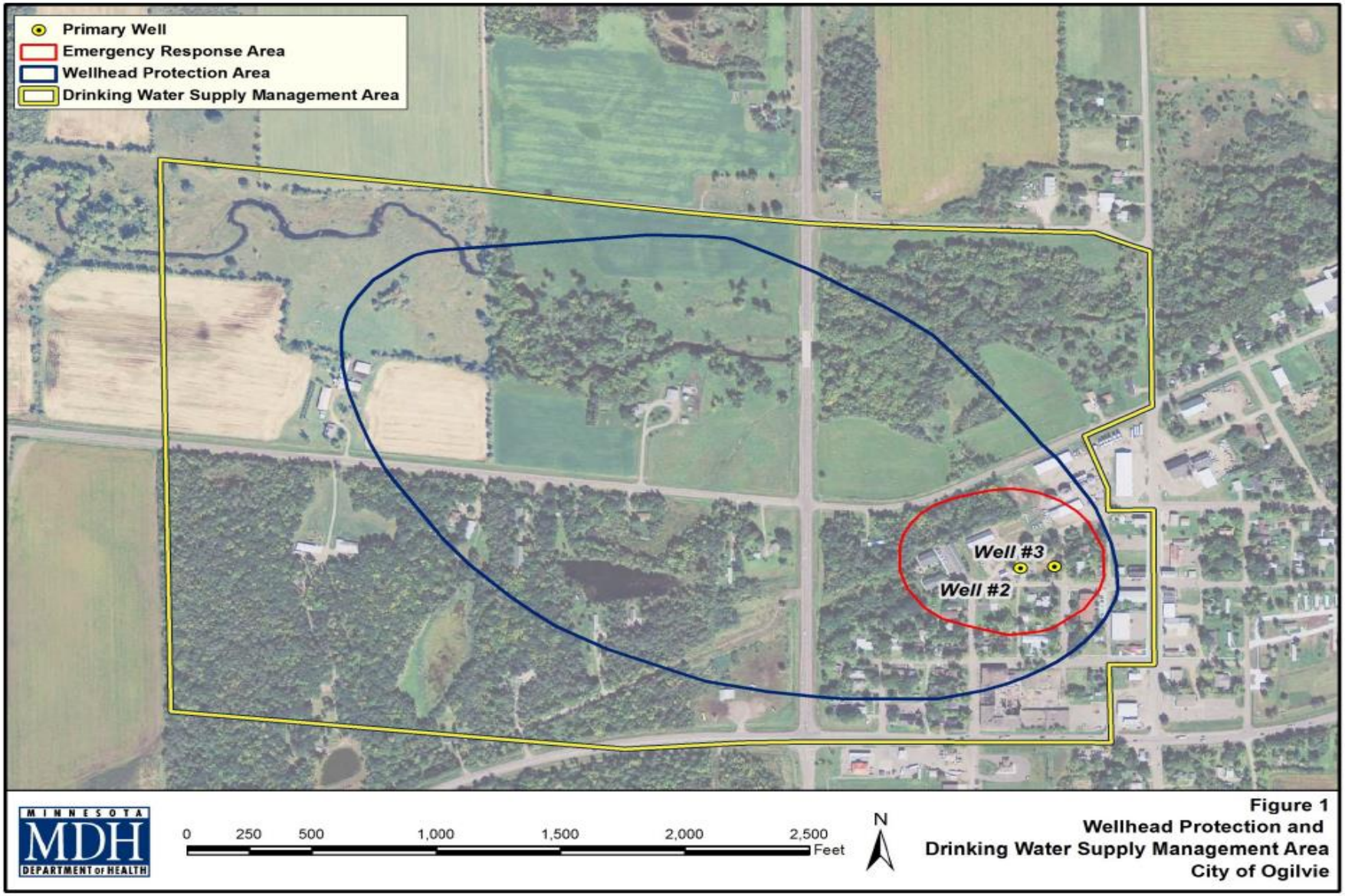
Wellhead protection is a method of preventing contamination of a public water supply well by managing potential contaminant sources in the area which contributes water to a public water supply well. All public water suppliers are required to manage an inner-wellhead management zone, a 20-foot radius surrounding a public water supply. In addition, owners and operators of such wells must prepare a wellhead protection plan. The City of Mora is in the process of implementing a Well Head Protection Plan.

The completion of the geologic portion of the Kanabec County Geologic Atlas in 2016 has aided in providing a better understanding of the local geology and the risks it poses to water quality. The second part of the Atlas, the hydrogeology portion is currently under way. This second part of the atlas will provide a better understanding of how surface waters flow across the land, through the soil and bedrock and how it eventually gets into our ground water aquifers. The hope is that the full Geologic Atlas will provide a better understanding of any limitation our local geology plays in groundwater quality and what activities we can promote to prevent any further groundwater contamination.

Quarry Concern

Kanabec County is home to numerous open pit quarries, mostly gravel quarries. Quarries can be vulnerable to runoff as they've had most of their topsoil and subsoil removed, which would normally aid in filtering runoff. These are sensitive areas which have nearly a direct flow of quarry runoff into the bedrock and below this our drinking water aquifers. For this reason it is crucial to ensure care is taken in the placement, planning and operation of quarries. A good management practice is to plan for the placement of quarries to prevent outside sources of land runoff from entering the pit. Care is also needed in the operation of quarries to ensure spills of hazardous materials (including petro chemicals, fertilizers and pesticides, to name a few) do not occur within the quarries sensitive landscape.


Legend
Public Water Supply Sources
Emergency Response Area
Drinking Water Supply Management Area
AgChem Incident Investigation Boundaries
Municipalities
Parcels
DWSMA Vulnerability
Moderate Vulnerability
High Vulnerability
Investigation & Cleanup
RCRA Cleanup
Superfund Project
Unpermitted Dump Site
Solid Waste
Landfill, Closed
Landfill, Open
Landfill, Permitted By Rule
Tanks & Leaks
Leak Site
Tank Site
Water Quality
Wastewater Discharger
Mora
Mora Well No. 4
Mora Well No. 5
Mora Well No. 6
State Hwy 65
State Hwy 23
Forest Ave E
0 500 1,000 2,000
Feet
SEH
Project: MORAM 109696
Print Date: 3/11/2013
WELLHEAD PROTECTION PLAN
Phase II
Mora, Minnesota
Potential Contaminant Sources
Figure 6

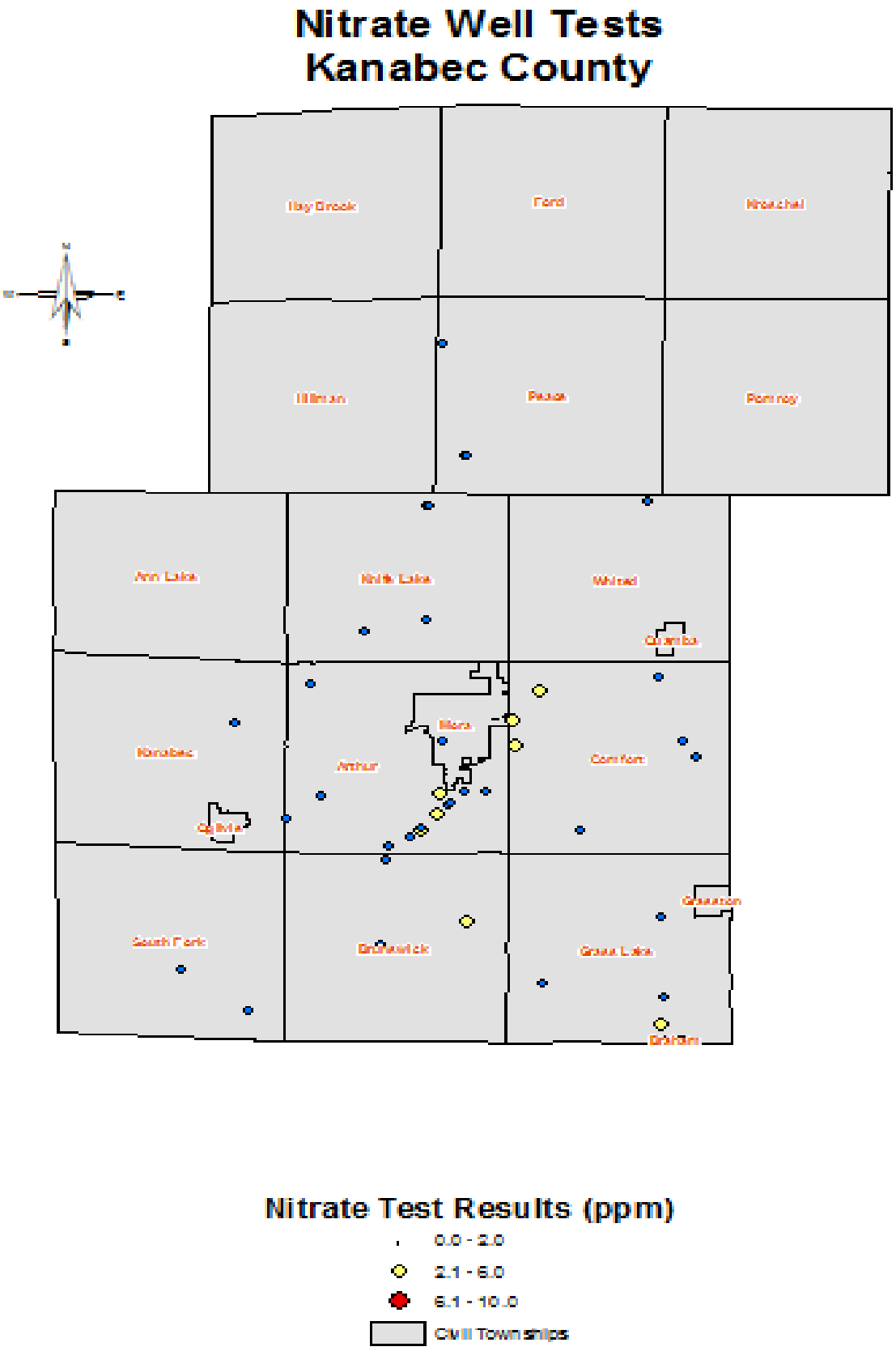

Primary Well
Emergency Response Area
Wellhead Protection Area
Drinking Water Supply Management Area
Well #3
Well #2
MINNESOTA
MDH
DEPARTMENT of HEALTH
0
250
500
1,000
1,500
2,000
2,500
Feet
N
Figure 1
Wellhead Protection and
Drinking Water Supply Management Area
City of Ogilvie

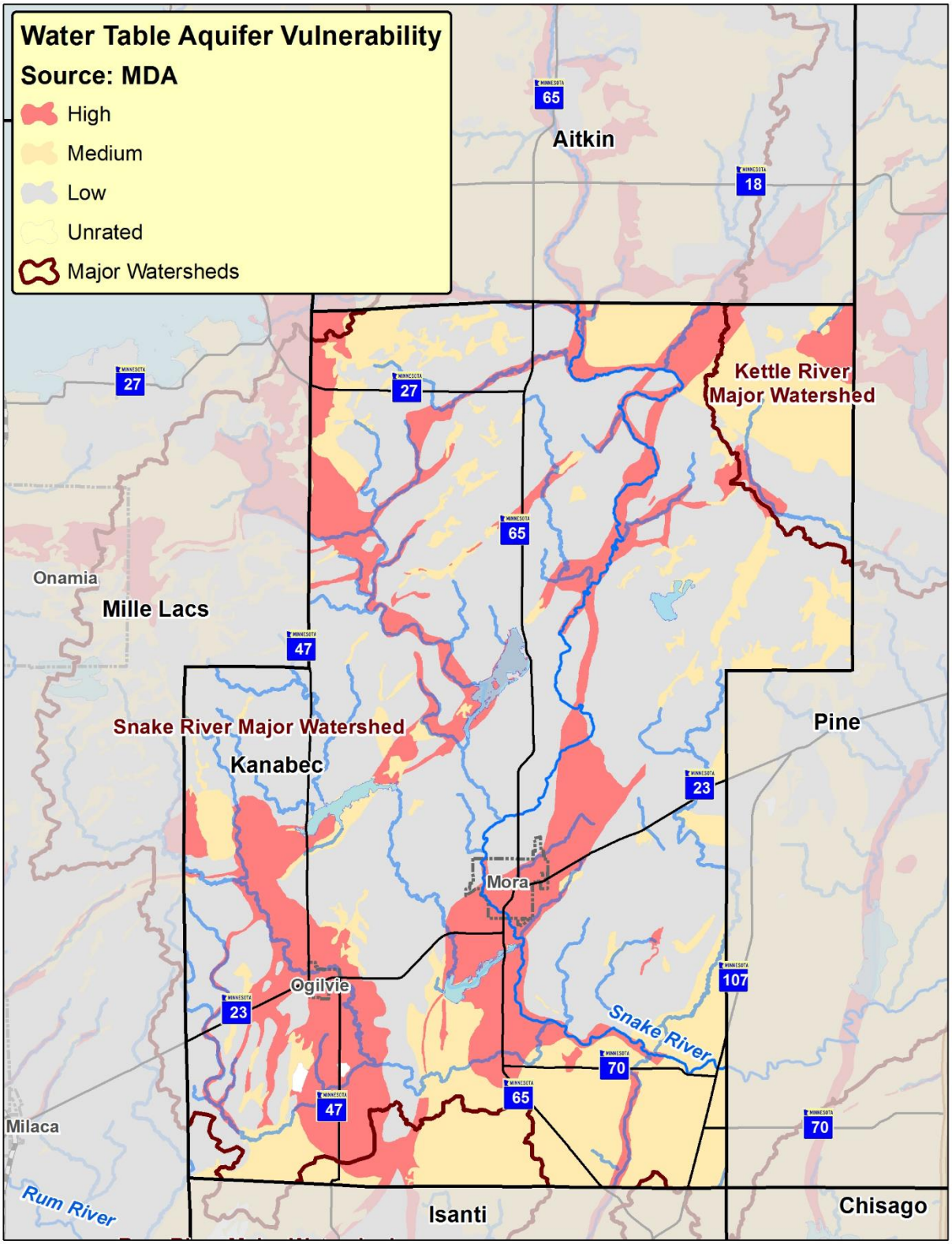
Well Water Testing – Nitrates

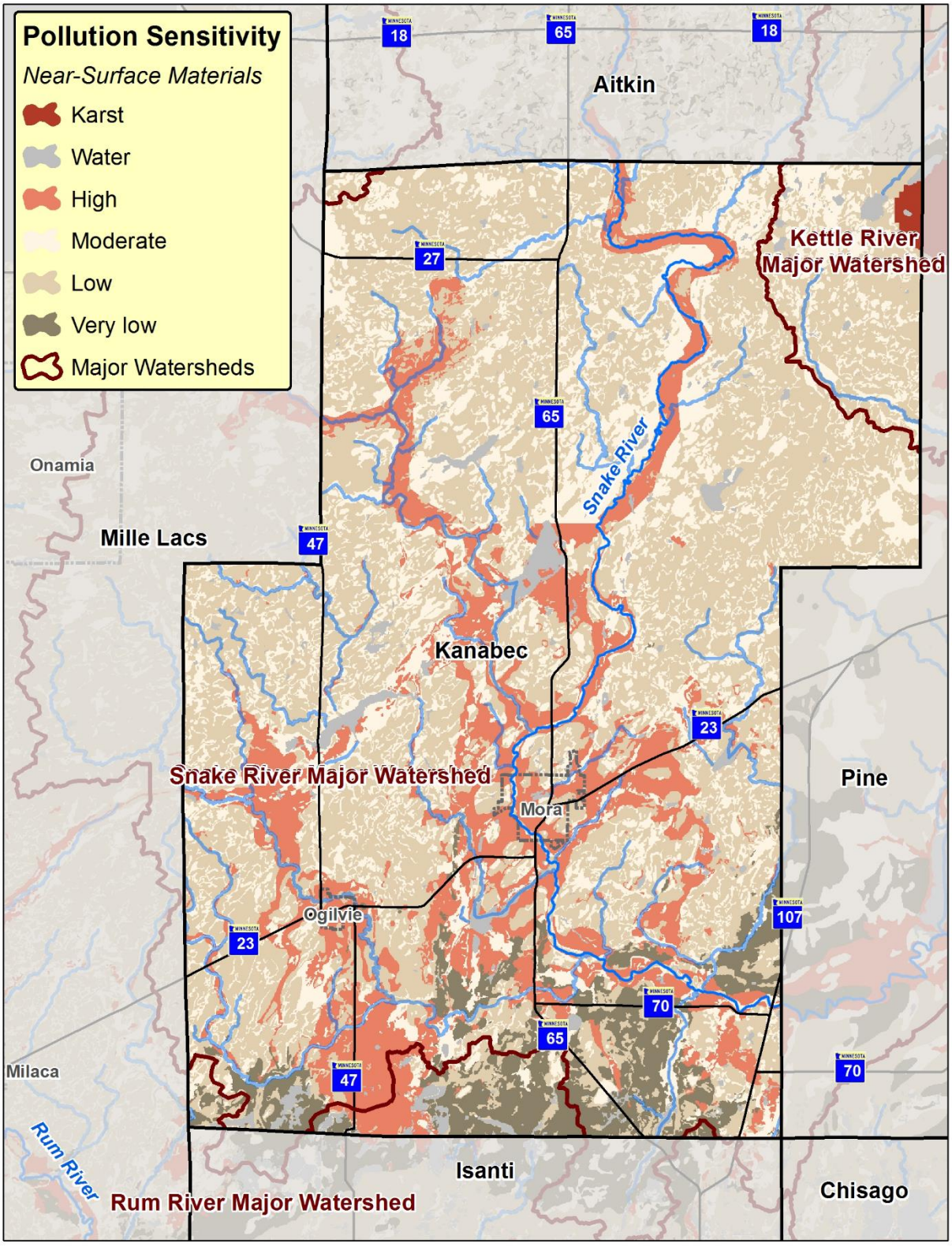
In 2016 the SWCD staff started offering public well water testing for nitrates at local outreach events. This practice will continue in order to develop a comprehensive special representation of where areas of high well water nitrates exist. The hope is to pin-point areas of higher nitrates in order to focus future Best Management Practices (BMP) to prevent or protect further nitrate aquifer contamination. Possible BMPs to address high nitrates in groundwater could entail Nutrient Management Planning (590) and Filter Strips (393).

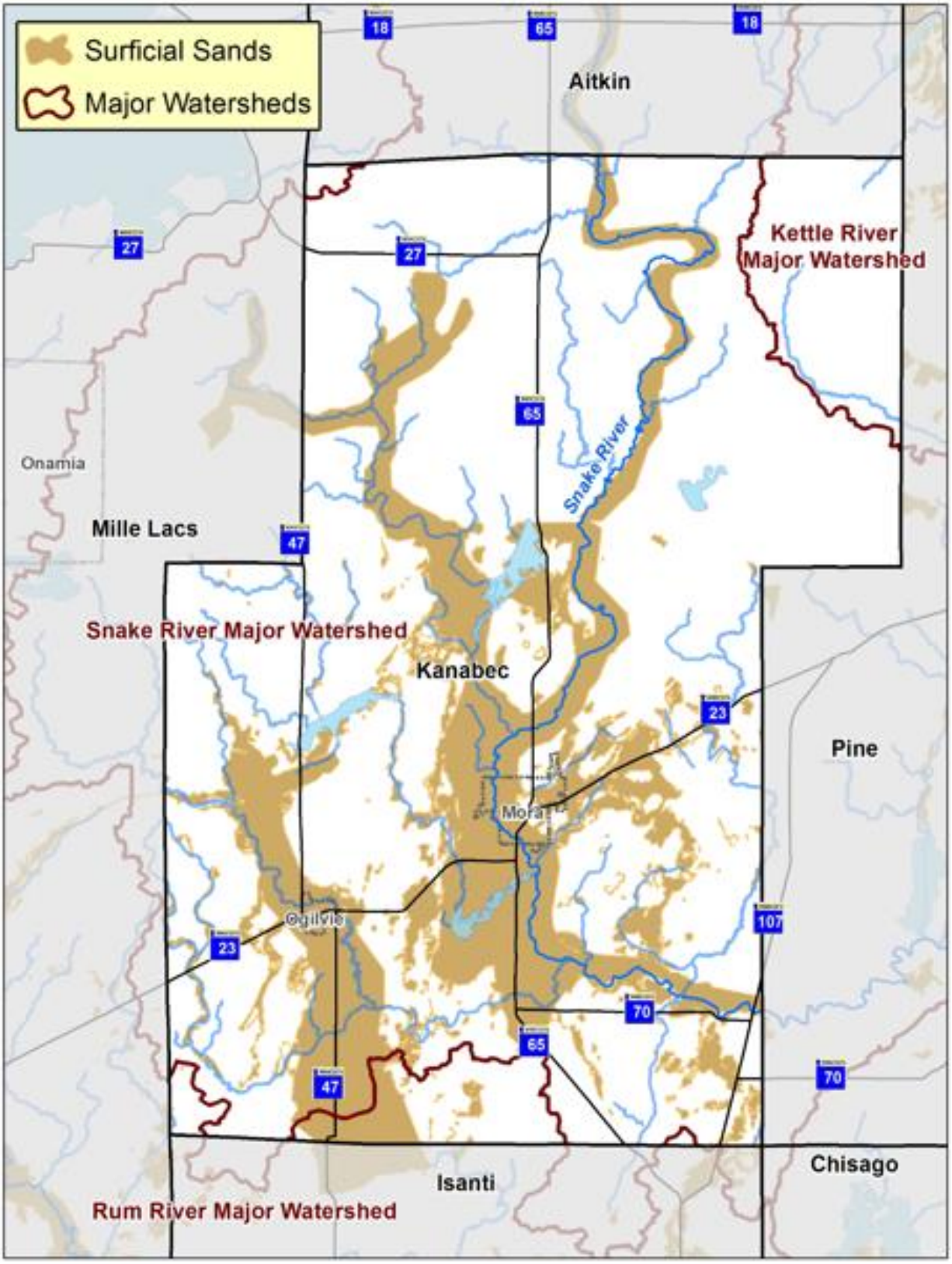
In 2018 in collaboration with the MN Department of Agriculture the Kanabec SWCD has conducted private well testing for nitrates within the South Fork Township, in the very southwest township of Kanabec County. This data will hopefully provide more data on potential trends of where high nitrates exist in the county. This will be helpful in any future plans to address high nitrates through education and/or conservation practice implementation.

The Kanabec County Public Health continues to offer free to reduced cost private well Nitrate and Coliform testing for families and caregivers with babies less than six months of age. Well water with high levels of Nitrates can cause a life-threatening condition called, “blue baby syndrome” (methemoglobinemia). Boiling the water WILL NOT make the water safe. For a fee, weekly they also collect private well waters for testing.


Nitrate Well Tests
Kanabec County
Bay Brook
Ford
Kroschel
Ann Lake
Knife Lake
Mora
Kanabec
Arthur
Comfort
South Fork
Grass Lake
Nitrate Test Results (ppm)
0.0 - 2.0
2.1 - 6.0
6.1 - 10.0
Civil Townships


Water Table Aquifer Vulnerability
Source: MDA
High
Medium
Low
Unrated
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River Major Watershed
Kanabec
Pine
Mora
Ogilvie
Snake River
Milaca
Rum River
Isanti
Chisago
65
18
27
47
23
107
70


Pollution Sensitivity
Near-Surface Materials
Karst
Water
High
Moderate
Low
Very low
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River
Kanabec
Snake River Major Watershed
Mora
Pine
Ogilvie
Milaca
Rum River
Rum River Major Watershed
Isanti
Chisago
18
65
27
47
23
107
70


Surficial Sands
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River
Snake River Major Watershed
Kanabec
Pine
Mora
Ogilvie
Isanti
Chisago
Rum River Major Watershed
18
65
27
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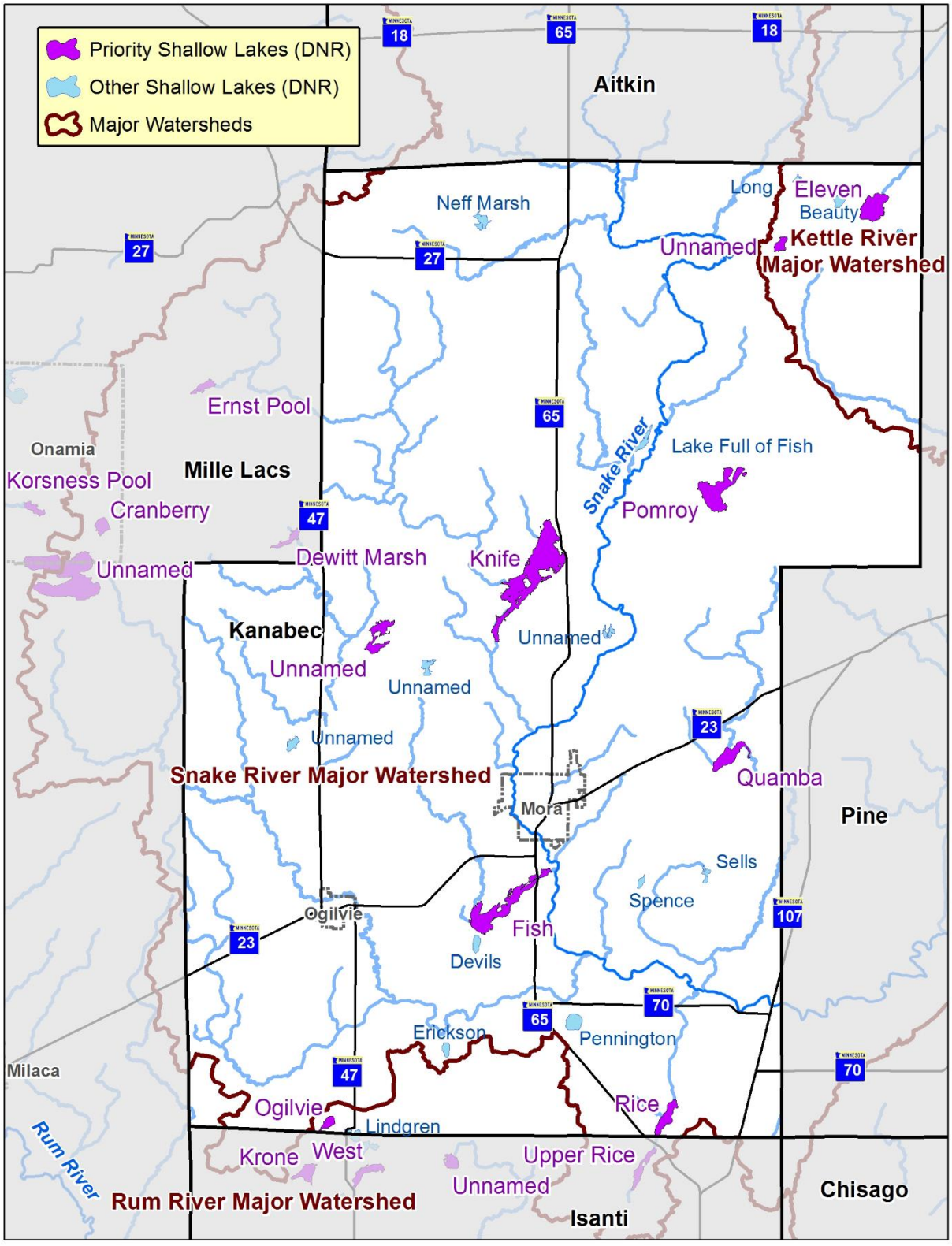
107
70

LAKES


Priority Shallow Lakes (DNR)
Other Shallow Lakes (DNR)
Major Watersheds
Aitkin
Neff Marsh
Long
Eleven
Beauty
Unnamed
Kettle River
Major Watershed
Ernst Pool
Onamia
Mille Lacs
Korsness Pool
Cranberry
Unnamed
Dewitt Marsh
Knife
Snake River
Lake Full of Fish
Pomroy
Kanabec
Unnamed
Unnamed
Unnamed
Unnamed
Snake River Major Watershed
Mora
Quamba
Pine
Sells
Spence
Ogilvie
Fish
Devils
Erickson
Pennington
Milaca
Ogilvie
Rice
Lindgren
Krone West
Upper Rice
Unnamed
Rum River
Rum River Major Watershed
Isanti
Chisago

Aquatic Vegetation

Kanabec County has a few shallow lakes, namely Knife, Fish, Quamba, Rice, Pomroy and Lake Eleven (Ann is listed as deep, but is mostly shallow, <15' deep). In 2017 a 'Shallow Waters Workshop' (hosted by Kanabec SWCD) was held to educate the public on the limitations associated with shallow waters. Continued education will occur. In 2018 another educational event is planned on native aquatic vegetation.

Since the fall of 2015 the Kanabec SWCD has been leading in the administration of the Aquatic Invasive Species (AIS) funding for education and prevention of AIS in Kanabec County. The formation of the Kanabec County Coalition of Lake Association (COLA) was in part, the result of this process. The Kanabec County COLA is formed of the six active lake associations in the County. They are the Ann Lake Watershed Alliance (ALWA), the Fish Lake Improvement Association, the Knife Lake Improvement District, the Lewis Lake Association, the Pomroy Lake Association and the Quamba Lake Association. The Kanabec COLA meets every other month and leads in setting policy for the use of the AIS funding, with oversight from the Kanabec SWCD Board of Supervisors.

One of the major nuisance aquatic weeds is curly leaf pondweed. Training was provided on the characteristics of curly leaf and its' control methods to lake shore owners in 2016. Various lake associations in the County work at controlling their curly leaf populations. The lakes with the longest treatment programs are Knife, Fish, Ann, Quamba, Lewis and Pomroy.

In the past there was an extensive attempt to re-establish bulrushes along the shores of Knife Lake. Bulrushes have been planted to minimize wave action and thus erosion of the shoreland. The bulrushes also serve to improve fish habitat and act as sources of nutrients in the water.

Aquatic Invasive Species (AIS)

Below is the current Aquatic Invasive Species plan for Kanabec County:

2017 Planned activities for State AIS funds in Kanabec County

<u>Fish Lake</u>

- $560 from the education fund (not part of requested funds) to Install 2 – 3x4' Clean Drain Dispose signs at lake accesses
    - Using time and material cost to put towards match
    - 10% match = $56 of in-kind and cash
- $10,045 for 28 acres of curly leaf pondweed treatment by Lake Management, Inc.
    - 18 acres treated in the channel
    - 5 acres in Sandy Bay
    - 5 acres east of lake access by Fish Lake Resort
    - 10% match to be paid by Fish Lake Improvement Association = $1,004.50
- **Total funds requested = $9,040.50**

Ann Lake

- $4,100 for 15 acres of curly leaf pondweed treatment by Aquatic Solutions of MN near high density housing and the public access
- $870 for area definition by Freshwater Scientific Services, LLC
- $630 depth contingencies for treatment
- Total Cost = $5,600
- 10% match = $560 cash
- **Total funds requested = $5,040**

Quamba Lake

- $14,583 for 32 acres of curly leaf pondweed treatment. The last year of a 5 year treatment plan.
- 10% match = $1,458.30
- **Total funds requested = $13,125**

Knife Lake

- $33,000 for 55 acres of curly leaf pondweed and milfoil treatment in April/May @ $600/acre
- $1,700 for pre and post- treatment lake surveys
- $3,300 for additional treatment in mid-July if necessary
- **Total funds requested = $38,000**
- 10% match = $3,800, would come from paying for DNR permits for treatment (Estimated at $5,000)

Pomroy Lake

- $5,000 for a comprehensive aquatic plant survey, data analysis, preparation of data summary maps, project report and meeting to present results.
- 10% match = $500 would be paid in cash
- **Total funds requested = $4,500**

Lewis Lake

- $8000 for curly leaf pondweed treatment on less than 15% (one spot in the north end of the lake and three spots in the south end) of the lake by LLPOA members supervised by Aquatic Solutions Company.
- 10% match = $800 in kind education and meeting hours
- **Total funds requested = $8000**

Education:

Each lake association is purchasing 1-2 Clean Drain Dispose signs for the public accesses in 2016-2017, 2 will also be purchases for Snake River public accesses.

O Using install time and material cost to put towards match

O 10% match = $56 of in-kind and cash

The Kanabec County Fair is held every July in Mora. Kanabec COLA uses that as an opportunity to hold a booth for AIS education and awareness. Members volunteer their time and provide education materials.

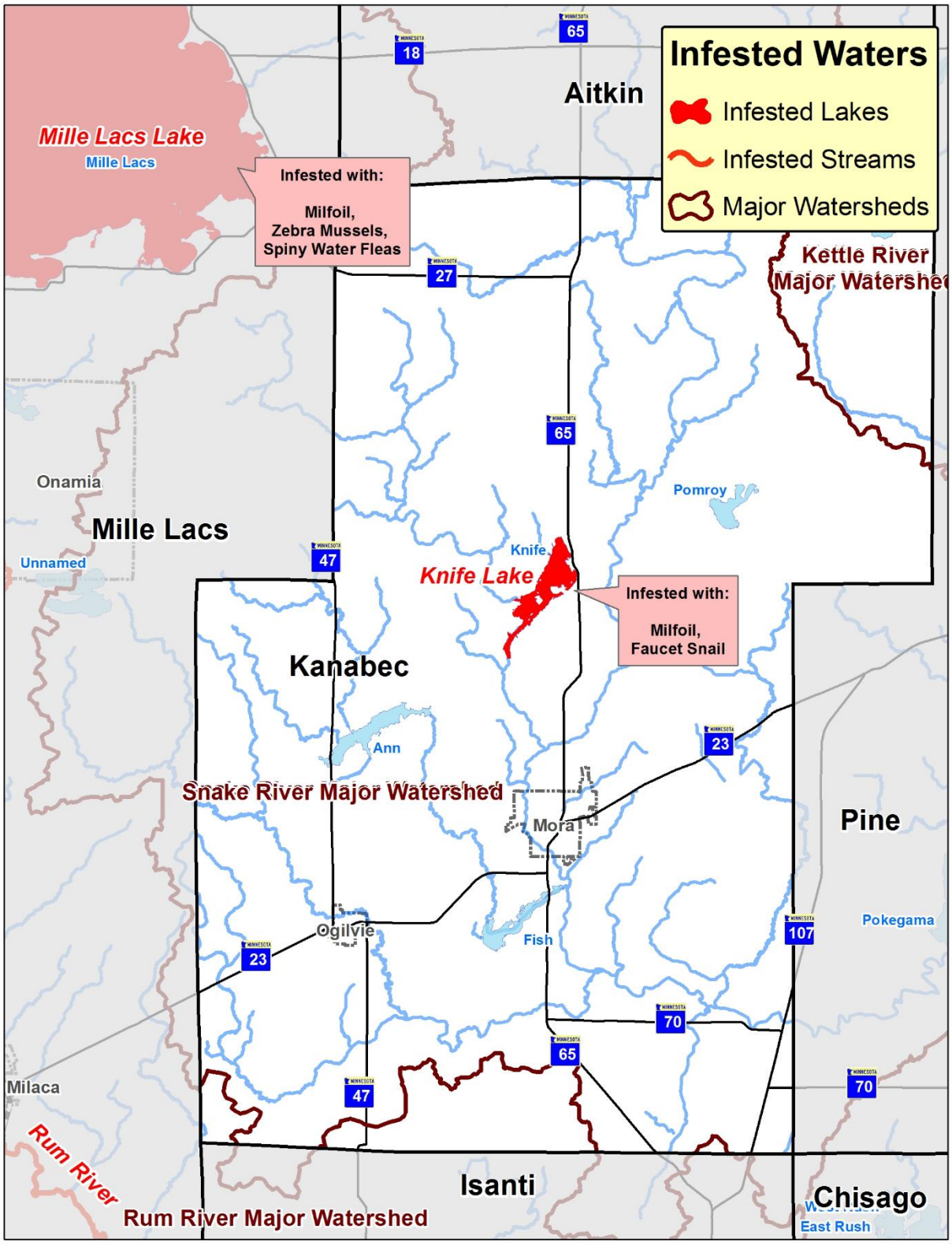
Each lake association organizes education days at the public accesses as Ambassadors for AIS boat inspection, education and removal.

Kanabec COLA will possibly host a booth at the County Fair for AIS education.

The group will be looking for new "outside the box" education methods and material ideas this 2017 season.

SWCD Recommendation = $6,090.02 per lake from 2017 funding. That is 73% of the total funding split between 6 lakes. The SWCD board approved these allocations at their 12/13/16 board meeting with the encouragement that lakes with excess funds assist other lakes that don't have the fund to complete projects in 2017. The flexibility of the funding will allow lake associations to assist in AIS prevention county-wide.

The rest of the money will be placed in administration and general categories for contingencies and education purposes. Education and contingency funds are approved by the Kanabec County - Coalition of Lake Associations (COLA) and overseen by Kanabec SWCD.


Infested Waters
Infested Lakes
Infested Streams
Major Watersheds
Mille Lacs Lake
Mille Lacs
Infested with:
Milfoil,
Zebra Mussels,
Spiny Water Fleas
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Unnamed
Pomroy
Knife
Knife Lake
Infested with:
Milfoil,
Faucet Snail
Kanabec
Ann
Snake River Major Watershed
Mora
Pine
Ogilvie
Fish
Pokegama
Milaca
Rum River
Rum River Major Watershed
Isanti
Chisago
East Rush
18
65
27
47
23
107
70

LAND USE

The table below indicates the percentage and acreage of existing land use, determined by LMIC, based on dominant land use of 40 acre cells.

USE	ACRES (1969)	% (1969)	ACRES (2000)	% (2000)	% Change
Forested	166,160	48.9	144,948	42.5	(13)
Cultivated	52,040	15.3	69,483	20.4	34
Water	4,120	1.2	6,341	1.9	54
Marsh (wetland)	9,160	2.7	18,955	5.6	107
Urban Res/Non-Res.	4,240	1.3	6,432	1.9	52
Hayland/Pasture	104,120	30.6	67,933	19.9	(35)
Brushland	unknown	unknown	26,563	7.8	
Mining	unknown	unknown	540	.2	
Total	339,840	100	341,195	100%	

The northern half of Kanabec County is predominately forested. The southern half of the County is mostly in agricultural use, either cultivated or in pasture. Areas with significant development include along highway corridors 65 and 23 and the cities of Mora, Ogilvie, Quamba, Grasston, and around Fish Lake, Ann Lake, Knife Lake, Lewis Lake, and Quamba Lake.

Subdivision Regulations:

The Kanabec County's present subdivision ordinance (No.4) has been in effect since 1985. It regulates the subdivision of land, established standards for streets, utility easements and other issues related to land development. The County's Subdivision Ordinance generally applies to the division of a tract of land into two or more lots or parcels of less than five acres with a lot width of less than 300 feet and less than 300 feet minimum frontage on an existing public road or any division of a parcel where a new road is required. The County's ordinance applies to the unincorporated area of the County where townships have not enacted subdivision controls within their respective jurisdictions. The Cities of Ogilvie and Mora and Arthur Township have enacted their own subdivision regulations apart from Kanabec County's subdivision ordinance No. 4.

Provisions exist within the subdivision platting ordinance which regulates land development activities in ways that ground and surface water can be impacted. Depending on how a subdivision ordinance is written it may have a substantial effect on water quality. To generalize the more developed a parcel of land the more potential for water quality impairments. Development generally creates more impervious or hard surfaces that flush runoff water faster off the land. Pollutants from various sources may be carried off in runoff water. Ordinances can be written with water quality in mind by ensuring natural buffers are left in place to filter run-off water prior to entering a water source. Development with plans for the storage of runoff water can also help to limit the cumulative impact runoff can have on flooding. Also very sensitive land could have further protected by placing restrictions on development to protect the critical resource.

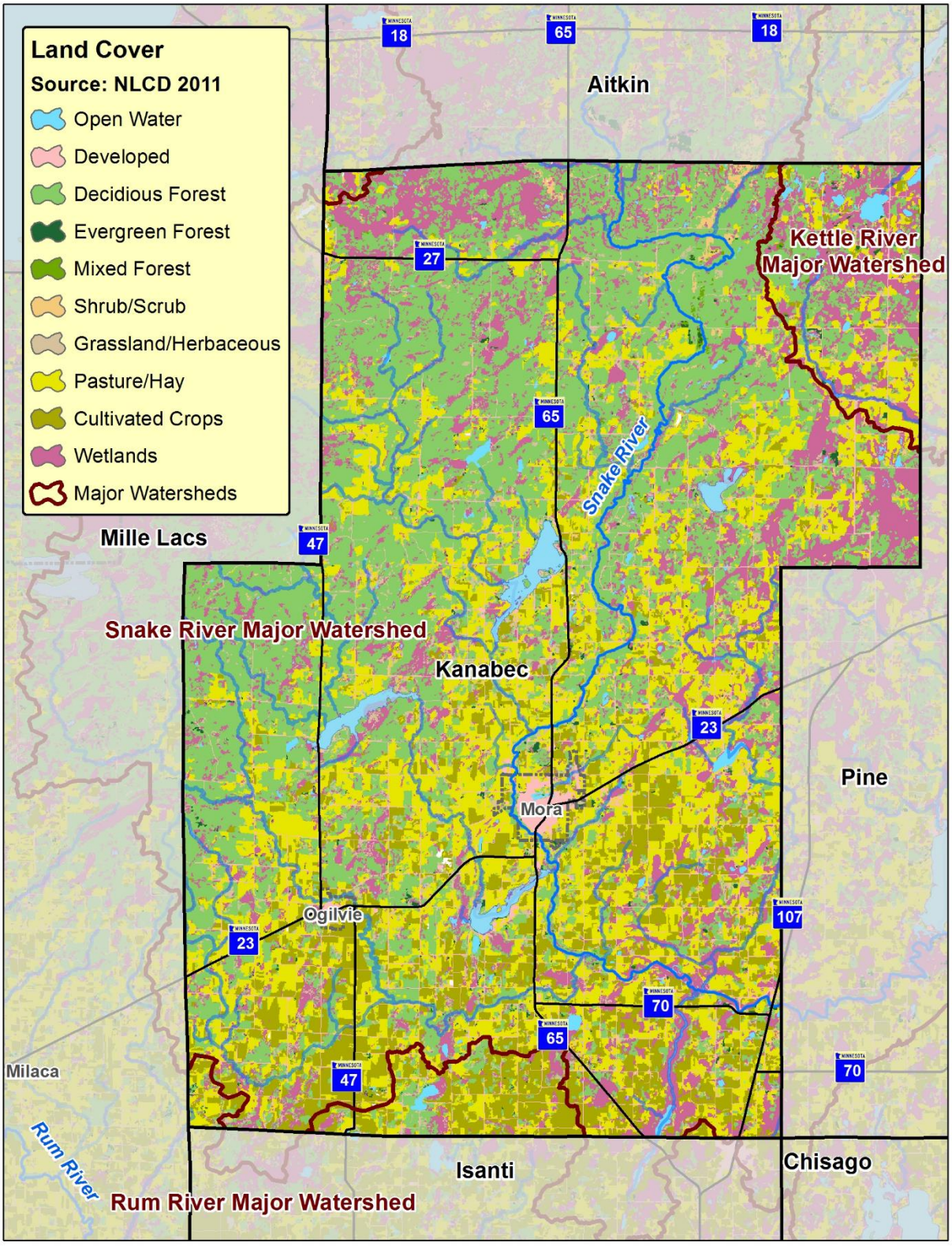
In 2017 the Shoreland Ordinance #5 was proposed for revision. Under consideration, is allowing commercial development through a conditional use process. The proposed area is under consideration, along state highways that border lakes in the county. This ordinance revision is currently under review (3/2019).

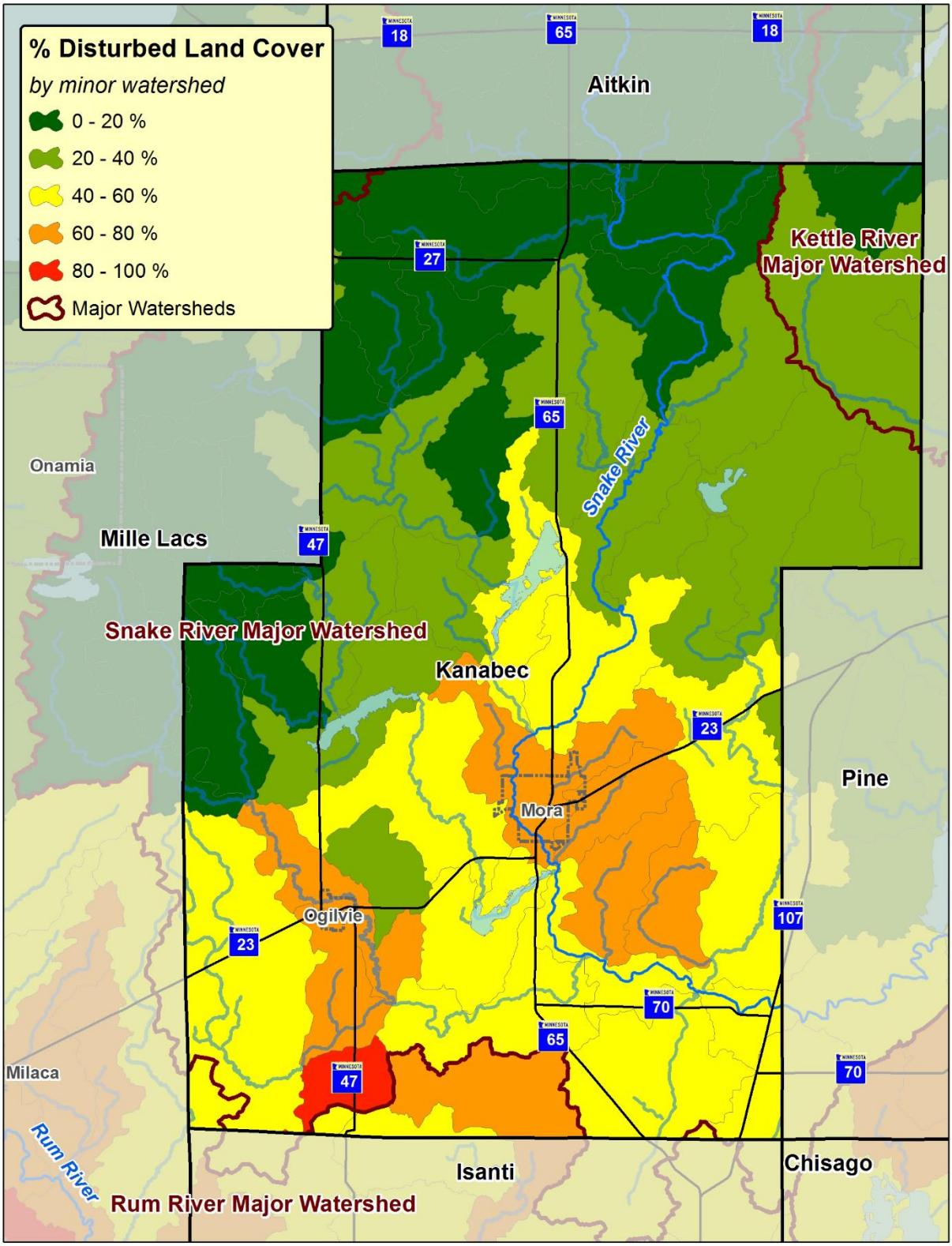
Below is a table summarizing the existing zoning ordinances adopted for each Township.

Summary - Township Zoning Ordinances

	Districts			Residential Densities			Minimum Lot Size				
	Ag/Open	Ag/Res	Comm	1/40	2/40	3/40	1	2	5	10	20
Ann Lk											
Arthur	X	X	X				X	X			
Brunswick		X	X			X		X			
Comfort		X			X				X		
Ford		X			X				X		
Grass Lk		X	X		X				X		
Haybrook		X									X
Hillman		X			X			X			
Kanabec	X	X	X	X	X		X	X			
Knife Lk	X	X						X			
Kroschel	X			X	X						X
Peace	X	X							X	X	
Pomroy		X			X			X			
Southfork		X			X		X				
Whited	X	X							X		

Source: The Kanabec County Comprehensive Plan, May 2002


Land Cover
Source: NLCD 2011
Open Water
Developed
Decidious Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Wetlands
Major Watersheds
Aitkin
Kettle River
Major Watershed
Snake River
Mille Lacs
Snake River Major Watershed
Kanabec
Pine
Mora
Ogilvie
Milaca
Rum River
Isanti
Chisago
Rum River Major Watershed
18
65
27
47
23
107
70


% Disturbed Land Cover
by minor watershed
0 - 20 %
20 - 40 %
40 - 60 %
60 - 80 %
80 - 100 %
Major Watersheds
Aitkin
Kettle River
Major Watershed
Onamia
Mille Lacs
Snake River
Snake River Major Watershed
Kanabec
Mora
Pine
Ogilvie
Milaca
Rum River
Rum River Major Watershed
Isanti
Chisago
18
65
27
47
23
70
107

POPULATION

Kanabec County has experienced a modest overall growth rate. The growth rate over the last ten year was 17.1 percent, which was higher than the State's rate of 12.4 percent.

The population growth rates vary greatly between minor civil divisions within the County. The fastest growing areas since 1990 are: Peace Township (58.1%) and Ann Lake Township (42.8%), which is probably attributable to lake related development. These municipalities lost population: Grasston (-11.7%), Ogilvie (-7%), and Quamba (-20.9%).

WATERS

Public Water Supply / Public Sewer Systems

Within Kanabec County only the municipalities of Mora and Ogilvie have public water supplies. Mora is the only city in the county which is serviced by storm sewers.

Rules have recently gone into effect which establish regulations and require storm water discharge permits in certain cases. There are two types of permits - municipal and industrial storm water permits. No municipal permits are currently required in Kanabec County.

Smaller cities, counties, and school districts with storm water discharges associated with industrial activity may be required to apply for industrial storm water permits. Activities which require a permit include facilities with contaminated storm water discharges; facilities were certain minerals are exposed to storm water, solid and hazardous waste facilities, and where construction activity disturbs one or more acres.

The City of Mora's storm water system has approximately nine outlets that flow directly into Lake Mora and five outlets that flow directly into the Snake River. None of these flows are monitored for surface water quality before they enter the surface waters. The DNR strongly encourage municipalities to establish holding ponds as a means of treating storm water.

The cities of Quamba and Mora in the past were involved in a joint project along with local state and federal agencies to establish city sewer within the city of Quamba. The result of the project provided public sewer for the city of Quamba by routing a sewer line west to Mora, for the effluent to be treated at the Mora Wastewater Treatment Facility.

Comfort Township:
There is a continued need for an addition sewer spur in Comfort Township to provide public sewer treatment for land owners around Quamba Lake. Quamba Lake has an estimated 60% / 40% year round resident to seasonal resident. A design has been fully completed, but lacks funding to complete project with hook-ups. The existing sewer line from the town of Quamba to the City of Mora was constructed to include the added capacity around Quamba Lake. The estimated cost for this added line is $1.2 Million with an estimated $12,000-13,500 cost per land owner hook-up. Comfort Township continues to seek funding for this project.

Water Classification Summary

In general, the waters of Kanabec County are suitable as fisheries for sport fishes and for recreation, industrial consumption, agricultural uses including irrigation and livestock use, aesthetic enjoyment, navigation, and fire prevention.

Hay Creek in northern Kanabec County is of especially high quality and may be used as a source of drinking water with approved disinfection. This water body is protected as a source of drinking water.

The Southfork of the Groundhouse River in southwestern Kanabec County has been classified of a lower quality and use as to include the propagation and maintenance of rough fish species. This was addressed with the Groundhouse River Watershed TMDL in 2009.

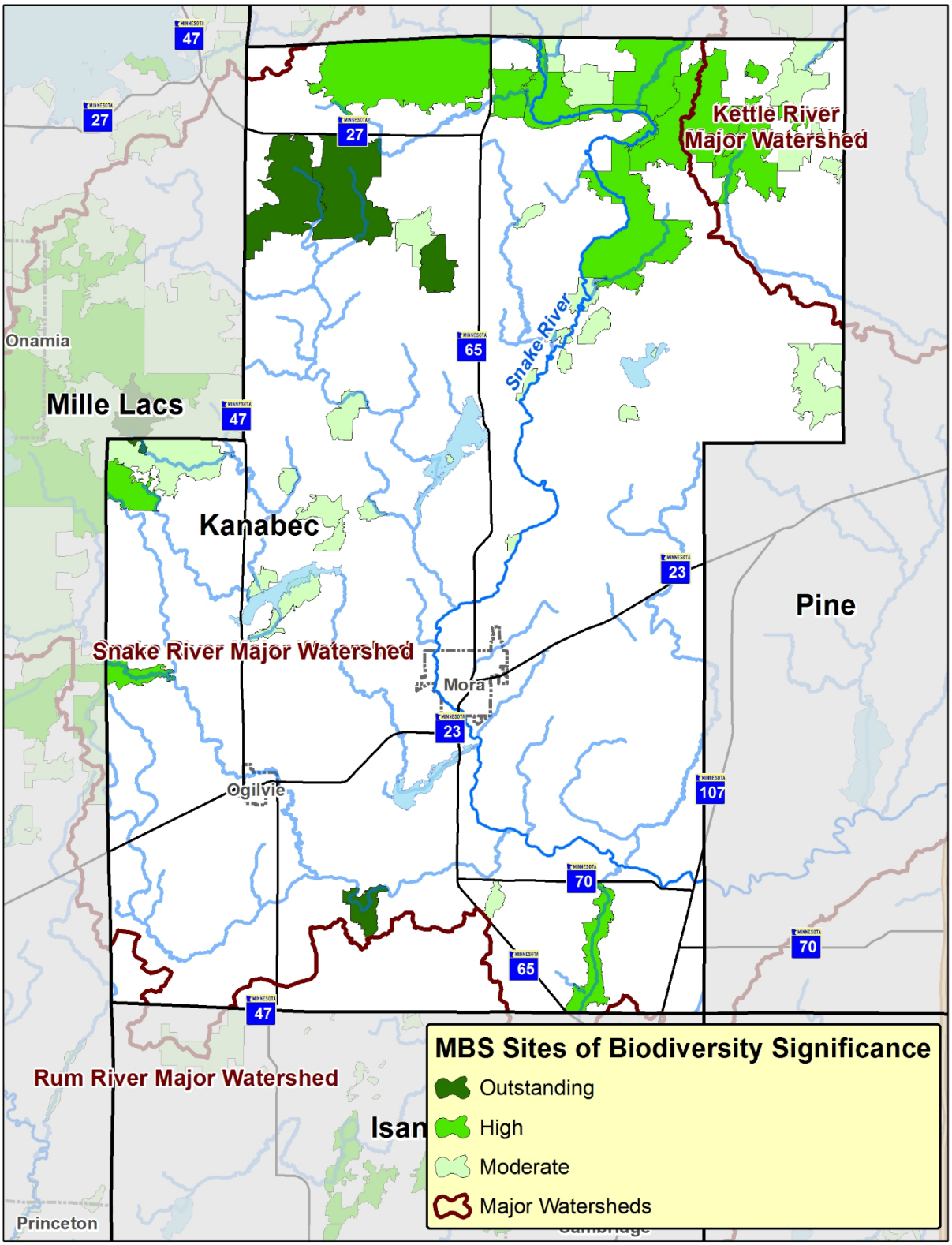
Water Use Issues

There are some water use conflicts involving jet ski users, fisherman, and recreational boaters, in Kanabec County, according to the DNR and local sources. There are also concerns over the cattle utilizing stream areas.

On May 17, 2001, Kanabec County enacted Ordinance #21 to control surface water use on Knife Lake.
On April 13, 2005, Kanabec County enacted Ordinance #28 to control surface water use on Ann Lake.

WILDLIFE

Wildlife habitat continues to be a land use of much interest as many land owners are managing their land for wildlife recreational use. Public lands in Kanabec are also utilized regularly for wildlife recreation such as hunting and fishing. Public funding for private wildlife habitat is often limited as well as agency staff time for this type of work. There are however private non-profit organizations in Kanabec County working toward better wildlife habitat development on private lands. Some of these organizations include: Pheasants Forever and the Snake River Chapter of the MN Deer Hunters Assn.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27
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Kettle River
Major Watershed
Onamia
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Snake River
Mille Lacs
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Kanabec
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Pine
Snake River Major Watershed
Mora
23
Ogilvie
107
70
65
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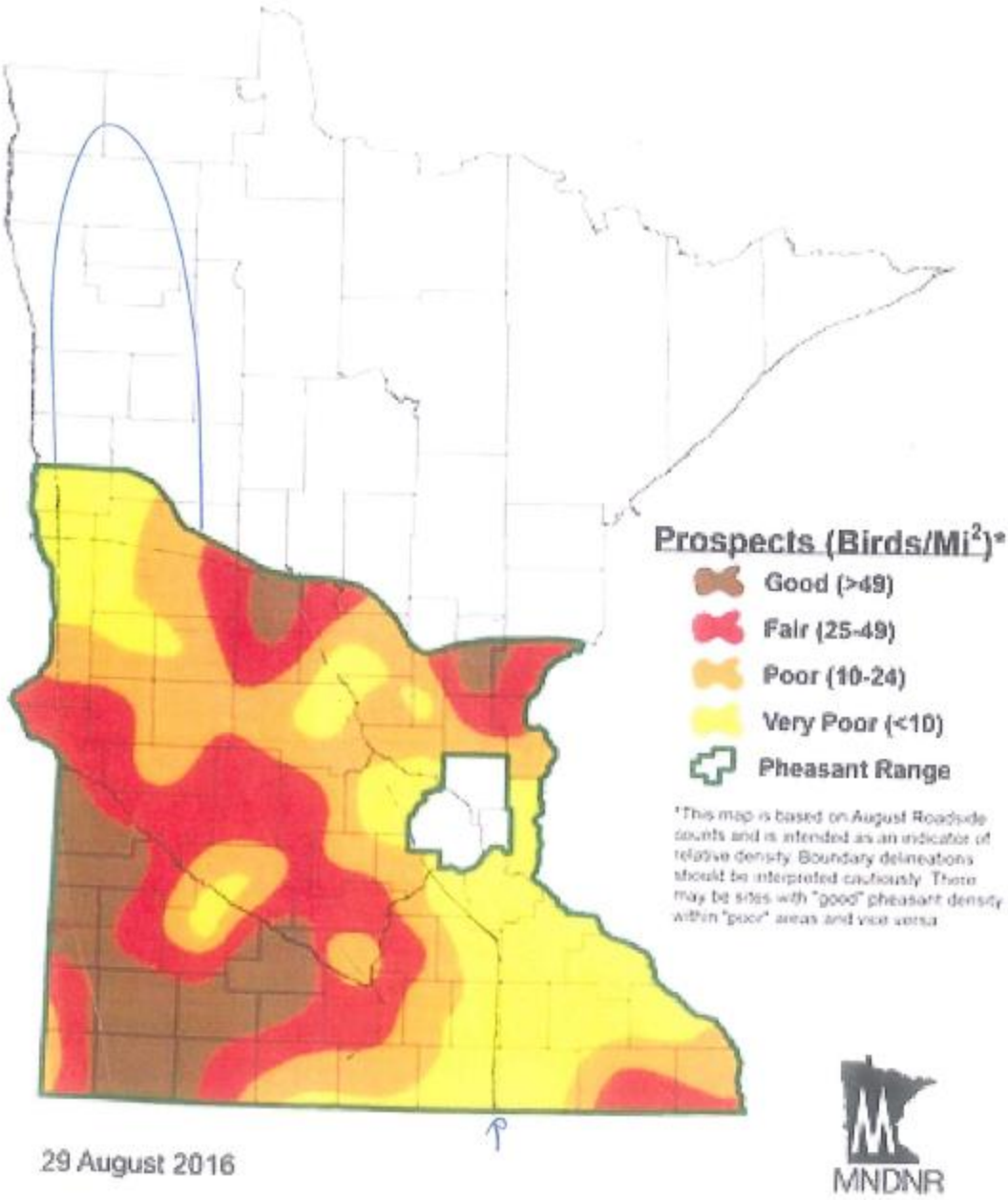
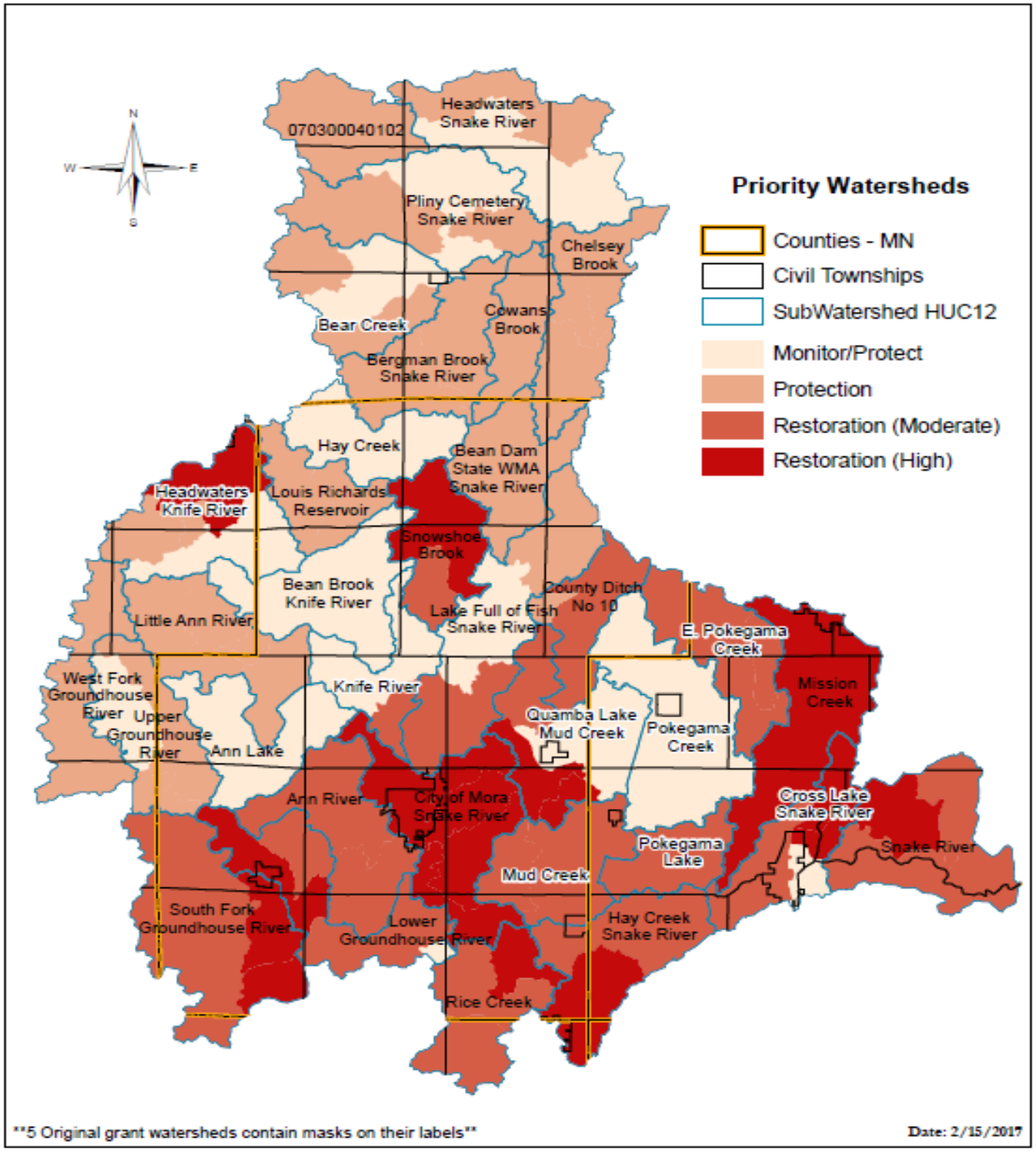
47
Rum River Major Watershed
Isan
Princeton
MBS Sites of Biodiversity Significance
Outstanding
High
Moderate
Major Watersheds

2016 Pheasant Hunting Prospects

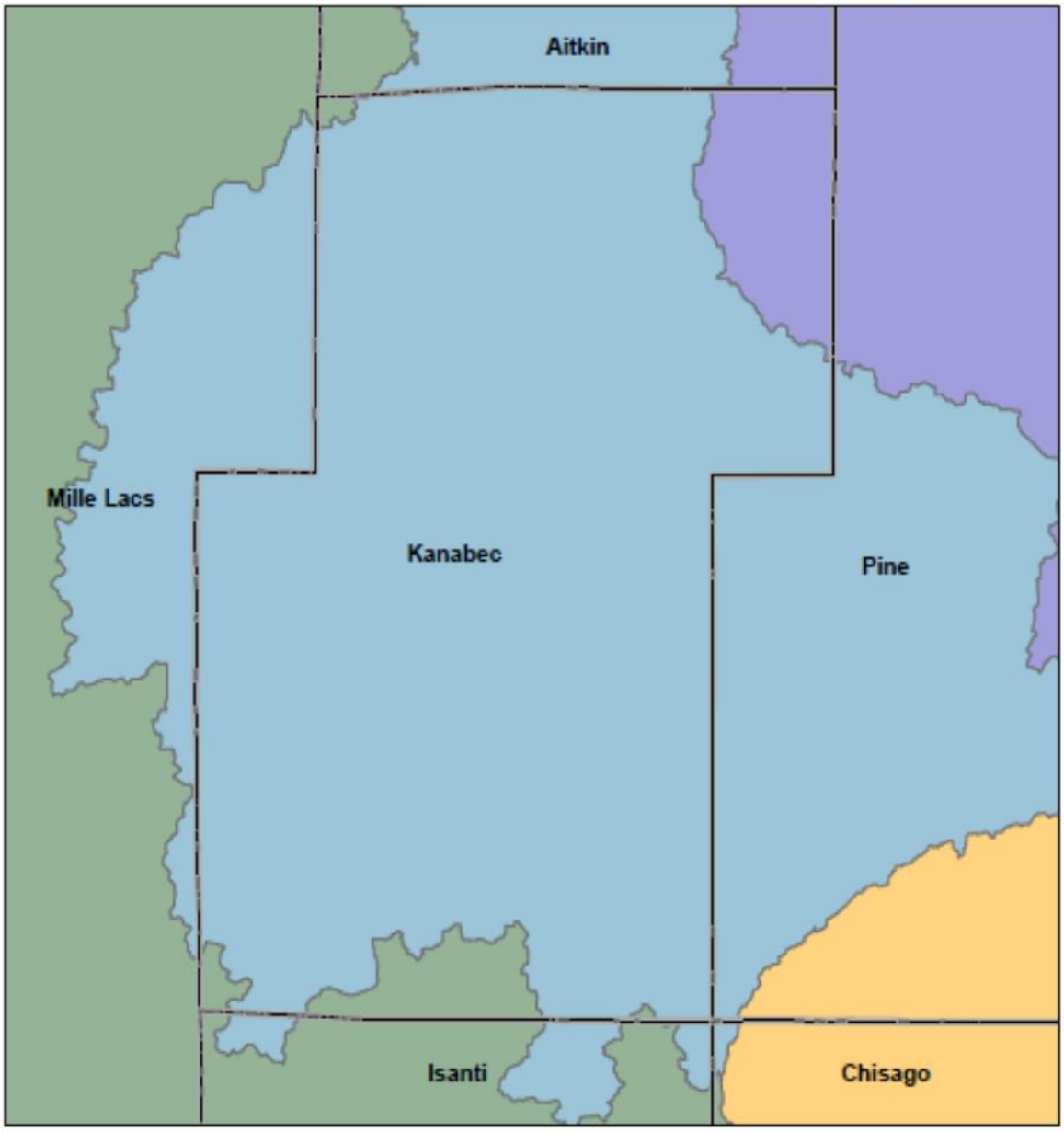


Snake River Watershed



Source: Snake Watershed WRAPS Report

Major Watersheds within Kanabec County



HUC8 Watersheds

Counties - MN
Snake (91%)
Kettle (6%)
Rum (3%)
Lower St.Croix (0%)

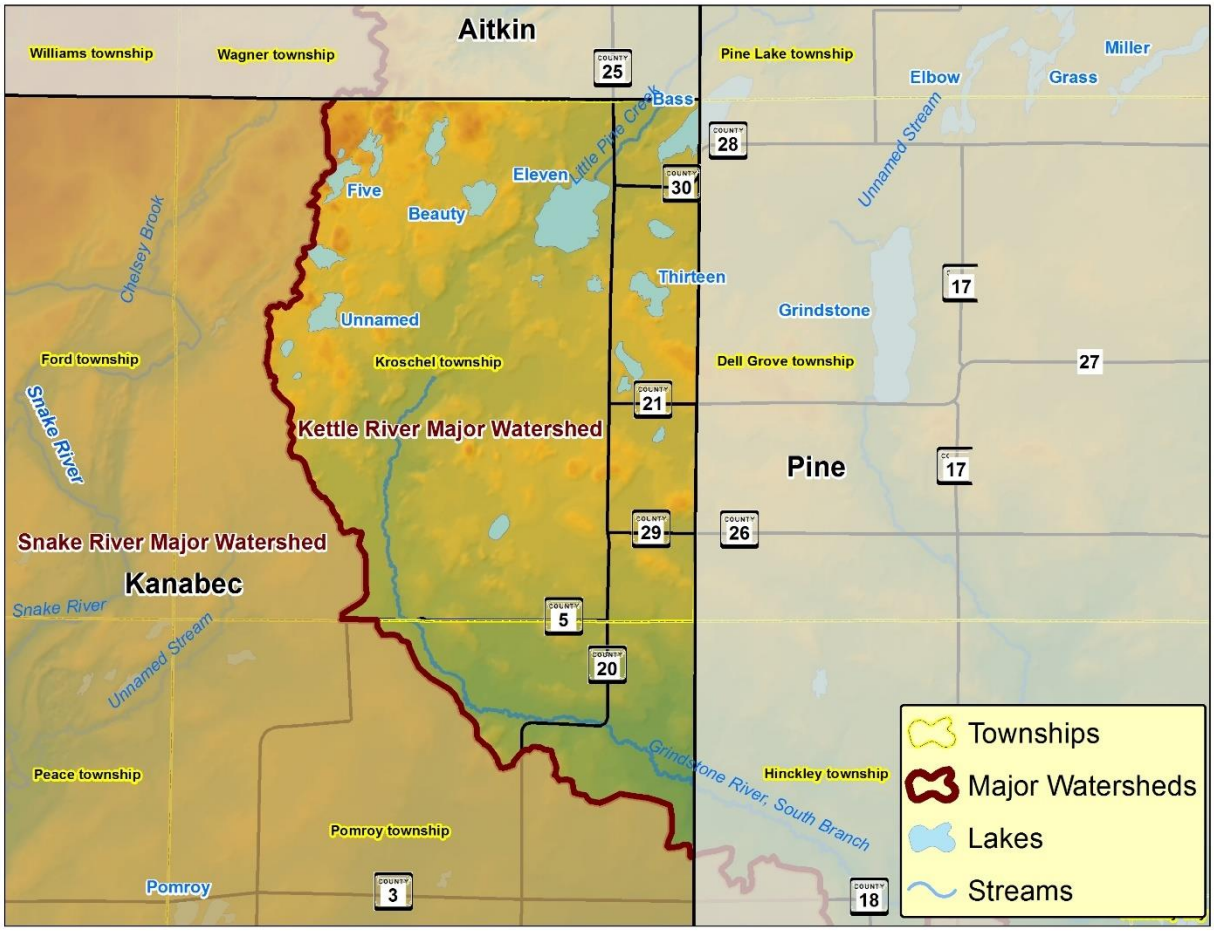
WATERSHEDS:

There are 3 major watersheds within Kanabec County: Snake River, Rum River, and Kettle River. The Snake River consists of 92% of the county. The Rum River consists of 2.5% and the Kettle River 5.5% of the county. Land use varies from watershed to watershed. The Rum River is mainly agricultural in use. The Snake River has both agricultural and forested. The Kettle River is mainly forested in use. The general surface water flow is north to south in the northern part of the County and west to east in the south. Knowing the direction of surface water flow will help locate possible pollution sources as well as downstream water bodies which would be affected by the source.

Priorities within the three watersheds vary with land use. Due to the majority of the county lying in the Snake River Watershed, it is the highest priority of concern. The Rum River watershed would be second due to the heavy agricultural use. The Kettle River watershed would be third.

SNAKE RIVER – MAJOR WATERSHED

The Snake River sub-watershed, which includes the upper, middle, and lower Snake River, is the largest group of sub-watersheds in the basin encompassing 273,301 acres or 43 % of the total Snake River Watershed. The Snake River originates in Aitkin County and flows for a total of 101.3 miles before entering the St. Croix River east of Pine City. The upper Snake River sub-watershed is characterized by areas of steep slopes which can be up to 25%, its relatively low percentage of cultivated land, and its exceptionally high numbers of state-listed rare and endangered wetland plant and animal species. Due to the upper Snake River's susceptibility to erosion and high number of rare and endangered plant and animal species, it is listed as a high priority and should be maintained and protected through the use of wise land stewardship practices.



KETTLE RIVER - MAJOR WATERSHED

The Kettle River consists of 5.5% of Kanabec County. The Kettle River watershed covers 672,235 acres in northeast Minnesota and lies within Northern Lakes and Forests ecoregion. Parts of Aitkin, Carlton, Kanabec, and Pine counties are in the Kettle River watershed. The headwaters for the Kettle River begin in Carlton County, and the river flows 104 miles south to its confluence with the St. Croix River south of Hinckley.

The Kettle River watershed includes dozens of lakes and wetlands and a few small streams that flow into the St. Croix River, which borders the watershed on the southeast. There are 23 lakes 100 acres or greater in the Kettle River watershed. Major cities include Hinckley, Kettle River, Barnum, Willow River, Moose Lake, Sturgeon Lake, Sandstone, and Finlayson. The watershed also includes part of the Fond du Lac tribal lands.

Land uses in the Kettle River watershed are predominately forest (55%), agriculture (20%), and wetlands (19%). Currently impairments are mercury (lakes and Kettle River), bacteria, and biota.

The Pine County SWCD has a SWAG grant to assess a few of the streams and lakes in the Kettle River watershed. There has also been a lot of work done in the Grindstone River watershed in the

way of monitoring; but a TMDL has been put on hold until the entire Kettle River watershed is assessed in 2015.

In 2014 the Kettle Watershed had a completed Landscape Stewardship Plan (LSP) to aid in prioritizing the protection strategies for the watershed. This report assessed the Grindstone River Sub-watershed at a very high risk for forest management action. (Kettle River Sub-watershed Assessment Criteria Summary Table, page 18 of the Kettle LSP) The risks listed for the Grindstone River included the least amount of public landownership, greatest loss of upland forest, highest potential Private Forest Management, second highest average watershed slope, and high length of impaired streams. In Kanabec County the Grindstone sub-watershed represents about 25 square miles in Kroschel and Pomroy Townships. For these reasons the Grindstone sub-watershed will be a future focus area of the Kanabec SWCD for protection strategies and forest management promotion and action.

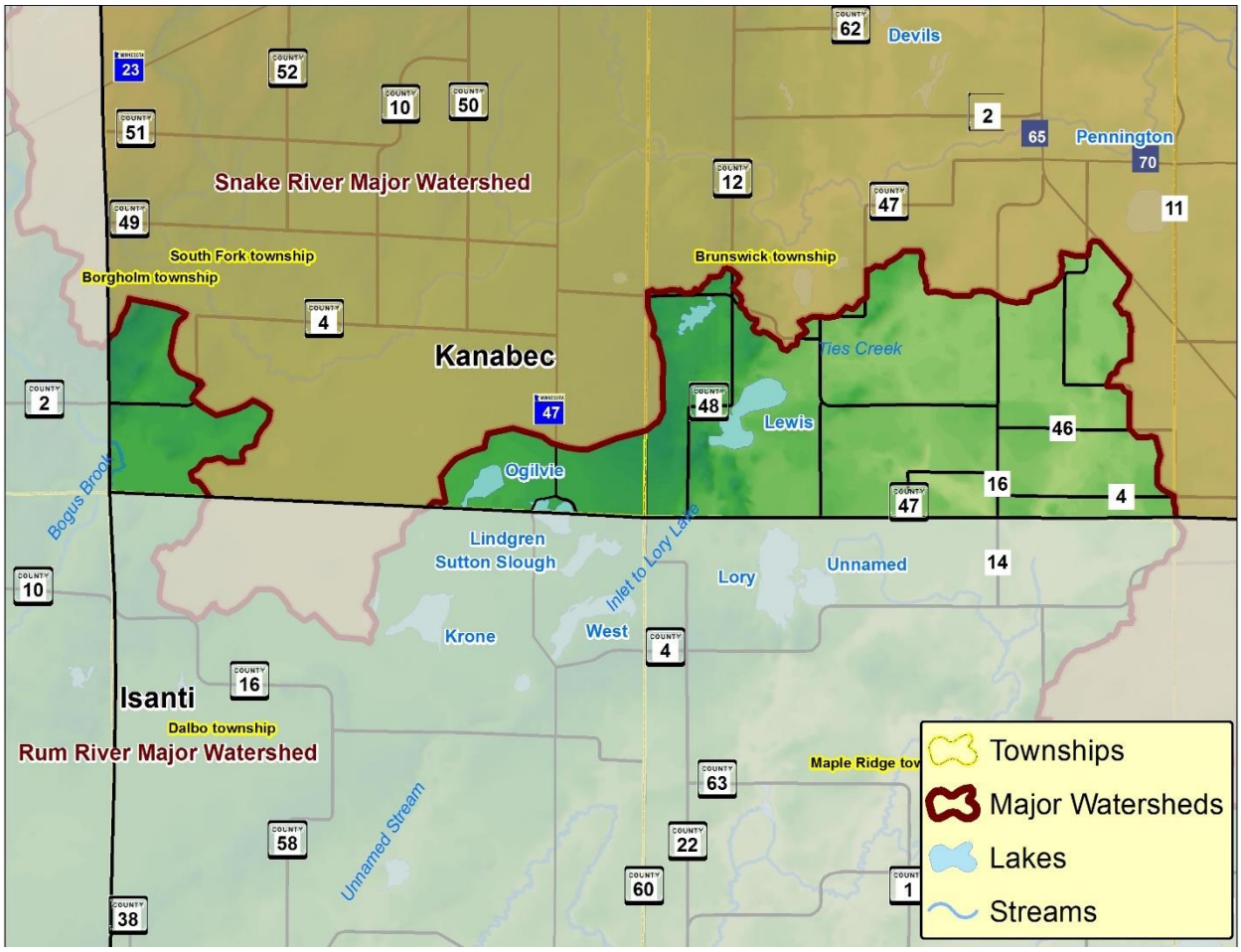
The Lake St. Croix TMDL report has identified the Kettle River as one of the many watersheds contributing to its impairments, so work is starting locally to target source areas and begin implementing BMPs.

Little Pine Creek (35037) - The watershed is flat and marshy with slopes of only 2-4%. Near the Aitkin County border north of Beauty Lake, the slopes increase to 8-10%.

South Branch of Grindstone River (35038) - Around Lake Five and Long Lakes the topography is very diverse with slopes ranging from 10-25%. Further south it flattens off to marsh land and bogs. It has few rolling hills with slopes of only 2-5% in the southern areas.

North Branch of Grindstone River (35040) - The watershed includes Lake Thirteen and is very flat with slopes of only 3-5%.

West Branch of Grindstone River (35039) - This watershed is flat and marshy with slopes of only 2-4%.



RUM RIVER - MAJOR WATERSHED

The Rum River consists of 2.5% of Kanabec County. The Rum River watershed covers 997,060 acres in east-central Minnesota. The watershed lies within both the Northern Lakes and Forests and North Central Hardwoods Forest ecoregions. Parts of Aitkin, Crow Wing, Morrison, Mille Lacs, Kanabec, Benton, Isanti, Chisago, Sherburne, and Anoka counties are in the Rum watershed. The headwaters for the Rum begin at Mille Lacs Lake. and the river flows 145 miles to its confluence with the Mississippi River at Anoka.

The Rum River watershed includes 212 lakes that are over 10 acres in size. Land use in the Rum River watershed is 39% agricultural, 24% forested, 18% grass/shrub/wetland, and 15% water.

Only a handful of lakes do not meet water quality standards for beneficial uses, such as aquatic recreation, drinking, and swimming. The main lake pollutant is phosphorus, causing algae blooms in summer months. The Rum River is designated as a "wild and scenic river." The upper river valley has one of the highest concentrations of prehistoric sites in Minnesota.

The Rum River Watershed in Kanabec County includes the Lewis Lake area. The Kanabec SWCD continues to work with the Lewis Lake Association on water quality concerns. The lake association monitors the lakes' water quality and promotes practices that foster improved water quality. The association has worked with the Kanabec County - Coalition of Lake Association (COLA) on a variety of aquatic invasive species monitoring and educational activities. In the past a few of the Lewis Lake shore-land owners had coordinated their efforts to install a group septic system. Given the size limitation of the lots this project was very beneficial and helps ensures cleaner lake waters.

The Rum River Watershed has successfully applied for planning funds through the Board of Water & Soil Resources in 2018. They are currently (4/19) starting the 'One Watershed Planning Process' with all the planning partners within the Rum River Watershed. This process is expected to take 1.5 - 2 years with a final product to be a comprehensive watershed plan. The final plan is expected to contain prioritized, targeted and measurable concerns and goals for cleaner water and better management of the natural resources within the Rum River Watershed.

Malone Creek (21003) - The watershed is very flat and marshy as it drains into Mile Lacs Lake.

Bogus Brook (21032) - The watershed is heavily farmed with a flat terrain of 0-2% slope.

Lory Lake & Creek to Ties Creek (21061) - The watershed is relatively flat with slopes of 4-6%. At the south end of Lewis Lake the slopes increase to 8-10%.

Ties Creek (21062) - This watershed is a heavily farmed area. It consists of ditches and wetlands and has an average slope of 4%.

Goal 1: Surface Water Quality and Quantity		**Implementation Schedule**				
'Protection and restoration of Kanabec County surface water quality and quantity'						
Action		**Lead / Supporting Agency**	**Timeframe**	**Cost**	**Watershed**	**Measured Goals**
1.	Promote the installation of perennial vegetative buffers along public waters and ditches	SWCD / Cty. Ditch Inspector / (Environmental Services)	2019-2028	$10,000 /yr Tech. Assistance $15,000 for installation funding ($40,000 /yr if Cty. elects enforcement)	Countywide	100% compliance with the buffer law
2.	Promotion and installation of Conservation Best Management Practices (BMP)–erosion control & others for the restoration and protection of surface waters in targeting sub-watersheds based on runoff and impaired water's status	SWCD / NRCS	2019-2028	BWSR state cost share - $9,607 annually, plus potential other grant funding	Countywide	Average: 20 T / yr Soil Erosion Reduction 380 # P reduction /yr.
3.	Promote & provide technical assistance for the implementation of upland soil health improvements (such as cover crops, minimal tillage, perennial vegetation & manure incorporation into the system)	NRCS / SWCD	2019-2028	$30,000 / yr. – NRCS – EQIP funding	Countywide	One soil health outreach / educational event per year – resulting in 3 soil health BMP conservation practice client sign-ups per year.
4.	Educate - Develop a plan and start the implementation of providing conservation education through the use of the District Land	SWCD / District Land Committee / Local School Educators	2024-2028	$2,000 / yr.	Countywide	Develop 3 new client interest in soil health practices per year.
5.	Prevent & control the runoff of household hazardous and solid waste into surface waters	Environmental Services	2019-2028	$4,000 /yr SCORE $1,000 /yr - Education	Countywide	One hazardous waste collection event held per year.

	Action	Lead / Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
6.	Through education – prevent the spread of Aquatic Invasive Species in the waters of Kanabec Cty.	Kanabec COLA / SWCD	2019-2028	$35,000 /yr	Countywide	Hold 2 educational events per year. (Fair + other) Educate / inspect for AIS at boat launches – 1000 hours
7.	Control the spread of Aquatic Invasive Species in the lakes & streams of Kanabec Cty.	Kanabec COLA / SWCD	2019-2028	$15,000 /yr	Countywide	Prevent the introduction and spread of AIS on Kanabec waters
8.	Complete the Snake River Cycle 2 surface water monitoring	SWCD / MPCA	2017-2019	$46,500	Snake River	Complete monitoring on 5 lakes and 11 stream sites over 2 yrs (2017-18)
9.	Update the Snake WRAPS report with the MPCA	SRWMB / Environmental Services / SWCD	2019-2021	$40,000	Snake River	Determine updates to water quality impairments in the watershed – complete report update.
10.	Apply for a grant in the Lewis Lake watershed to improve water quality, prevent the lake from becoming impaired	SWCD	2024-2028	$180,000	Rum River Watershed	Install soil & P reducing BMP's in the lakes' watershed resulting in 10 T / yr Soil Erosion Reduction & 190 # P reduction /yr.
11.	Apply for a Mora storm water grant to implement identified storm water practices to filter or retain runoff waters	SWCD / City of Mora	2021-2023	$250,000	City of Mora Watershed (Snake)	26 # P reduction /yr.
12.	Existing Snake Watershed Grant for BMP implementation – focus on shore land practices	SRWMB / SWCDs: Pine, Mille Lacs & Kanabec	2017-2019	$300,000	Priority Sub-watersheds in the Snake	Install 20 BMPs: 615 # P reduction / yr. 62 Tons soil saved / yr.
13.	Existing CWF Ann River Watershed Grant – install BMP to improve water quality	SWCD	2017-2018	$83,000	Ann River Watershed	Install 12 BMPs: 20 # P reduction / yr. 20 Tons soil saved / yr.

Action		Lead / Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
14.	Apply for a 'One Watershed One Plan' Grant – implement this planning process for the Snake Watershed	SRWMB / Environmental Services / SWCD	2019-2022	$80,000	Snake River	Prep for this planning in 2018, apply in 2019 – start planning in 2020 – finish plan in 2023
15.	Treatment on Ann Lake to reduce the high internal P loading	SWCD / ALWA / ALWACOLT	2019-2028	$675,000	Ann Lake	Total P reduction of 4,100 # Prep. for grant applications in 2018 – apply in 2019.
16.						
17.						

Goal 2: Ground Water Quality and Quantity **Implementation Schedule**

'Protect groundwater resources from impairments and develop a sustainable framework for groundwater users'

	Action	Lead/Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
1.	Promote and close abandoned manure storage pits	NRCS / SWCD	2017-2021	$125,000	Snake River	Close 4 abandoned manure storage pits
2.	Continue to test private drinking wells, provide education, assess any trends & identify BMP's for implementation to reduce nutrient leaching (nutrient management)	Public Health / Environmental Services / SWCD	2019-2028	$3,000 / yr.	Countywide	Test 20 wells / yr. for nitrates Provide educational materials to 75% of expectant mothers. Provide education to producers/land owners on BMP's to reduce nutrient leaching.
3.	Upgrade private septics to prevent contamination from non-compliant systems	Environmental Services / SWCD (AgBMP)	2019-2028	$130,000 SSTS; $52,000 - AgBMP	Countywide	14 septic upgrades / year
4.	Provide education and promotion for the upgrade of private septics	Environmental Services	2019-2028		Countywide	Provide more septic education with Lake Assn. & annually at the County Fair
5.	Provide education & groundwater protection BMP focus (BMP-nutrient management)	SWCD / NRCS	2024-2028	$30,000 / yr.	Countywide – focus on groundwater sensitive areas & well head protection areas	Provide one education event / yr. 4 groundwater focused BMP / yr.
6.	Fill to capacity of the Mora municipal sewer system as needed from neighboring towns with septic needs	City of Mora / Comfort Twp.	2024-2028	$1,200,000	City of Mora Area, Comfort Twp.	Upgrade / provide municipal sewer to the residence of Quamba Lake
7.	Nitrate well testing	SWCD / MDA	2018	$8,700	South Fork Township	Test 40% of the private wells in the township

	Action	Lead / Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
8.	Promote, provide funding and seal private abandoned wells	SWCD / NRCS	2019-2028	$5,000	Countywide	Educate and seal 6 wells / yr.
9.	Monitor wells in the City of Mora & Countywide (SWCD) to protect the drinking water aquifer	SWCD / City of Mora	2022-2028	$30,000	City of Mora	Monitor the city wells to acquire a level of risk & formulate an action plan to protect the acquifer.
10.						

Goal 3: Land Use **Implementation Schedule**

'Promote land use management beneficial to the county's natural resources'

	Action	Lead/Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
1.	Promote Forest Stewardship Plans (FSP)for the use of Forest Mgmt. BMPs	SWCD / NRCS	2019-2028	$100,000	Countywide – focus northern part	15 FSP plans / yr. 1000 acres planned /yr.
2.	Provide information and education on conservation easements for private lands protection (preventing development of sensitive lands)	SWCD / NRCS	2024-2028	$575,000	Countywide – focus northern part	Seek out land owners in priority focus areas for possible easements. Process 3 easements / yr.
3.	Existing Clean Water Partnership Grant for Protection BMPs – surface water monitoring (2 yrs.)	SWCD / NRCS / MPCA	2017-2018	$82,700	Countywide – focus in north, protection area	Install 8 BMP's / yr: 1600 # P reduction / yr. 32 Tons soil saved / yr.
4.	Increase outreach to forest landowners promoting woodland stewardship planning, easement protection and forest BMPs.	SWCD – new forester on staff	2020-2023	$140,000	Countywide – focus northern part & the Grindstone sub-watershed of the Kettle	Install 8 Forestry BMP's / yr
5.	Land Use Planning	Environmental Services	2019-2028		Countywide	Stay current on shoreland zoning legislation
6.						

	Action	Lead/Supporting Agency	Timeframe	Cost	Watershed	Measured Goals
1.						
2.						
3.						
4.						

EXPECTED CHANGES

Surface Water Changes

Seasonal development will continue to result in pressure to the surface water resources. Much of the riparian lands of the recreational lakes have already been developed. Second tier development is common around the larger lakes. Additional second tier development can be expected where it does not presently exist. It is expected that the rivers will experience an increase in development since river frontage represents the only undeveloped shoreland available. The potential for significant water quality impacts will continue without effective zoning.

Seasonal residential use on lakes results in numerous impacts to lake resources. Residential developments usually involve lawns, which leads to the use of fertilizers, herbicides, and mowing to the water's edge, giving the potential for runoff containing nutrients and chemicals to surface waters. Impervious surfaces associated with the development around lakes and rivers adds to surface water runoff and related problems. Education should be directed to riparian owners regarding lawn care practices and the problems resulting from runoff of herbicides and fertilizers.

Surface use of lakes continue to increase, while major conflict or over-use does not presently exist. Conflicts between surface water users are now occurring; jet skies, water skiing, fishing, pleasure boating, swimming, wildlife nesting, shoreline development. These issues may need to be monitored at some point in the future.

Certain changes have occurred or are occurring which should be considered positive for surface water quality. There are fewer feedlots and livestock within the shoreland areas. Marginal lands are less likely to be put to agricultural uses due to wetland regulation, CRP and RIM programs, and the general downturn in farming.

Ground Water Changes

There are no expected changes to ground water quality or quantity. The most significant activity related to ground water will be efforts to determine its present quality through monitoring.

There is no significant change expected in the usage of ground water for agricultural and industrial purposes. The supply of ground water should be sufficient for the foreseeable future.

Known areas of potential ground water pollution, such as the sanitary landfill are being tested or monitored.

Land Use Changes

Changes occurring related to land resources include a reduction in agricultural activities, the limitation and regulation of development through township zoning and recently updated ordinance for shorelands and floodplains. The development of river shoreland is expected since lakeshore land is nearly all developed.

Population: There is no indication that the recent growth rate of Kanabec County (14.6%) will change in the immediate future. However, a majority of the growth since 1980 has been in the un-serviced, unincorporated areas of the County. The County has been experiencing out-migration.

Control Plans: Previously, the townships within the County have developed comprehensive plans and adopted land use controls, resulting in a total of fourteen of the County's fifteen townships having controls.

Land Use: There is not specific data available on changes in land use. It is known that the number of farms, farm employment and farm income have decreased within recent years. The economic base of Kanabec County is shifting to non-farm employment with the greatest increase in the services sector. This economic trend will result in fewer farms and more non-farm residences.

Public Facilities, Services

There are no expected major changes to roads, public utility extensions, regulation or other factors which will significantly impact water resources.

In summary, the changes in land use and the recent out-migration to lakes and rivers are trends which may result in a possible need for further monitoring of water resources in the County.

CONFLICT RESOLUTION

CONFLICTS WITH EXISTING OR PROPOSED PLANS OF CONTIGUOUS COUNTIES, OR LOCAL UNITS OF GOVERNMENT.

At this time, there are not known conflicts between the Kanabec County Comprehensive Water Plan, and plans of local units of government or other counties. If conflicts should arise in the future, they will be addressed in an informal or formal resolution process.

Informal Resolution Process

The County or other local unit of government may request a meeting with the chair of the Board of Water and Soil Resources to informally resolve the following disputes: to determine the meaning of any provision of Minnesota Statutes Chapter 103B; to resolve conflicts between any two comprehensive water plans; or to settle any other dispute relating to a comprehensive water plan. The informal resolution process is as follows:

1. A meeting with the chairman of the State Board of Water and Soil Resources may be requested in writing by any of the involved parties.

2. The nature of the provision or omission causing the conflict must be described, whether it is in the comprehensive water plan, local plan, or other control. All parties in the conflict must be identified.

3. The chair shall acknowledge the request in writing, and request a meeting of all parties. If requests for a meeting does not satisfy the parties, or if there is no response from one of the other parties, the chair shall make a reasonable effort to obtain the information needed for resolution in another manner.

4. The chair shall establish the meeting time and place, and inform all parties in writing. A local unit of government may be represented by any person or persons of its choosing, subject to control of the chair. The chair may consider any relevant and reasonable evidence or argument by local unit of government in reaching a resolution.

5. The decision of the chair may be announced at the meeting, or made later. In any case, the decision shall be submitted in writing to all parties, and will be effective 60 days following the decision of the chair.

6. A petition may be filed within that time pursuant to Minnesota Statues, Section 103B.25, Subdivision 3, for a contested case hearing under that section.

Formal Resolution Process

A county or other local unit of government may petition for a contested case hearing if: the interpretation and implementation of a comprehensive plan is challenged by a local unit of government aggrieved by the plan; if two or more counties disagree about the apportionment of the costs of a projects implemented in a comprehensive plan; or if a county and another local unit government disagree about a change in a local water and related land resources plan or official control recommended by the county under Statute 103B. The process for a formal resolution of a conflict is as follows:

1. A petition must be filed within 60 days after the date of adoption or approval of the disputed ordinance, or the date a local unit of government receives a recommendation of the County Board under Section 103B.12. The petition must be made in writing, addressed to the state board, and include the following: the names, phone numbers, and addresses of the parties or their representatives involved in the petition; a request for a hearing; a statement of the allegations or issues to be determined by the hearing; and proof of service of a copy of the petition on all other involved local units of government.

2. The petition is considered filed with the State Board when it is received by the Board. The Board shall acknowledge receipt of the petition in writing.

3. Within 5 days of the receipt of the petition, the State Board shall file a request for the assignment of an administrative law judge.

4. Hearings are governed by the contested case procedure of Minnesota Statutes, Chapter 14. The Board shall not be considered a party to the hearing for the purpose of apportioning the fees of the Office of Administrative Hearings and for transcript fees.

5. Following the hearings and the report of the administrative law judge, the BWSR must make a final decision on the issue. All parties will be informed of the decision in writing.

6. A decision of the Board may be appealed to the court of appeals.

		Appendix C						
Water Body Name	**Water Body Description**	**Year Added**	**ID**	**Affected Use**	**Pollutant**	**TMDL Target**	**TMDL Approved**	
Grindstone River, South Branch	Headwaters to Grindstone R	2002	07030003-516	Aquatic Life	Fishes bioassessments	2020		
Grindstone River, South Branch	Headwaters to Grindstone R	2002	07030003-516	Aquatic Recreation	Fecal Coliform	2020		
Lewis	Lake or Reservoir	1998	33-0032-00	Aquatic Consumption	Mercury in fish tissue	2025		
Ann	Lake or Reservoir	2018	33-0040-00	Aquatic Consumption	Mercury in fish tissue			
Ann	Lake or Reservoir	2004	33-0040-00	Aquatic Recreation	Nutrient/eutrophication biological indicators		2013	
Ann River	Headwaters (Ann Lk 33-0040-00) to Snake R	2010	07030004-511	Aquatic Life	Aquatic macroinvertebrate bioassessments		2013	
Ann River	Headwaters (Ann Lk 33-0040-00) to Snake R	2002	07030004-511	Aquatic Life	Fishes bioassessments		2013	

Water Body Name	Water Body Description	Year Added	ID	Affected Use	Pollutant	TMDL Target	TMDL Approved	
Ann River	Headwaters (Ann Lk 33-0040-00) to Snake R	2010	07030004-511	Aquatic Recreation	Escherichia coli		2013	
Fish	Lake or Reservoir	1998	33-0036-00	Aquatic Consumption	Mercury in fish tissue		2008	
Fish	Lake or Reservoir	2004	33-0036-00	Aquatic Recreation	Nutrient/eutrophication biological indicators		2013	
Groundhouse River	Headwaters to S Fk Groundhouse R	2004	07030004-513	Aquatic Life	Aquatic macroinvertebrate bioassessments		2009	
Groundhouse River	Headwaters to S Fk Groundhouse R	2002	07030004-513	Aquatic Life	Fishes bioassessments		2009	
Groundhouse River	Headwaters to S Fk Groundhouse R	2002	07030004-513	Aquatic Recreation	Fecal Coliform		2009	
Groundhouse River	S Fk Groundhouse R to Snake R	2008	07030004-512	Aquatic Recreation	Fecal Coliform		2009	
Groundhouse River, South Fork	Headwaters to Groundhouse R	2004	07030004-573	Aquatic Life	Aquatic macroinvertebrate bioassessments		2009	

Water Body Name	Water Body Description	Year Added	ID	Affected Use	Pollutant	TMDL Target	TMDL Approved	
Groundhouse River, South Fork	Headwaters to Groundhouse R	2010	07030004-573	Aquatic Life	Dissolved oxygen	2022		
Groundhouse River, South Fork	Headwaters to Groundhouse R	2008	07030004-573	Aquatic Life	Fishes bioassessments		2009	
Groundhouse River, South Fork	Headwaters to Groundhouse R	2008	07030004-573	Aquatic Recreation	Fecal Coliform		2009	
Knife	Lake or Reservoir	2014	33-0028-00	Aquatic Consumption	Mercury in fish tissue		2014	
Knife	Lake or Reservoir	2004	33-0028-00	Aquatic Recreation	Nutrient/eutrophication biological indicators		2014	
Knife River	Dry Run to Knife Lk	2004	07030004-549	Aquatic Life	Aquatic macroinvertebrate bioassessments	2022		
Mud Creek (County Ditch 10)	Headwaters to Mud Lk (Quamba Lk 33-0015-00)	2004	07030004-566	Aquatic Life	Aquatic macroinvertebrate bioassessments		2014	
Mud Creek (County Ditch 10)	Headwaters to Mud Lk (Quamba Lk 33-0015-00)	2002	07030004-566	Aquatic Life	Fishes bioassessments		2014	

Water Body Name	Water Body Description	Year Added	ID	Affected Use	Pollutant	TMDL Target	TMDL Approved	
Mud Creek (County Ditch 10)	Headwaters to Mud Lk (Quamba Lk 33-0015-00)	2016	07030004-566	Aquatic Recreation	Escherichia coli		2014	
Mud Creek (County Ditch 10)	Mud Lk (Quamba Lk 33-0015-00) to Snake R	2008	07030004-567	Aquatic Recreation	Fecal Coliform		2014	
Quamba	Lake or Reservoir	2004	33-0015-00	Aquatic Recreation	Nutrient/eutrophication biological indicators		2014	
Snake River	Chelsey Bk to Knife R	1998	07030004-506	Aquatic Consumption	Mercury in fish tissue		2008	
Snake River	Fish Lk outlet to Groundhouse R	1998	07030004-505	Aquatic Consumption	Mercury in fish tissue		2008	
Snake River	Groundhouse R to Mud Cr	1998	07030004-524	Aquatic Consumption	Mercury in fish tissue		2008	
Snake River	Hay Cr to Chelsey Bk	1998	07030004-523	Aquatic Consumption	Mercury in fish tissue		2008	
Snake River	Knife R to Fish Lk outlet	1998	07030004-525	Aquatic Consumption	Mercury in fish tissue		2008	
Spring Brook	Headwaters to Snake R	2002	07030004-515	Aquatic Life	Fishes bioassessments	2022		