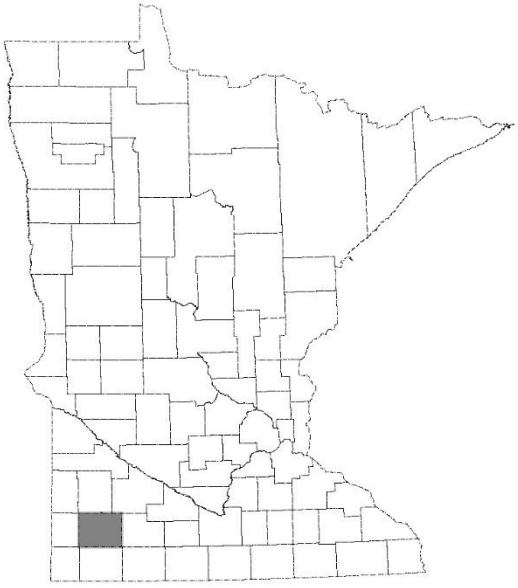
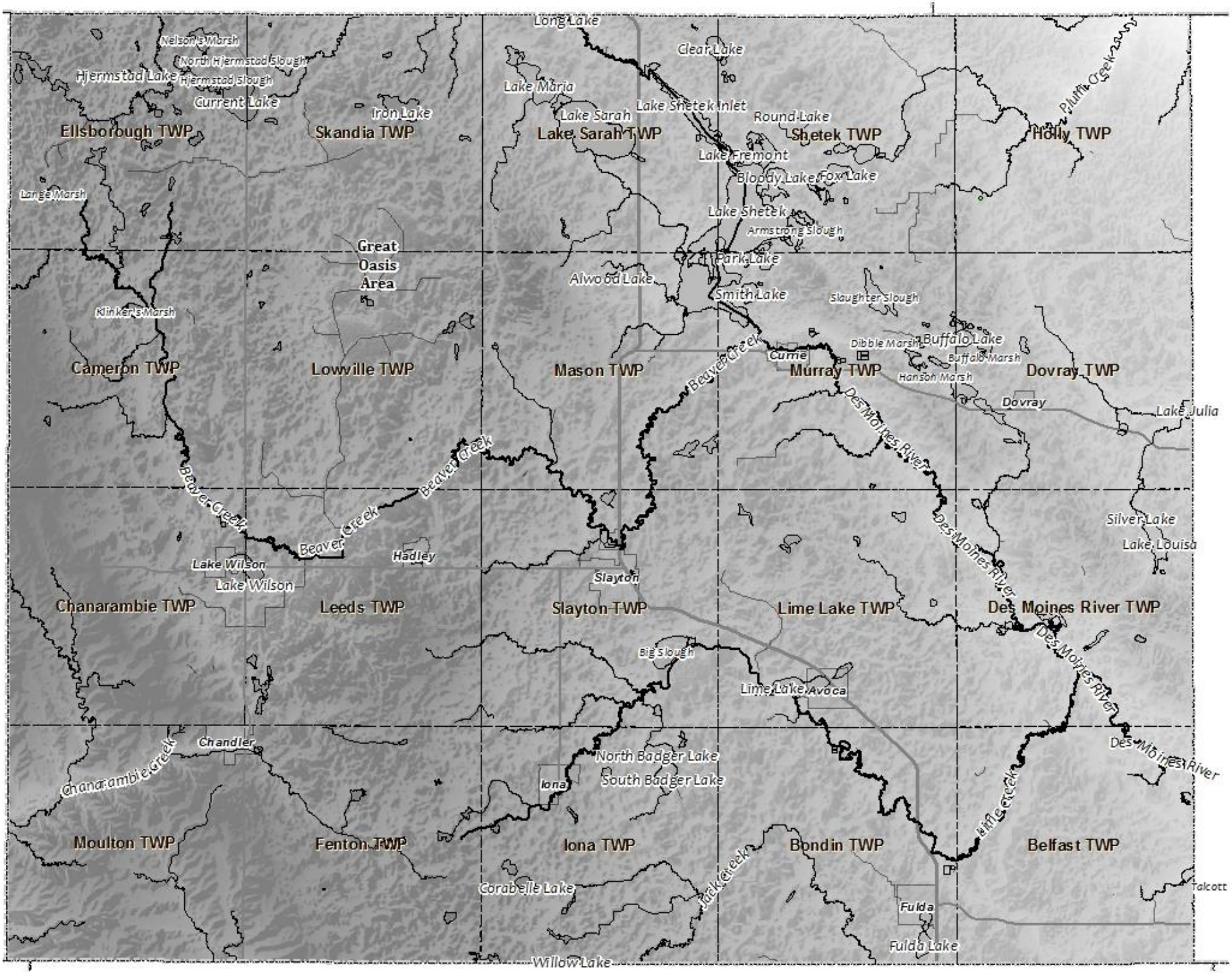
MURRAY COUNTY
LOCAL WATER MANAGEMENT PLAN 2017-2027

Developed according to guidelines established by Minnesota Statutes Chapter 103B and
the Minnesota Board of Water and Soil Resources



Murray County Local Water Management Plan Task Force
Murray County Environmental Office | 2500 28th Street / PO Box 57 | Slayton, Minnesota 56172

March 1, 2017


Long Lake
Nelson's Marsh
North Hjermstad Slough
Hjermstad Lake
Hjermstad Slough
Current Lake
Iron Lake
Clear Lake
Lake Maria
Lake Sarah
Lake Shetek Inlet
Round Lake
Plum Creek
Ellsborough TWP
Skandia TWP
Lake Sarah TWP
Shetek TWP
Holly TWP
Lake Fremont
Bloody Lake
Fox Lake
Lange Marsh
Lake Shetek
Armstrong Slough
Great Oasis Area
Park Lake
Alwood Lake
Smith Lake
Slaughter Slough
Klinker's Marsh
Dibble Marsh
Buffalo Lake
Buffalo Marsh
Hanson Marsh
Beaver Creek
Currie
Cameron TWP
Lowville TWP
Mason TWP
Murray TWP
Dovray TWP
Des Moines River
Dovray
Lake Julia
Beaver Creek
Beaver Creek
Beaver Creek
Silver Lake
Lake Louisa
Lake Wilson
Hadley
Lake Wilson
Slayton
Chanarambie TWP
Leeds TWP
Slayton TWP
Lime Lake TWP
Des Moines River TWP
Des Moines River
Big Slough
Lime Lake
Avoca
Chandler
Chanarambie Creek
North Badger Lake
Iona
South Badger Lake
Des Moines River
Lime Creek
Moulton TWP
Fenton TWP
Iona TWP
Bondin TWP
Belfast TWP
Jack Creek
Corabelle Lake
Talcott
Fulda
Fulda Lake
Willow Lake

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Local Water Management Plan Task Force (January 2017)

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Paul Posthuma		
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PART I

1. EXECUTIVE SUMMARY

A. **Purpose of this plan.** This Local Water Management Plan (LWMP) was created to:

1.) Identify surface and groundwater resources that are polluted by human activity, or that are in danger of becoming polluted in a way that makes them unfit for their designated use,

2.) Prioritize among those on the basis of environmental impact, cost, and the current nonpoint priority funding plan.

3.) Specify policies, procedures, and practices, including construction projects that can be implemented to preserve or restore those resources, with measurable goals.

The purpose of the LWMP is to prioritize stressed water resources and to make a plan for protection of those resources. This is the fifth version of the LWMP. The first LWMP was adopted September 4, 1990, and revised plans have been adopted as required since that date.

Requirements of a local water plan are set forth in current state statute (Minn. Stat. § 103B.311, Subd. 4). The LWMP must address management of water, effective environmental protection, and efficient resource management, and must be consistent with local water management plans prepared by watershed management organizations within the county. This LWMP is a ten-year management plan with a five-year implementation schedule.

B. **Priority concerns to be addressed by the LWMP:** Through comments received from state and local agencies, a public input meeting, and a survey of perceived problems within the county, the following priority concerns were identified:

1.) **Improve surface water quality and quantity.** In particular, the LWMP will address those waters listed as impaired by the Minnesota Pollution Control Agency (MPCA). Seven lakes (Sarah, Shetek, Bloody, Currant, Lime, Talcot, and Fulda) are assessed as impaired due to nutrient loading and eutrophication. It has been a goal of the Water Plan Task Force (Task Force) to keep the water quality in these lakes from degrading. Numerous streams are listed as impaired due to coliform bacteria and/or turbidity. A few water bodies are listed due to bioassessments for aquatic macroinvertebrate, fishes, and plants.

2.) **Improve groundwater quality and quantity.** Murray County has 30 regulated public water supplies that use well water. Eight of these are municipal water supplies. Outside of these areas, parts of the county in the west and northeast are covered by Lincoln-Pipestone Rural Water or Red Rock Rural Water; the remainder of the rural areas are served by private wells. Certain areas of the County, especially the Lake Shetek/Lake Sarah area, are in need of a rural water system due to both poor quality and lack of a water source. The Task Force felt this was an important issue because of the need to improve the existing potable water sources as well as increasing the number of them for rural water systems. Since the inception of the LWMP, the Task Force has

conducted annual testing of 70 wells throughout the county. These wells have been specially selected for depth and location. The testing has provided 26 years of baseline data. The Task Force also provided funding to the cities of Chandler, Lake Wilson, Iona, and Fulda to assist with the development of their wellhead protection plans.

Other practices will be targeted to areas listed with the 2016 Nonpoint Priority Funding Plan priority areas and criteria. Projects that have a multiple-benefit best management practice (BMP) will be considered a priority. The Chandler drinking water source management area will be a priority area because of elevated nitrate levels. The LWMP supports preparation of wellhead protection plans for Avoca, Currie, Hadley, and Slayton; sealing of abandoned wells as required by Minn. Stat. § 103I.301; and collaboration with other counties in the Watershed Restoration and Protection Strategies (WRAPS) planning process, as well as the Missouri River One Watershed One Plan (1W1P). Annual monitoring of the test wells throughout the county will continue.

The LWMP will prioritize protection of areas where the Minnesota Department of Health (MDH) determined the aquifer to be highly sensitive to contamination, in particular municipal systems.

3.) **Drainage water management/water retention.** This Priority Concern connects directly to the need to address more frequent large rainfalls resulting from climate change. Improved drainage for agricultural land has changed the amount and timing for flow in streams, causing increased streambank and streambed erosion. In order to address water quality impairments resulting from changed flow patterns, the LWMP will emphasize drainage water management, water retention, conservation practices, and restoration of wetlands, especially in the Beaver Creek, Shetek, and Heron Lake watersheds.

4.) **Subsurface sewage treatment systems and feedlots.** Murray County estimates that approximately 29 percent of the subsurface sewage treatment systems (SSTS) in the county are classified as imminent public health threats, which generally means the system discharges to the ground surface or into a drainage tile. According to the 2006 West Fork Des Moines River (WFDMR) Total Maximum Daily Load (TMDL) study by the MPCA, "The primary contributing sources to fecal coliform bacteria were found to be livestock on overgrazed riparian pasture, surface-applied manure on cropland, feedlots lacking adequate runoff controls and inadequate septic systems." These priorities are part of improving surface water quality and can be part of protecting groundwater quality. Nutrient and eutrophication impairments in Lakes Sarah, Shetek, Bloody, Currant, Lime, Talcot, and First Fulda, and fecal coliform/E. coli impairments in streams can be addressed, in part, by reductions in nonpoint pollution from faulty septic systems and pollutants from feedlots.

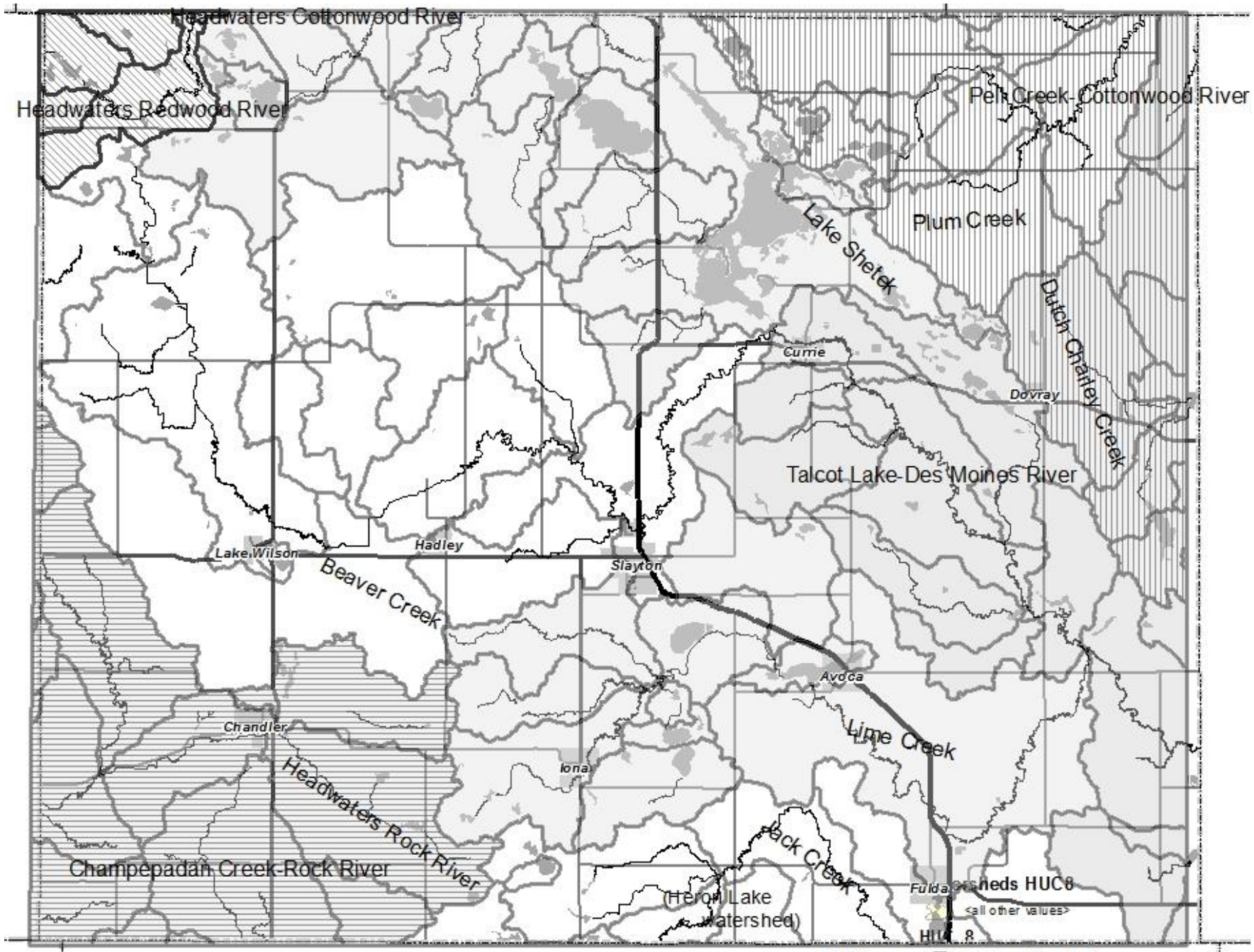
C. Consistency of this LWMP with other existing plans and controls.

This LWMP is governed by the requirements of Minn. Stat. § 103B.314. Murray County's Environmental Services Office (ESO) staff administer the Murray County Comprehensive Land Use Plan and the Murray County Zoning Ordinance, which includes sections for Shoreland, Floodplain, SSTS, and Feedlot regulations. The LWMP, Zoning Ordinance, Solid Waste Ordinance, the Natural Resources Block Grant, and the MPCA Feedlot Grant are administered out of the ESO. The ESO communicates with all other County offices and the Murray County Soil and Water Conservation District (SWCD) for planning processes. The ESO has access to other local, watershed-level, and state plans for use in LWMP development. This helps to maintain consistency between this LWMP and other plans and ordinances.

Additional input was received, and the LWMP was approved, a process described in the Appendix.

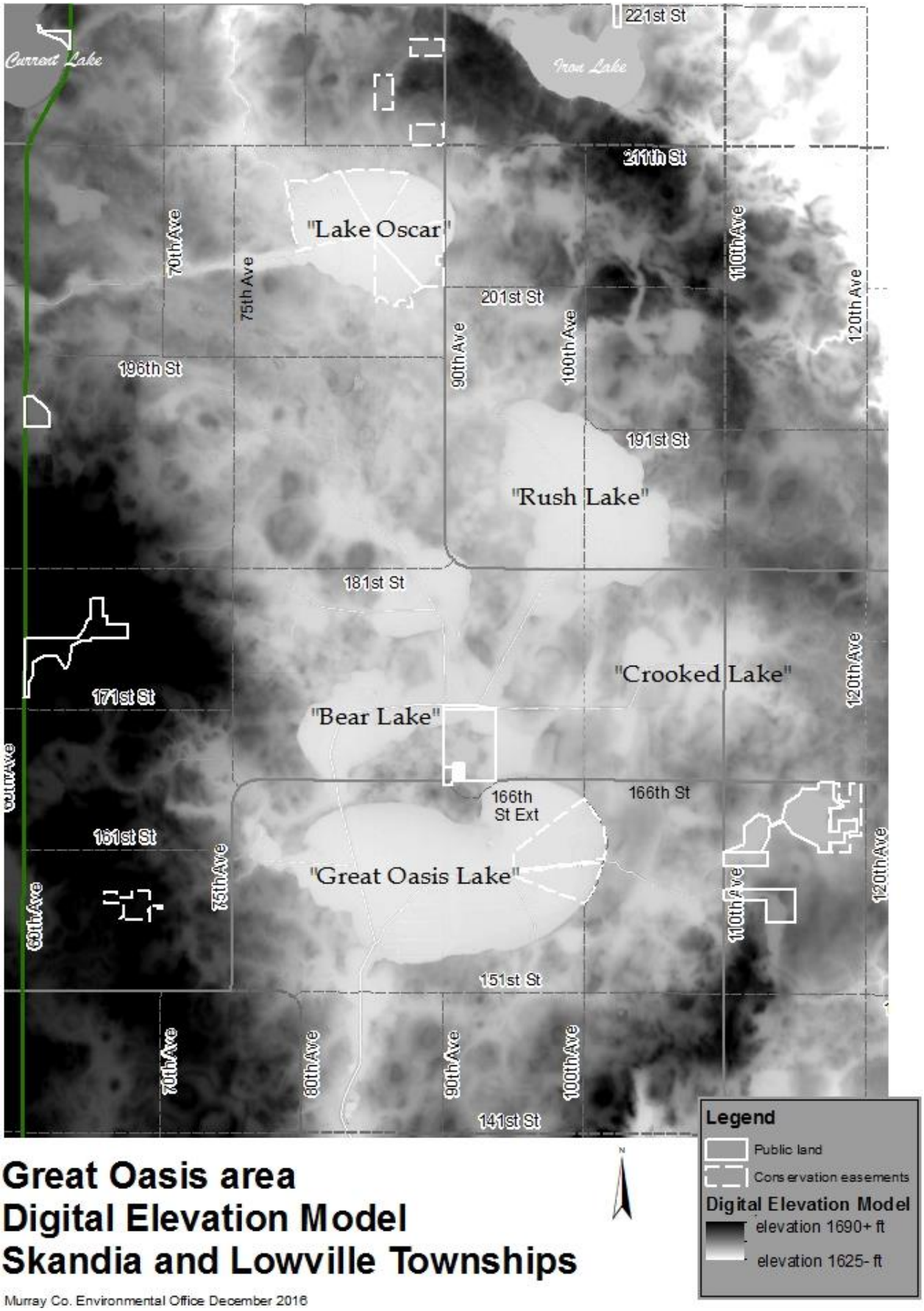
D. Recommended amendments to other plans and official controls to achieve consistency.

No specific amendments are recommended at this time.



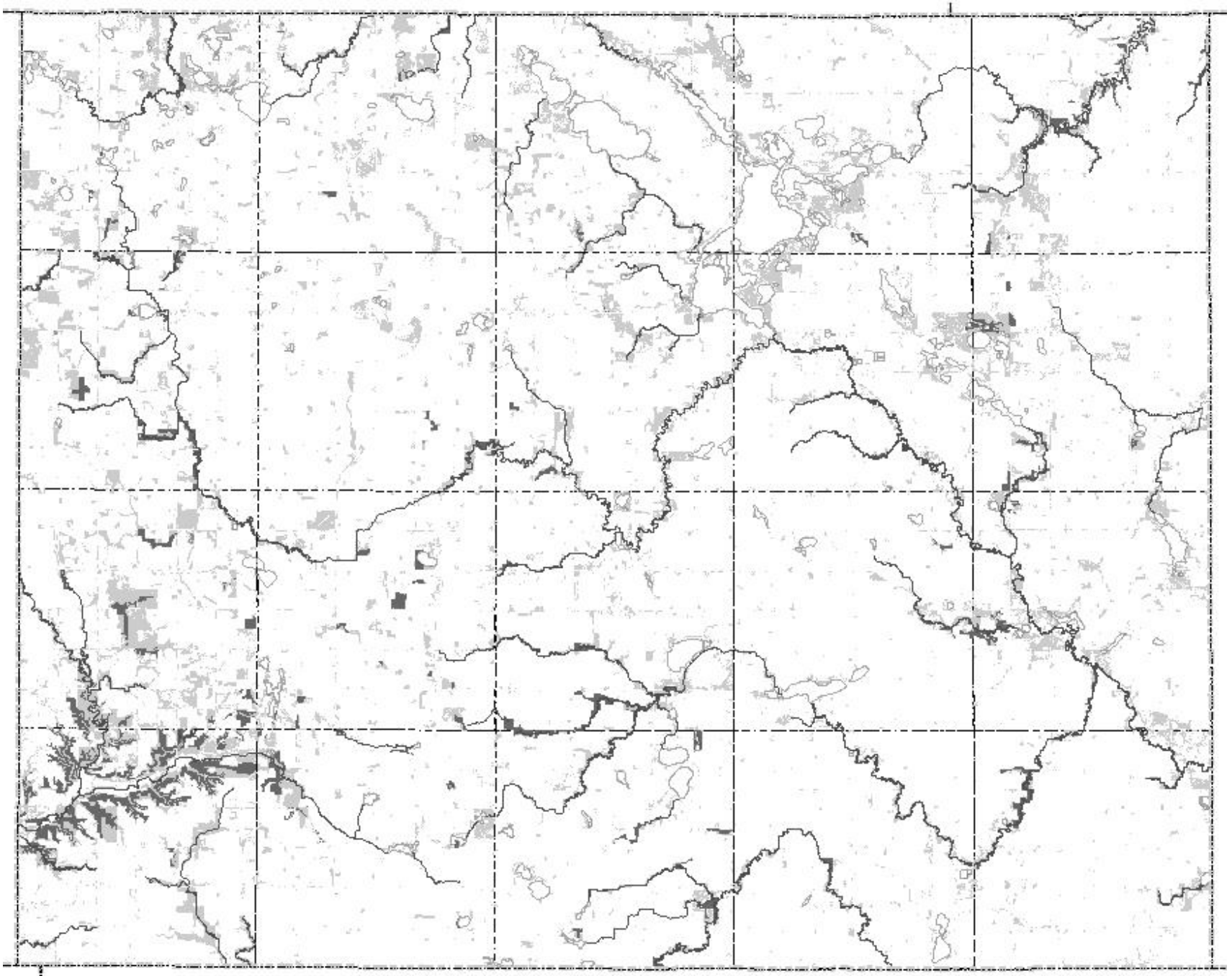
Major & minor watersheds in Murray County

Murray Co. Environmental Office January 2017



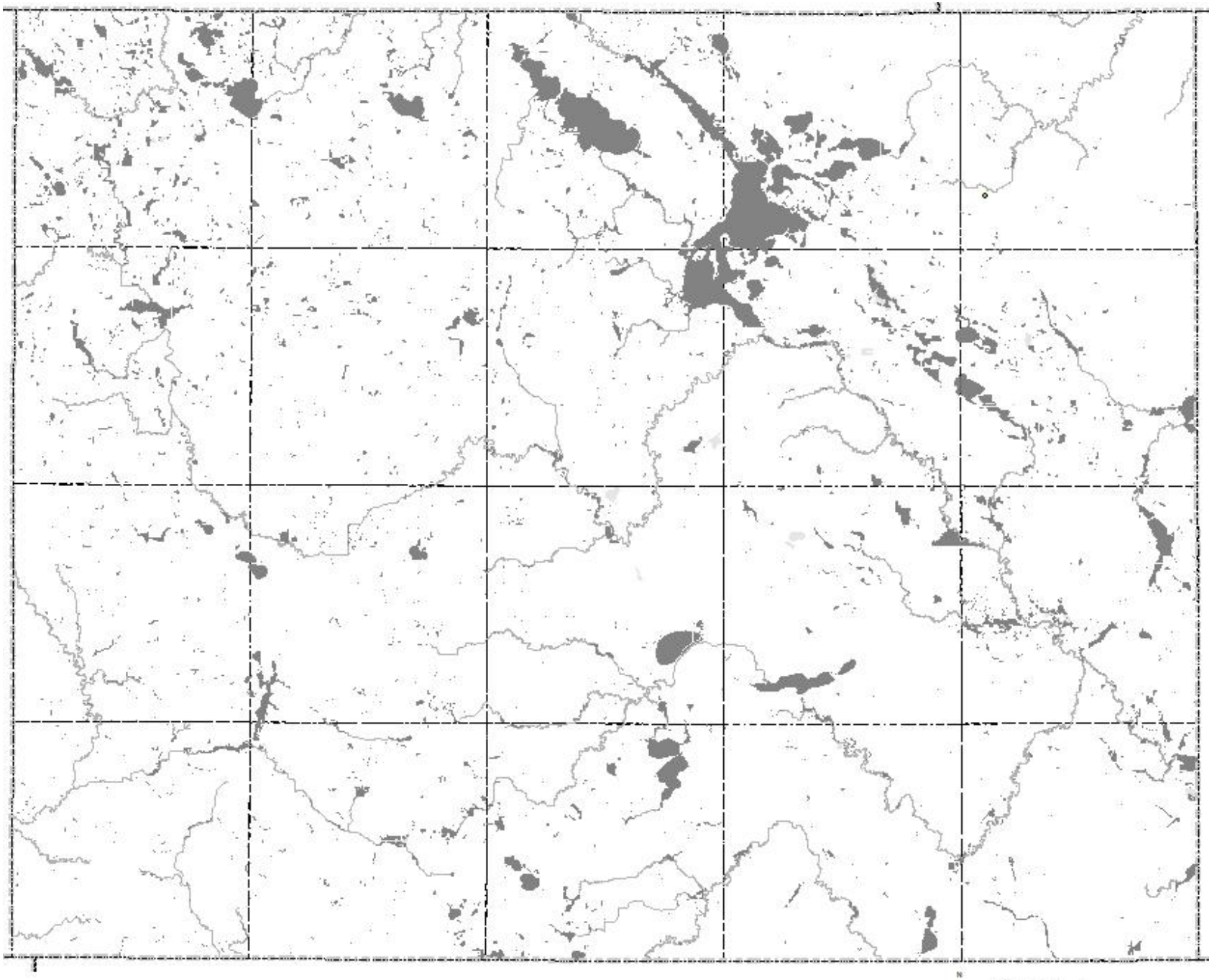
Great Oasis area
Digital Elevation Model
Skandia and Lowville Townships

Murray Co. Environmental Office December 2016



Pasture and grassland and native prairie

Source MN DNR via MN Geospatial Commons
Murray Co. Environmental Office January 2017



National inventory of wetlands

Source: US Fish & Wildlife Svc via Minnesota Geospatial Commons
Murray Co. Environmental Office January 2017

2. THE MURRAY COUNTY ENVIRONMENT AND PRIORITY CONCERNS

A. **Population.** Murray County is located in southwestern Minnesota. Slayton is the county seat. The county population in 2010 was 8,725. Over 60 percent of the population live in nine towns and one census-designated place.

B. **Geology.** Murray County is a prairie environment with no exposed bedrock. The center of the county is dominated by Buffalo Ridge, a thick glacial deposit that was bypassed in the last glaciation. The land is divided into four major drainages (see Major and minor watersheds map): The DMR, which drains more than 70 percent of the county; the Rock/Missouri drainage in the southwest corner (about 13 percent); the Cottonwood River drainage in the northeast (13 percent); and the Redwood River, about 2 percent of the land in the northwest corner of the county.

The eastern escarpment of Buffalo Ridge cuts across the northeast corner of the county, creating northeast-flowing streams with steep gradients, including Plum Creek in Holly Township, a tributary to the Cottonwood River. Much of the highly erodible land in Murray County is located on the banks of Plum Creek.

The western escarpment of Buffalo Ridge crosses the southwest corner of the county, creating dramatic bluffs in excess of 140 feet. Much of Murray County's grassland – which makes up about nine percent of its land surface – is in steep land in this area. This area contains one of the largest concentrations of untilled native prairie in Minnesota. West of Buffalo Ridge, Chanarambie Creek and Champepedan Creek flow toward the Rock River, part of the Missouri River drainage.

Between the two escarpments, Buffalo Ridge cradles the upper reaches of the DMR. The DMR basin takes in a larger percentage of Murray than of any other Minnesota county. In some areas, the banks of the DMR are severely eroding, a natural process exacerbated by modern drainage.

At the northwest end of the DMR lie several highly valued recreational lakes lined with cabins and houses and recreational areas, especially Lake Shetek, Bloody Lake, and Lake Sarah. Water quality in these lakes directly affects their value as recreational settings. These lakes are shallow – 9 to 11 feet – and as a result, bottom sediments and nutrients, especially phosphorus, are easily resuspended by carp, wind, and human activity. Other residential lakes in the county – Wilson, Lime, and Fulda – are even shallower.

Fifteen miles west of the Lakes, Beaver Creek rises, flowing first southwest along Buffalo Ridge, then northeasterly into the DMR, more than 50 river miles in length. Beaver Creek, with 169 square miles within the county, drains more than 23 percent of the county's land area. The stream gradient is alternately very flat and fairly steep. The streambank for part of Beaver Creek's length is severely and actively eroding.

Situated between the Lake Shetek drainage and Beaver Creek is a large area that once contained many lakes in Skandia and Lowville Townships. This area (see map) was dubbed the Great Oasis in a 1993 book by Janet Timmerman. Early in the last century, thousands of acres of lakes and marshes in the area were drained to create productive farmland. Property lines in the area still record how this area was legally claimed by the adjacent landowners as meandered land, resulting in numerous pie-wedge shaped parcels. About 700 acres of this land has since been placed in conservation easements or purchased outright by the State.

Another stream of interest is Lime Creek. This stream drains about 14 percent of the county before joining with the DMR. The sinuous path of Lime Creek on maps is a clue to the frequent appearance of streambank erosion along its length.

C. **Animal agriculture.** Murray County ranks fifth by sales among Minnesota counties in the production of cattle and calves, 20th in hogs and pigs, 32nd in milk from cows, and fourth in sheep and goats, according to the USDA 2012 Census of Agriculture. Cattle and milk production often rely on grassland, which is commonly located near streams and wetlands. Manure from grazing land and

manure applied as fertilizer are important contributors to fecal coliform and E. coli bacteria impairments in streams, and also contribute to turbidity and to high nutrient levels leading to eutrophication.

D. **Agricultural land.** About 84 percent of the land is under cultivation, and about 9 percent is grassland. Nearly all of the cropland that would benefit from artificial drainage has been tiled. Tiling extends the planting and harvest seasons and prevents crops from drowning, but it accelerates drained water, leading to higher peak flows and lower drought flows. The result of higher peak flows is an increase in streambank erosion. Streambank erosion is considered to be the largest contributor to siltation in Corn Belt agricultural areas.

Land use in Murray County *from Mn Land Management Information Center*

Land cover	Acres	% of total	Land cover	Acres	% of total
Cultivated land	388,772	84.39%	Urban and industrial	1,882	0.41%
Grassland	41,264	8.96%	Other rural developments	553	0.12%
Water	9,827	2.13%	Grassland-shrub-tree complex	287	0.06%
Deciduous forest	8,322	1.81%	Rural res. developments	270	0.06%
Farmsteads/rural residences	5,946	1.29%	Transitional agricultural land	269	0.06%
Wetlands	2,999	0.65%	Gravel pits and exposed soil	269	0.06%
			Total	460,660	100%

E. **Impaired waters.** Murray County contains around 30 named streams (counting waterways converted to ditches), around 40 lakes and ponds larger than 40 acres, and hundreds of smaller streams and wetlands. Of these, 27 have been assessed for impairments by the MPCA and ALL have been found to be impaired. See the table below for a list of waters listed as impaired:

Clean Water Act Section 303(d)
List of Impaired Waters in Murray County
Adapted from *2016 Minnesota Impaired Water List*, Minnesota PCA

Note that streams, wetlands, and lakes not listed here have not been assessed for impairments by the MPCA. Not all water bodies shown have been assessed for all impairments.

		IMPAIRMENT					
					bioassessments		
RIVER BASIN	WATER BODY	nutrients/ eutrophication	turbidity	fecal coliform or E. coli	aquatic macroinvertebra	fishes	plant
WFDMR	Lakes Sarah, Shetek, Bloody, Currant, Lime, First Fulda, & Talcot	x					
	Beaver Creek - County Ditch 20 to DMR		x	x			
	County Ditch 20			x			
	DMR - Lake Shetek to Beaver Creek		x				
	DMR - Beaver Creek to County line		x	x			
	Lake Sarah Outlet (two parts, upper and lower)			x			
	Lake Shetek Inlet			x			
	Lime Creek - Lime Lake to DMR		x	x			
	Two unnamed creeks entering SW corner of Lake Shetek			x			
Cottonwood River	Plum Creek		x	x			
	Pell Creek		x				
	Dutch Charlie Creek		x			x	
Redwood River	Redwood River			x		x	
	Two unnamed wetlands, Ellsborough Township Sections 7 & 15				x		x
Rock River	Chanarambie Creek		x	x	x	x	
	Chanarambie Creek, North Branch (two parts)				x		
	Champepedan Creek		x	x	x	x	

The largest part of this LWMP is dedicated to planning for addressing those impairments.

3. CLIMATE CHANGE AND WATER RESOURCE PLANNING IN MURRAY COUNTY

A. **Effect of climate change on Murray County waters.** The current trend in climate change in southwest Minnesota is for an increase in large and very large rainfall events, and climate models predict that trend will continue.

Intense rainfalls can mean intense, high velocity runoff of fertilizers, pesticides and sediment into our rivers and streams. Heavy rainfall leads to sheet, rill, and gully erosion in fields and increases streambank and streambed erosion. Unexpected large rainfalls can undermine environmental practices that are in place to protect waters from feedlot runoff and applied manure. Siltation as the result of such rainfall can damage or reduce the service life of conservation measures such as grass waterways, water and sediment control basins, and detention/retention structures.

Climate models also show that the frequency of droughts will increase. The increase in droughts and large rainfalls could reduce the productivity of wetlands. Increases in average and low temperatures will favor the spread of some invasive plant and insect species and may stress native species in Murray County as their range is pushed northward.

B. **Mitigating the effects of climate change.** Conservation farming practices can mitigate soil erosion on tilled land. Once runoff leaves the field, mitigating stream bank and bed erosion and reducing the silt load in waters will require a combination of practices that:

1.) Retain water on the land (drainage water management, soil health…)
2.) Remove silt from runoff (filter/buffer strips, grass waterways, wetland protection/restoration, detention/retention)
3.) Slow velocity in streams (grade control, wetland protection/restoration, detention/retention)
4.) Stabilize stream banks and beds.

All of these practices will be necessary in order to protect and restore our water resources.

Murray County landowners have a more-limited toolbox of conservation practices when it comes to coping with drought and higher average temperatures. To some extent soil health makes plants better able to cope with drought, but practices like drainage water management will provide little relief in times of substantial drought.

C. **Effect of Murray County land and water practices on climate change.** The following recommended practices rely on the assumption that climate change is affected by atmospheric carbon dioxide levels.

1.) Better soil health through a variety of conservation and tillage practices will increase carbon retained in the soil and decrease nitrous oxide emissions.
2.) Prairie and wetland protection and restoration sequester carbon and methane in vegetation and soil.
3.) Tree planting activities by Murray SWCD – while often only marginally related to water quality – sequester carbon.

The choice of conservation practices in the coming decade will have to take into account the effect of changes in hydrology due to climate change.

4. WATER PLAN ACCOMPLISHMENTS 2012-2016

Murray County Comprehensive Local Water Management Plan, working through the Murray County Environmental Services Office and Murray SWCD, has addressed Water Quality and other conservation issues. They were addressed as part of the 5-year implementation plan from the updated 2007-2017 Local Water Management Plan.

A. **Yearly activities summary.** Activities of the LWMP since the most recent update in 2012:

1.) Education and outreach:
   a.) Provided funding annually for the Ecology Bus to conduct environmental education for about 300 students at two elementary schools in the county and hundreds more at the County Fair.
   b.) Provided funding for 4-H Day Camp where about 50 children learn about wetlands and wildlife.
   c.) Provided funding for the Southwest Minnesota Environmental Fair each year, with an annual attendance of as many as 2,700 students.
   d.) Conducted classes on water quality and recycling three times per year at Murray County Central High School.
   e.) Promoted well sealing at the Murray County Fair, with around 10,000 attendees annually.

2.) Tested approximately 70 wells throughout the county to maintain a database that was started in 1991, approximately one-half each year.

3.) Conducted free nitrate testing at the Murray County Fair, testing around 30 samples annually.

4.) Tested pit tiles in approximately 106 hog confinement buildings built since 1991, half each year, to make sure they are not contaminating the groundwater.

5.) Inspected and regulated 175 subsurface sewage treatment systems (SSTS) for new or upgrades in the period 2012-2016.

6.) Contributed to the activities of the Technical Evaluation Panel (TEP) for wetland protection and delineation as required.

7.) Promoted aquatic invasive species control through signage, over 400 radio spots, County Fair promotions including door prize drawings, meetings with local lake organizations, and distribution of aquatic invasive species promotional items when boats are licensed.

8.) Provided loans for the upgrade of deficient septic systems – average 11 per year.

B. **Other activities summary**. Other activities within Murray County, including work by the County, SWCD, Natural Resources Conservation Service (NRCS), and others, since the 2012 LWMP update:

1.) Provided engineering and cost-share funds for the following projects:
   a.) 27 water and sediment control basins (WASCOBs)
   b.) 11 grassed waterways
   c.) 39 alternative tile intakes
   d.) Five retention basin dam repairs
   e.) Terraces on two sites
   f.) 5,690 acres of cover crops, and
   g.) Restoration of a 45-acre wetland in Iona Township.

2.) Completed a large retention basin in Chanarambie Township Section 26.

3.) Restored 189.7 acres of drained lake bottom to wetlands in the Beaver Creek watershed and 375.3 acres in the Lake Shetek watershed (these areas are included in the table below).

4.) Assisted in the planting of farmstead shelterbelts.

5.) Since 2007, enrolled 2399.5 acres of perpetual conservation easements, listed in the tables below by type of easement, year of enrollment, and watershed:

MURRAY COUNTY CONSERVATION EASEMENTS 2007-2016								
By type of easement			**By year of enrollment**			**By HUC-10 watershed**		
Type of easement	no.	acres	year	no.	acres	Watershed	no.	acres
CREPII Riparian	10	354.4	2007	1	1148.5	Beaver Creek	10½*	457.4
CREPII Wetland Restoration	10	772	2009	3	246.3	Lake Shetek	13	1007.5
RIM/WRP	3	136.3	2010	4	141.2	Lime Creek	5	99.4
Flowage Easement	1	3	2011	1	30.8	Talcott Lake - DMR	13½*	598.7
Riparian Buffer Strip-Perpetual	7	124.7	2012	10	430.2	Jack Creek (Heron Lake)	3	45.7
Riparian Lands-Perpetual	16	1009.1	2013	4	198.7	Plum Creek (Cottonwood River)	2	190.8
Total	47	2399.5	2014	3	203.8	Total	47	2399.5
Source: BWSR via Minnesota Geospatial Commons			Total	47	2399.5	*one easement is split between two watersheds		

6.) As of 2016, Murray County had 18,115.6 acres enrolled in CRP (Source: USDA Conservation Reserve Program Statistics website), 1940.9 acres in RIM, and 3992.7 acres in CREP.

7.) Analyzed each agricultural parcel in the county for situational compliance with the Minnesota Buffer Law and sent more than 500 letters to landowners informing them of how the Buffer Law appeared to impact their specific property (Murray SWCD).

8.) Planning:

   a.) Participated in the Missouri River 1W1P process (still in its initial stages).

   b.) Served on the technical committees for:

      1. The *West Fork Des Moines River (WFDMR) and Heron Lake TMDL Implementation Plan.*
      2. The *Rock River Fecal Coliform and Turbidity TMDL Implementation Plan*.

9.) In 2014 and 2015, conducted extensive surface water quality monitoring in the DMR, Beaver Creek, and Lime Creek under a Surface Water Assessment Grant.

10.) Participated in the effort to complete Wellhead Protection Plans for Chandler and Iona.

11.) Coordinated activities of the Lime Creek Subordinate Service District to install a community sewer system, which was completed in 2011. Continue to provide assistance for management of the system.

12.) Continue to provide support for the Shetek Area Water and Sewer District, which has provided centralized sewer service to more than 700 residences and businesses in the shoreland area of the county's recreational lakes, removing them from on-site septic systems.

13.) Coordinated connection of Lime Lake Drive in Avoca into the City of Avoca sewer system, thereby removing about 10 residences and additional undeveloped residential lots from septic systems within the shoreland area of Lime Lake.

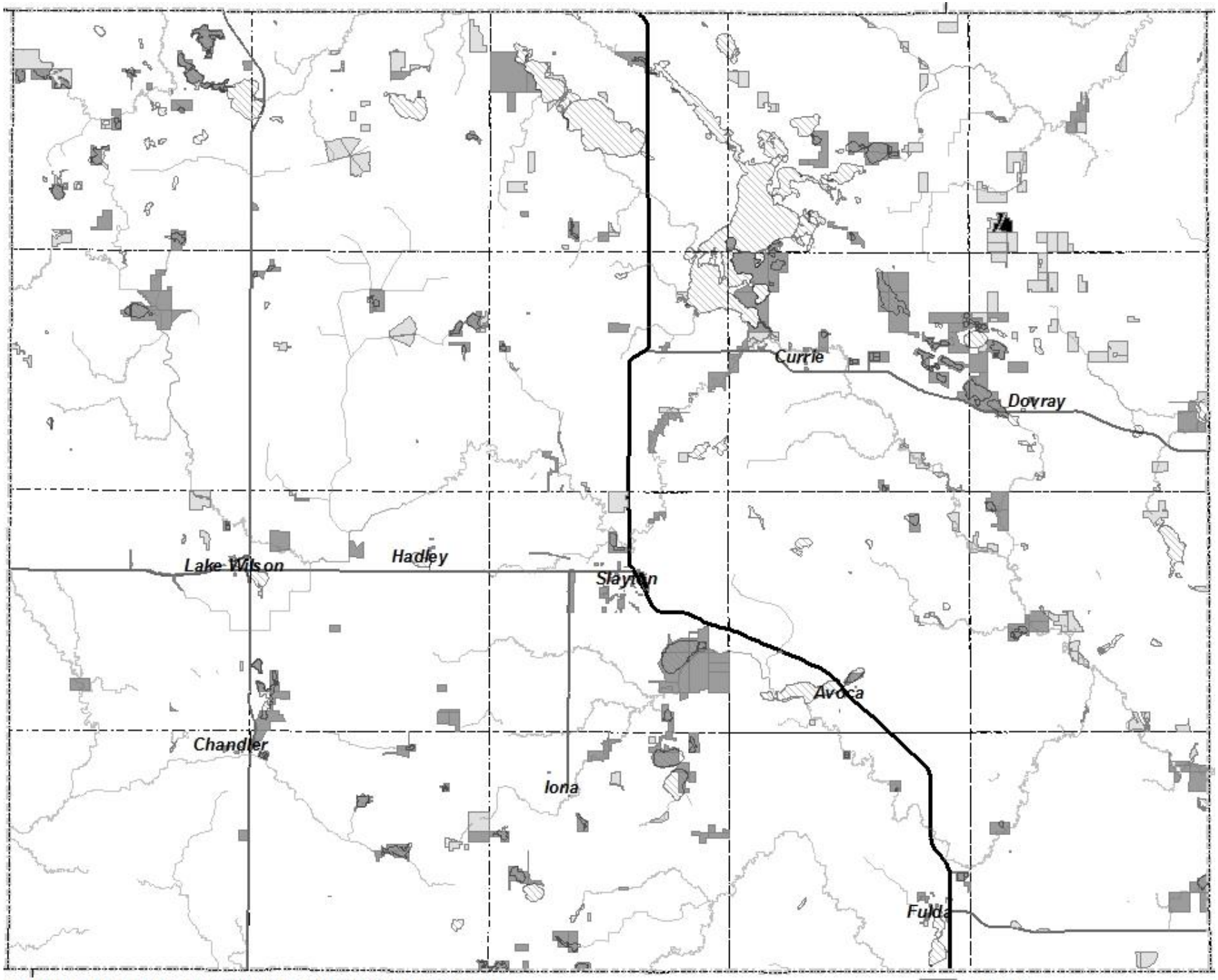
14.) Cost-shared in sealing 160 unused wells throughout the county.

15.) Assisted in the update of the Comprehensive Land Use Plan for Murray County.

16.) Performed Level III feedlot inventories for facilities in the DMR watershed. Feedlot inventories in this watershed are over 80% complete.

17.) Summary of Ag BMP loans the Murray County Ag/Solid Waste Department issued since 2012:

MURRAY COUNTY AG BMP LOANS 2012-2016												
	2012		2013		2014		2015		2016		Total	
Type of conservation practice	no. of loans	amount	no. of loans	amount	no. of loans	amount	no. of loans	amount	no. of loans	amount	no. of loans	amount
Ag waste	4	$272,305	4	$264,000	4	$290,000	4	$308,029	3	$111,900	15	$1,246,234
Conservation tillage	12	$419,258	5	$171,000	1	$21,000	1	$45,000	5	$326,698	24	$982,956
Other					1	$13,070	2	$130,500			3	$143,570
TOTAL	16	$691,563	9	$435,000	6	$324,000	7	$483,529	8	$438,598	42	$2,372,759



Public land and conservation easements

This exhibit does not include land in CRP.
Murray Co. Environmental Office December 2016

PART II: ASSESSMENT OF PRIORITY CONCERNS

Priority concerns for Murray County were selected after reviewing agency comments, and through discussion with the LWMP Task Force.

1. PRIORITY CONCERN 1: IMPROVE SURFACE WATER QUALITY AND QUANTITY

This priority is guided by data contained in various TMDL studies, by our own data from testing of Beaver Creek, Lime Creek, and the DMR, and by large amounts of surface water quality data available from the MPCA at *pca.state.mn.us/water/water-quality-data*.

This part of the LWMP is believed to be mutually consistent with the following plans and policies:

WFDMR Watershed [Multiple Impairments Study] (MPCA, October 2008)
WFDMR and Heron Lake Watershed District TMDL Implementation Plan (HLWD, September 2009)
Rock River Fecal Coliform and Turbidity TMDL Implementation Plan (Rock County SWCD/LMO, October 2008)
Redwood River and *Cottonwood River Fecal Coliform TMDL Reports* (RCRCA, October 2013)
HLWD 10-year Watershed Management Plan (HLWD and Houston Engineering, 2011)
Minnesota Statutes and Rules; Murray County Zoning Ordinance.

A. <u>Magnitude of the concern.</u> Nearly all of the large surface waters of Murray County would probably be considered to be impaired. Of the 27 bodies that have been evaluated so far, ALL have been found to be impaired. The primary visible impairment in streams is turbidity, and in lakes, summer algae blooms are the visible sign of high levels of nutrients in the water and sediment. Invisible impairments include high levels of coliform bacteria in streams (lakes have not been assessed for bacteria impairments), an indication of the presence of intestinal bacteria from warm-blooded animals, which is taken as a sign of a potential health hazard for recreational users.

Impairment in the waters of Murray County are generally of three types:

1.) Turbidity caused by suspended soil and organic material.
2.) Nutrients and eutrophication caused mostly by field runoff, nonpoint sources, and legacy phosphorus in lake bottom sediments.
3.) Coliform bacteria from unknown sources but thought to be mostly from domestic animals.

Bioassessment impairments in fish, aquatic macroinvertebrates, and plants are mostly secondary to nutrient/eutrophication and sediment load, assuming they are not due to synthetic chemicals.

The Rock River TMDL Implementation Plan calls for a reduction of 63 percent in coliform bacteria to meet state water quality standards, and a 27 percent reduction in turbidity to meet standards.

The WFDMR TMDL Implementation Plan calls for a 35-86 percent reduction in bacteria and a 54-71 percent reduction in turbidity to meet turbidity standards in streams within Murray County.

While all the waters assessed have been found to be impaired at least some of the time, these waters are highly prized by the people of Murray County, who share the goal of preserving and improving surface water quality. Improvement of the nutrient impairments in the lakes, especially if it improved perceived water quality, would increase their value and utility as quality-of-life enhancing recreational amenities.

Streambank stabilization is not a substitute for wetland restoration and drainage water management. However, given the current state of drainage in cities and farmland and the predicted increase in large and very-large rainfall events, some bank stabilization efforts will be a necessary part of overall surface water quality protection. Bank instability also affects Lake Shetek and its Inlet.

With changing hydrology due to climate change, streambank stabilization will be important for infrastructure protection. Streambank stabilization efforts will include a combination of bioengineering with deep-rooted vegetation on banks, erosion control blankets, brush mattresses, toe wood-sod mats, J-hooks and rock vanes, grade control with riffles and rock weirs (or with hard grade controls), channel modification, and rip-rap protection where appropriate.

B. Goals for improving surface water quality and quantity:

1.) Improve water quality, or prevent its further degradation, in surface waters.
2.) Reduce peak flows in waterways by slowing runoff and drainage.

C. Objectives for the goals of improving surface water quality and quantity:

1.) Regulation, testing, inspection, and enforcement:

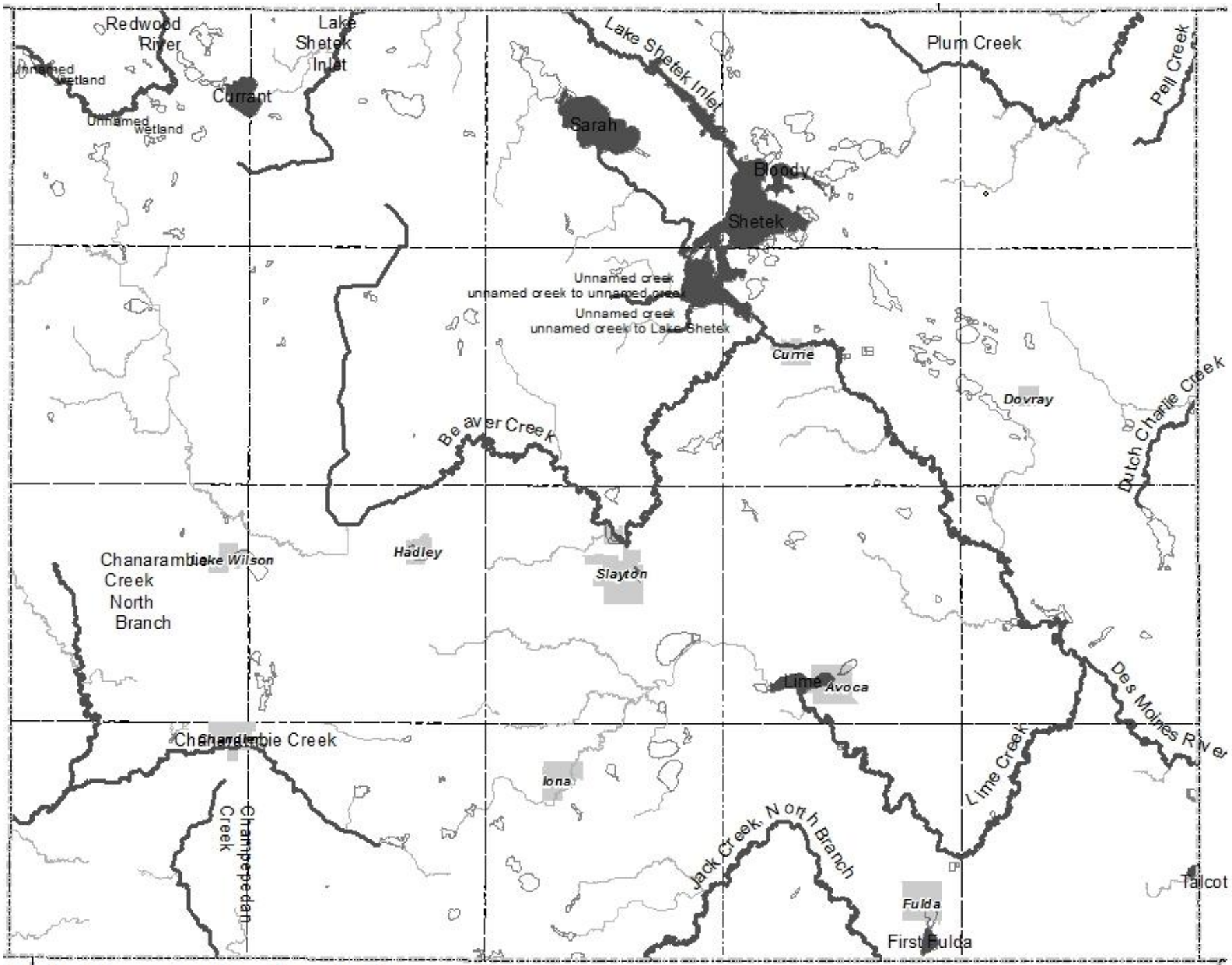
1.1 Work with landowners to ensure the legally required 16.5-ft buffer strip is installed on all ditch improvements.
1.2 Work with producers to comply with the 2015 Buffer Law, Minn. Stat. § 103F.48, requiring vegetative buffers or alternative practices around public waters.
1.3 Meet with 20 landowners/yr. to manage effective and environmentally sound lakeshore and bank stabilization practices.
1.4 Seek funding to conduct intensive ambient water quality monitoring for Beaver Creek, Lime Creek, DMR and Lake Shetek to identify the source of a pollutant contained in a TMDL.

2.) Watershed planning and plan implementation:

1.5 Use TMDL implementation plans in adopting and implementing work plans.
1.6 Participate and assist the development of the WRAPS for the WFDMR watershed, under the leadership of the HLWD, and any subsequent efforts, such as 1W1P.
1.7 Provide technical assistance for implementing the WFDMR and Heron Lake TMDL Implementation Plans.
1.8 Work with local partners on TMDL/WRAPS and 1W1P efforts for the Missouri River basin.
1.9 Participate and assist the development of the TMDL/WRAPS for the Redwood and Cottonwood River watersheds, under the leadership of RCRCA, and any subsequent efforts, such as 1W1P.
1.10 Develop a list of "other waters" to be protected, as required by the Riparian Protection and Water Quality Practices law, to be included in the LWMP. Adopt the list provided as an addendum to the LWMP.

3.) Conservation practices:

1.11 Support and promote conservation practices and programs to landowners in Murray County, such as buffers, conservation tillage, terraces, sediment basins, nutrient management, wetland banking program, and wetland restorations.
1.12 Provide technical assistance and seek EQIP and state cost-share funding for ten projects using conservation practices.
1.13 Assist landowners and seek funding to enroll 1000 acres of marginal land into CREP riparian buffers.
1.14 Actively promote and recruit five landowners to implement engineered grass waterways – providing incentives including cost sharing when possible.



Listed impaired waters in Murray County

Impaired water data: Minnesota PCA Murray Co. Environmental Office January 2017

NOTE: Waters that are not shown as impaired have not been evaluated

Impaired lakes & wetlands

Impaired streams

4.) Streambank stabilization efforts to be undertaken by the LWMP in the next five years:

1.15 Complete an inventory of all streambanks in Murray County to identify those areas where streambank stabilization may be effectively and optimally implemented. Prioritize all unstable streambanks inventoried in terms of cost-effectiveness.

1.16 Promote, assist, seek funding, and complete two streambank stabilization projects in Beaver Creek, Lime Creek, DMR, and/or Lake Shetek.

Beaver Creek,
Slayton Township

1.17 Provide education to landowners on effective shoreline and streambank stabilization and restoration.

5.) Lime Lake, Summit Lake, and Lake Sarah dams are nearing the end of their useful lives. The LWMP promotes providing technical support for efforts to responsibly replace the dams.

1.18 Participate in planning and seek funding for Lime Lake dam replacement.

1.19 Participate in planning and seek funding for Summit Lake dam replacement.

1.20 Participate in planning and seek funding for Lake Sarah dam replacement.

6.) Education and outreach:

1.21 Promote conservation tillage, EQIP, and Ag BMPs by contacting landowners through an annual informational bulletin.

1.22 Assist producers in applying for cost share opportunities for conservation practices by sending out yearly newsletters and publishing advertisements in the local newspapers and on the county website, describing state and local cost share programs.

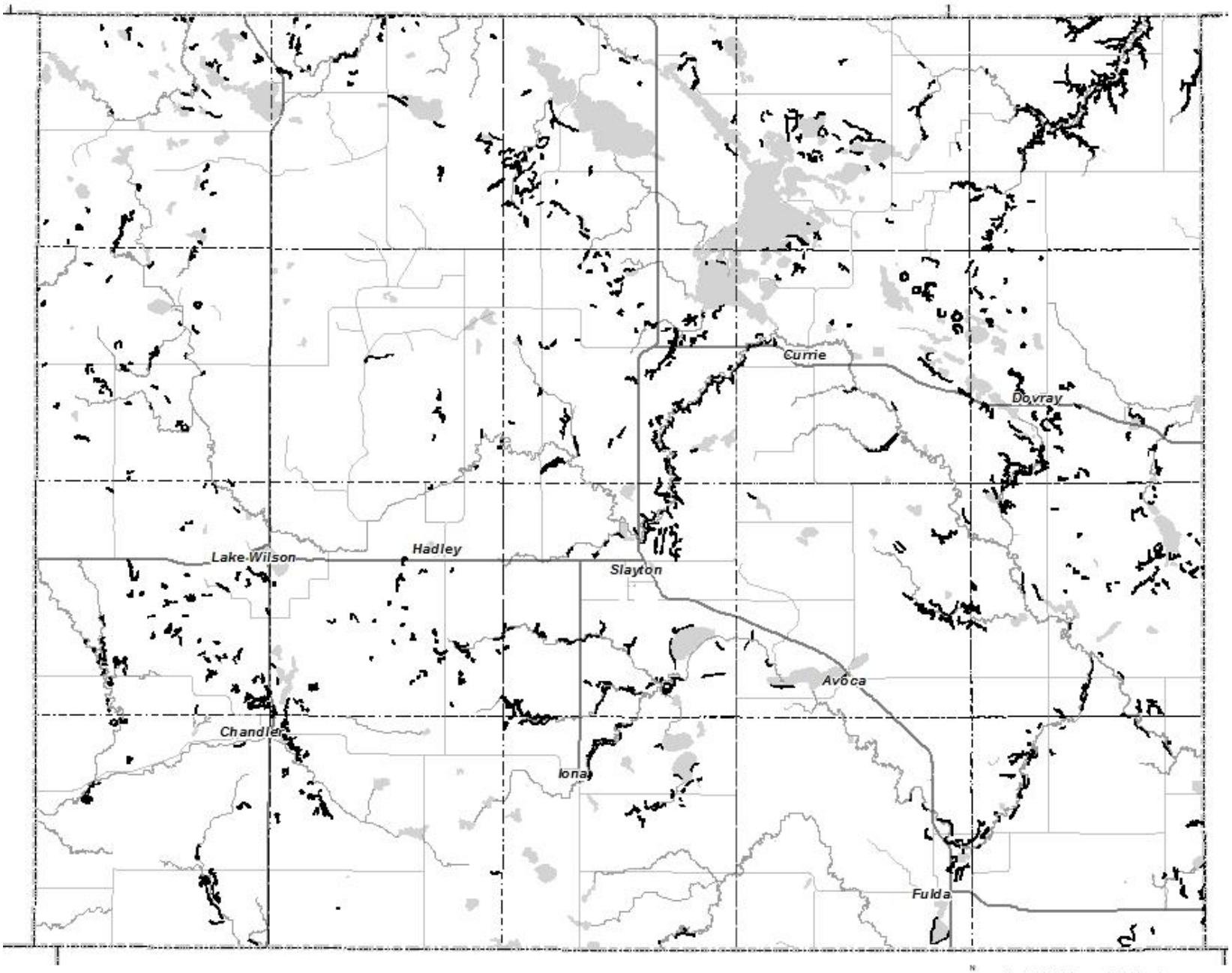
1.23 Assist with coordination and funding of the Prairie Ecology Bus for yearly educational events for students in Murray County schools, as well as a yearly educational event at the Murray County Fair.

1.24 Assist with funding for a 4-H day camp that provides education on environmental stewardship and assist with coordination and funding of the annual environmental fair for students in eleven area counties.

7.) Streambank stabilization capital improvement projects: Not all waters in Murray County have been evaluated for bank stability, but the following project has been tentatively identified as a potential site. Other sites may be identified and the LWMP will be amended to include them.

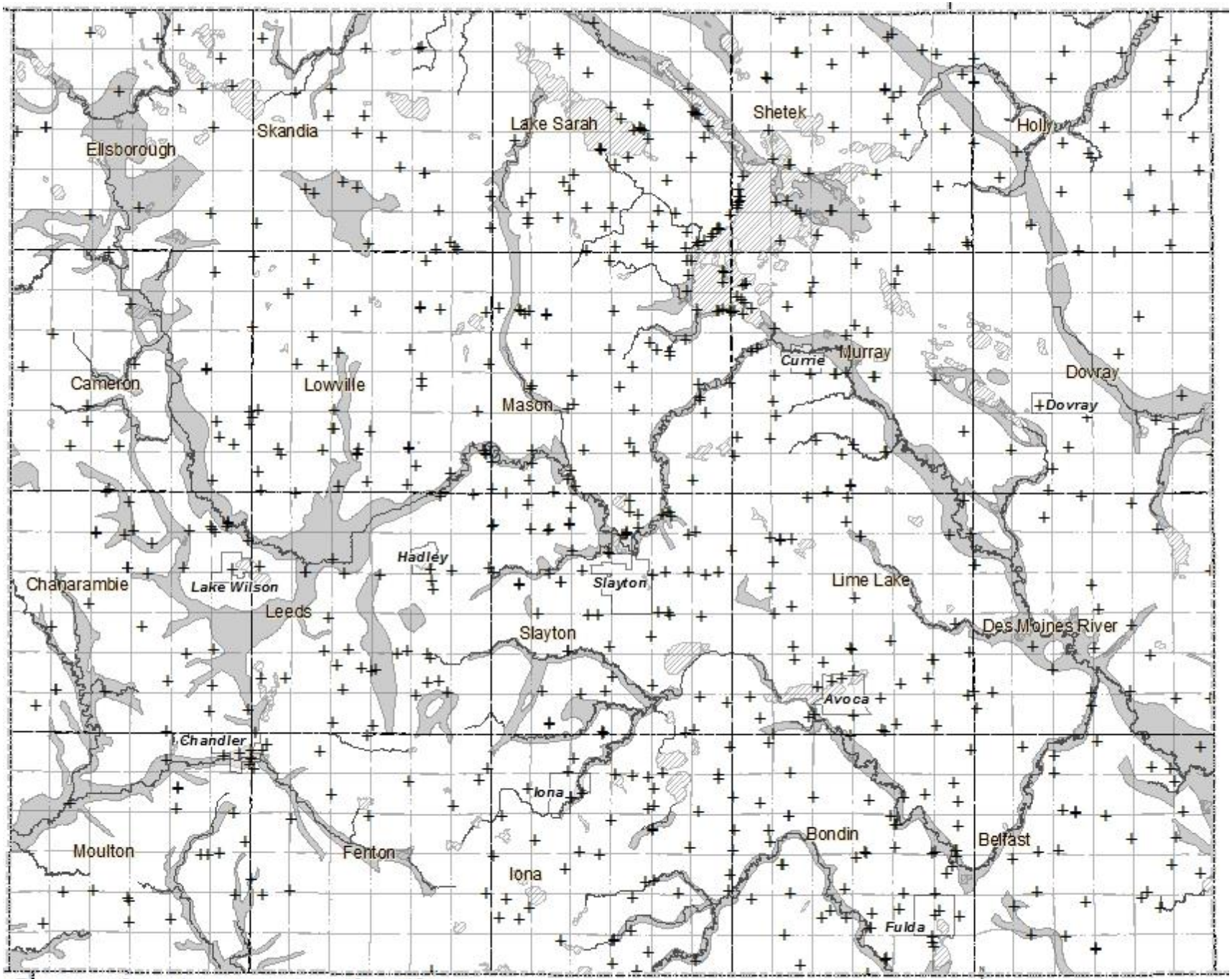
1.25 Promote, assist, and seek funding for a Beaver Creek streambank stabilization project in Slayton Township, Section 10: 0.9 miles of bank.

D. <u>Staff and financial resources</u> are described in Part II, Section 5 Implementation Plan.



Highly erodible land in Murray County

Highly erodible land classified by USDA
Murray Co. Environmental Office January 2017



Groundwater contamination susceptibility and well locations

Data source: Well locations: MDH; groundwater susceptibility: Mn DNR
Murray Co. Environmental Office January 2017

"The Minnesota DNR defines an area as sensitive if natural geologic factors create a significant risk of groundwater degradation through the migration of waterborne contaminants"

Groundwater information is general large-scale data and should not be used as guidance for a specific well.

2. PRIORITY CONCERN 2: IMPROVE GROUNDWATER QUALITY AND QUANTITY

This priority is guided by source water assessments conducted by the Minnesota Department of Health, by the Regional Hydrogeologic Assessment for Southwestern Minnesota (Mn Geological Survey), and by large amounts of groundwater quality data collected by the ESO.

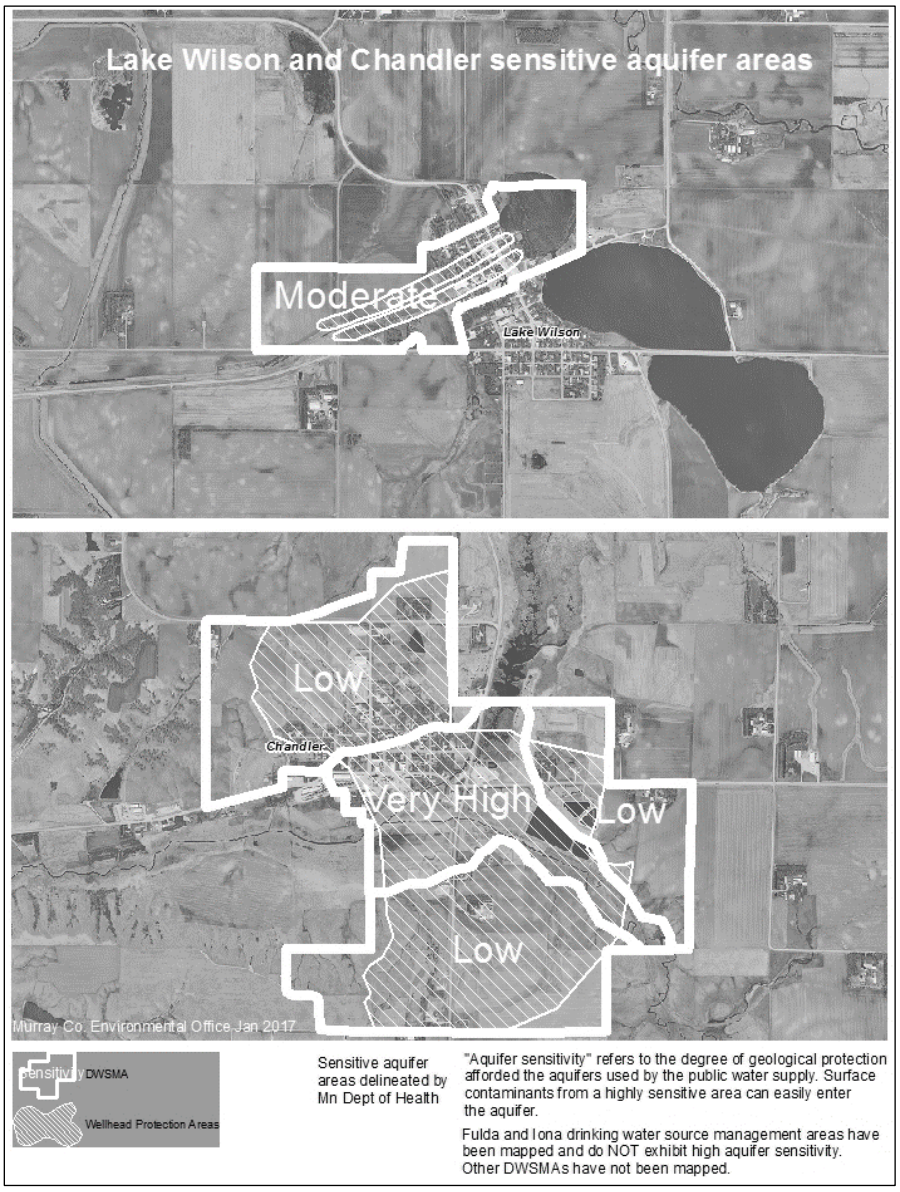
Plans and policies that inform this priority concern are: Minnesota Statutes and Rules; and Murray County Ordinances.

A. <u>Magnitude of the concern.</u> Murray County has 30 public water supplies, including nine municipal systems and Red Rock Rural Water, but not counting Lincoln-Pipestone Rural Water, which provides water but doesn't have wells in Murray County. Increasing portions of the northeast and west of the county are supplied by Red Rock Rural Water and Lincoln Pipestone Rural Water respectively, but most rural residents are still served by individual wells.

	Source water assessments for public water supplies in Murray County Source: *Minnesota Department of Health Source Water Assessment website, 11/16/2016*		Source water management area mapped?	Aquifer sensitivity[1]	Well is susceptible[2]
Cities with a wellhead protection plan:					
1	Chandler		Y	**High**	**Yes**
2	Fulda		Y	Low	No
3	Iona		Y	Low	No
4	Lake Wilson	Entire wellhead protection (WPA) area vulnerable.	Y	**High**	No
Public community water supplies without a wellhead protection plan:					
5	Avoca		N	Low	No
6	Currie		N	Low	No
7	Hadley		N	Low	No
8	Slayton		N	Low	No
9	RRRW Dovray Twp site		N	UNKNOWN	
Cities without wells:					
10	Dovray	Purchases water	NA		
Noncommunity public water supplies:					
11	Key Largo on Lake Shetek	Within WPA: Sewer less vulnerable; unused, unsealed well or boring; lake. Contaminants detected but meets standards.		**High**	**Yes**
12	Sillerud Lutheran Church	Within WPA: Building; drainfield; LP tank, septic tank, sewage lift station.		**High**	**Yes**
13	Skandia Evangelical Free Church	Within WPA: drainfield; septic tank; sewage lift station, LP tank, petroleum storage above ground. Contaminants detected but meets standards.		**High**	**Yes**
14	Slayton Country Club	Within WPA: drainfield; septic tank; building; sewer vulnerable.		**High**	**Yes**
15	Trail's Edge General Store	Within WPA: sewage holding tank, watertight; LP tank		**High**	**Yes**
16	Valhalla Island Campground	Within WPA: pit; LP tank		**High**	**Yes**
17	Lake Shetek Lodge & RCA			**High**	No
18	Lake Shetek State Park	Four wells		**High**	No
19	Lost Timber Bible Camp	Within WPA: drainage ditch, operating well.		**High**	No
20	Shetek Baptist Camp	Within WPA: LP tank, sewer vulnerable, stormwater pipe, operating well.		**High**	No
21-30	Breezy Point, Carlson's Corner, East Lake Sarah Park, Edgewater Bay Campground, Lake Sarah Baptist Church, Marsha's Landing, Schreier's on Shetek, Shetek Lutheran Ministries, Sundquist Park, Swenson Park			Low	No

Notes:
1: The Minnesota Department of Natural Resources (DNR) defines an area as sensitive if natural geologic factors create a significant risk of groundwater degradation through the migration of waterborne contaminants.
2: 'Susceptibility' describes how likely it is that a water source may become contaminated. For wells, susceptibility is based on well construction, the type of aquifer that supplies the well(s), and previous water sampling results.

Efforts to protect groundwater should be focused on well sealing and on Drinking Water Supply Management Areas (DWSMAs) and surficial aquifer areas.



The County continues to provide funding assistance for well sealing. The County provides cash assistance for sealing of unused wells at an average rate of around 30 per year. In 2016, the maximum County cost-share per well was increased from 50% of the cost up to $250 to 50% of the cost up to $500. At the 2016 average cost-share cost of $390, this program is anticipated to cost more than $11,000 per year.

The County has not yet made an effort to identify unused or contaminated wells that have not been sealed.

Murray County has participated in well testing over the past 26 years. The ESO currently samples 62 wells semiannually for fecal coliform bacteria, nitrate, sulfate, and conductivity. The current budget calls for continuation of this well sampling program at a reduced rate of one-quarter of the wells annually.

County policies can have an influence on nitrate in the environment, which is largely a byproduct of fertilizer applied to cropland, and which can eventually enter aquifers. 25 percent of individual wells in the sampling program contained nitrate at greater than 10 mg/L (the allowable maximum contaminant level) more than half the times they were sampled; another 31 percent contained high nitrate in some of the samples tested.

Sensitive aquifer area protections: The LWMP requires protections for DWSMAs that are located in geologically sensitive aquifer areas. Only the City wellfields of Chandler and Lake Wilson currently meet these criteria. (See *Lake Wilson and Chandler Sensitive aquifer areas* map.) The DWSMAs for Fulda and Iona have been mapped and are not located in geologically sensitive areas. The DWSMAs for Avoca, Currie, Hadley, and Slayton, and any areas used by Red Rock Rural Water or Lincoln-Pipestone Rural Water, have not been mapped. The DWSMA for Red Rock Rural Water's new well field in DMR Township is anticipated to be mapped by July 1, 2017, and the Wellhead Protection Plan for the well will be completed the following year.

Manure land application practices in sensitive aquifer areas can affect nitrate levels in wells. Education should be provided to feedlot operators, regarding manure application in sensitive aquifer areas be keyed to phosphorus levels, which typically will have the effect of reducing applied nitrate from manure by around 50 percent, as a way of protecting water supplies from high nitrate levels in groundwater.

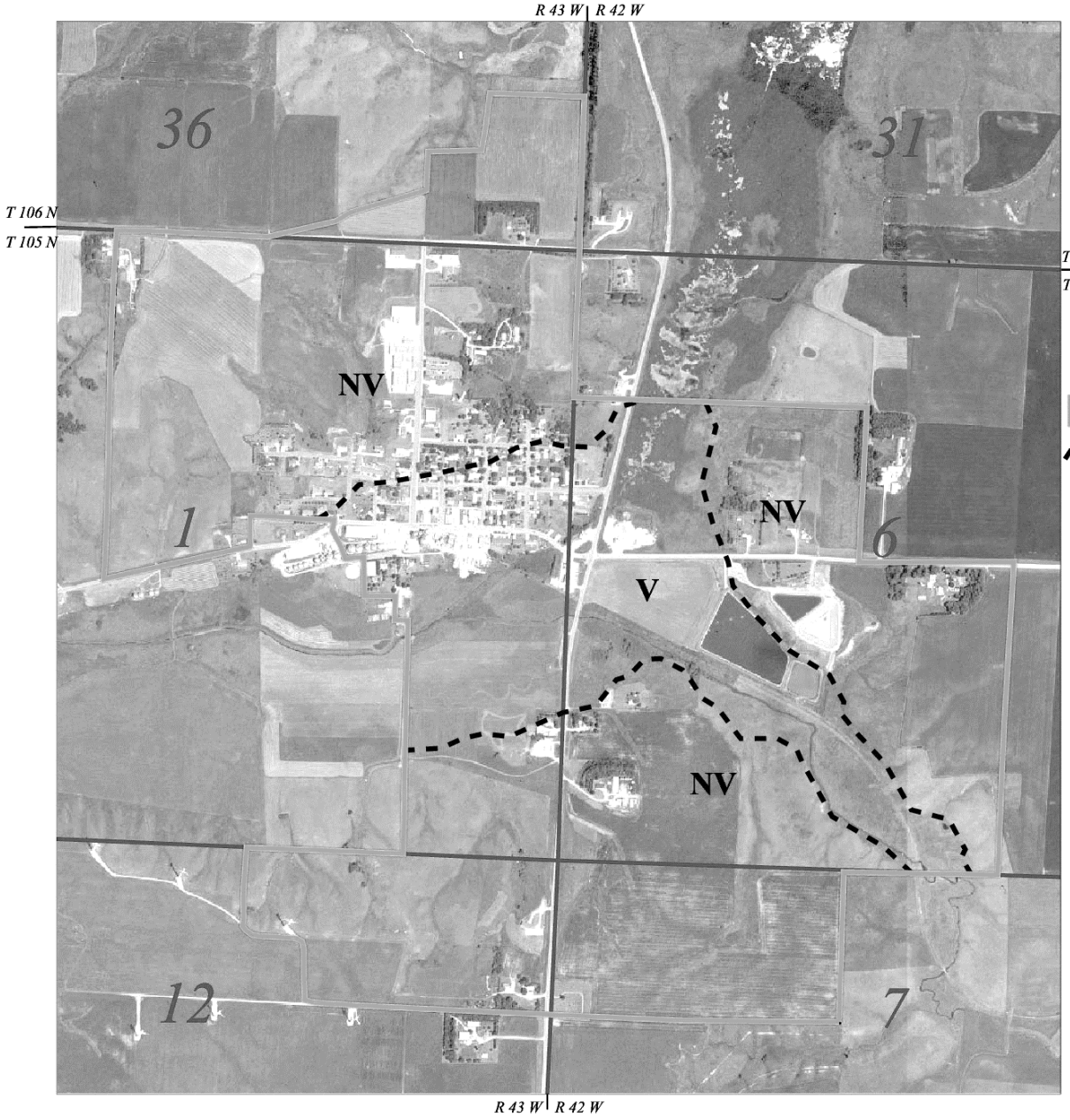
B. Goals for improving groundwater quality and quantity:

1.) Protect existing community and noncommunity public groundwater supplies.
2.) Protect private groundwater supplies.

C. Objectives for the goals of improving groundwater quality and quantity:

2.1 Support protection of wellhead protection areas and DWSMAs in land use decisions through zoning ordinances.
2.2 Provide technical assistance and support wellhead protection planning and implementation for public community (municipal and rural water) water supplies.
2.3 Continue to support private groundwater supply testing through the well testing program and continue to conduct free clinics for testing nitrate levels in well water at the Murray County Fair.
2.4 Provide educational/public information resources to reduce nitrate levels in affected municipal aquifers in the cities of Chandler and Lake Wilson.
2.5 Promote, assist, and seek funding to continue financial support for the sealing of unused wells.
2.6 Identify, promote, assist, and seek funding to seal five unused or contaminated wells that are required to be sealed under Minn. Stat. § 103I.301. These would be wells proactively identified by the County, not by well drillers when a new well is installed.
2.7 Provide education and promote manure application rates be keyed to phosphorus in DWSMA sensitive aquifer areas.
2.8 Cooperate with Red Rock Rural Water Systems on the expansion of the rural water system and advise the public about county programs that will help manage potential contamination sources.

D. Staff and financial resources are described in Part II, Section 5 Implementation Plan.



Chandler

Drinking Water Supply Management Area (DWSMA) MN-00476 10 year Time of Travel

DWSMA
DWSMA Vulnerability Boundary

V = Vulnerable
NV = Not Vulnerable

0.2 0 0.2 Miles

Approved June 8, 2009

Fulda
Murray County
Minnesota

Fulda Drinking Water Supply Management Area (DWSMA) MN-00742 - Not Vulnerable

Minnesota Department of Health
Environmental Health
Source Water Protection Unit

Iona
Murray County
Minnesota

Iona Drinking Water Supply Management Area (DWSMA) MN-00788 - Not Vulnerable

Minnesota Department of Health
Environmental Health
Source Water Protection Unit

Lake Wilson
Murray County
Minnesota

Lake Wilson Drinking Water Supply Management Area (DWSMA) MN-00542 - Vulnerable

Minnesota Department of Health
Environmental Health
Source Water Protection Unit

3. PRIORITY CONCERN 3: DRAINAGE WATER MANAGEMENT/WATER RETENTION

Drainage water management and retention can reduce degradation of streams by lessening the frequency and severity of high flows, reducing creek bank and bed erosion; it also causes precipitation to infiltrate into the groundwater, replenishing aquifers and filtering the water.

The change in climate to more frequent large rains makes this concern an emerging necessity in the effort to preserve our soil and water.

The WFDMR/Heron Lake TMDL Implementation Plan emphasizes the importance of making wetland restorations and flood storage projects a high priority. A priority will be to identify optimal sites for retention practices and to encourage the installation of retention structures. Areas within the Beaver Creek and DMR watershed will be systematically assessed. Potentially affected landowners will be contacted and, if they are willing, projects will be completed subject to funding.

This priority concern overlaps with Priority Concern 1, and many of the practices listed in that section of the LWMP, especially conservation practices, are also applicable to this priority concern.

A. Magnitude of the concern. Strategic drainage water management, wetland restoration, and construction of water retention structures is essential to attaining surface water quality goals.

B. Goals for drainage water management/water retention:

1.) Reduce runoff from normal precipitation events by retaining water on the land through drainage water management and water retention.

2.) Move from no net loss of wetlands to active wetland restoration; support wetland restoration, particularly in the Beaver Creek watershed.

C. Objectives for the goals of drainage water management/water retention:

3.1 Provide technical assistance, and seek funding to analyze terrain for potential water retention structures. Actively recruit five landowners to participate in installation of retention structures.

3.2 Continue to administer Floodplain regulations from the Murray County Zoning Ordinance.

3.3 Develop and propagate drainage water management informational/educational materials.

3.4 Provide technical assistance and incentives for construction of two rock inlets and two drainage tile control structures in sensitive areas.

3.5 Support and provide technical assistance to the SWCD for the Wetland Conservation Act (WCA) and the WCA TEP to minimize the amount of wetland acres lost in the county.

3.6 Implement review of petitions to improve public drainage systems and develop a Drainage Management Plan in light of the criteria of Minn. Stat. § 103E.015, in the context of the Murray County environment. Incorporate BMPs into drainage projects.

1.) **Proposed retention basin projects:** While comprehensive terrain analysis has not yet been completed, the following potential project areas have been tentatively identified. 18 other sites have been identified; other sites may be identified and the LWMP will be amended if necessary.

3.7 Seek funding to provide a 25% match for a Roadway Retention Basin in Holly Township, Section 22, NW¼, already designed by Area II, with 75% match, that will impact Plum Creek/Cottonwood River drainage.

3.8 Seek funding and assist with the installation of a small retention basin in Slayton Township, Section 9, SW¼, that drains to Beaver Creek.

2.) **Potential wetland restoration sites:** As mentioned in the section titled The Murray County Environment and Priority Concerns, the Great Oasis area originally contained around 6000 acres of wetlands, and a few hundred of these acres are in the process of being restored. This area is a priority for wetland restoration. Other wetlands for restoration will be identified.

D. Staff and financial resources are described in Part II, Section 5 Implementation Plan.

4. PRIORITY CONCERN 4: SUBSURFACE SEWAGE TREATMENT SYSTEMS AND FEEDLOTS

Seven percent of Murray County subsurface sewage treatment systems (SSTS) are failing to protect groundwater, and 29 percent are classified as imminent public health threats – a designation that usually means the system discharges to the ground surface or into a drainage tile. This can be a major contributor to coliform bacteria impairments and other impairments in surface waters.

Many of the SSTS within shoreland have been upgraded; a centralized sewer system around the lakes area has been installed; the village of Lime Creek is now operating a community SSTS; and an area adjacent to Lime Lake has been sewered into the City of Avoca .

Feedlots within the county are re-registered every four years, and a Level III feedlot inventory is currently being completed. The County tests all hog confinement building pit tiles built since 1991 to ensure that the pits are not leaking into the groundwater. When compliance issues are encountered in feedlot inspections, the following measures are considered for inclusion in achieving compliance: revised manure management plans, manure storage basins, clean water runoff diversion, roofs, and nutrient loading reduction.

The Murray County Comprehensive Land Use Plan, amended in 2016, included a recommendation for point-of-sale SSTS inspections, which will be addressed in 2017 with ordinance amendments.

A. **Magnitude of the concern:** These are ongoing concerns with public health implications, and can be addressed with definable goals. Improvement of feedlot and SSTS environmental protections can help with addressing MPCA-listed coliform bacteria and nutrient impairments, and protect groundwater.

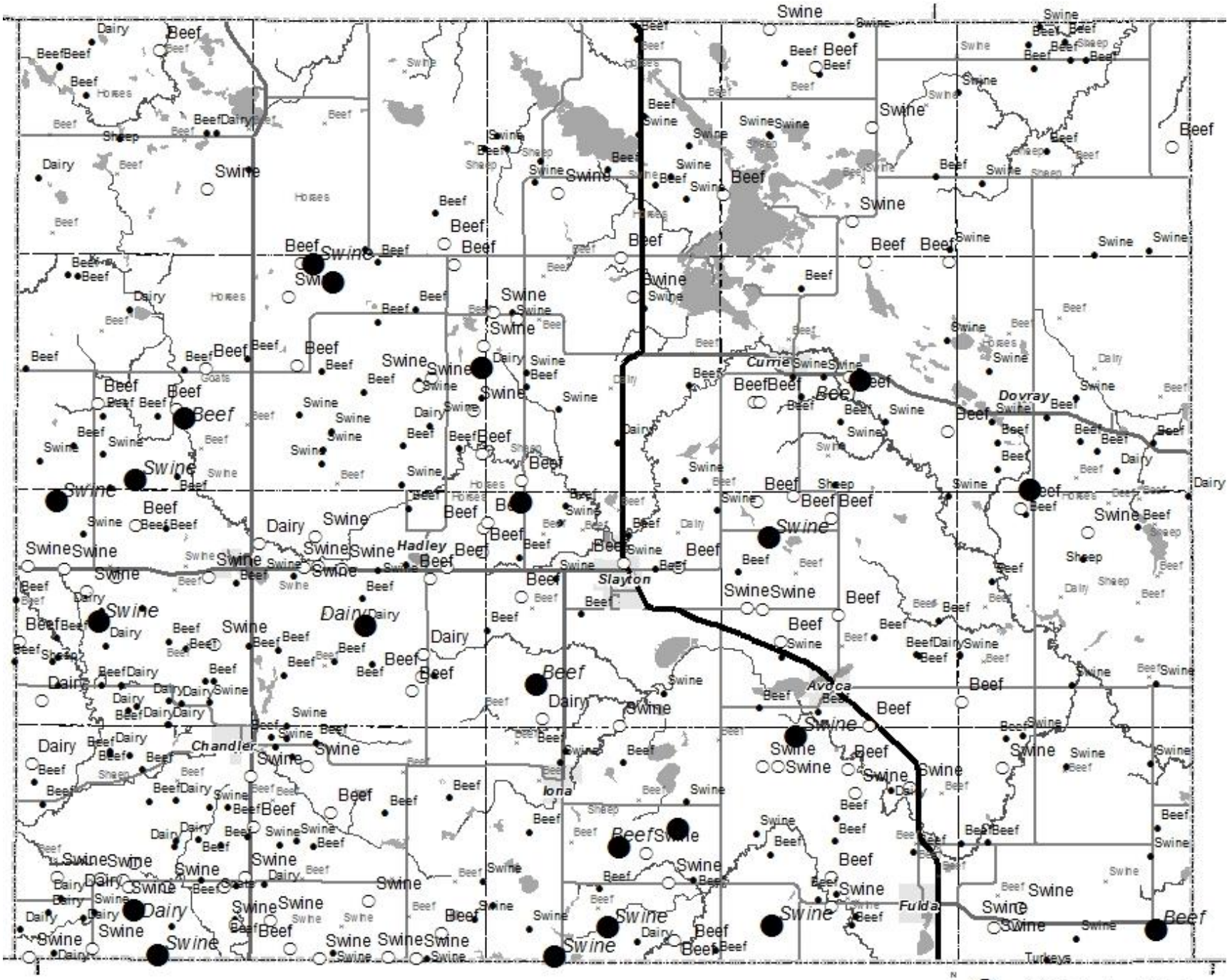
When the Level III feedlot inventories are completed in the DMR watershed, a targeted approach to fixing the non-compliant feedlots will be implemented.

B. **Goals for Subsurface Sewage Treatment Systems and Feedlots:**
   1.) Reduce waterborne pollutants from SSTS.
   2.) Reduce waterborne pollutants from feedlots and grazing areas.

C. Objectives for the goals Subsurface Sewage Treatment Systems and Feedlots:

4.1 Promote, assist, and seek funding to administer the SSTS provisions of the Zoning ordinance.
4.2 Promote, assist and seek funding to upgrade non-compliant SSTS through qualifying state and local loan programs.
4.3 Promote, assist, and seek funding to connect Lime Lake County Park to the City of Avoca sewer system.
4.4 Promote, assist, and seek funding to connect End-O-Line County Park to the City of Currie sewer system.
4.5 Promote, assist, and seek funding to install a SSTS or connect Sundquist at West Lake Sarah County Park to the Shetek Area Water and Sewer System.
4.6 Promote, assist, and seek additional funding for SSTS construction with an emphasis on imminent public health threats.
4.7 Develop a GIS layer for all septic systems in the county.
4.8 Seek funding to provide an informational packet regarding SSTS maintenance to every homeowner that installs a new or upgraded system.
4.9 Promote, assist, and seek funding to help livestock producers that need waste management upgrades found with the Level III inventories.
4.10 Promote, assist, and seek funding to administer the feedlot provisions of the Zoning ordinance.
4.11 Complete all Level III feedlot inventories within the Heron Lake and WFDMR watersheds.
4.12 Inspect 7% of all registered feedlots per year to verify compliance with MN Rules 7020.

D. **Staff and financial resources** are described in Part II, Section 5 Implementation Plan.



Registered feedlots in Murray County

Data source: MPCA via Minnesota Geospatial Commons
Murray Co. Environmental Office January 2017

5. IMPLEMENTATION PLAN

This section establishes the implementation program for local water management to address priority concerns. Objectives describe specific measures that the County intends to implement, in cooperation with appropriate local, state and federal agencies and organizations. Objectives listed below were reached by consensus and are not necessarily in rank order.

PRIORITY CONCERN 1: IMPROVE SURFACE WATER QUALITY AND QUANTITY

Goals:

1.) **Improve water quality, or prevent its further degradation, in surface waters.**
2.) **Reduce peak flows in waterways by slowing runoff and drainage.**

	Objective		
	Implementation	**Time**	**Watershed**
	Cost (source)	**Anticipated measurable result**	
1.1	Work with landowners to ensure the legally required 16.5-ft buffer strip is installed on all ditch improvements.		
	Murray County Ditch Inspector	2017-2027	All watersheds
	$4,600 staff (local levy)	Buffers in place.	
1.2	Work with producers to comply with the 2015 Buffer Law, Minn. Stat. § 103F.48, requiring vegetative buffers or alternative practices around public waters.		
	ESO, SWCD, BWSR	2017-2027	All watersheds
	$30,000/yr SWCD, $30,000/yr ESO if County opts for enforcement (grants)	Buffers in place.	
1.3	Meet with 20 landowners/yr to manage effective and environmentally sound lakeshore and bank stabilization practices.		
	ESO, DNR	2017-2021	All watersheds
	$3,300/year staff (Shoreland NRBG and local levy)	Bank/lake shores protected.	
1.4	Seek funding to conduct intensive ambient water quality monitoring for Beaver Creek, Lime Creek, DMR and Lake Shetek to identify the source of a pollutant contained in a TMDL.		
	ESO, MPCA, BWSR	2017-2021	Those listed
	$30,000 staff + $6,000 lab fees (grants, local levy)	Monitoring data obtained.	
1.5	Use TMDL implementation plans in adopting and implementing work plans.		
	ESO	2017-2021	All watersheds
	$1,100 staff (local levy)	Progress towards meeting TMDLs.	
1.6	Participate and assist the development of the WRAPS for the WFDMR watershed, under the leadership of the HLWD, and any subsequent efforts, such as 1W1P.		
	ESO, HLWD, SWCD, BWSR, MPCA	2017-2019	West Fork DMR
	$10,000 staff + mileage, etc. (local levy, grant)	Planning completed.	
1.7	Provide technical assistance for implementing the WFDMR and Heron Lake TMDL Implementation Plans.		
	ESO, HLWD, BWSR, MPCA	2017-2021	Heron Lake, WFDMR
	$1,100 staff (local levy, grant)	Progress towards meeting TMDLs	
1.8	Work with local partners on TMDL/WRAPS and 1W1P efforts for the Missouri River basin.		
	ESO, BWSR, other local partners, County elected official	2017-2018	Rock (Missouri)
	$10,000 staff + mileage, etc. (local levy, grant)	Planning completed.	
1.9	Participate and assist the development of TMDL/WRAPS for the Redwood and Cottonwood River watersheds, under the leadership of RCRCA, and any subsequent efforts, such as 1W1P.		
	ESO, RCRCA, SWCD, BWSR, MPCA	2017-2019	Redwood/Cottonwood
	$3,000 staff + mileage, etc. (local levy, grant)	Planning completed.	
1.10	Develop a list of "other waters" to be protected, as required by the Riparian Protection and Water Quality Practices law, to be included in the LWMP. Adopt the list provided as an addendum to the LWMP.		
	SWCD, ESO	2017-2018	All watersheds
	$600 SWCD staff (grant), $600 ESO (local levy)	List completed.	
1.11	Support and promote conservation practices and programs to landowners in Murray County, such as buffers, conservation tillage, terraces, sediment basins, nutrient management, wetland banking program, and wetland restorations.		
	ESO, SWCD, NRCS, SWPTSA, DNR, BWSR, Landowners	2017-2021	All watersheds
	$7,200 SWCD/NRCS staff (local levy, grants to SWCD)	Practices implemented to reduce soil erosion.	

	Objective		
	Implementation	**Time**	**Watershed**
	Cost (source)	**Anticipated measurable result**	
1.12	Provide technical assistance and seek EQIP and state cost-share funding for ten projects using conservation practices.		
	SWCD, NRCS, ESO, SWPTSA, BWSR	2017-2021	All watersheds
	$5,000/yr SWCD/NRCS staff (local levy, grants to SWCD) + cost of conservation measures	Ten projects completed in five years.	
1.13	Assist landowners and seek funding to enroll 1000 acres of marginal land into CREP riparian buffers.		
	NRCS, SWCD, Landowners	2017-2021	All watersheds
	$800,000 easements + SWCD/NRCS staff (local levy, grants to SWCD)	1,000 acres enrolled in five years.	
1.14	Actively promote and recruit five landowners to implement engineered grass waterways – providing incentives including cost sharing when possible.		
	NRCS, SWCD, ESO, BWSR, landowners, SWPTSA	2017-2021	All watersheds
	$25,000/yr waterways + $800/yr NRCS/SWCD staff (local levy, grants to SWCD, cost-share)	Twenty waterways in five years.	
1.15	Complete an inventory of all streambanks in Murray County to identify those areas where streambank stabilization may be effectively and optimally implemented. Prioritize all unstable streambanks inventoried in terms of cost-effectiveness.		
	ESO, BWSR, DNR	2017-2021	All watersheds
	$6,000 staff (local levy, grant)	Inventory completed.	
1.16	Promote, assist, seek funding, and complete two streambank stabilization projects in Beaver Creek, Lime Creek, DMR, and/or Lake Shetek.		
	ESO, BWSR, DNR, SWPTSA	2017-2021	Those listed
	$3,600 staff + $4,000 engineering + project cost (grant, local levy)	2 projects underway or completed in five years.	
1.17	Provide education to landowners on effective shoreline and streambank stabilization and restoration.		
	ESO, BWSR	2017-2021	All watersheds
	$3,800/yr (local levy and Shoreland NRBG)	Shoreland stabilized/restored as needed.	
1.18	Participate in planning and seek funding for Lime Lake dam replacement.		
	ESO, DNR, others	2017-2021	Lime Creek
	$250,000 + $3,500 staff (grant and local levy)	Dam replaced if funding available.	
1.19	Participate in planning and seek funding for Summit Lake dam replacement.		
	ESO, DNR, City of Hadley, others	2017-2021	Beaver Creek
	$150,000 + $3,500 staff (grant and local levy)	Dam replaced if funding available.	
1.20	Participate in planning and seek funding for Lake Sarah dam replacement.		
	ESO, DNR others	2017-2021	Des Moines River
	$450,000 + $3,500 staff (grant and local levy)	Dam replaced if funding available.	
1.21	Promote conservation tillage, EQIP, and Ag BMPs by contacting landowners through an annual informational bulletin.		
	SWCD, ESO	2017-2021	All watersheds
	$500 staff + $1,000 mailing (local levy, grant)	Bulletin sent.	
1.22	Assist producers in applying for cost share opportunities for conservation practices by sending out yearly newsletters and publishing advertisements in the local newspapers and on the county website, describing state and local cost share programs.		
	SWCD, ESO	2017-2021	All watersheds
	$500 staff + $1,000 mailing (local levy, grant)	Newsletter sent.	
1.23	Assist with coordination and funding of the Prairie Ecology Bus for yearly educational events for students in Murray County schools, as well as a yearly educational event at the Murray County Fair.		
	ESO, SWCD	2017-2021	All watersheds
	$1,850/yr (LWM NRBG) + $2,500 (County local levy)	3 seminar/classrooms annually.	
1.24	Assist with funding for a 4-H day camp that provides education on environmental stewardship and assist with coordination and funding of the annual environmental fair for students in eleven area counties.		
	ESO, others	2017-2021	All watersheds
	$1000/yr grants to 4-H and environmental fair (LWM NRBG)	50 children/yr (4-H); 1000 children/yr (Fair)	
1.25	Promote, assist, and seek funding for a Beaver Creek streambank stabilization project in Slayton Township, Section 10: 0.9 miles of bank.		
	ESO, BWSR, DNR	2017-2021	Beaver Creek
	$120,000 (grant)	Bank stabilized.	

PRIORITY CONCERN 2: IMPROVE GROUNDWATER QUALITY AND QUANTITY

Goals:

1.) **Protect existing community and noncommunity public groundwater supplies.**
2.) **Protect private groundwater supplies.**

	Objective		
	Implementation	**Time**	**Watershed**
	Cost (source)	**Anticipated measurable result**	
2.1	Support protection of wellhead protection areas and DWSMAs in land use decisions through zoning ordinances.		
	ESO, MDH, BWSR	2017-2027	Groundwater
	$2,000/yr staff (local levy)	All land use decisions consider WHP.	
2.2	Provide technical assistance and support wellhead protection planning and implementation for public community (municipal and rural water) water supplies.		
	ESO, MDH, Red Rock Rural Water, Lincoln-Pipestone Rural Water	2017-2027	Groundwater
	$1,200 over five years staff (local levy)	Planning completed for PCWS.	
2.3	Continue to support private groundwater supply testing through the well testing program and continue to conduct free clinics for testing nitrate levels in well water at the Murray County Fair.		
	ESO	2017-2027	Groundwater
	$1,250/yr program + $250/yr fair + $500/yr staff (LWM NRBG)	Well water sampled/tested.	
2.4	Provide educational/public information resources to reduce nitrate levels in affected municipal aquifers in the cities of Chandler and Lake Wilson.		
	ESO, MDH	2017-2021	Groundwater
	$400 staff + $250 printing/mailing (grant, MDH)	Mailing or informational meeting.	
2.5	Promote, assist, and seek funding to continue financial support for the sealing of unused wells.		
	ESO, BWSR, MDH	2017-2021	Groundwater
	$1,000/yr staff + $10,000/yr (LWM NRBG, local levy) + >$10,000/yr (landowners)	Approx. 25-30 wells sealed/yr.	
2.6	Identify, promote, assist, and seek funding to seal five unused or contaminated wells that are required to be sealed under Minn. Stat. § 103I.301. These would be wells proactively identified by the County, not by well drillers when a new well is installed.		
	ESO, MDH	2017-2021	Groundwater
	$1,450 staff + $1,900 well sealing match (local levy, LWM NRBG) + >$1,900 (landowner funds)	Five wells sealed in five years.	
2.7	Provide education and promote manure application rates be keyed to phosphorus in DWSMA sensitive aquifer areas.		
	ESO. MPCA, MDH	2017-2021	Groundwater
	$320/yr staff + producer costs (Feedlot grant, local levy, producer funds)	Manure application in sensitive DWSMAs keyed to phosphorus	
2.8	Cooperate with Red Rock Rural Water Systems on the expansion of the rural water system and advise the public about county programs that will help manage potential contamination sources.		
	ESO, MDH, BWSR, DNR, RRRW	2017-2021	Groundwater
	Unknown staff + cost of conservation measures as areas are identified	DWSMAs protected.	

PRIORITY CONCERN 3: DRAINAGE WATER MANAGEMENT/WATER RETENTION

Goals:

1.) **Reduce runoff from normal precipitation events by retaining water on the land through drainage water management and water retention.**
2.) **Move from no net loss of wetlands to active wetland restoration; support wetland restoration, particularly in the Beaver Creek watershed.**

	Objective		
3	**Implementation**	**Implementation**	**Implementation**
	Cost	**Cost**	
3.1	Provide technical assistance, and seek funding to analyze terrain for potential water retention structures. Actively recruit five landowners to participate in installation of retention structures.		
	ESO, BWSR, DNR, SWPTSA	2017-2021	All watersheds
	$3,600 staff (local levy) + cost of conservation measures (grant?)	Retention structures planned and installed	
3.2	Continue to administer Floodplain regulations from the Murray County Zoning Ordinance.		
	ESO, DNR	2017-2021	All watersheds
	$4,400/yr staff (local levy)	Floodplain protected	
3.3	Develop and propagate drainage water management informational/educational materials.		
	SWCD, ESO	2017-2021	All watersheds
	$500 staff + $1,000 mailing	Material sent to landowners one time.	
3.4	Provide technical assistance and incentives for construction of two rock inlets and two drainage tile control structures in sensitive areas.		
	SWPTSA, ESO, County Drainage Authority, NRCS, FSA, SWCD	2017-2021	All watersheds
	$1,200/yr ESO staff + SWPTSA and SWCD staff + $10,000/yr (grant, EQIP)	Rock inlets installed.	
3.5	Support and provide technical assistance to the SWCD for the Wetland Conservation Act (WCA) and the WCA TEP to minimize the amount of wetland acres lost in the county.		
	SWCD, ESO, BWSR, NRCS	2017-2021	All watersheds
	$30,000 staff (SWCD, ESO) (WCA grant + local levy)	Wetlands protected.	
3.6	Implement review of petitions to improve public drainage systems and develop a Drainage Management Plan in light of the criteria of Minn. Stat. § 103E.015, in the context of the Murray County environment. Incorporate BMPs into drainage projects.		
	County Drainage Authority	2017-2021	All watersheds
	$11,500/yr (10-15% FTE) (local levy)	Reviews on all drainage projects; BMPs incorporated into drainage projects.	
3.7	Seek funding to provide a 25% match for a Roadway Retention Basin in Holly Township, Section 22, NW¼, already designed by Area II, with 75% match that will impact Plum Creek/Cottonwood River drainage.		
	ESO, BWSR, Township, Area II, Landowner, DNR	2017-2021	Plum Creek/Cottonwood R
	$80,000 for 25% match (unknown, grant)	Basin in place.	
3.8	Seek funding and assist with the installation of a small retention basin in Slayton Township, Section 9, SW¼, that drains to Beaver Creek.		
	ESO, landowner, Area II, BWSR, DNR	2017-2021	Beaver Creek
	$70,000 (local levy, landowner match)	Basin installed.	

PRIORITY CONCERN 4: SUBSURFACE SEWAGE TREATMENT SYSTEMS AND FEEDLOTS

Goals:

1.) **Reduce waterborne pollutants from SSTS.**
2.) **Reduce waterborne pollutants from feedlots and grazing areas.**

	Objective		
4	**Implementation**	**Time**	**Watershed**
	Cost	**Anticipated measurable result**	
4.1	Promote, assist, and seek funding to administer the SSTS provisions of the Zoning ordinance.		
	ESO, MPCA, BWSR	2017-2021	Groundwater
	$25,000/yr staff (SSTS NRBG, local levy)	Compliant SSTS	
4.2	Promote, assist and seek funding to upgrade non-compliant SSTS through qualifying state and local loan programs.		
	ESO, BWSR, MPCA, County Commissioners	2017-2021	Groundwater
	$150,000/yr loans (multiple sources) + $3,000 staff (SSTS NRBG)	Compliant SSTS	
4.3	Promote, assist, and seek funding to connect Lime Lake County Park to the City of Avoca sewer system.		
	ESO, BWSR, County Parks, City of Avoca, MPCA	2017-2018	Lime Creek
	$36,000 (local levy)	Removal of pit toilet.	
4.4	Promote, assist, and seek funding to connect End-O-Line County Park to the City of Currie sewer system.		
	ESO, BWSR, County Parks, City of Currie, MPCA	2017-2021	Lake Shetek
	$40,000 (local levy, grant)	Removal of pit toilet.	
4.5	Promote, assist, and seek funding to install a SSTS or connect Sundquist at West Lake Sarah County Park to the Shetek Area Water and Sewer System.		
	ESO, BWSR, County Parks, SAWS, DNR	2017-2027	Lake Shetek
	$35,000 (local levy, grant)	Connection completed.	
4.6	Promote, assist, and seek additional funding for SSTS construction with an emphasis on imminent public health threats.		
	ESO, MPCA, BWSR	2017-2027	Groundwater
	$2,000 (local levy) + cost of SSTS improvements (landowner, grant)		
4.7	Develop a GIS layer for all septic systems in the county.		
	ESO	2017-2018	Groundwater
	$3,000 staff (local levy)		
4.8	Seek funding to provide an informational packet regarding SSTS maintenance to every homeowner that installs a new or upgraded system.		
	ESO, MPCA	2017-2027	Groundwater
	$500 staff (local levy)	Packet provided for all owners at time of upgrade	
4.9	Promote, assist, and seek funding to help livestock producers that need waste management upgrades found with the Level III inventories.		
	ESO, MPCA	2017-2027	All watersheds
	$10,000/yr staff + cost of upgrades (grant, local levy)	Systems upgraded.	
4.10	Promote, assist, and seek funding to administer the feedlot provisions of the Zoning ordinance.		
	ESO, MPCA	2017-2021	All watersheds
	$60,500/yr staff (70% FTE) (feedlot grant, local levy)	Feedlots in compliance.	
4.11	Complete all Level III feedlot inventories within the Heron Lake and WFDMR watersheds.		
	ESO, MPCA	2017-2018	Heron Lake, WFDMR
	$8,600/yr staff (10% FTE) (feedlot grant, local levy)	Inventory completed.	
4.12	Inspect 7% of all registered feedlots per year to verify compliance with MN Rules 7020.		
	ESO, MPCA	2017-2021	All watersheds
	$17,300/yr staff (20% FTE) (feedlot grant, local levy)	Feedlots inspected	

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GLOSSARY

1W1P:	One Watershed, One Plan.
BMP:	Best Management Practices. Acceptable practices implemented to protect water quality and promote soil conservation.
BWSR:	The Minnesota Board of Water and Soil Resources.
CREP:	Conservation Reserve Enhancement Program. Incentive program for taking land out of production for a limited period, targeted to high-priority conservation issues.
CRP:	Conservation Reserve Program. Incentive program for taking land out of production for a limited period.
DMR:	Des Moines River. Also known as the West Fork Des Moines River.
DWSMA:	Drinking Water Supply Management Area.
EQIP:	Environmental Quality Incentives Program. A cost-share program for land and water BMPs.
ESO:	The Murray County Environmental Services Office.
FSA:	Farm Service Agency.
HLWD:	Heron Lake Watershed District.
HUC-10:	The 10-digit 'hydraulic unit code' used to designate minor drainage areas.
LWMP:	Local Water Management Plan.
MDH:	Minnesota Department of Health
MCL:	The Maximum Contaminant Level of a chemical allowed in public drinking water supplies.
MPCA:	Minnesota Pollution Control Agency.
NRBG:	Natural Resources Block Grant.
NRCS:	Natural Resources Conservation Service.
RCRCA:	Redwood-Cottonwood Rivers Control Area. An organization similar to a watershed district.
RIM:	Reinvest in Minnesota. A permanent easement program for conservation land.
RRRW:	Red Rock Rural Water
SSTS:	Subsurface Sewage Treatment Systems.
SWCD:	The Murray County Soil and Water Conservation District.
SWPTSA:	Southwest Prairie Technical Service Agency
TMDL:	Total Maximum Daily Load – The maximum amount of a pollutant that a water body can receive while still meeting water quality standards.
WCA:	The Wetlands Conservation Act.
WFDMR:	West Fork Des Moines River. Also known as the Des Moines River.
WHPA:	Wellhead Protection Areas.
WRAPS:	Watershed Restoration and Protection Strategies - a planning and management framework.
WRP:	Wetland Reserve Program

LWMP REVIEW AND APPROVAL PROCESS

January 19, 2016 – Murray County Board of Commissioners approves Resolution 2016-01-0-19-01 authorizing revisions to the Comprehensive Local Water Management Plan and authorizing establishment of a Water Management Advisory Committee.

December 14, 2016 – Met with LWMP Task Force to review draft revision.

January 12, 2017 – Met with BWSR Board Conservationist to review second draft revision and seek advice. Received written comments.

January 18, 2017 – Met with LWMP Task Force to review second draft revision.

Jan. 12-20, 2017 – Contacted agencies to request draft review/input by January 31; provided digital copy of second draft.

January 31, 2017 – Conducted Technical Review Committee meeting. Attending were representatives of BWSR, Murray County, Murray SWCD, Mn Department of Health, Red Rock Rural Water, Lincoln-Pipestone Rural Water, and Pheasants Forever. The following is a record of entities that were provided a copy of the second DRAFT LWMP and were invited to attend the review meeting or provide comments:

Agency	**Contact**	Received digital DRAFT copy; invited to meeting	Attended January 31 review meeting	Provided written comments	Provided verbal comments
BWSR	Doug Goodrich	x	x	x	x
MN DNR	Brian Nyborg	x			
MN PCA	Mark Hanson	x		x	
MN Department of Agriculture	Spencer Herbert	x			
MN Department of Health	Amanda Strommer	x	x		x
Murray SWCD	Craig Christensen	x	x		x
Heron Lake Watershed District	Jan Voit	x		x	
RCRCA/Area II	Kerry Netzke	x		x	
Missouri River Watershed Partnership	Doug Bos	x			x
Red Rock Rural Water	Dominic Jones	x	x		x
Lincoln-Pipestone Rural Water	Jason Overby	x	x		x
Lake Shetek Area Improvement Assoc.	Ralph Knapp	x			x
Fulda Game & Fish Club	Keith Hakeneis	x			x
Peoples Association of Lake Sarah	Thomas Hey	x			x
MN DOT	Lindsey Knutson	x		x	
MN Soybean Growers Assoc.	Joe Smentek	x		x	
MN Corn Growers Association	Meghan Doyle	x			
Pheasants Forever/Quail Forever	Matt Christensen	x		x	
	Meghan Howell	x	x		

February 7, 2017 – Murray County Board of Commissioners authorizes and sets public hearing for the draft LWMP for February 28, 2017, at 9:30 a.m.

February 10, 2017 – Mailed and posted Public Notice for hearing to be held February 28 during the regular County Board of Commissioners' meeting. Posted notice and draft LWMP on County website. Notification List is attached.

February 13, 2017 – LWMP Task Force met to review and approve draft LWMP for submittal to Public Hearing. Minor revisions included on the attached Proposed Changes document.

February 13 and 15, 2017 – Public Notice for hearing on draft LWMP published in the Murray County Wheel Herald and the Murray County News newspapers.

February 28, 2017 – Public Hearing held per Minnesota Statutes §103B.315. No written comments were received. Board of Commissioners approved the Final LWMP for submittal for State review with the Proposed Changes. A record of the Public Hearing is attached.

Public Hearing Distribution List

The following individuals/organizations received a copy of the Notice of Public Hearing along with a copy of the DRAFT LWMP, in addition to posting the Notice of Public Hearing to the public.

Agency	Contact	City	State	Zip
MN Department of Natural Resources	Rob Collett	New Ulm	MN	56073
MN Department of Agriculture	Robert L. Sip	St. Cloud	MN	56303
MN Pollution Control Agency	Juline Holleran	St. Paul	MN	55155
MN Department of Health	Amanda Strommer	Marshall	MN	56258
MN Board of Soil and Water Resources	Ed Lenz	Marshall	MN	56258
MN Board of Soil and Water Resources	Doug Goodrich	Marshall	MN	56258
MN Environmental Quality Board	Erik Dahl	St. Paul	MN	55155
MN DNR Parks and Recreation		Currie	MN	56123
MN DOT	Lindsey Knutson	Willmar	MN	56201
Murray County SWCD	Craig Christensen	Slayton	MN	56172
Murray County Highway Department	Randy Groves	Slayton	MN	56172
Lincoln-Pipestone Rural Water	Jason Overby	Lake Benton	MN	56149
Red Rock Rural Water	Dominic Jones	Jeffers	MN	56145
Southwest Regional Development	Annette Fiedler	Slayton	MN	56172
Heron Lake Watershed District	Jan Voit	Heron Lake	MN	56137
RCRCA	Kerry Netzke	Marshall	MN	56258
Missouri River One Watershed One Plan	Dan Livdahl	Worthington	MN	56187
Fulda Fish & Game	Keith Hakeneis	Fulda	MN	56131
Lake Sarah PALS	Tom Hey	Marshall	MN	56258
Lake Shetek Area Improvement Association	Ralph Knapp	Slayton	MN	56172
Shetek Area Water & Sewer Commission	Jamie Thomazin	Slayton	MN	56172
Pipestone County SWCD	Kyle Krier	Pipestone	MN	56164
Rock County SWCD	Eric Hartman	Luverne	MN	56156
Lincoln County Environmental Office	Robert Olsen	Ivanhoe	MN	56142
Redwood County Environmental Office	Scott Wold	Redwood Falls	MN	56283
Lyon County Planning and Zoning	John Biren	Marshall	MN	56258
Cottonwood County Environmental Office	Jared Morrill	Windom	MN	56101
Nobles County Environmental Services	Wayne Smith	Worthington	MN	56187

Contact	Representing	City	State	Zip
Kayla Johnson	Asst County Attorney	Slayton	MN	56172
Murray County Auditor	Heidi Winter	Slayton	MN	56172
Murray County Website	Christy Riley			
Murray County Water Plan Task Force				
5 County Commissioners				
20 Township Clerks				
9 City Clerks				

Public Notice

The Murray County Board of Commissioners will hold a public hearing on Tuesday, February 28, 2017, commencing at 9:30 a.m., in the County Commissioner's Meeting Room, Murray County Government Center, to take public comment on the 2017-2027 Murray County Local Water Management Plan Final Draft, which was drafted based on the following four Priority Concerns:

1. Improve Surface Water Quality/Quantity
2. Improve Groundwater Quality/Quantity
3. Drainage Water Management/Water Retention
4. Subsurface Sewage Treatment Systems and Feedlots

The Final Draft of the Plan is available for review in the Murray County Auditor's Office, the Murray County Environmental Services' Office, and on the Murray County website: www.murray-countymn.com.

All interested parties are invited to attend. If you are unable to attend, any comments or questions may be submitted in writing by February 21, 2017, to the Murray County Environmental Services Office – PO Box 57, Slayton, MN 56172, or via email to kbickner@co.murray.mn.us.

Murray County Local Water Management Plan Update
Proposed Changes
February 28, 2017

[The following proposed changes from the DRAFT LWMP were presented to the Board of Commissioners at the Public Hearing]

I. Murray County Local Water Management Plan Meeting Minutes
February 13, 2017
Excerpt

MSP: John Busman, Duane Spartz to recommend approval of the 2017-2027 Murray County Local Water Management Plan Final Draft to the County Commissioners with the following changes:

1. **Objective 1.12 – increase the number of projects from five to ten in the next five years.**
2. **Objective 1.13 – change "Promote, assist, and seek funding…" to "Assist landowners and seek funding…"**
3. **Objective 1.14 – change "grass swales" to "grass waterways" and increase the number of waterway projects to twenty in the next five years with estimated costs of $5,000 per waterway and 20 hours staff time per waterway.**
4. **Objective 1.23 – delete "grant to Prairie Ecology Bus"**

II. Mark Hanson
MPCA Watershed Project Manager
February 24, 2017
Email

1. PART I, Subpart 1B1: Change "six" to "seven" lakes and add "Talcot" to the lakes listed
2. PART I, Subpart 1B4: Add "Talcot" to last sentence after "Lime"
3. PART I, Subpart 2E (Table): Redwood River – add "X" under Fecal Coliform column
4. PART II, Subpart 1C2: 1.8 – Change "the WRAPS" to "TMDL/WRAPS"
5. PART II, Subpart 1C2: 1.9 – Delete all and replace with the following: "Participate and assist the development of the TMDL/WRAPS for the Redwood and Cottonwood River watersheds, under the leadership of RCRCA, and any subsequent efforts, such as 1W1P."
   (The reason is there will not be a implementation plan developed (as stated in 1.9.1), but rather it will be part of the WRAPS and the turbidity TMDLs (as stated in 1.9.3) will also be in the New TMDL/WRAPS. This is why I add the TMDL in the recommended sentence.)

County Coordinator
2848 Broadway Ave.
P.O. Box 57
Slayton, MN 56172
(507) 836-1148

EXCERPT FROM THE DRAFT PROCEEDINGS OF
THE MURRAY COUNTY BOARD OF COMMISSIONERS
MURRAY COUNTY GOVERNMENT CENTER – SLAYTON, MINNESOTA
February 28, 2017

At 9:30 a.m. the County Board Chair called the public hearing for the 2017 water plan update to order.

Chairman Kluis read the following public notice for the 2017 water plan update:

The Murray County Board of Commissioners will hold a public hearing on Tuesday, February 28, 2017, commencing at 9:30 a.m., in the County Commissioner's Meeting Room, Murray County Government Center, to take public comment on the 2017-2027 Murray County Local Water Management Plan Final Draft, which was drafted based on the following four Priority Concerns:

1. *Improve Surface Water Quality/Quantity*
2. *Improve Groundwater Quality/Quantity*
3. *Drainage Water Management/Water Retention*
4. *Subsurface Sewage Treatment Systems and Feedlots*

All interested parties are invited to attend. If you are unable to attend, any comments or questions may be submitted in writing by February 21, 2017, to the Murray County Environmental Services Office – PO Box 57, Slayton, MN 56172, or via email to kbickner@co.murray.mn.us.

Zoning/Water Resources Administrator Jean Christoffels reviewed the following written comments/changes:

Murray County Local Water Management Plan Update
Proposed Changes
February 28, 2017

I. *Murray County Local Water Management Plan Meeting Minutes*
February 13, 2017
Excerpt

MSP: John Busman, Duane Spartz to recommend approval of the 2017-2027 Murray County Local Water Management Plan Final Draft to the County Commissioners with the following changes:

1. *Objective 1.12 – increase the number of projects from five to ten in the next five years.*
2. *Objective 1.13 – change "Promote, assist, and seek funding..." to "Assist landowners and seek funding..."*
3. *Objective 1.14 – change "grass swales" to "grass waterways" and increase the number of waterway projects to twenty in the next five years with estimated costs of $5,000 per waterway and 20 hours staff time per waterway.*
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February 24, 2017
Email

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(The reason is there will not be a implementation plan developed (as stated in 1.9.1), but rather it will be part of the WRAPS and the turbidity TMDLs (as stated in 1.9.3) will also be in the New TMDL/WRAPS. This is why I add the TMDL in the recommended sentence.)

9:37 a.m. Chairman Kluis opened the public hearing. Four members of the public were present.

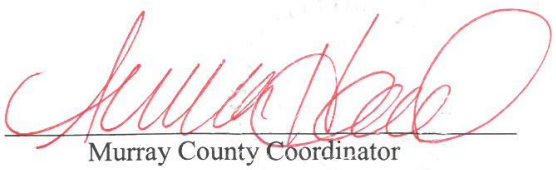
Dean Pearson, landowner, spoke regarding a water retention structure he had put in on his property. There were no other comments from the public.

It was moved by Thiner, seconded by Jens and passed to approve adopting the 2017 water plan update with the proposed amendments.

9:48 a.m. The public hearing was closed.

I, Aurora Heard, County Coordinator of the County of Murray, State of Minnesota, do hereby certify that the foregoing copy represents a true and correct copy of the original thereof on file in Murray County.

Dated: March 1, 2017



Murray County Coordinator

Jean Christoffels

From: Sip, Rob (MDA) <rob.sip@state.mn.us>
Sent: Thursday, March 16, 2017 12:00 PM
To: Goodrich, Douglas (BWSR)
Cc: Jean Christoffels; Kenneth Bickner
Subject: RE: Murray Comprehensive Local Water Management Plan

A. Doug,
B.
C. Here are the MDA responses:

D. A. Does the plan violate any statutory or rule requirements administered by your agency? If so, cite the statute or rule and provide an explanation of the violation.

MDA Response - The draft plan does not appear to violate any MDA statute or rule. However, without conducting a legal analysis and review of the draft plan, the MDA is not aware of if the plan violates MDA statutes or not.

B. Does your agency recommend that BWSR:

- Approves the entire plan as submitted; OR
- Disapproves the entire plan as submitted; OR
- Disapproves parts of the plan (provide citations of the parts to disapprove).

MDA Response - Approve the plan but consider the comments under Item C below.

C. Provide additional explanation of your recommendations for the Board's consideration when reviewing and acting on the Plan.

MDA Response:

- A plan of action should be developed to reach out to Certified Crop Advisers that work with clients in Murray County to inform them of the goals and objectives of the Murray County Water Plan.
- Reference should be made to the MN Agricultural Water Quality Certification Program.
- Consideration should be given to reaching out to agricultural groups in Murray County to inform them of the goals of the water plan. There may be potential partnerships that could be made to further the goals of the plan.

Robert L. Sip
Environmental Policy Specialist
Pesticide and Fertilizer Management Division
Minnesota Department of Agriculture
3725 12Th Street North
St. Cloud, MN 56303

320-223-6531 (Office)
651-319-1832 (Cell)
651-201-6120 (Fax)

rob.sip@state.mn.us
www.mda.state.mn.us

Jean Christoffels

From: Strommer, Amanda (MDH) <Amanda.Strommer@state.mn.us>
Sent: Friday, March 24, 2017 2:27 PM
To: Goodrich, Douglas (BWSR); Lenz, Ed (BWSR)
Cc: Jean Christoffels
Subject: RE: Murray Comprehensive Local Water Management Plan

I do not have any comments and on behalf of MDH recommend approval.
Thanks!

AMANDA STROMMER
Principal Planner
Minnesota Department of Health
Drinking Water Protection Section
1400 E. Lyon Street, Marshall, MN 56258-1268
p 507-476-4241 | m 507-649-0854

MDH Minnesota Department *of* Health

Jean Christoffels

From: Goodrich, Douglas (BWSR) <douglas.goodrich@state.mn.us>
Sent: Thursday, April 13, 2017 2:13 PM
To: Jean Christoffels
Subject: Fwd: Murray Comprehensive Local Water Management Plan

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: "Cords, Wayne (MPCA)" <wayne.cords@state.mn.us>
Date: 4/10/17 3:56 PM (GMT-06:00)
To: "Goodrich, Douglas (BWSR)" <douglas.goodrich@state.mn.us>
Cc: "Hanson, Mark (MPCA)" <mark.hanson@state.mn.us>, "MacLean, Scott (MPCA)" <scott.maclean@state.mn.us>
Subject: FW: Murray Comprehensive Local Water Management Plan

Douglas,
The MPCA has reviewed the Murray County Comprehensive Local Water Management Plan and recommends approval of the entire plan. The plan does not violate any statutory or rule requirement administered by the MPCA

Wayne Cords
Manager
South Watershed Section
Watershed Division
Minnesota Pollution Control Agency
TEL 507-344-5245
CELL 507-384-8790

Minnesota Board of Water & Soil Resources

Marshall
1400 East Lyon Street
Marshall, MN 56258
(507) 537-6060

Bemidji

Brainerd

Detroit Lakes

Duluth

Mankato

New Ulm

Rochester

St. Cloud

St. Paul

www.bwsr.state.mn.us

TTY: (800) 627-3529

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April 6, 2017

Jean Christoffels, Murray County Zoning/Environmental Administrator

RE: Response for Request of Comments for the Murray County Local Water Management Plan

Dear Jean:

Thank you for all you have done in the process of writing the Murray County Local Water Management Plan. Plan expectations for the update and revisions are authorized under the Comprehensive Local Water Management Act, Minnesota Statutes, §103B.301.

The Board of Water and Soil Resources has the following comments:

General Comments:

- We applaud the effort on the part of Murray County on this water plan in the face of much staff turnover and appreciate the openness and willingness of the Zoning Administrator to facilitate the process.
- We encourage strong efforts to build on this plan to be integrated in the watershed approach and build on the collaborations and efforts with neighboring entities to strengthen water management on a watershed basis.
- There are a few small formatting and word choice suggestions we can go over before the regional committee meeting.

I look forward to working with you in the future. If you have any questions, please feel free to contact me: Douglas Goodrich (507) 537-6636 or e-mail douglas.goodrich@state.mn.us.

Sincerely,

Douglas Goodrich
Board Conservationist
MN Board of Water & Soil Resources
Marshall, MN

Cc: Ed Lenz, BWSR South Regional Manager (via e-mail)
Jean Christoffels, Murray Planning and Zoning Administrator (via e-mail)

Minnesota Board of Water & Soil Resources

December 14, 2016

Murray County Commissioners
c/o Jean Christoffels, Zoning Administrator
2500 28th Street
Slayton, MN 56172

RE: Official Comments Pertaining to the State Review of the Murray County Priority Concerns Scoping Document for the Local Water Management Plan Update

Dear Murray County Commissioners:

Pursuant to Minnesota Statutes §103B.313, subdivision 5, this letter communicates the official comments of the State of Minnesota pertaining to the priority concerns Murray County has chosen to address in the update of the County Comprehensive Local Water Management Plan (Plan).

The Murray County Priority Concerns Scoping Document (PCSD) provides information about the County, summarizes the priority concerns development process, and provides the following priority concerns for inclusion in the Plan update:

- Improve Surface Water Quality and Quantity
- Improve Groundwater Quality and Quantity
- Drainage Water Management
- SSTS/Feedlots

The Board of Water and Soil Resources (BWSR), along with the State review agencies, received the PCSD on September 1, 2016. Comments were received from BWSR staff, Minnesota Department of Health (MDH), and Minnesota Department of Agriculture (MDA). The Minnesota Department of Natural Resources (DNR) and Minnesota Pollution Control Agency (MPCA) did not provide comments on the PCSD.

The BWSR, MDA, and MDH concurred with the priority concerns identified and noted they felt the process to identify the concerns was commendable. The priority concerns identified in the Murray County PCSD took all the agency comments into consideration and addresses identified agency priorities.

RECEIVED DEC 19 2016

Bemidji
403 Fourth Street NW
Suite 200
Bemidji, MN 56601
(218) 755-2600

Brainerd
1601 Minnesota Drive
Brainerd, MN 56401
(218) 203-4470

Detroit Lakes
26624 N. Tower Road
Detroit Lakes, MN 56501
(218) 846-8400

Duluth
394 S. Lake Avenue
Suite 403
Duluth, MN 55802
(218) 723-4752

Mankato
12 Civic Center Plaza
Suite 3008
Mankato, MN 56001
(507) 344-2021

Marshall
1400 East Lyon Street
Marshall, MN 56258
(507) 537-6060

New Ulm
21371 State Hwy 15
New Ulm, MN 56073
(507) 359-6074

Rochester
3555 9th Street NW
Suite 350
Rochester, MN 55901
(507) 206-2889

Central Office / Metro Office 520 Lafayette Road North Saint Paul, MN 55155 Phone: (651) 296-3767 Fax: (651) 297-5615
www.bwsr.state.mn.us TTY: (800) 627-3529 An equal opportunity employer

The BWSR Southern Regional Committee (Committee) met on November4, 2016, to discuss comments received from State review agencies and others, discuss the content of the PCSD, and recommendations for the content of the final Plan. The Committee's findings were presented to the BWSR Board at its meeting on December 14, 2016.

The BWSR Board has deemed the priority concerns to be addressed in the Plan are appropriate; no changes are recommended or required to the PCSD as drafted. Please proceed with the development of your Plan. During the development of the goals and action items, the County should include a discussion on climate change and how that may influence water management within the County. The BWSR Board encourages the County to continue to engage in a process that includes a broad range of citizens and interest groups, in addition to local government officials, and State and federal resource managers during the development of goals, objectives, and an implementation plan.
We look forward to the completion of your Plan and its implementation.

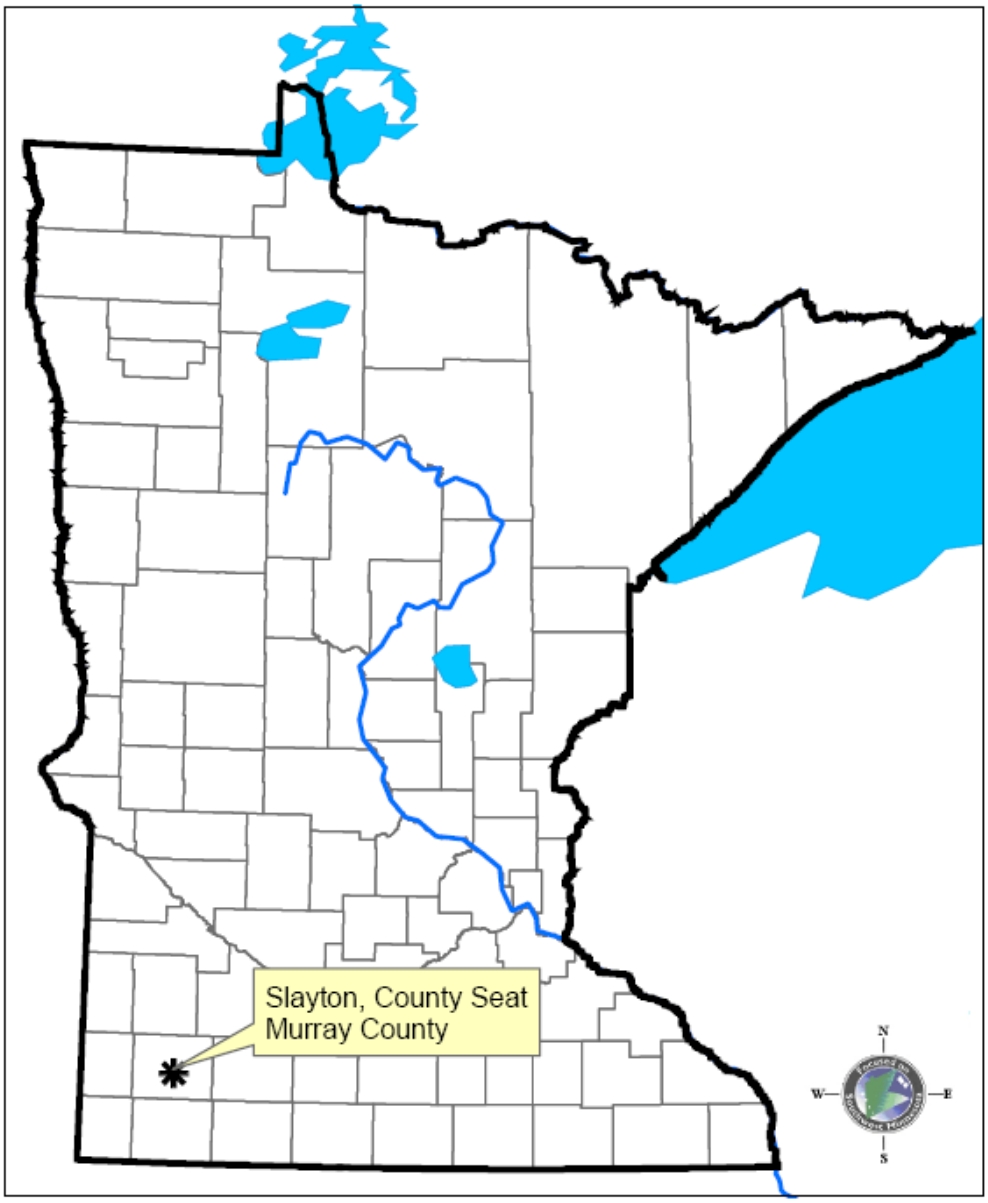
Sincerely,

Brian Napstad, Chair
Minnesota Board of Water and Soil Resources

cc: Jean Christoffels, Zoning Administrator
Robert I. Sip, MDA (via email)
Amanda Strommer, MDH (via email)
Catherine Fouchi, DNR (via email)
Juline Holleran, MPCA (via email)
Ed Lenz, BWSR Regional Manager (via email)
Douglas Goodrich, BWSR Board Conservationist (via email)
Mary Jo Anderson, BWSR (file copy)

Murray County

Priority Concerns Scoping Document



2017

Prepared for the Murray County Local Water Management Plan Task Force

By Murray County Water Resources

Murray County Local Water Management Plan – Scoping Document

A 10-year plan with a 5-year implementation schedule. 2017-2027
Plan Update 2016-2017

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1. Introduction

1.1.1 Map and Location

1.1.2. Murray County is located in the southwestern corner of Minnesota, adjacent to Cottonwood, Redwood, Lyon, Pipestone, and Nobles counties. The City of Slayton is the county seat. Murray County's population in the 2010 U.S. Census was 8,725, with a density of 12 persons per square mile. The Minnesota State Demographic Center estimates the current population (2014) is 8,475. The Demographic Center forecasts total population of 8,758 by 2045.

1.1.3. Murray County is typical prairie environment, with variation in land elevation from 1900 feet above sea level atop the Coteau de Prairies (Buffalo Ridge) to 1250 feet in the northeast corner of the county, with nine generalized soil areas. Murray County contains the headwaters of four major watersheds, including the Cottonwood and Redwood rivers which drain into the Minnesota River, the Rock River which drains into the Missouri River basin, and the Des Moines River which eventually drains into the Mississippi River.

Slayton (pop. 2,078) and Fulda (pop. 1,257) are the largest cities in the county. The Lakes CDP was designated for the 2000 Census, which found approximately 600 housing units with 600 permanent residents in the Lake Shetek and Lake Sarah area. The dominant land use in the county is agriculture. The 2008 *Murray County Comprehensive Plan* reports 79 % of land was under cultivation, 2% water, and 5% developed. The 2012 U.S. Census of Agriculture reports 895 farms on 407,919 acres in Murray County. Of these, 374,929 acres were in cropland. There were 229 farms with cattle, 76 with hogs, 33 with sheep, and 19 with poultry.

1.2. Plan Information

1.2.1. The Murray County Water Resources Department is responsible for local water management in Murray County, including facilitation of public input and convening the Murray County Local Water Management Plan Task Force. Task Force membership currently includes:

2016 Local Water Management Plan Task Force Members

Five County Commissioners	
Paul Posthuma	Agriculture/Murray SWCD
Duane Spartz	Private Business
Jon Hoyme	Shetek Area Water and Sewer Commission (SAWSC)
Larry Byers	Township Representative
Dave Kremer	Private Business
Justin Hoffmann	City of Slayton Representative
Jay Takle	State Park
Ken Bickner	SWCD
Robert Koehler	Extension
Amy Rucker	County EDA
Jon Bloemendaal	Murray County Ag & Solid Waste Administrator
Melissa Runck	Extension Educator
Rick Parker	Retired/Private Business
Jean Christoffels	Secretary/ Murray County Zoning Administrator
Chris Hansen	Water Plan Coordinator/Water Resources Administrator

1.2.2. The Murray County Board of Commissioners adopted a resolution on 10 October 1987 to develop a Comprehensive Local Water Plan according to Minnesota Statutes in effect at that time. This plan was developed as part of a multi-county project under the direction of the Redwood-Cottonwood Rivers Control Area. A committee was organized in August of 1988 to advise the Murray County Board, and give direction to RCRCA. A public hearing was held in January of 1990 where comments were heard by the County Board, and a final draft adopted by the Murray County Board of Commissioners on 4 September 1990.

On 7 December 1995, the Murray County Board of Commissioners adopted a resolution to update and revise the Comprehensive Local Water Plan. A public information meeting was held on 13 March 1995. After a one-year extension, draft copies of the revised plan was distributed for review in July 1996, and adopted on 1 April 1997. The Murray County Board of Commissioners adopted a resolution on 6 September 2005 to revise this plan, according to Minnesota Statutes now in effect. This plan is in effect from June 2007 through June 2017. The Murray County Board of Commissioners approved a resolution to revise this plan on 22 November 2011 and the plan was approved on 18 September 2012. On January 19, 2016, the Murray County Board of Commissioners adopted a resolution to update the current plan.

1.2.3. The expiration date of the current plan is June of 2017.

2. Priority Concerns Addressed by the Plan

2.1. Below are the selected priority concerns as chosen by the Murray county Local Water Management Plan Committee:

1. Improve Surface Water Quality and Quantity.

   This was chosen because Murray County is at the top of several different watersheds. Murray County has many of the prime lakes of Southwestern Minnesota. It has been a goal of the Water Plan Committee to keep the water quality in these lakes from degrading. Also, with the new buffer law taking effect, this will be a more noticeable priority concern.

   The impairments from the approved Minnesota Pollution Control Agency's TMDL listing that will be addressed are fecal coliform, nutrients, and turbidity. Those listings were used as a justification to make this a priority concern. Practices will be targeted to areas listed with the 2016 Nonpoint Priority Funding Plan priority areas and criteria. We are also looking at protecting water resources for public use and public health, including drinking water. We are hoping to address the surface water quantity and quality through the natural restoration of drained wetlands. A priority area for this would be the Beaver Creek Watershed. This will provide benefits on multiple levels as it will also provide wildlife habitat. Other projects that have a multiple benefit BMP (quantity, quality, and habitat) will be considered a priority.

   The types of practices that will be completed are buffers, conservation tillage, terraces, sediment basins, nutrient management, assistance with the wetland banking program, wetland restorations, work with the ditch system on setting flow goals for public ditches, and outreach and education to lakeshore property owners on proper shoreline stabilization and restoration.

2. Improve Groundwater Quality and Quantity.

   Certain areas of the County, especially the Lake Shetek/Lake Sarah area, are in need of a rural water system due to both poor quality and lack of a water source. The Water Plan Board felt this was an important issue because of the need to improve the existing potable water sources as well as increasing the number of them for rural water systems. Since the inception of the Murray County Local Water Plan, the Board has approve to conduct annual testing of over 70 wells throughout the County. These wells have been specially selected for depth and location. The testing has provided close to 25 years of baseline data. The Water Plan Board has also funded

the cities of Chandler, Lake Wilson, Iona and Fulda to complete wellhead protection plans. Other practices will be targeted to areas listed with the 2016 Nonpoint Priority Funding Plan priority areas and criteria. Projects that have a multiple benefit BMP will be considered a priority. The city of Chandler will be a priority area because of the elevated nitrate levels (as stated in the MDH letter).

Nitrates are of most concern for this priority concern. The practices that will be promoted to improve groundwater quality and help water quantity are encouraging wellhead protection plans to be written for the towns of Avoca, Currie, Hadley, and Slayton, encouraging the proper sealing of abandoned wells, and collaborating with other counties with the WRAPS planning process. We will also continue the annual monitoring of the test wells throughout the County.

3. Drainage Water Management/Water Retention.

   The Murray County Board of Commissioners as well as the Murray County Local Water Plan has continued to express interest in specifically creating new water retention structures. The Beaver Creek watershed has been the priority area. This is because over the last 100 years, it has been estimated that 90 percent of the tillable ground within the watershed has been tiled and drained. Because of this, we have seen an increase in stream flow and bank destabilization. The impairments from the approved Minnesota Pollution Control Agency's TMDL listing that will be addressed are fecal coliform, nutrients, and turbidity. Specifically, Beaver Creek has been listed with the impairments of fecal coliform and turbidity. Other practices will be targeted to areas listed with the 2016 Nonpoint Priority Funding Plan priority areas and criteria. Other projects that have a multiple benefit BMP will be considered a priority. We are also looking at protecting water resources for public use and public health, including drinking water. The projects that will be proposed are administration of the floodplain ordinances, rock inlets, drainage tile control structures, providing technical assistance and incentives to landowners, and outreach and education on managing runoff.

4. SSTS/Feedlots.

   Murray County has made great progress in both of these areas. All septic systems within shoreland have been upgraded, a centralized sewer system around the lakes area has been installed, and the Village of Lime Creek has a new compliant cluster system. Work within the Feedlot area has been in re-registering all feedlots within the County as well as completing Level III feedlot inventory. The Water Plan Committee has also committed to testing of pit tiles around all new hog confinement buildings to ensure that the pits are properly constructed and not leaking into the groundwater. These tests are done every two years on the pit tiles. The Board

felt that the two items (SSTS/Feedlots) stood out and wanted them to be their own priority concern as much work has been done within the County on them and continues to be done. This is a county-wide priority concern. The impairments from the approved Minnesota Pollution Control Agency's TMDL listing that will be addressed are fecal coliform and nutrients. Those listings were used as a justification to make this a priority concern. These listings seem to be fairly consistent county-wide. One of the practices that will be addressed is non-compliant septic system replacement. For feedlots, the inventory will continue in the Des Moines River watershed to complete the Level III feedlot inventory. When the inventory is completed, a targeted approach to fixing the non-complaint feedlots will take place. Examples of fixes that will be done are manure storage basins, clean water runoff diversion, roofs, manure management, and nutrient loading reduction.

3. Description of Priority Concern Identification Process

3.1.1. Below is the list all public and internal forums held to gather input regarding priority concerns:

1-19-16	The Murray County Board of Commissioners approved a resolution to update the Murray County Local Water Management Plan.
2-11-16	Invitation to submit priority concerns for the update of the Murray County Local Water Management Plan sent out by email and letter to local units of government, organizations, and other agencies as requested or required. (53 notices sent out, 6 received)
5-26-16	Meeting with the Murray County Local Water Management Plan Committee to discuss received priority concerns. (16 attended)
6-16-16	Murray County Water Management Plan Committee held an Open House. (0 attended)

3.1.2. List of Participants and Affiliated Organizations

2016-2017 Murray County Local Water Management Plan Task Force Members

James Jens	County Commissioner, District 1
Robert Moline	County Commissioner, District 2
Gerald Magnus	County Commissioner, District 3
Glenn Kluis	County Commissioner, District 4
Dave Thiner	County Commissioner, District 5
Paul Posthuma	Agriculture/Murray SWCD
Duane Spartz	Private Business
Jon Hoyme	Shetek Area Water and Sewer Commission (SAWSC)
Larry Byers	Township Representative
Dave Kremer	Private Business

Justin Hoffmann	City of Slayton Representative
Jay Takle	State Park
Ken Bickner	SWCD
Robert Koehler	Extension
Amy Rucker	County EDA
Jon Bloemendaal	Murray County Ag & Solid Waste Administrator
Melissa Runck	Extension Educator
Rick Parker	Retired/Private Business
Jean Christoffels	Secretary/ Murray County Zoning Administrator
Chris Hansen	Water Plan Coordinator/Water Resources Administrator

Other Participants

Ed Lenz	Board of Soil and Water Resources
Annette Fiedler	Southwest Regional Development

3.1.3. A summary of the proceedings, and supporting data.

- Murray County Resolution (2016-01-19-01) Resolution to update the Murray County Comprehensive Local Water Management Plan.
- Invitation to submit Priority Concerns for the Update of the Murray County Comprehensive Local Water Management Plan.
- Agenda – Murray County Local Water Management Plan Committee Meeting (05-26-2016)
- Ad for Open House - Murray County Local Water Management Plan Committee.

3.2. There were no written comments received at any public meeting.

3.3. Stakeholder Issues - Below are the written comments received by Local and State agencies:

Jan Voit, Heron Lake Watershed –
Sediment/turbidity
Phosphorus
Bacteria
Drainage systems and natural waterways
Biotic habitat
Wetlands
Education
Funding

Amanda Strommer, Minnesota Department of Health-
Drinking Water Quality (Groundwater)
Groundwater Quantity

Rob Sip, Minnesota Department of Agriculture-
Drainage water management
Water storage

Wind and water erosion
Lake protection
General information on Department of Ag

Wayne Cords, Minnesota Pollution Control Agency-
TMDL Impaired Waters
Watershed Approach
Agricultural Drainage Management

Ed Lenz, Minnesota Board of Water and Soil Resources-
Include drainage authority in update process
Nonpoint Priority Funding Plan
WRAPS plans
Level III feedlot inventories
Utilize Rock River TMDL report
1W1P
Utilize West Fork Des Moines River TMDL
Continue with data collection
Emerging issues
Groundwater issues and DWSMA's

4. Description of Priority Concern Selection Process

4.1. Priority Concern Selection

The Murray County Local Water Management Plan Task Force selected the priority concerns after reviewing the current water management plan's priority concerns as well as the priority concerns submitted by the other local, county, and State agencies. There was a consensus among the concerns to protect both groundwater and surface water.

4.2. Differences between the Plan's Priority Concerns and other State, Local, and Regional Concerns

The Murray County Environmental Services Office administers the Murray County Comprehensive Land Use Plan as well as the County's Zoning Ordinance. Both the Murray County Environmental Services Office and the Murray County Soil and Water Conservation District work together to make sure there are consistencies in the way environmental issues are handled throughout the County. The 2008 approved Murray County Comprehensive Land Use Plan was reviewed to ensure consistency with the proposed 2017 Murray County Local Water Management Plan.

As stated above, comments were received from six separate local and State agencies. There was a consistent thread among all comments received and the approved priority concerns. There were no major differences to resolve.

5. Priority Concerns Not Addressed by the Plan

5.1. Description of why each Concern Submitted for Consideration was not Chosen

When looking back at the 2007 revision of the Murray County Local Water Management Plan, consistencies were seen with the proposed 2017 plan priority concerns. Ground and surface water quality are still of great importance. Also, water retention seems to be a priority within the County. Although feedlots and septic systems were of importance in the last plan revision, the Committee felt it was pertinent to create a stand-alone priority concern for them for the 2017 plan.

II. Appendix

1. Acronyms Used

CDP – Census Designated Place

EDA – Economic Development Authority

DWSMA – Drinking Water Supply Management Area

RCRCA – Redwood/Cottonwood Rivers Control Area

SAWSC – Shetek Area Water and Sewer Commission

SSTS – Subsurface Sewage Treatment System

SWCD – Soil and Water Conservation District

TMDL – Total Maximum Daily Load

WRAPS – Watershed Restoration and Protection Strategy

2. Murray County Resolution

Murray County Board of Commissioners
2848 Broadway Ave. PO Box 57
Slayton, MN 56172

EXCERPT FROM THE PROCEEDINGS OF
THE MURRAY COUNTY BOARD OF COMMISSIONERS
MURRAY COUNTY GOVERNMENT CENTER - SLAYTON, MINNESOTA
January 19, 2016

Commissioner Moline introduced the following resolution and moved its adoption:

Resolution 2016-01-19-01
Resolution to Update
the Murray County
Comprehensive Local Water Management Plan

Whereas, Minnesota Statutes, §103B.301, Comprehensive Local Water Management Act (Act), authorizes Minnesota counties to develop and implement a Comprehensive Local Water Management Plan, and

Whereas, the Act requires that a county update and revise their Comprehensive Local Water Management Plan on a periodic basis, and

Whereas, the Act encourages that a county coordinate its planning with contiguous counties, and solicit input from local governmental units and state review agencies, and

Whereas, the Act requires that plans and official controls of other local governmental units be consistent with the Comprehensive Local Water Management Plan, and

Whereas, Murray County has determined that the revision and continued implementation of a Comprehensive Local Water Management Plan will help promote the health and welfare of the citizens of Murray County, and

Now, Therefore, Be it Resolved, that the Murray County Board of Commissioners resolve to revise and update its current Comprehensive Local Water Management Plan.

Be it Further Resolved that Murray County will coordinate its efforts in the revision and update of its Comprehensive Local Water Management Plan with all local units of government within the county, and the state review agencies; and will incorporate where appropriate any existing plans and rules which have been developed and adopted by watershed districts having jurisdiction wholly or partly within Murray County into its Comprehensive Local Water Management Plan.

Be it Further Resolved that the Murray County Board of Commissioners authorizes the establishment of a Water Management advisory committee with the responsibility of revising and updating the plan and who shall report to the County Board on a periodic basis.

Be It Further Resolved that the Murray County Board of Commissioners delegates the Water Resources Department the responsibility of coordinating, assembling, writing and implementing the revised Comprehensive Local Water Management Plan pursuant to Minnesota Statutes, §103B.301.

The foregoing resolution was duly seconded by Commissioner Kluis and thereupon being put to a vote all members voted in favor.

I, Aurora Heard, County Coordinator of the County of Murray, State of Minnesota, do hereby certify that the foregoing copy represents a true and correct copy of the original thereof on file in Murray County.

Dated: February 1, 2016

Aurora Heard
Murray County Coordinator

3. Invitation to Submit Priority Concerns

Murray County Environmental Services Office

Murray County Government Center - 2500 28th Street, PO Box 57, Slayton, MN 56172-0057
Phone : (507) 836-1167 – Fax: (507) 836-8904

Date: February 11, 2016

To: _____

From: Chris Hansen, Murray County Water Resources Administrator

Re: Invitation to Submit Priority Concerns for the Update to the Murray County Comprehensive Local Water Management Plan

The Murray County Board of Commissioners adopted a resolution on January 19, 2016 requiring the update and revision of the Comprehensive Local Water Management Plan (Plan), as authorized under the Comprehensive Local Water Management Act, Minnesota Statutes, §103B.301. The Plan will focus on priority water management concerns.

The county invites all recipients of this notice to submit water management issues they feel the Plan should address. For each issue submitted, please consider including the following information:

1. Why is it important the plan focus on this issue or concern (include or cite relevant data)?
2. What actions are needed to address the concern?
3. What resources may be available to accomplish the actions (include contact names, funding sources, partnerships, citizen volunteers, etc.)?
4. What specific areas of the county are highest priority in regards to this issue?

Also, please submit any water and related land resources plans and official controls so that these items can be reviewed to ensure consistency with the Comprehensive Local Water Management Plan. These items may be submitted as a website link.

Please submit the requested information or direct inquiries by April 1, 2016, to:

Chris Hansen
Murray County Water Resources Administrator
2500 28th Street, PO Box 57
Slayton, MN 56172
(507)-836-1165
chansen@co.murray.mn.us

cc: file
enclosures: none

Jon Bloemendaal	Chris Hansen	Jean Christoffels	Laurie Hill
jbloemendaal@co.murray.mn.us	chansen@co.murray.mn.us	jchristoffels@co.murray.mn.us	lhill@co.murray.mn.us
Ag & Solid Waste Administrator	Water Resources Administrator	Zoning Administrator	Secretary

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4. Murray County Water Management Plan Task Force Agenda

Murray County Environmental Services Office

Murray County Government Center - 2500 28th Street, PO Box 57, Slayton, MN 56172-0057
Phone : (507) 836-1167 – Fax: (507) 836-8904

MEMORANDUM

DATE: May 18, 2016

TO: Local Water Management Plan Task Force

FROM: Chris Hansen – Water Resources Administrator

RE: WATER MANAGEMENT PLAN MEETING
May 26, 2016

(Please note this is a 1:00 p.m. meeting)

(It is important that you call the office to indicate whether you will attend or not as we need to have a quorum.)

There will be a meeting of the Murray County Local Water Management Plan Task Force on Thursday, May 26, 2016 at 1:00 p.m. in Meeting Room B of the Murray County Government Building, Slayton, MN.

AGENDA

1. Minutes
2. Water Plan Update, Priority Concerns Scoping Document
3. Next Meeting/Adjourn

If you have any questions or concerns, or would like any additional information, please contact me at telephone # 507-836-1165 or through an e–mail at <chansen@co.murray.mn.us>. Thank-you for your time, interest and participation.

cc: file
enclosures: none

Jon Bloemendaal
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Ag & Solid Waste Administrator

Chris Hansen
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Water Resources Administrator

Jean Christoffels
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Laurie Hill
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Secretary

AN EQUAL OPPORTUNITY EMPLOYER

5. Description of Current Priority Concerns

Description of Priority Concerns

The Priority Concerns listed below were selected by the Water Plan Task Force members by consensus, after carefully reviewing submitted concerns and comments. While the assessment of priority concerns utilized the best available data, this plan rests solidly on information and analysis contained in previous editions of the county's local water management plan.

Priority Concern A. Improve Surface Water Quality.

Protecting surface water is a challenge in any community. Improved land use and agricultural best management practices are necessary to address the quality of lakes, wetlands and rivers. MPCA listing of impaired waters requires local strategies to meet Total Maximum Daily Load (TMDL) standards. Sub-Surface Treatment System (SSTS) compliance is also a continued challenge.

Priority Concern B. Protect Groundwater.

Murray County has enjoyed abundant groundwater supplies, although there is increasing concern with groundwater quality and long-term supply. Efforts to protect groundwater should be focused on Drinking Water Supply Management Areas (DWSMA) and surficial aquifer areas.

Priority Concern C. Stormwater Retention.

While drainage improvements have improved our ability to manage stormwater, hastening flows has often led to problems downstream. Particular concerns include slowing runoff, promoting land conservation, and active wetland restoration, focused on the Beaver Creek, Shetek, and Heron Lake watersheds.

6. Ad for Open House

OPEN HOUSE NOTICE

There will be an open house on Thursday June 16, 2016 at 2:00 p.m. through 6:00 p.m. in Meeting Room B of the Murray County Government Center to take public comment on the Murray County Local Water Management Plan proposed Priority Concerns. These concerns are: 1. Improve Surface Water Quality/Quantity, 2. Improve Groundwater Quality/Quantity, 3. Drainage Water Management/Water Retention, and 4. SSTS/Feedlots.

The current plan is available for review in its entirety in the Murray County Water Resource's Office and on the Murray County website at http://murray-countymn.com/wp-content/uploads/2015/05/WaterPlan.pdf. Written comment can also be submitted to the Murray County Water Resources Administrator (P.O. Box 57, Slayton, MN 56172). All interested parties are welcomed to stop by.

7. Heron Lake Watershed Priority Concerns

Heron Lake Watershed District Priority Concerns

Why is it important that the plan focus on this issue or concern (include or cite relevant data)?

Priority Concerns
In the HLWD, sediment, phosphorus, and bacteria, have been identified as primary constituents of concern. Locating the sources of each of the aforementioned contaminants is integral to reducing the effect they have on a waterbody.

Sediment/Turbidity
The MPCA listed several stream reaches in the HLWD as impaired for turbidity on the 2002, 2004, and 2006 impaired waters lists. **Table 5** lists the reaches that were addressed in the TMDL Report. Data used for assessment was collected through several endeavors from 1994-2004.[1] Possible sources of origination include lack of filter strips, inadequate residue management, and streambank erosion due to lack of buffers.

Table 5. Stream reaches impaired because of turbidity in the HLWD

Reach	Assessment Unit ID #	Affected Use	Pollutants/Stressors
Jack Creek, North Branch Headwaters to Jack Creek	07100001-505	Aquatic Life	Turbidity
Okabena Creek Elk Creek to South Heron Lake	07100001-506	Aquatic Life	Turbidity
Elk Creek Headwaters to Okabena Creek	07100001-507	Aquatic Life	Turbidity
Jack Creek JD 26 to Heron Lake	07100001-509	Aquatic Life	Turbidity
Heron Lake Outlet Heron Lake (32-0057-01) to Okabena Creek	07100001-527	Aquatic Life	Turbidity
Division Creek Heron Lake (32-0057-01) to Okabena Creek	07100001-529	Aquatic Life	Turbidity

Phosphorus
The MPCA listed North Heron Lake and South Heron Lake as impaired due to phosphorus in 2006 (**Table 6**). Related to the Heron Lake nutrient impairment is a listing for pH in the Heron Lake outlet. Data used for assessment was collected through several endeavors from 1992-2002.[2] Potential sources of origination include fertilizer runoff through direct overland flow into ditches and open tile inlets, resuspension of stream and lake sediment, leaking septic systems, inadequate manure management, and wastewater treatment facilities.

[1] West Fork Des Moines River Watershed Total Maximum Daily Load Final Report: Excess Nutrients (North and South Heron Lake), Turbidity, and Fecal Coliform Bacteria Impairments, October 2008.
[2] West Fork Des Moines River Watershed Total Maximum Daily Load Final Report: Excess Nutrients (North and South Heron Lake), Turbidity, and Fecal Coliform Bacteria Impairments, October 2008.

Table 6. Waterbodies impaired because of phosphorus in the HLWD

Lakes	Lake ID#	Affected Use	Pollutants/Stressors
Heron (North Marsh)	32-0057-01	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
Heron (Duck)	32-0057-02	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
Heron (North Heron)	32-0057-05	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
Heron (South Heron)	32-0057-07	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
Second Fulda	51-0020-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
First Fulda	51-0021-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
East Graham	53-0020-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
West Graham	53-0021-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators

Bacteria

The MPCA listed three stream reaches in the HLWD as impaired for bacteria on the 2002, 2004, and 2006 Impaired Waters Lists (**Figure 11**). **Table 7** lists the reaches that were addressed in the TMDL Report. Data used for assessment was collected through several endeavors from 1994-2004.[3] Possible areas of origination include leaking septic systems, inadequate manure management, and confined animal feeding operations.

Table 7. Stream reaches impaired because of bacteria in the HLWD

Reach	Assessment Unit ID #	Affected Use	Pollutants/Stressors
Okabena Creek Elk Creek to South Heron Lake	07100001-506	Aquatic Recreation	Fecal Coliform
Elk Creek Headwaters to Okabena Creek	07100001-507	Aquatic Recreation	Fecal Coliform
Jack Creek JD 26 to Heron Lake	07100001-509	Aquatic Recreation	Fecal Coliform

Water Quantity and Flooding

Flooding of agricultural lands and roadways within the Heron Lake Basin is a serious economic and resource management concern. Seasonal flooding can occur during and following snowmelt and late spring rains after soils have been partially saturated. The late spring lake-level rises of Heron Lake can range from about four to six feet, resulting in damage to crops and roadway structures. Storm flooding can cause a lake-level rise of about three feet within 48 hours.

Flooding not only damages agricultural production and roadway structures, it also results in a number of problems associated with sediment transport. Streambank erosion and associated sediment discharge into Heron Lake following storms can result in increased siltation in the lake and adjacent lowlands. Runoff from agricultural lands also may carry pesticides and nutrients in both dissolved and particulate forms.

Drainage Systems and Natural Waterways

Drainage systems are interconnected within natural waterways in the HLWD (**Figure 13**). Eighty-six percent of the cropland in the watershed is in a corn/soybean rotation. The use of drainage ditches, increasing cropland tiling and

[3] West Fork Des Moines River Watershed Total Maximum Daily Load Final Report: Excess Nutrients (North and South Heron Lake), Turbidity, and Fecal Coliform Bacteria Impairments, October 2008.

channelization can lead to increased water movement through waterways. Furthermore, reducing channel buffers increases the potential for streambanks to fail. The combination of increased water movement and bank destabilization results in streambank erosion and ditch cleanouts that contribute to increasing turbidity in streams and lakes.

Biotic Habitat

Much of the fish habitat-related issues in the HLWD can be addressed by looking at watershed hydrology. The hydrology of watershed streams and rivers dictate the quantity and quality of fish habitat. Mankind, in land use and stewardship, has altered the hydrology by drainage and tiling. This has an adverse impact on the habitat within streams and rivers. By increasing drainage and losing storage, the quantity and timing of the stream and river flow is altered and can lead to the erosion of streams and drainage systems. As a result of the increased flow and erosion, there is an increase in sedimentation and siltation to not only streams, but also lakes. The sedimentation causes a decrease in the frequency and number of deeper water pools typically used by fish during winter. It also decreases the amount and quality of spawning habitat for some fish species that require hard substrates.

Wetlands

Presently, less than one percent of the basin consists of wetlands. Jackson and Nobles Counties, which includes most of the Heron Lake Basin, have less than one percent of the wetlands that were present at the time of settlement by European- Americans. Wetlands have been reduced in the two counties from greater than 284,000 acres in the late 1800's to presently about 2,000 acres. A primary issue in wetland loss is the loss of water storage, as well as the water quality and other ecological services that wetlands provide.

The restoration of wetlands in the Heron Lake Basin may reduce peak and total runoff by increasing available depressional storage and by increasing the potential for evaporation and transpiration. Riparian wetlands adjacent to streams provide hydraulic and hydrologic benefits. Additional storage in riparian wetlands and increased resistance to downstream flow provided by additional wetland vegetation reduces peak discharges following storms. [4]

Education

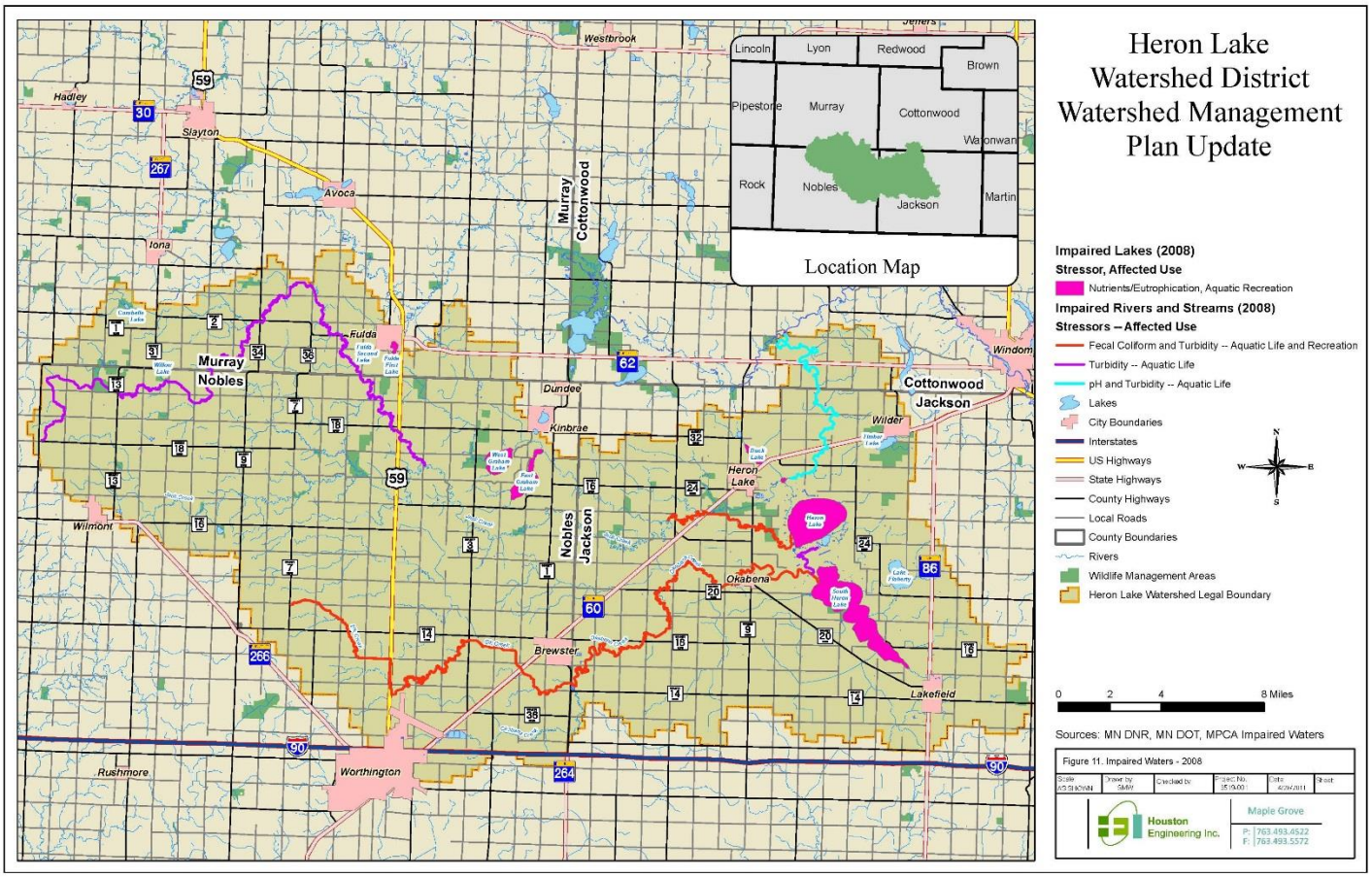
Watershed residents have significant impacts on the environment and its resources. Education seems to be the best tool for providing the public with an understanding of the ramifications of their actions and behavior patterns in order to increase awareness of environmental issues. The largest issue faced by the HLWD relative to education is effectively changing behavior to improve resource condition.

Funding

The operation of the HLWD is funded primarily through the ad valorem levy which is the only stable source of funding. Nearly all of the remaining programs and projects of the HLWD are funded through the use of grant dollars. In the absence of either an increase in the ad valorem levy or the continued success in obtaining grant dollars, the efforts of the HLWD to address the issues identified within this WMP are limited.

[4] Jones, Perry M. and Winterstein, Thomas A. 1999. *Characterization of Rainfall-Runoff Response and Estimation of the Effect of Wetland Restoration on Runoff, Heron Lake Basin, Southwestern Minnesota, 1991-97.*

Impaired waterbodies



8. Minnesota Department of Health Written Comments

Minnesota Department of Health Priority Concerns

Priority Concerns Input
Water Management Plan for Murray County

Submission Deadline: April 1, 2016
SUBMITTED BY:
Agency / Organization: Minnesota Department of Health, Source Water Protection Unit
Name of Person Completing Form: Amanda Strommer, Principal Planner

PRIORITY CONCERNS:

For each priority concern, provide a brief description and answer the questions listed after each priority concern.

PRIORITY CONCERN 1: ***Drinking Water Quality (Groundwater)***

Why is it important the plan focus on this issue? (Include or cite relevant data)
The current plan does a nice job highlighting the issues with groundwater. MDH appreciates continued coordination with public water suppliers regarding implementation of wellhead protection plans and drinking water protection.

What actions are needed?
-Consider wellhead protection areas in land use decisions.
-Support locating and properly sealing abandoned wells.
-Locally discuss and evaluate how to use WRAPS and 1W1P watershed planning in the future to target and prioritize drinking water protection activities.
-Support ongoing data collection efforts to enhance future wellhead protection activities.
-Work with the City of Chandler on elevated nitrate issues. Coordinate on ways to reduce nitrate in source water for the public water supply.

What resources may be available to accomplish the actions? Do you or your organization or agency have a role in addressing this priority concern? (Please include names, funding sources, partnerships, volunteers, etc.)
Grant funds for public water supplies.
http://www.health.state.mn.us/divs/eh/water/swp/grants/index.html
Up to date wellhead protection information can be found at:
http://www.health.state.mn.us/divs/eh/water/swp/swa/swainfo/default.cfm
Maps and geospatial data can be found at:
http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm

What areas of the County are the highest priorities?

Wellhead protection plans have been completed for the following communities:
Vulnerable/susceptible to contamination:
Chandler

Lake Wilson

Non-Vulnerable/Protected aquifer:
Fulda
Iona
Wellhead Protection Plans not yet started:
Avoca
Currie
Hadley
Slayton

PRIORITY CONCERN 2**: **Groundwater Quantity

Why is it important the plan focus on this issue? (Include or cite relevant data)
Adequate supply of drinking water will continue to be an important due to growth and development.

What actions are needed?
-Encourage water conservation efforts and education.
-Encourage land uses and the installation of best management practices which recharge groundwater.
-Increase awareness among public officials, land owners, and the general public regarding the interaction between groundwater and surface water sources in order to make informed water management decisions.

What resources may be available to accomplish the actions? Do you or your organization or agency have a role in addressing this priority concern? (Please include names, funding sources, partnerships, volunteers, etc.)
Many water suppliers include water conservation in wellhead protection plan measures.
Grant funds for public water supplies.
http://www.health.state.mn.us/divs/eh/water/swp/grants/index.html

What areas of the County are the highest priorities?
Entire County

9. Minnesota Department of Ag Written Comments

Fri 3/25/2016 12:14 PM
Sip, Rob (MDA) <rob.sip@state.mn.us>
Murray County Comprehensive Local Water Management Plan Update

Chris,

Below is a website that MDA has developed to discuss and illustrate priority concerns. The MDA is in the process of updating this website and MDA realizes that recommendations are implemented based on staff, financial and technical resources. The MDA also realizes that this is a 5 year update. In addition to the website recommendations, the MDA is providing additional information below to highlight priorities.

MDA Water Planning Assistance Website:
http://www.mda.state.mn.us/en/protecting/waterprotection/waterplanning.aspx

1. Drainage Water Management (DWM) - The MDA recommends additional effort be focused on encouraging landowners and farmers to implement DWM practices and management plans. The Murray County SWCD can play a important role in working with drainage authorities, landowners and agricultural groups to determine how best to promote and implement DWM practices. Attached are drainage related recommendations from the MDA, which are also being updating. A fact sheet from the Red River Watershed Management Board regarding ditch system maintenance is also attached. Please distribute this factsheet when appropriate as you work with area farmers and landowners. The MDA also recommends that Murray County consider the development of a Multipurpose Drainage Management Plan in conjunction with its partners and here is a recent example that you are probably aware of: http://www.co.martin.mn.us/images/Ditch%20Admin/Martin%20County%20Multipurpose%20Drainage%20Management%20Plan.pdf

2. Water Storage - The MDA recommends that Murray County along with its water management partners consider the development of a water storage plan for both public drainage systems and for private on-farm water storage. This plan may build off of the existingwater or drainage management plans and may include but not be limited to the following:

- Communication of the development of a water storage plan with private landowners in Murry County.
- Setting flow goals agreed upon by landowners within each public ditch systems or sub-watersheds.
- Prioritizing public ditch systems or sub-watersheds based on flow goals with input from landowners.
- Assessment of where short-term and long-term water storage projects can be located. This may include several types of water storage, including smaller scale (wetland restorations) or

larger scale projects such as constructed impoundments. However, larger scale projects are costly and require significant financial resources to engineer, construct, operate and maintain.
- Development of an implementation plan or schedule that would include discussion of funding considerations, again with landowner input.
- Operation and maintenance plans for each project.

3. Wind and Water Erosion - Attached is a map of prime soils that was recently updated by the USDA NRCS and please share this at public meetings that your SWCD may have in the future to create additional awareness about prime soils. The MDA recommends that the Murray County SWCD renew efforts to reduce wind and water erosion and that efforts continue to implement more conservation practices such as WASCOBs, grassed waterways, etc., in priority areas. Field windbreaks, farmstead windbreaks and small areas of trees or other vegetation have been removed from the landscape at unprecedented levels in recent years. However, the MDA also realizes that many of the field windbreaks that have been removed were beyond their lifespan. Windbreaks and vegetative plantings that also incorporate pollinator habitat can serve dual purposes. It is also critical that cover crops, residue management and other soil health initiatives be implemented at an increased levels.

4. Lake Protection - The MDA recommends that a process be considered for development to prioritize lake management in Murray County. As an example, Crow Wing County developed a process (attached) to prioritize lake protection efforts. Recently two additional counties have adopted components of this process or have created similar lake protection efforts.

5. General Information about the MDA - you may wish to incorporate the following language if there is a need to illustrate state agency duties and responsibilities:

The MDA is statutorily responsible for the management of pesticides and fertilizer other than manure to protect water resources. The MDA implements a wide range of protection and regulatory activities to ensure that pesticides and fertilizer are stored, handled, applied and disposed of in a manner that will protect human health, water resources and the environment. The MDA works with the University of Minnesota to develop pesticide and fertilizer Best Management Practices (BMPs) to protect water resources, and with farmers, crop advisers, farm organizations, other agencies and many other groups to educate, promote, demonstrate and evaluate BMPs, to test and license applicators, and to enforce rules and statutes. The MDA has broad regulatory authority for pesticides and has authority to regulate the use of fertilizer to protect groundwater. The MDA is the lead agency for all aspects of pesticide and fertilizer environmental and regulatory functions as directed in the Groundwater Protection Act (Minnesota Statute 103H). These include but are not limited to the following:

- Serve as lead agency for groundwater contamination from pesticide and fertilizer nonpoint source pollution.
- Conduct monitoring and assessment of agricultural chemicals (pesticides and nitrates) in ground and surface waters.
- Oversee agricultural chemical remediation sites and incident response.
- Regulate use, storage, handling and disposal of pesticides and fertilizer.

Thank you for the opportunity to comment. Please do not hesitate to contact me if you have any questions.

Robert L. Sip
Environmental Policy Specialist

Pesticide and Fertilizer Management Division
Minnesota Department of Agriculture
3725 12Th Street North
St. Cloud, MN 56303

320-223-6531 (Office)
651-319-1832 (Cell)
651-201-6120 (Fax)

rob.sip@state.mn.us
www.mda.state.mn.us

10. Minnesota Pollution Control Agency Written Comments

Minnesota Pollution Control Agency

Willmar Office | 1601 East Highway 12 | Suite 1 | Willmar, MN 56201-6002 | 320 214 3786
800 657 3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

March 18, 2016

Mr. Chris Hansen
Murray County Water Resources Administrator
2500 - 28th Street, P.O. Box 57
Slayton, MN 56172

RE: Murray County Local Water Management Plan, Five Year Amendment

Dear Mr. Hansen:

This letter responds to a request that the Minnesota Pollution Control Agency (MPCA) provide water management priorities of concern for consideration in amending the Murray County (County) Local Water Management (LWM) Plan.

1. Impaired Waters/Total Maximum Daily Loads (TMDL)

The federal Clean Water Act requires states to adopt water quality standards to protect water resources. Water quality standards are fundamental tools that help protect Minnesota's water resources from pollution. The states are also required to monitor and assess their waters to determine if they meet water quality standards and thereby support the beneficial uses they are intended to provide. These standards define how much of a pollutant can be in a surface and/or ground water while still allowing it to meet its designated uses, such as for drinking water, fishing, swimming, irrigation or industrial purposes. Many of Minnesota's waters do not meet their designated uses because of pollution problems from a combination of point and nonpoint sources. Waters that do not meet their designated uses, because of water quality standard violations, are considered impaired. States are then required to develop a list (Impaired Waters 303 (d) List) of impaired waters that require TMDL studies, and to submit an updated list to the U.S. Environmental Protection Agency for approval.Grant funding applications for TMDL impaired water implementation projects may request citations from local water plans identifying water bodies as County priorities. This documented commitment by a county may improve an applications ranking and ultimately the County's ability to secure implementation funding.

As a priority issue to consider in the amended LWMP, the County should focus on impaired waterbodies that are on the approved Impaired Waters 303 (d) List. The waters that are on the proposed approved 2014 Impaired Waters 303(d) List for Murray County are provided in the tables below.

Streams

Reach name	Reach Description	River AUID	Basin	Year Listed	Affected designated use	Pollutant or stressor	TMDL Status
Beaver Creek	CD 20 to Des Moines R	07100001-503	DesM	2004	Aquatic Life	Turbidity	Approved
				2002	Aquatic Recreation	Fecal Coliform	Approved
Champepadan Creek	Headwaters to Rock R	10170204-520	MoR	2014	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	Required
				2014	Aquatic Life	Fishes Bioassessments	Required
				2014	Aquatic Life	Turbidity	Required
				2014	Aquatic Recreation	*Escherichia coli*	Required

Chanaranbie Creek	Headwaters to Rock R	10170204-522	MnR	2014	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	Required
				2014	Aquatic Life	Fishes Bioassessments	Required
				2014	Aquatic Life	Turbidity	Required
				2014	Aquatic Recreation	*Escherichia coli*	Required
Chanaranbie Creek, North Branch	Unnamed cr to Unnamed cr	10170204-560	MnR	2014	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	Required
County Ditch 20	Headwaters to Beaver Cr	07100001-504	DesM	2002	Aquatic Recreation	Fecal Coliform	Approved
Des Moines River	Lime Cr to Heron Lk outlet	07100001-533	DesM	2004	Aquatic Life	Turbidity	Approved
				2004	Aquatic Recreation	Fecal Coliform	Approved
Des Moines River	Lk Shetek to Beaver Cr	07100001-515	DesM	2006	Aquatic Life	Turbidity	Approved
Des Moines River	Beaver Cr to Lime Cr	07100001-546	DesM	2004	Aquatic Life	Turbidity	Approved
				2004	Aquatic Recreation	Fecal Coliform	Approved
Dutch Charlie Creek	Headwaters to Highwater Cr	07020008-518	MnR	2006	Aquatic Life	Fishes Bioassessments	Required
				2006	Aquatic Life	Turbidity	Required
Jack Creek, North Branch	Headwaters to Jack Cr	07100001-505	DesM	2006	Aquatic Life	Turbidity	Approved
				2002	Aquatic Recreation	Fecal Coliform	Approved
Lime Creek	Lime Lk to Des Moines R	07100001-535	DesM	2004	Aquatic Life	Turbidity	Approved
				2004	Aquatic Recreation	Fecal Coliform	Approved
Lower Lake Sarah Outlet	First Unnamed cr on Lk Sarah outlet str to Lk Shetek inlet	07100001-508	DesM	2002	Aquatic Recreation	Fecal Coliform	Approved
Pell Creek	Headwaters to T109 R38W S29, east line	07020008-535	MnR	2010	Aquatic Life	Turbidity	Required
Plum Creek	Headwaters to Cottonwood R	07020008-516	MnR	2006	Aquatic Life	Turbidity	Required
				2006	Aquatic Recreation	Fecal Coliform	Approved
Redwood River	Headwaters to Coon Cr	07020006-505	MnR	1998	Aquatic Consumption	Mercury in fish tissue	Approved
				2002	Aquatic Life	Fishes Bioassessments	Required
				2008	Aquatic Recreation	Fecal Coliform	Approved
Unnamed creek	Unnamed cr to unnamed cr	07100001-517	DesM	2002	Aquatic Recreation	Fecal Coliform	Approved
Unnamed creek	Unnamed cr to Lk Shetek	07100001-519	DesM	2002	Aquatic Recreation	Fecal Coliform	Approved
Unnamed creek	Unnamed cr to N Br Chanaranbie Cr	10170204-559	MnR	2014	Aquatic Life	Aquatic Macroinvertebrate Bioassessments	Required
Upper Lake Sarah Outlet	Lk Sarah outlet to Unnamed cr	07100001-514	DesM	2002	Aquatic Recreation	Fecal Coliform	Approved

Lakes

Name	Lake AUID	Basin	Year Listed	Affected designated use	Pollutant or stressor	TMDL Status
Current	51-0082-00	DesM	2008	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required
Sarah	51-0063-00	DesM	2006	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required
Shetek	51-0046-00	DesM	2006	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required

Bloody	51-0010-00	DesM	2010	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required
Talcot	17-0060-00	DesM	2010	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required
First Fulda	51-0021-00	DesM	2008	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required
Lime	51-0024-00	DesM	2010	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	Required

Wetlands

Name	Wetland AUID	Basin	Year Listed	Affected designated use	Pollutant or stressor	TMDL Status
Unnamed	51-0128-00	MnR	2010	Aquatic Life	Aquatic macroinvertebrate bioassessments	Required
			2010	Aquatic Life	Aquatic Plant Bioassessments	Required
Unnamed	51-0124-00	MnR	2010	Aquatic Life	Aquatic macroinvertebrate bioassessments	Required
			2010	Aquatic Life	Aquatic Plant Bioassessments	Required

It is suggested that the following actions be considered in the amended LWM Plan:

- The MPCA strongly encourages the County to focus restoration implementation actions on impaired waters listed for pollutants/stressors (other than mercury and polychlorinated biphenyls) in the amended LWM Plan;
- identify the pollutant(s) source(s) causing the impairment; and
- describe implementation actions to reduce the pollutant(s) causing the impairments to address impaired waters from approved implementation plans, TMDLs, and selected strategies.

The following resources are available to accomplish the previous suggested actions:

MPCA Environmental Data Access System (EDA)

The water quality section of the MPCA's EDA system allows visitors to find and download data from surface water monitoring sites located throughout the state. Where available conditions of lakes, rivers or streams, that have been assessed, can be viewed. We encourage the County to visit this site for water quality monitoring data, which may be useful with LWM Plan planning efforts
http://cf.pca.state.mn.us/water/watershedweb/wdip/search_more.cfm

Previous approved Studies, Implementation Plans, and Strategies

There are several approved TMDLs/ TMDL Implementation Plans, Clean Water Partnership Projects, and Strategies that have been developed that apply to the County and are recommended to be used as a guidance for the Priority Concerns, Objectives and Actions in the amended LWM Plan.

West Fork Des Moines River Watershed TMDL:
https://www.pca.state.mn.us/water/tmdl/west-fork-des-moines-river-watershed-multiple-impairments-tmdl-project.

Lake Shetek Clean Water Partnership (CWP) Diagnostic Study and Implementation Plan:
Currently no link to this report and implementation plan. The MPCA and the County have hard copies on file.

Minnesota River Low Dissolved-Oxygen TMDL:
https://www.pca.state.mn.us/water/tmdl/lower-minnesota-river-low-dissolved-oxygen-tmdl-project.

Redwood River Fecal Coliform TMDL:
http://www.pca.state.mn.us/index.php/view-document.html?gid=20169.

Cottonwood River Fecal Coliform TMDL:
http://www.pca.state.mn.us/index.php/view-document.html?gid=20167.

Cottonwood River Clean Water Partnership:
http://www.rcrca.com/images/GrantReports/CR_finalreport_Implementation.pdf.

Redwood River CWP Diagnostic Study and Implementation Plan:
Currently no link to this report and implementation plan. The MPCA and Redwood Cottonwood River Control Area have copies on file.

Rock River Turbidity and Fecal coliform TMDL:
https://www.pca.state.mn.us/water/tmdl/rock-river-near-iowa-border-ammonia-fecal-coliform-turbidity-tmdl-project.

Sediment Reduction Strategy:
http://www.pca.state.mn.us/index.php/view-document.html?gid=20703.

Nutrient Reduction Strategy:
http://www.pca.state.mn.us/index.php/view-document.html?gid=20213.

High priority areas would include impaired water bodies on the Clean Water Act Impaired Waters 303(d) List, though any area with high resource value waters should be considered.

2. Watershed Approach

Since 2007, the MPCA has been assessing waters by the process known as the Watershed Approach (https://www.pca.state.mn.us/water/watershed-approach-restoring-and-protecting-water-quality) as recommended by the Clean Water Council and directed by the Minnesota Legislature (http://www.pca.state.mn.us/index.php/view-document.html?gid=6125). The Watershed Approach is a 10-year rotation for addressing waters of the state on the level of Minnesota's major watersheds.

The Watershed Approach process begins with the Intensive Watershed Monitoring and Assessment phase of the project area that is at the eight digit hydrologic scale. The Watershed Approach focuses on the watershed's condition as the starting point for water quality assessment, planning, implementation, and measurement of results. This approach may be modified to meet local conditions, based on factors such as watershed size, landscape diversity and geographic complexity. This approach will ultimately lead to a more comprehensive list of impaired and non-impaired waters. This list will be used to develop TMDLs and Watershed Restoration and Protection Strategies (WRAPS) that will provide restoration strategies for impaired waters, as well as protection strategies for non-impaired waters. The development of strategies will rely greatly on county participation and counties will likely be asked to identify critical areas to target restoration and protection activities. Targeted critical areas will be an important step toward receiving funding for implementation activities.

The MPCA and its partners have begun implementing this approach, also referred to as the WRAPS approach. As you are aware, WRAPS that are currently underway for your county are the Missouri River Basin and Des Moines River Watershed. The Cottonwood River and the Redwood River Watersheds are currently scheduled to begin in 2017. The MPCA encourages the County to incorporate the Watershed Approach in the amended LWM Plan. Once the WRAPS are completed, they will most likely be incorporated into the next phase of water planning such as the One Watershed One Plan.

It is suggested that the following actions be considered in the amended LWM Plan:

- **Monitor and gather data and information.** The MPCA employs an intensive watershed monitoring schedule that will provide comprehensive assessments of all of the major watersheds on a 10-year cycle. This schedule provides intensive monitoring of streams and lakes within each major watershed, to determine overall health of the water resources, to identify impaired waters, and to identify those waters in need of additional protection in order to prevent future impairments. It is suggested that the amended LWM Plan address Surface Water Assessment Grants (SWAGs) and additional county monitoring that may be used in the WRAPS.
- **Assess the data.** Based on results of intensive watershed monitoring in step one, MPCA staff and its partners conduct a rigorous process to determine whether water resources meet water quality standards and designated uses. Waters that do not meet water quality standards are listed as impaired waters. It is suggested that the amended LWM Plan also address data submittal and representation to participate in the assessment process for use in the WRAPS.
- **Establish implementation strategies to meet standards.** Based on the watershed assessments, a TMDL study and WRAPS report with restoration and/or protection strategies are completed. Existing LWM Plans and water body studies are incorporated into the planning process. It is also suggested that the amended LWM Plan address participation in development of restoration and protection strategies.
- **Implement water quality activities.** Included in this step are all traditional permitting activities in addition to programs and actions directed at nonpoint sources. Partnerships with state agencies and various local units of government, including watershed districts, municipalities, and soil and water conservation districts, will be necessary to implement these water quality activities. It is also suggested that the amended LWM Plan address implementation of restoration and protection strategies once developed through the WRAPS.

It is suggested that the County maintain the current relationships with local watershed organizations and partners for continued participation in the watershed project efforts. Financial resources for coordination and communication between counties could include, but are not be limited to, grants from the Clean Water Fund (CWF), CWP, SWAG, Legislative Citizen Commission on Minnesota Resources (LCCMR), and federal Section 319. Technical assistance could be sought from an advisory group of local and state agency staff, local decision makers, and landowners.

Priorities by year (start-completion) include: Des Moines River Watershed 2015-2019, Cottonwood River Watershed 2017-2021, and Redwood River Watershed 2017-2021.

3. Agricultural Drainage Management

The MPCA recognizes the importance of agricultural drainage for maintaining crop production in the County. Agricultural drainage can have unintended consequences on the hydrology and water quality of lakes and rivers. Public and private drainage systems provide a direct conduit for transport of pollutants such as nutrients, pesticides, and herbicides to water bodies degrading their recreational, aesthetic, and functional value. In addition, drainage can short-circuit the landscape's water storage potential resulting

in flashier river systems with higher peak flows. The higher flows result in bank and channel erosion as the streams adjust to the increased energy and force. The down cutting and widening of the channel limits stream access to the natural floodplain, reducing sediment deposition, and increasing sediment transport.

It is suggested that the following actions be considered in the amended LWM Plan:

- The County should consider working towards the development of a comprehensive Drainage Management Plan (DMP) that addresses present and future drainage needs, as well as methods to mitigate the unintended consequences as described above. To ensure the DMP is maintained and utilized, the MPCA recommends it be incorporated into the amended LWM Plan and that it include explicit language that the county drainage authority should consult the plan with any petition to improve a public drainage system, and elect options that mitigate increases in flow volume in areas where the increase has or may cause impairments to occur. A concerted effort by local decision makers, local and state agencies, and landowners will be necessary to ensure sufficient drainage for crop production, while maintaining and improving water quality. As soon as possible, the MPCA recommends that the County use its authority to implement Best Management Practices such as alternative tile intakes, wetland restorations, vegetated buffer strips/zones, and other new technologies, such as saturated buffers, two stage ditches, and wood chip bioreactors into drainage projects.

Financial resources for development of a comprehensive DMP could include, but are not be limited to, grants from the CWF, LCCMR, and Section 319. Technical assistance for development of the plan could be sought from the state Drainage Management Team and/or an advisory group of local and state agency staff, local decision makers and landowners.

High priority areas would include impaired water bodies on the Clean Water Act Impaired Waters 303(d) List, though any area with high resource value waters should be considered.

We trust these recommendations will help with the County's LWM Plan planning efforts. If we may be of further assistance, please contract Katherine Pekarek-Scott in the Willmar office at 320-441-6973 or Mark Hanson in the Marshall office at 507-476-4259.

Thank you and please let us know if we may be of further assistance.

Sincerely,

Wayne Cords

This document has been electronically signed.
Wayne Cords
Manager, Southeast Region
Watershed Division

cc Ed Lenz, BWSR

WC/KPS:mjs/jlb

11. Minnesota Board of Water and Soil Resources Priority Concerns

Minnesota Board of Water & Soil Resources

3/24/2016

Chris Hanson, Water Resources Administrator
Murray County
2500 28th Street, PO Box 57
Slayton, MN 56172

RE: Response to invitation to submit priority concerns for the Murray County Priority Concerns Scoping Document for the Local Water Management Plan Update

Dear Murray County Commissioners:

Thank you for providing the opportunity to provide priority issues and plan expectations for the update and revision of the Murray Comprehensive Local Water Management Plan, as authorized under the Comprehensive Local Water Management Act, Minnesota Statutes, §103B.301.

The Board of Water and Soil Resources (BWSR) has the following specific priority issues:

- The County is strongly encouraged to include the drainage authority as a stakeholder in the plan update process as well as include projects and activities consistent with multipurpose drainage criteria outlined in Minnesota Statutes §103E.015, Subd. 1.
- The State's Nonpoint Priority Funding Plan (NPFP) outlines a criteria-based process to prioritize Clean Water Fund investments—if the County is intending to pursue Clean Water Fund as a future source of funding, partners are strongly encouraged to consider the high-level state priorities, keys to implementation, and criteria for evaluating proposed activities in the NPFP.
- The Watershed Restoration and Protection Strategies (WRAPS) development for the Missouri, Cottonwood, and Des Moines Watersheds are ongoing, and at their current stage, may have identified specific stressors and priority locations within all three watersheds. Considering that these WRAPS are not yet completed, and final reports are unavailable, utilizing the current monitoring efforts and collected data could provide valuable information as to the stressors and priority locations for implementation activities.

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- Continue to strive for achieving your goal of completing Level III feedlot inventories on all feedlots within Murray County. Ongoing partnering with the Heron Lake Watershed District should be considered in implementing this compliance goal. Consider the requirement for the County or SWCD to inventory streambank erosion, non-compliant septic systems, and other possible pollutant contributing issues within Murray County and to incorporate those inventories into the Local Water Management Plan.
- BWSR recommends you utilize the TMDL Report for the Rock River Watershed (EPA, April 2008) when considering implementation efforts to address bacteria and turbidity. Additionally, BWSR recommends that you review and consider the Rock River Fecal Coliform and Turbidity TMDL Implementation Plan (October 2008) in which Murray County was part of the technical committee. As identified in the Rock River TMDL Report in regards to bacteria "A reduction of 63 percent is needed to meet the water quality standard". And similarly in Rock River TMDL specific to turbidity," A 27 percent reduction is needed to meet the water quality standard"
- Continue to collaborate with BWSR, MPCA and local partners on development of One Watershed One Plan efforts for the Missouri River Basin, and to work with the West Fork Des Moines and Cottonwood Watersheds on planning efforts as opportunity to transition arises.
- BWSR recommends you utilize the TMDL Report for the West Fork Des Moines River (EPA, December 2008) when considering implementation efforts to address bacteria, turbidity, and excess nutrients within the watershed. Additionally, BWSR recommends that you review and consider the West Fork Des Moines River and Heron Lake TMDL Implementation Plan (September 2009) in which Murray County was part of the technical committee. Murray County is a large part of the West Fork Des Moines Watershed and has multiple stream reaches listed as impaired. The TMDL Implementation Plan identifies a bacteria reduction need of 35 to 86 percent and a turbidity reduction of 54 to 71 percent in streams within Murray County.
- Data collection and monitoring activities necessary to support implementation schedules and to reasonably assess and evaluate plan progress are suggested and should be coordinated with other organized local governmental and state efforts. It is important that data collection efforts are developed and be continued. The associated data already collected should be taken into consideration when developing the watershed-based Comprehensive Local Water Management Plan.
- Emerging issues: There are a number of emerging issues that could have an effect on water quality and quantity in Murray County. These could include, but are not limited to, riparian buffer protection, drainage technology, urban stormwater management, conversion of grassland, changes in crop rotations, and cover crops. The Plan should assess strategies related to their resiliency based on expected changes in climate, land use, etc. This includes an understanding and use of current precipitation frequency and distribution information in the National Oceanic and Atmospheric Administration (NOAA) Atlas 14.

- Groundwater issues and Drinking Water Supply Management areas should be considered with development of priority concerns. Protection efforts should be incorporated into the development of the plan as well as support of planning efforts within Wellhead Protection Areas. Initiating the development of a County Geological Atlas within Murray County should be an important implementation effort. Groundwater Atlases are very beneficial for the prioritization of BMP's that provide both surface water and groundwater improvements and protection efforts.

When developing the County's Priority Concerns Scoping Document that will be distributed for State Agency review and comments, don't forget to add a brief section that talks about implementing the County's ongoing programs and ordinances. Although these ongoing programs and ordinances may not be among the selected priority concerns for the next five or ten years, implementing them will work hand-in-hand with the selected priority concerns to protect and improve the natural resources of the county.

Local prioritization, detailed targeting, and measureable outcomes are vital in the creation of priority concerns, goals, and actions. A more targeted approach down to the sub watershed or specific site level should include answers to the following questions: who is involved; what is going to be done; where is it located; why is it being done; and how will it be done? Answering these five questions for the goals and objectives will be key to a quality, useable plan.

We look forward to working with you through the rest of the plan development process. If you have any questions, please feel free to contact Ed Lenz, 507-537-6374, ed.lenz@state.mn.us.

Sincerely,

Ed Lenz
Board Conservationist
Minnesota Board of Water and Soil Resources

cc: Robert L. Sip, MDA (via email)
Amanda Strommer, MDH (via email)
Catherine Fouchi, DNR (via email)
Juline Holleran, MPCA (via email)
Jeff Nielsen, BWSR Regional Manager (via email)