

**Rapid Watershed Assessment**  
**Resource Profile**  
**Upper Minnesota (MN) HUC: 7020001**



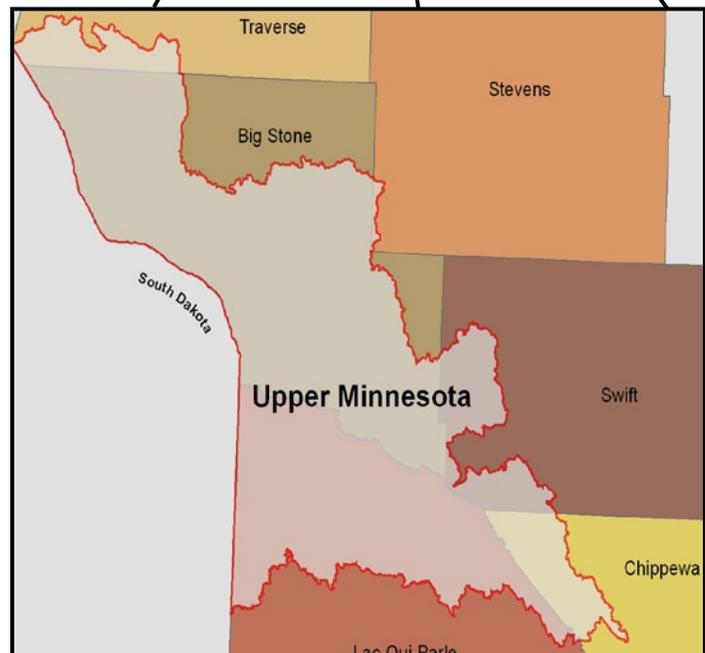
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

## Introduction

The Upper Minnesota 8-Digit Hydrologic Unit Code (HUC) subbasin is located in the Prairie Parkland Ecological Province of Southwestern Minnesota. This agriculturally dominated watershed is 487,015 acres in size. Slightly less than 87 percent of the land in this watershed is privately owned.

There are 741 farms in the subbasin. About 37 percent of the operations are less than 180 acres in size, nearly 44 percent are 180 to 1,000 acres in size, and the remaining farms are more than 1,000 acres in size. Nearly seventy five percent of the producers are full time operators and do not rely on off-farm income.

The main resource concerns on the cropland are wind and water soil erosion, and flooding. Associated with the cropland runoff are increased pollutant loadings to surface waters. Additional resource concerns include surface and groundwater water quality (mercury, turbidity and fecal coliform), agriculture waste management, and declining wildlife habitat.



### County Totals

	<b>Acres in HUC</b>	<b>% HUC</b>
Big Stone	254,844.93	52.33
Chippewa	27,478.53	5.64
Lac Qui Parle	145,089.86	29.79
Stevens	1,576.06	0.32
Swift	36,497.33	7.49
Traverse	21,528.54	4.42
<b>Total acres:</b>	<b>487,015.3</b>	<b>100</b>

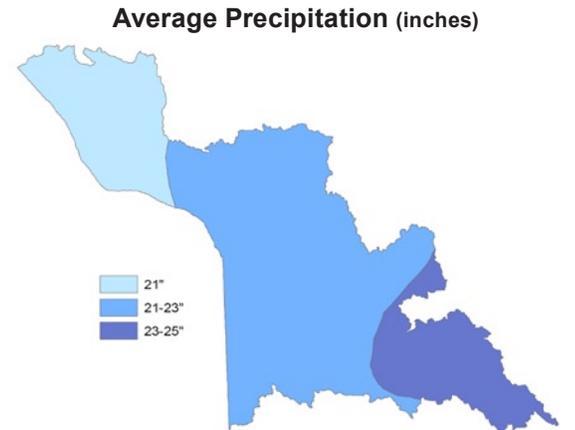
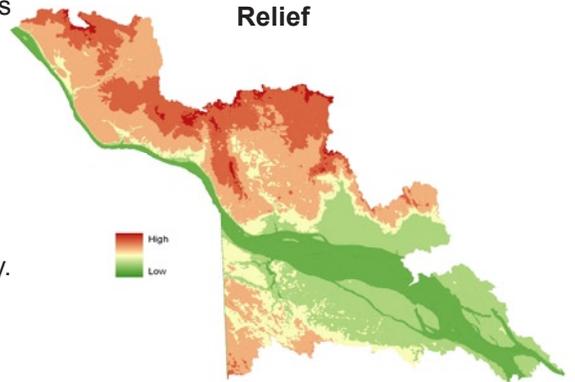
## Physical Description

This once glaciated area is part of the Prairie Pothole Region. Soils in this HUC are predominantly glacial till plains. Average elevation in the watershed is 1065 feet above sea level, with the highest values being in the Northern and Northwestern portions of the watershed, while the lowest are found across the central regions, near the Minnesota River channel.

Precipitation in the watershed ranges from 21 to 25 inches annually. Most lands within this watershed are not highly erodible, and are well to moderately well suited to agricultural uses. Predominate land uses are row crops (64%), grass/pasture/hay (19%), and wetlands (8%).

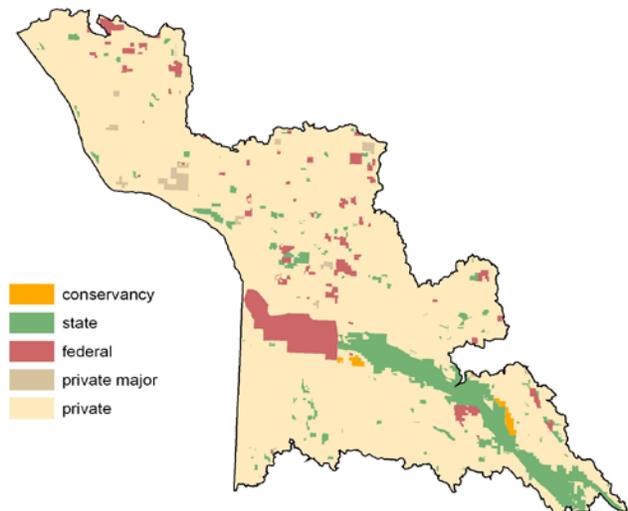
Land use within the Upper Minnesota watershed is primarily agricultural, accounting for approximately 80% of the available acres. Two-year corn/soybean rotations comprise close to 90% of cropped lands within the watershed; small grains, hay, and grasslands enrolled in the Conservation Reserve Program (CRP) make up the majority of the balance

Development pressure is moderate, with occasional farms being parceled out for recreation or country homes.



## Ownership\* <sup>1</sup>

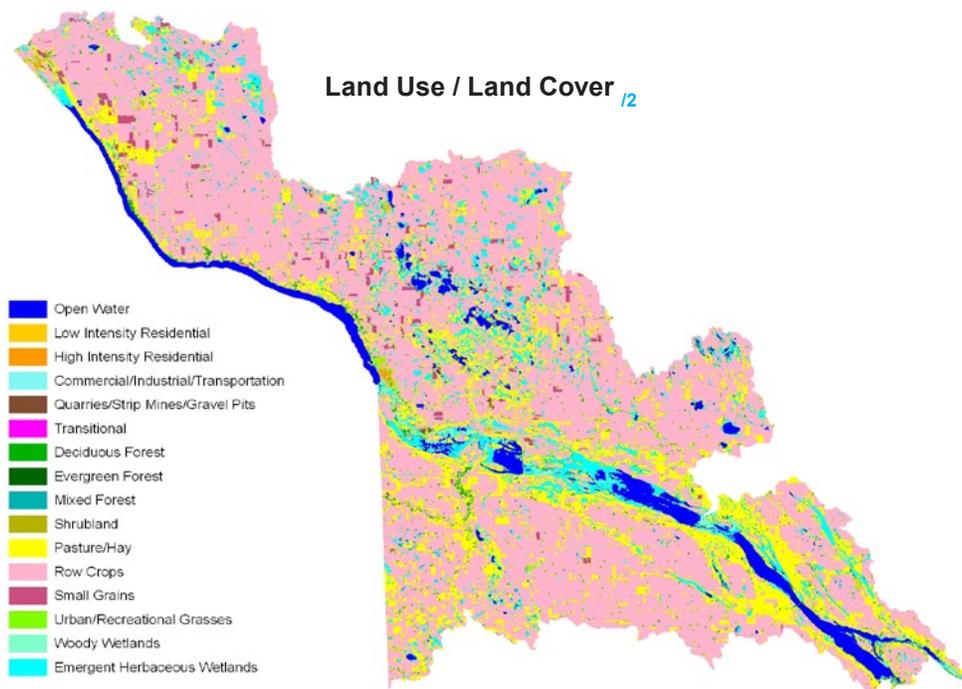
Ownership Type	Acres	% of HUC
Conservancy	1,172.4	0.24
County	0.0	0.00
Federal	26,940.3	5.53
Tribal	0.0	0.00
State-Misc.	42,361.2	8.70
Other Public	0.0	0.00
Private Major	4,375.9	0.90
Private	412,165.5	84.63
<b>Ownership Totals:</b>	<b>487,015.3</b>	<b>100</b>



\* Ownership totals derived from 2007 MN DNR GAP Stewardship data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

## Ownership / Land Use

The Upper Minnesota Watershed covers an area of 487,015 acres. Over eighty four percent of the land in the watershed is owned by private landholders (412,166 acres). The second largest ownership type is State, with just over 42,360 acres (8.7%), followed by Federal with approximately 26,940 acres (5.53%). Private-Major lands amount to 4,376 acres (0.9%), and Conservancy lands account for the smallest ownership percentage, covering just over 172 acres (0.24%). Land use by ownership type is represented in the table below.



## Ownership / Land Use

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	Percent	Acres	Percent	Acres	Percent		
Forest	2,418.2	0.50	7,924.93	1.63	0.0	0.00	10343.14	2.12%
Grain Crops	302.5	0.06	6,320.40	1.30	0.0	0.00	6622.92	1.36%
Grass, etc	20,516.4	4.21	69,936.94	14.36	0.0	0.00	90453.32	18.57%
Orchards	0.0	0.00	0.00	0.00	0.0	0.00	0.00	0.00%
Row Crops	13,831.4	2.84	298,585.10	61.31	0.0	0.00	312416.50	64.15%
Shrub etc	11.5	0.00	301.23	0.06	0.0	0.00	312.69	0.06%
Wetlands	18,330.7	3.76	21,141.46	4.34	0.0	0.00	39472.19	8.10%
Residential/Commercial	129.92	0.19	2,929.34	0.60	0.0	0.0	3059.26	0.63%
Open Water	13,761	19.86	10,577.00	2.53	0.0	0.0	24338.00	5.00%
** includes private-major								
<b>Totals:</b>	<b>69,301.62</b>	<b>14.23%</b>	<b>417,716</b>	<b>85.77%</b>	<b>0</b>	<b>0.00%</b>	<b>487015.25</b>	<b>100.00%</b>

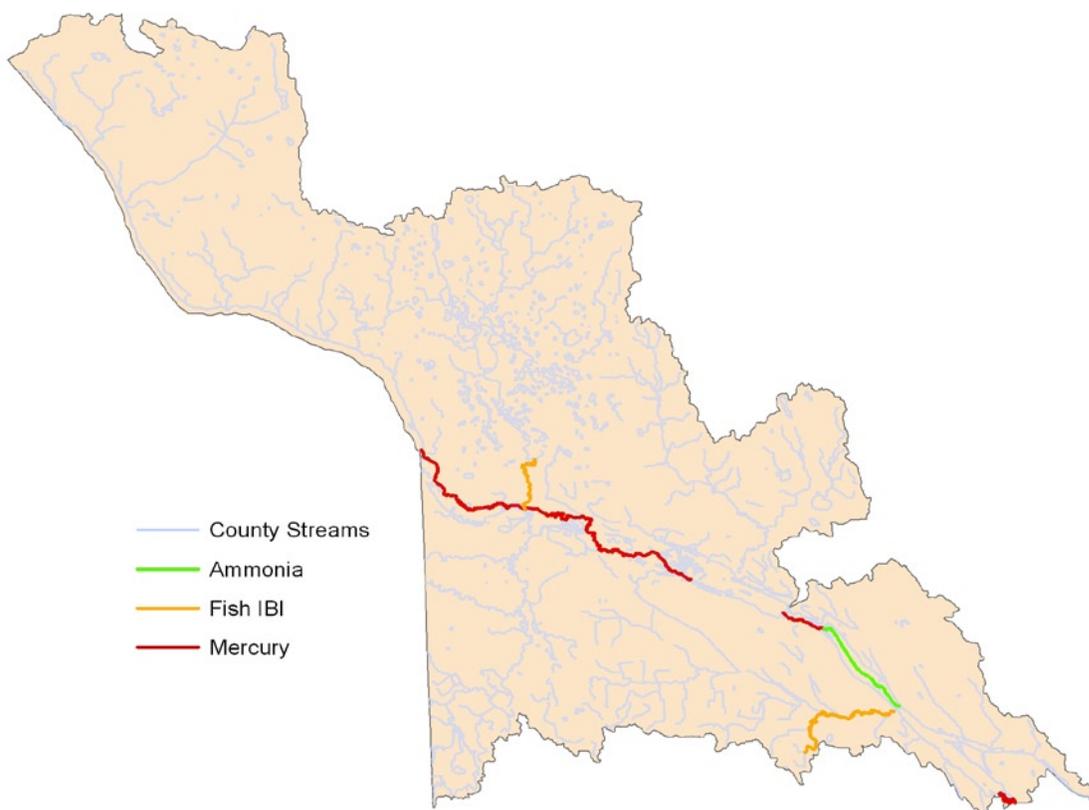
Physical Description (continued)

		ACRES	cu. ft./sec	
<b>Stream Flow Data</b>	USGS 05292000 MINNESOTA RIVER AT ORTONVILLE, MN	<b>2006 Total Avg.</b>	201.0	
		<b>May – Sept. Avg.</b>	147.0	
<b>Stream Data<sup>14</sup></b> (*Percent of Total HUC Stream Miles)		<b>ACRES/MILES</b>	<b>PERCENT</b>	
	Total Miles – Major (100K Hydro GIS Layer)	1064.51	---	
	303d/TMDL Listed Streams (DEQ)	81.71	7.68%	
<b>Riparian Land Cover/Land Use<sup>15</sup></b> (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Dev/Barren	103	0.4	
	Fallow	0	0	
	Forest	1649	6.6	
	Grain Crops	153	0.61	
	Grass/Pasture	4605	18.8	
	Orchards/Vine	0	0	
	Row Crops	8215	32.8	
	Shrub/Range	1.5	0.006	
	Water	3456	13.8	
	Wetlands	6731	26.9	
	<b>Total Buffer Acres</b>	<b>25,012</b>	---	
<b>Crop and Pastureland Land Capability Class<sup>16</sup></b> (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	<b>1 – slight limitations</b>	22,600	6.5%	
	<b>2 – moderate limitations</b>	225,900	64.8%	
	<b>3 – severe limitations</b>	70,300	20.2%	
	<b>4 – very severe limitations</b>	11,100	3.2%	
	<b>5 – no erosion hazard, but other limitations</b>	0	0%	
	<b>6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest</b>	11,100	3.2%	
	<b>7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat</b>	7,700	2.2%	
	<b>8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply</b>	4,800	1.4%	
	<b>Total Croplands &amp; Pasturelands</b>	<b>348,600</b>	---	
	<b>TYPE OF LAND</b>	<b>ACRES</b>	<b>% of Irrigated Lands</b>	<b>% of HUC</b>
<b>Irrigated Lands<sup>17</sup></b> (1997 NRI Estimates for Non- Federal Lands Only)	<b>Cultivated Cropland</b>	0	0%	0%
	<b>Uncultivated Cropland</b>	0	0%	0%
	<b>Pastureland</b>	0	0%	0%
	<b>Total Irrigated Lands</b>	0	0%	0%

## Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state’s impaired waters list. A water body is “Impaired” or polluted when it fails to meet one or more of the Federal Clean Water Act’s water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.

**2006 Minnesota TMDL Listed Streams - Upper Minnesota**



Listed Stream / Reach <sup>1/8</sup>	Impairment	Affected Use
Minnesota River	Ammonia, Mercury	Aquatic Consumption, Aquatic Life
Yellow Bank River, North Fork	Fecal Coliform	Aquatic Recreation
Yellow Bank River, South Fork	Fecal Coliform	Aquatic Recreation
Emily Creek	Fish IBI	Aquatic Life
Stony Run	Fish IBI	Aquatic Life
Lac qui Parle River	Mercury	Aquatic Consumption

**Assessment of Waters (continued)**

Minnesota’s impaired waters list, updated every two years, identifies assessed waters that do not meet water quality standards. The primary tool for addressing impaired waters is a pollution reduction plan called a Total Maximum Daily Load, or TMDL. After impaired use(s) have been identified, the TMDL process identifies all sources of each pollutant. The plan then determines how much each source must reduce its contribution in order to meet the applicable water quality standard. The Clean Water Act requires a completed TMDL for each water quality violation identified on a state’s impaired waters list. Lakes or river reaches with multiple impairments require multiple TMDLs.

**2006 Minnesota TMDL Listed Lakes - Upper Minnesota**



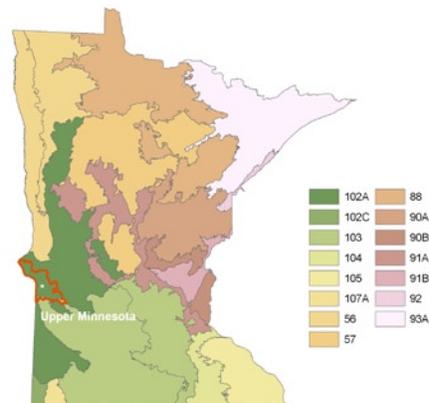
Listed Lake	Impairment	Affected Use
Marsh	Mercury	Aquatic Consumption
Long Tom	Mercury	Aquatic Consumption
Big Stone	Mercury	Aquatic Consumption
Lac Qui Parle	Mercury	Aquatic Consumption

## Common Resource Areas

The Upper Minnesota Watershed encompasses two common resource areas, CRA 102A.1 and 103.1.<sup>9</sup>

**102A.1 - Rolling Till Prairie:** Gently sloping to steep, loamy glacial till soils with scattered sandy outwash soils and silty alluvial flood plains soils. This area is part of the Prairie Pothole region of the upper Midwest. Predominantly cropped to corn and soybeans with increasing hayland and pasture and small grains in the western part. Resource concerns are water and wind erosion, nutrient management and water quality.

**103.1 – Iowa and Minnesota Till Prairies:** Primarily loamy glacial till soils with scattered lacustrine areas, potholes, outwash and flood plains. Nearly level to gently undulating with relatively short slopes. Most of the wet soils have been artificially drained to maximize crop production. Primary land use is cropland. Corn, soybeans, sugar beets, peas and sweet corn are the major crops. Native vegetation was dominantly tall grass prairie. Resource concerns are water and wind erosion, nutrient management, and water quality.



Only the major CRA units are described above. For further information, go to: <http://soils.usda.gov/survey/geography/cra.html>

## Geology / Soils<sup>10</sup>

The Upper Minnesota watershed can be divided into three geomorphic settings: the headwaters flowing off the Coteau des Prairies, the lower basin-situated within the Blue Earth Till Plain, and the Minnesota River Valley-carved by the glacial River Warren.

The portion of the watershed within the Blue Earth Till Plain is represented by nearly level to gently sloping lands, ranging from 0-6% in steepness. Soils are predominantly loamy, with landscapes having a complex mixture of well and poorly drained soils. Drainage of depressional areas is often poor, and tile drainage is common. Water erosion potential is moderate on much of the land within this geomorphic setting.

The Coteau des Prairies or Highland of the Prairies, so named by French explorers, is a morainal plateau that occupies the headwaters of the Upper Minnesota River and several other rivers. In addition to being an impressive topographic barrier, the Coteau acts as an important drainage divide. Its well drained southwestern side sheds water into the Big Sioux River, while waters on the northeastern side flow into the Des Moines and Minnesota Rivers.

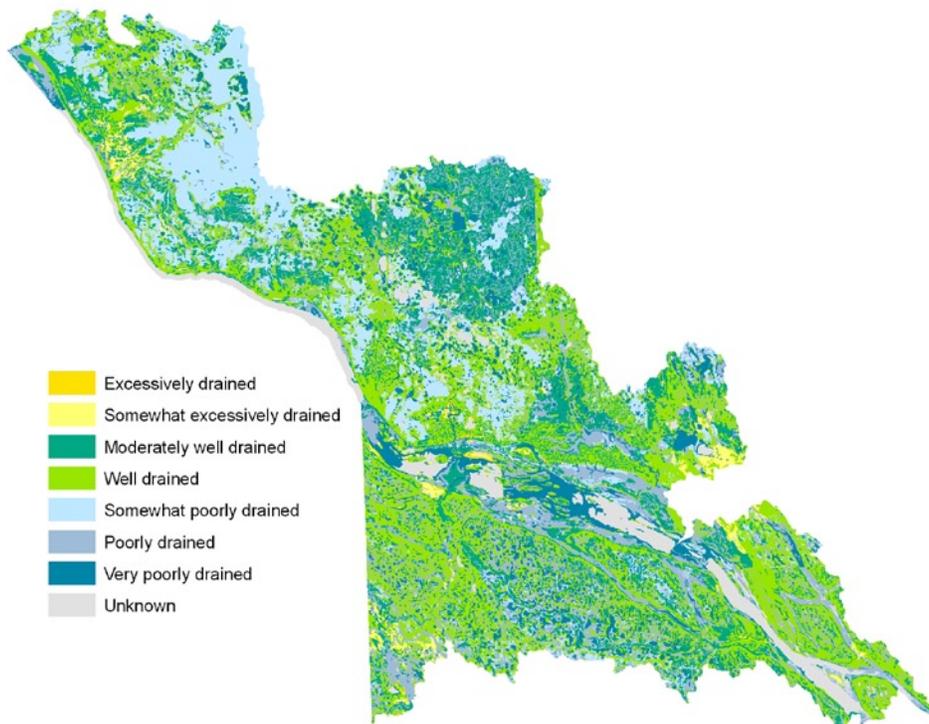
The Coteau is characterized by landscapes with long northeast facing slopes which are undulating to rolling (2-18%). Soils are predominantly loamy and well drained.

Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.

## Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



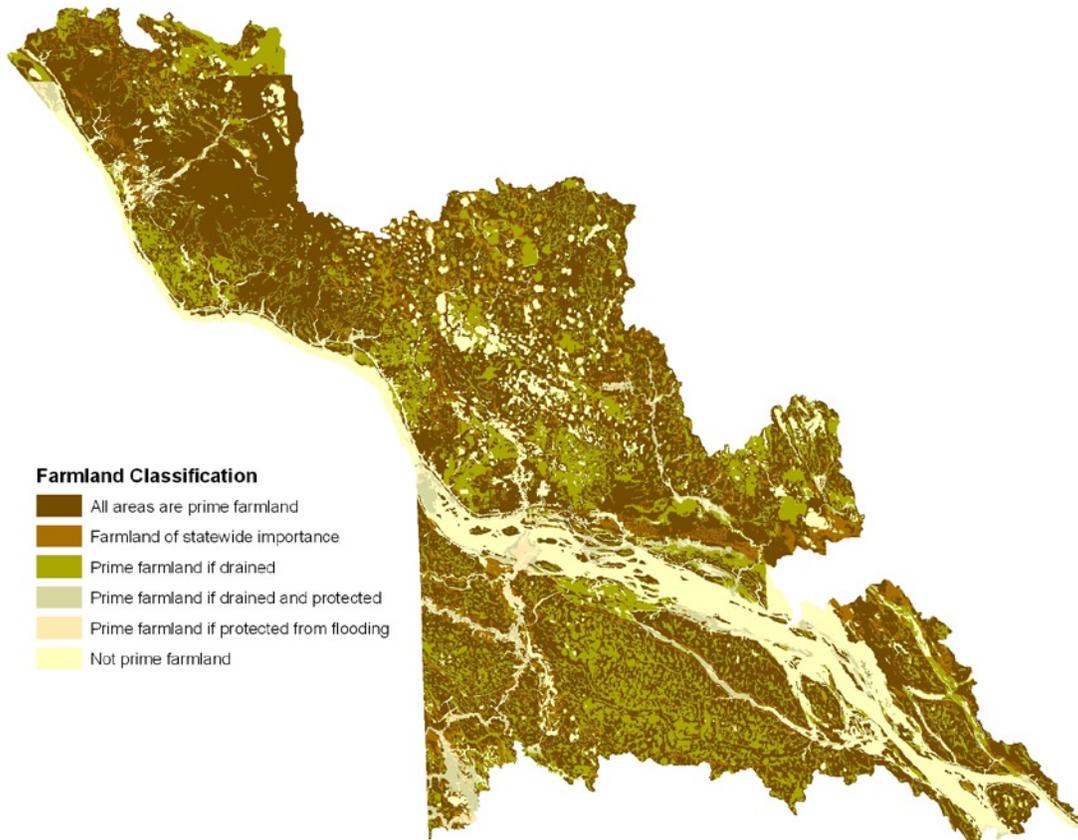
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## Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

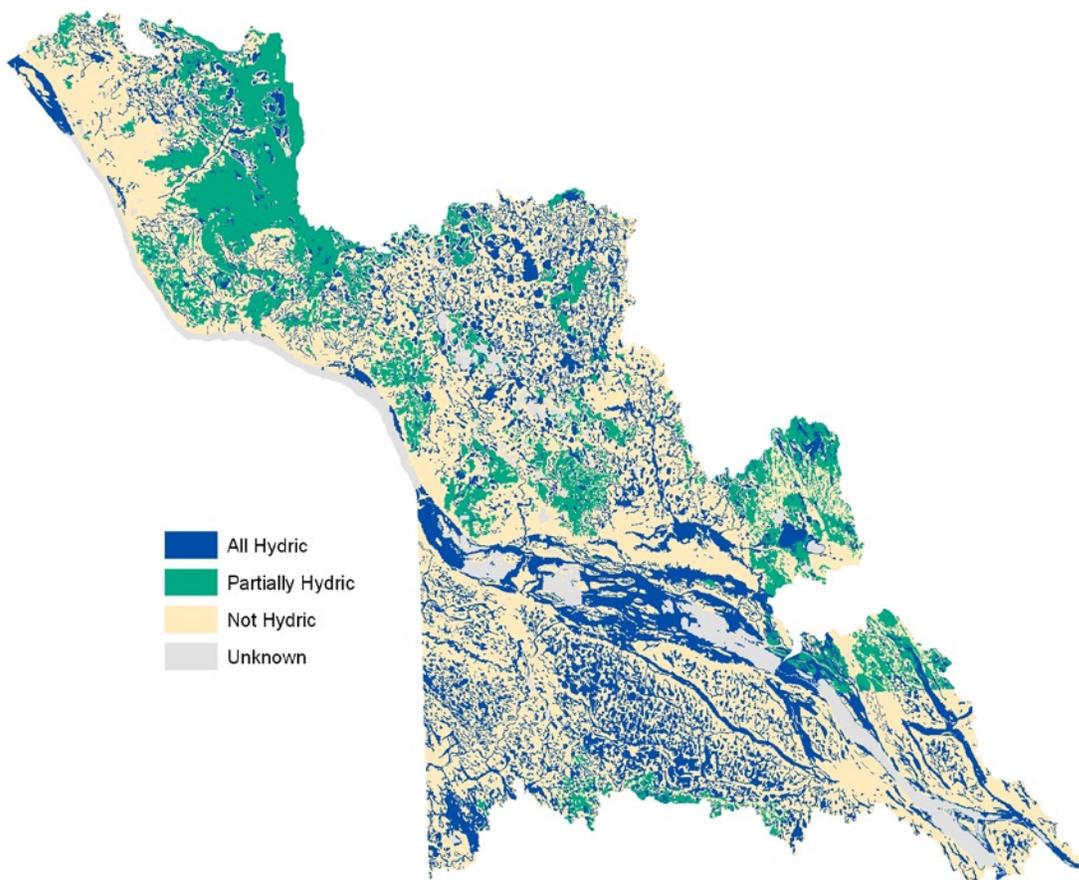


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## Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



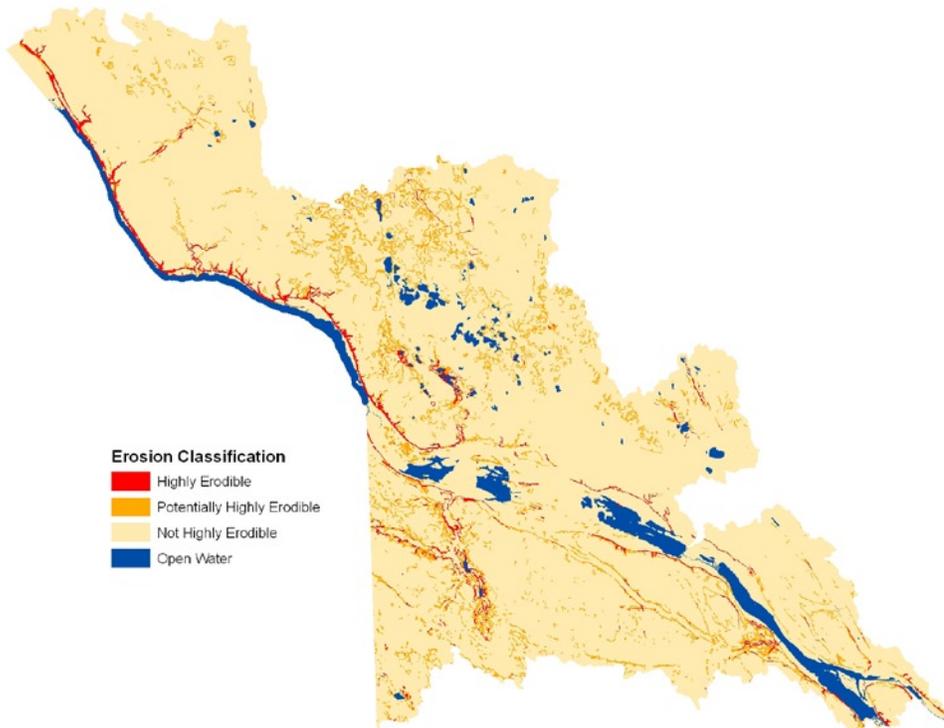
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## Highly Erodible Land (HEL)

The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990.

A soil map unit with an EI of 8 or greater is considered to be highly erodible land (HEL).

Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.

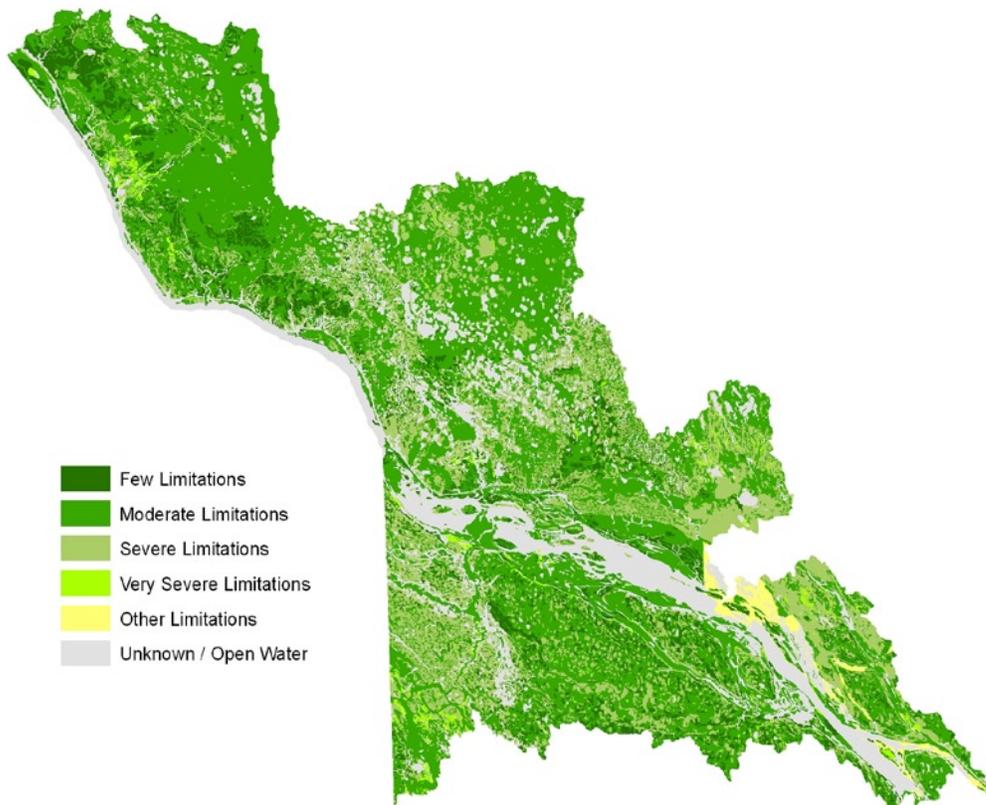


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## Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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## Performance Results System and Other Data

NRCS Conservation treatment practices applied or prescribed within the Upper Minnesota watershed in the last three years have primarily concentrated on Conservation tillage (3,451 acres/yr average), Nutrient Management (1508 acres/yr), Wildlife Habitat (796 acres/yr), Prescribed Grazing (510 acres/yr), and Wetland Creation or Restoration Habitat (440 acres/yr). Other notable efforts have been made in areas of air quality/ wind erosion management, with the addition of an average 13,600 feet of windbreak yearly.

Conservation Treatment Acres	NRCS Practice Code	FY 04	FY 05	FY 06	Avg/Year	Total
Waste Management (Number)	313, 317, 359	0	0	0	0	0
Buffers (Acres)	391, 393	209	53	114	125	376
Erosion Control (Acres)	311, 332, 589, 386, 412, 600, 601, 603, 380, 650	12	26	4	14	42
Irrigation Water Management (Acres)	449	0	0	0	0	0
Wind Break (ft)	380	13270	15438	12102	13603	40810
Atmospheric Resource Quality Management (Acres)	370	0	0	0	0	0
Nutrient Management (Acres)	590	2076	810	1639	1508	4525
Pest Management (Acres)	595	11	78	661	250	750
Prescribed Grazing (Acres)	528, 472, 528A	768	0	761	510	1529
Prescribed Burning (Acres)	338	0	109	398	169	507
Trees & Shrubs (Acres)	612, 666	17	0	5	7	22
Conservation Tillage (Acres)	329A, 329B, 329C	1650	3389	5313	3451	10352
Conservation Crop Rotations (Acres)	328	282	206	318	269	806
Cover Crops (Acres)	340	0	0	0	0	0
Wildlife Habitat (Acres)	644, 645	849	207	1333	796	2389
Brush Management (Acres)	314	0	0	0	0	0
Restoration of Declining Habitat (Acres)	643	320	6	442	256	768
Wetland Wildlife Habitat Management (Acres)	644	0	0	4	1	4
Wetlands (Acres)	657, 658, 659	723	120	478	440	1321
<b>LANDS REMOVED FROM PRODUCTION THROUGH FARM BILL PROGRAMS<sup>11</sup></b>						
<b>Program</b>					<b>Acres</b>	
Conservation Reserve Program (CRP)					8,501	
Wetland Restoration Program (WRP)					517	
Conservation Reserve Enhancement Program (CREP)					3,880	

### Socioeconomic and Agricultural Data (Relevant)

The Upper Minnesota subbasin has an estimated population of 8,875 people. Median household income throughout the district is \$33,606 yearly, roughly 73% of the national average. Fifty seven percent of the population over the age of 18 is active in the workforce, and approximately 11% of the residents in the watershed are below the national poverty level.



There are 741 farms in the subbasin. About 37 percent of the operations are less than 180 acres in size, nearly 44 percent are 180 to 1,000 acres in size, and the remaining farms are more than 1,000 acres in size.

Upper Minnesota (MN) HUC #7020001 /12		
Population Data	Watershed Population	8,875
	Unemployment Rate	43%
	Median Household Income	33,606
	% below poverty level	11
	Median Value of Home	51,100
Farms	# of Farms	741
	# of Operators	741
	# of Full Time Operators	552
	# of Part Time Operators	189
	<b>Total Crop/Pasturelands</b>	<b>348,600</b>
Farm Size	1 to 49 Acres	119
	50 to 179 Acres	158
	180 to 499 Acres	186
	500 to 999 Acres	138
	1,000 Acres or more	140
Livestock & Poultry	Cattle - Beef	11,001
	Cattle - Dairy	6,140
	Chicken	89,999
	Swine	87,627
	Turkey	224,877
	Other	2,652
	<b>Animal Count Total:</b>	<b>422,296</b>
	<b>Total Permitted AFO's:</b>	<b>174</b>
Chem (Acres Applied)	Insecticides	15,693.10
	Herbicides	210,595.30
	Wormicides	0
	Fruiticides	3,243.50
	Total Chemicals	229,532
	<b>% State Chemical Totals</b>	<b>1.61%</b>

## RESOURCE CONCERNS

County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

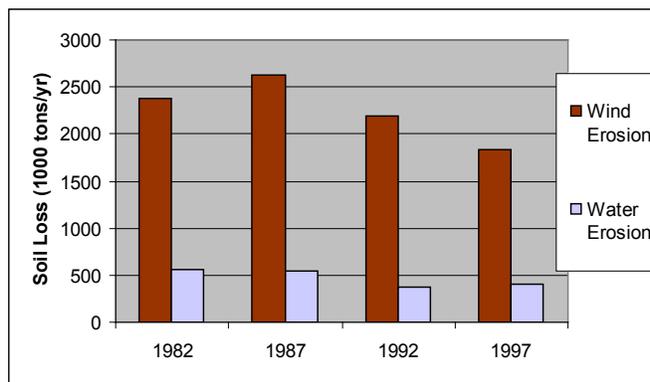


- Soil Quality, Excessive Sheet and Rill Erosion. Soil Erosion and Deposition has ranked as a top concern in each county within the watershed.
- Soil Quality, Excessive Wind Erosion. Prairie Topography makes wind erosion a major conservation issue. Wind erosion physically removes the lighter, less dense soil constituents such as organic matter, clays, silts, thus removing the fertile part of the soil and lowering productivity.
- Surface Water Quality, Nutrients. Reduction of priority pollutants and sediments in surface waters is a priority issue throughout the watershed. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing an unbalanced fish community with depressed populations and limited diversity.
- Ground Water Quality, Nutrients, Organics, Animal and Human Waste. Aging septic systems, feedlot runoff, cropland nutrient runoff, tilling practices, and abandoned wells all pose significant threats to groundwater quality throughout the region.
- Surface Water Management, Flood Control, Drainage Management. Drained wetlands, crop production in flood prone areas, and aging dams all diminish surface water quality and productivity. Restoration of wetlands, dam repair and placing flood-prone lands in CRP/RIM all serve to lessen the impact of flooding and improve drainage.

• Sheet and rill erosion by water on the cropland and pastureland have declined by approximately 161,300 (29%) tons of soil between 1982 to 1997.

• NRI estimates indicate wind erosion rates decreased 22.9% between 1982 and 1997, a reduction of 546,000 tons .

113



Federally Listed Threatened And Endangered Species <sup>114</sup>	
ENDANGERED SPECIES	CANDIDATE SPECIES
Fish – Topeka Shiner	Insect – Dakota Skipper
THREATENED SPECIES	PROPOSED SPECIES
Plants – Prairie Bush Clover	None
<b>Essential Habitat</b> - -Prairie river and stream habitat for the Topeka Shiner. Gravelly soil, dry to mesic prairie for the Prairie bush-clover and Dakota Skipper.	

## Watershed Projects, Plans and Monitoring\*

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- **Beardsley Ground Water Study (CWP)**  
Upper Minnesota River Watershed District, MPCA
- **Big Stone Lake Restoration Project**  
Environmental Protection Agency
- **Lac qui Parle County Ditch #3 Project.**  
Lac qui Parle SWCD
- **Lac qui Parle Reservoir Lake Assessment**  
Minnesota Pollution Control Agency
- **Meadowbrook Study**  
US Fish and Wildlife Service, MPCA
- **Minnesota River Reconnaissance Study**  
US Army Corps of Engineers
- **Upper Minnesota River Subbasin Study**  
USDA, US Army Corps of Engineers
- **Upper MN River Conservation Security Program**  
Natural Resources Conservation Service MN
- **Minnesota River Turbidity TMDL Work Plan**  
Minnesota Pollution Control Agency.
- **MRAP Biological & Toxicological Assessment**  
Minnesota Pollution Control Agency
- **MRAP Land Use Assessment Levels III, IV**  
Minnesota Pollution Control Agency
- **South Central MN Comprehensive County Water Planning Project,**  
Minnesota River Basin Joint Powers Board

\* Have a watershed project you'd like to see included? Submit suggestions online @ <http://www.mn.nrcs.usda.gov/technical/rwa/>

## Conservation Districts, Organizations & Partners

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- **Area II Minnesota River Basin Projects, Inc**  
1400 E Lyon Street, Bx 267 Marshall, MN 56258  
Phone 507-537-6369 Fax 507-537-6368
- **Big Stone County SWCD**  
342 NW 2nd Street Ortonville, MN 56278  
Phone 320-839-6149
- **Bois de Sioux Watershed District**  
1002 Broadway Wheaton, MN 56296  
Phone 320-563-4185
- **Chippewa County SWCD**  
629 N 11th Street Montevideo, MN 56265  
Phone 320-269-2139
- **Clean up the River Environment (CURE)**  
114 South First Street West Montevideo, MN 56265  
Phone 320-269-2984
- **Lac qui Parle SWCD**  
122 8th Avenue S Madison, MN 56256  
Phone 320-598-7321 ext 3 Fax 320-598-3432
- **Mid-Lower Minnesota River CWP**  
520 Lafayette Rd. St. Paul, MN 55155  
Phone 612-282-5559
- **Minnesota River Basin Joint Powers Board**  
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- **NRCS Swift County**  
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Phone 320-843-2458
- **NRCS Lac qui Parle County**  
525 1st Street E Madison, MN 56256  
Phone 320-598-7321
- **Stevens County SWCD**  
Ag Service Center Rt. 3 Box 10 Morris, MN 56267  
Phone 320-589-2266
- **Swift County SWCD**  
1430 Utah Avenue Benson, MN 56215  
Phone 320-843-2458 ext 115
- **South Central Comprehensive Water Plan Joint Powers Board** P.O. Box 248, New Ulm, MN 56073 Phone 507-233-6642
- **Traverse County SWCD**  
1700 3rd Avenue S, # 205 Wheaton, MN 56296  
Phone 320-563-8218 ext. 3
- **Prairie Country RC&D**  
1005 High Avenue NE Willmar, MN 56201-4817  
Phone 320-231-0008 Fax 320-235-8151

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## Footnotes / Bibliography

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1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. USGS 1:100,000 Hydrography Layer .This data set represents all features coded as ‘rivers’ on the USGS 1:100,000-scale DLG Hydrography data set. This current version was converted to ARC/INFO by the Land Management Information Center and edge-matched across map sheet boundaries. Minnesota DNR made further modifications to the files, verified lake feature identifiers, and created a state layer from the separate 100k data. The Hydro 100k layer was compared to MPCA’s 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: <http://www.nrcs.usda.gov/technical/NRI/>
8. 303(d) Stream data. Minnesota’s Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.

## Footnotes / Bibliography (continued)

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9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county. Geological description: Van Voast, W. A., Broussard, W. L., and Wheat, D. E., 1972, Water resources of the Minnesota River-Hawk Creek watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inv. Atlas, HA-391.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: [www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm](http://www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm) (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>.