

## Rapid Watershed Assessment

### Cannon River

(MN) HUC: 07040002



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

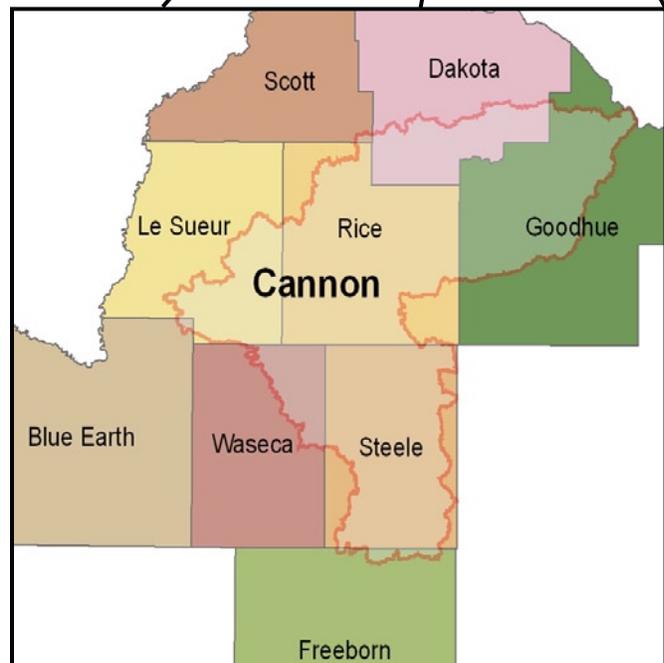
The Cannon River 8-Digit Hydrologic Unit Code (HUC) subbasin is located within the Western Corn Belt Plains and North Central Hardwood Forests Ecoregions of Minnesota. This diverse area boasts the largest remnants of “Big Woods” in the state, and is home to rare species including the endangered Dwarf Trout Lily, which is only found in southeastern Minnesota, primarily in the Cannon River Subbasin.

Approximately ninety seven percent of the 946,440 acres in this HUC are privately owned. The remaining acres are county, federal or conservancy lands or covered by open water.

Assessment estimates indicate 3,172 Farms in the watershed. Approximately sixty five percent of the operations are less than 180 acres in size, thirty percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Fifty nine percent of the producers are full time operators and do not rely on off-farm income.

The main resource concerns in the watershed are water and soil quality, animal waste management, nutrient management, stormwater management, sediment and erosion control, wetland management, surface water quality, and groundwater protection.

Many of the resource concerns relate directly to agricultural practices and increased development in the region, resulting in fragmentation and increased sediment and pollutant (mercury, fecal coliform, phosphorus, excess nutrients) loadings to surface waters.



### County Totals

<b>County</b>	<b>Acres in HUC</b>	<b>% HUC</b>
Blue Earth	1,706.96	0.18%
Dakota	94,834.38	10.08%
Dodge	1.89	0.00%
Freeborn	8,505.39	0.90%
Goodhue	190,423.06	20.23%
Le Sueur	92,808.88	9.86%
Rice	269,100.90	28.59%
Scott	1,453.77	0.15%
Steele	231,681.11	24.62%
Waseca	50,626.54	5.38%
<b>Total acres:</b>	<b>946,440.8</b>	<b>--</b>

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## Physical Description

Elevations in the Cannon River watershed range from 1352 feet above mean sea level near the Southeast, sloping to elevations of 667 feet above sea level near the convergence of the Cannon and Mississippi Rivers.

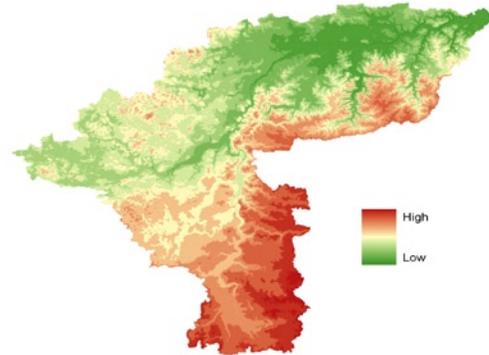
Precipitation in the watershed ranges from 29 to 33 inches each year. Evaporation estimates are between 37 to 39 inches annually (Minnesota State Climatologists Office, 1999).

Many areas within the watershed have a notable erosion potential, although much of the land within this HUC is not considered highly erodible. Soils are moderately to well suited to agricultural uses. Predominate land covers / uses are Row Crops (60.5%), Grass, Pasture & Hay (16.08%), Forest (8.79%), Residential / Commercial Development (8.04%), and Wetlands (2.79%) Slightly less than three percent of the HUC is classified as open water.

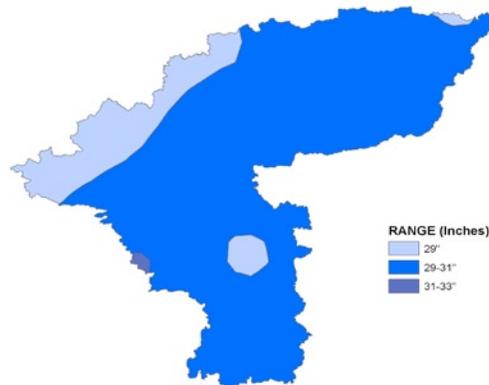
Land use within the watershed is largely agricultural, with crop and pasture lands accounting for approximately 76% of the overall watershed acres.

Development pressure is moderate to considerable in some areas, with occasional farms, timberland, and lakeshore being parceled out for recreation, lake or country homes and expanding suburban populations.

**Relief**

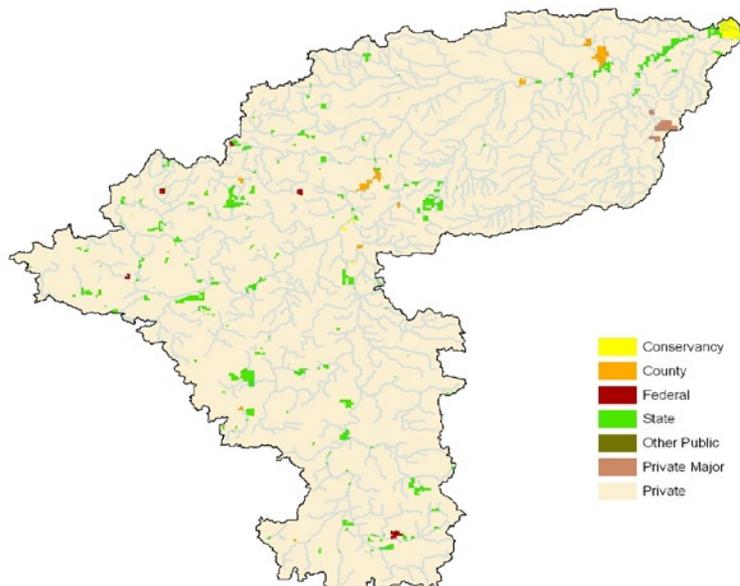


**Average Precipitation**



## Ownership

Ownership Type	Acres	% of HUC
Conservancy	2243.09	0.24
County	2737.75	0.29
Federal	859.66	0.09
State	18085.03	1.91
Other	42.51	0.00
Tribal	-	-
Private Major	1343.52	0.14
Private	921129.29	97.33
<b>Total Acres:</b>	<b>946440.84</b>	<b>100</b>



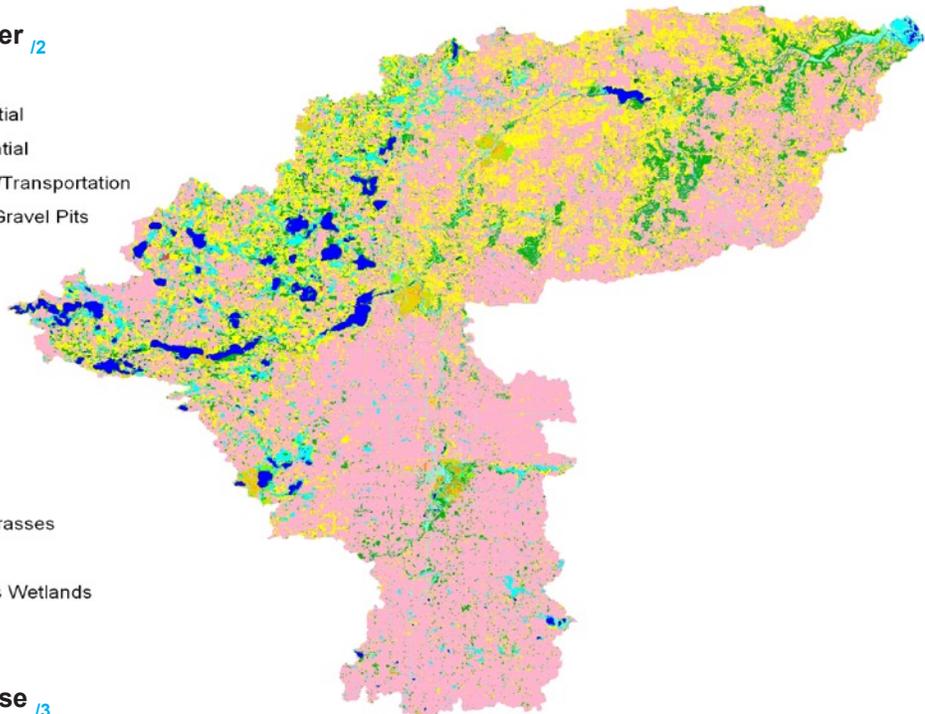
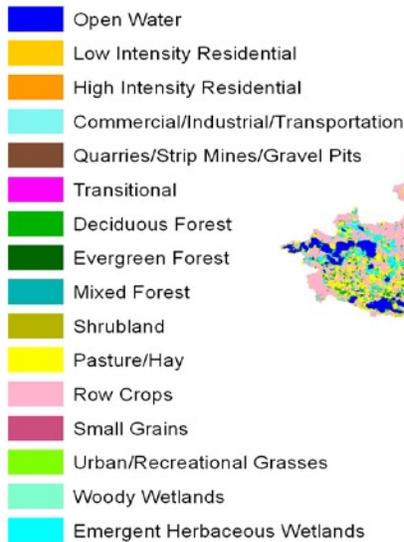
\* Ownership totals derived from 2007 MN DNR GAP Stewardship data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

## Ownership / Land Use

The Cannon River watershed covers an area of 946,440 acres. Approximately ninety seven percent of the land in the watershed is owned by private landholders (921,129 acres). The second largest ownership type is State, with approximately 18,085 acres (1.9%), followed by County with 2,738 acres (0.29%), Conservancy with 2,343 acres (0.24%), Private Major with 1,344 acres (0.14%) and Federal, with approximately 860 acres (0.09%). In addition, there are nearly 43 acres of miscellaneous owned or managed public lands, and ownership data shows no major Tribal land holdings in the subbasin.

Land use by ownership type is represented in the table below.

### Land Use / Land Cover <sup>12</sup>



### Ownership / Land Use <sup>13</sup>

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	Percent	Acres	Percent	Acres	Percent		
Forest	5,934.85	0.6%	77,277.07	8.2%	0.00	0.0%	83211.92	8.79%
Grain Crops	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.00%
Grass, etc	5,084.63	0.5%	147,075.92	15.5%	0.00	0.0%	152160.55	16.08%
Orchards	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.00%
Row Crops	4,131.24	0.4%	568,858.41	60.1%	0.00	0.0%	572989.64	60.54%
Shrub etc	408.97	0.0%	5,589.69	0.6%	0.00	0.0%	5998.66	0.63%
Wetlands	4,455.85	0.5%	25,083.75	2.7%	0.00	0.0%	29539.60	3.12%
Residential/Commercial	974.10	0.1%	75,159.22	7.9%	0.00	0.0%	76133.32	8.04%
Open Water*	728.82	0.1%	25,670.34	2.7%	0.00	0.0%	26399.16	2.79%
<b>Totals:</b>	<b>21,718.45</b>	<b>2.29%</b>	<b>924,714</b>	<b>97.71%</b>	<b>0.00</b>	<b>0.00%</b>	<b>946432.84</b>	<b>100.00%</b>

\* ownership undetermined

\*\* includes private-major

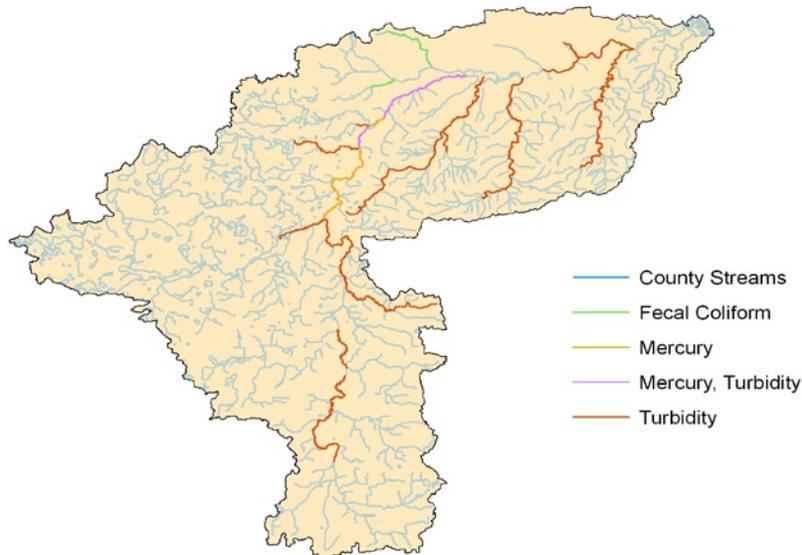
**Physical Description (continued)**

		ACRES	cu. ft/sec	
<b>Stream Flow Data</b>	USGS 05355200 CANNON RIVER AT WELCH, MN	<b>2007 Total Avg.</b>	766.3	
		<b>May – Sept. Avg.</b>	622.4	
		ACRES/MILES	PERCENT	
<b>Stream Data<sup>14</sup></b> (*Percent of Total HUC Stream Miles)	Total Miles – Major (100K Hydro GIS Layer)	1,745	---	
	303d/TMDL Listed Streams (DEQ)	254	7%	
<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	588.2	1.4%	
	Fallow	0	0.0%	
	Forest	5,552.1	13.2%	
	Grain Crops	0.2	0.0%	
	Grass/Pasture	7,425.3	17.7%	
	Orchards/Vine	0	0.0%	
	Row Crops	17,702.5	42.2%	
	Shrub/Range	0.3	0.0%	
	Water	3,587.7	8.5%	
	Wetlands	7,119.4	17.0%	
	<b>Total Buffer Acres</b>		<b>41,975.8</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</b> – slight limitations	36,800	5%	
	<b>2</b> – moderate limitations	400,600	58%	
	<b>3</b> – severe limitations	199,600	29%	
	<b>4</b> – very severe limitations	30,800	4%	
	<b>5</b> – no erosion hazard, but other limitations	3,400	0%	
	<b>6</b> – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	8,500	1%	
	<b>7</b> – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	8,300	1%	
	<b>8</b> – miscellaneous areas; limited to recreation, wildlife habitat, water supply	1,200	0%	
	<b>Total Croplands &amp; Pasturelands</b>		<b>688,700</b>	---
	TYPE OF LAND	ACRES	% of Crop Lands	% of HUC
<b>Irrigated Lands<sup>17</sup></b> (1997 NRI Estimates for Non- Federal Lands Only)	Cultivated Cropland / Pastureland	19,400	2.82%	2.1%
	Uncultivated Cropland	0	0%	0%
	<b>Total Irrigated Lands</b>	<b>19,400</b>	<b>2.82%</b>	<b>2.1%</b>

## 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.

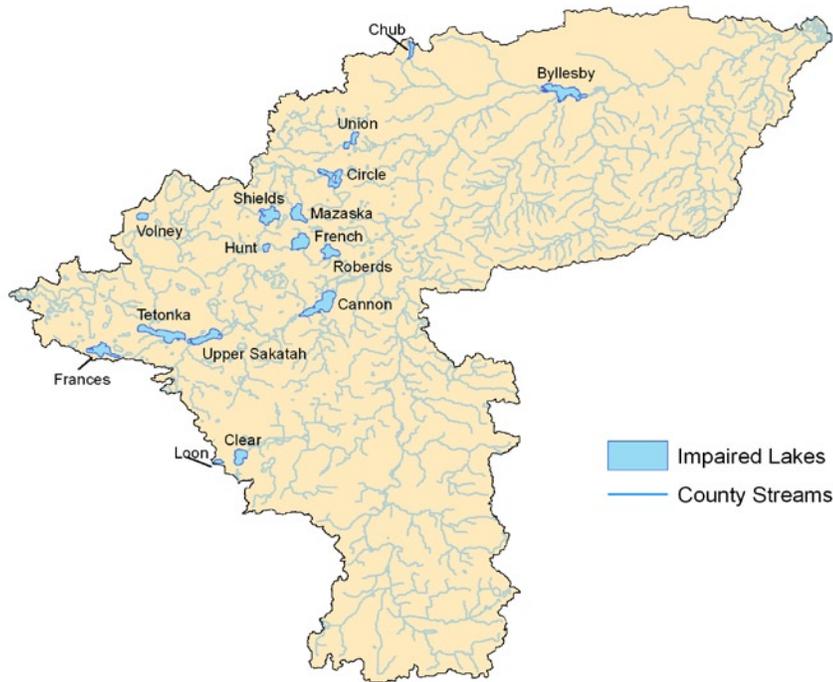
### 2006 Minnesota 303d Listed Streams - Cannon River Watershed



Listed Stream / Reach <sup>18</sup>	Impairment	Affected Use
Cannon RiverPine Cr to Belle Cr	Turbidity	Aquatic Life
Straight RiverMaple Cr to Crane Cr	Turbidity	Aquatic Life
Prairie CreekHeadwaters to Cannon R (Lk Byllesby)	Turbidity	Aquatic Life
Rush CreekHeadwaters to Straight R	Turbidity	Aquatic Life
Cannon RiverWolf Cr to Heath Cr	Mercury, Turbidity	Aquatic Consumption and Aquatic Life
Cannon RiverHeath Cr to Northfield Dam	Mercury	Aquatic Consumption
Cannon RiverNorthfield Dam to Lk Byllesby inlet	Mercury, Turbidity	Aquatic Consumption and Aquatic Life
Unnamed creekHeadwaters to Prairie Cr	Turbidity	Aquatic Life
Unnamed creekUnnamed Cr to Unnamed Cr	Fecal Coliform	Aquatic Recreation
Straight RiverRush Cr to Cannon R	Turbidity	Aquatic Life
Crane CreekHeadwaters (Watkins Lk) to Straight R	Fecal Coliform	Aquatic Recreation
Straight RiverCD 25 to Turtle Cr	Turbidity	Aquatic Life
Turtle CreekHeadwaters to Straight R	Fecal Coliform	Aquatic Recreation
Maple CreekHeadwaters to Straight R	Fecal Coliform	Aquatic Recreation
Wolf CreekHeadwaters to Cannon R	Turbidity	Aquatic Life
Little Cannon RiverT111 R17W S18, west line to Cannon R	Turbidity	Aquatic Life
Belle CreekHeadwaters to Cannon R	Turbidity	Aquatic Life
Chub CreekHeadwaters to Cannon R	Fecal Coliform	Aquatic Recreation
Straight RiverTurtle Cr to Owatonna Dam	Turbidity	Aquatic Life
Cannon RiverCannon Lk to Straight R	Turbidity	Aquatic Life
Little Cannon RiverT110 R18W S15, west line to T111 R18W S13, east line	Turbidity	Aquatic Life
Unnamed creek (Spring Brook)Unnamed Cr to Cannon R	Turbidity	Aquatic Life
Mud CreekUnnamed Cr to Chub Cr	Fecal Coliform	Aquatic Recreation
Chub Creek, North BranchT113 R19W S19, west line to Chub Cr	Fecal Coliform	Aquatic Recreation
Unnamed creek (Trout Brook)Unnamed Cr to Cannon R (trout stream portion)	Turbidity	Aquatic Life
Cannon RiverStraight R to T110 R20W S19, east line	Mercury	Aquatic Consumption
Cannon RiverT110 R20W S20, west line to Wolf Cr	Mercury	Aquatic Consumption

**Assessment of Waters (continued)**

**2006 Minnesota 303d Listed Lakes - Cannon River Watershed**

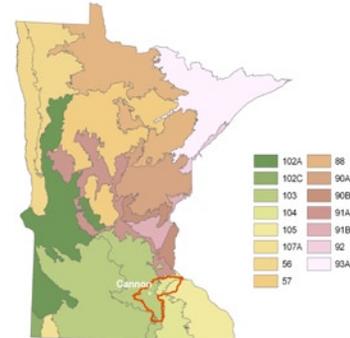


Listed Lake	Impairment	Affected Use
Byllesby	Excess nutrients, Mercury	Aquatic Recreation and Aquatic Consumption
Chub	Excess nutrients	Aquatic Recreation
Upper Sakatah	Excess nutrients	Aquatic Recreation
Tetonka	Excess nutrients, Mercury	Aquatic Recreation and Aquatic Consumption
Volney	Excess nutrients	Aquatic Recreation
Frances	Mercury	Aquatic Consumption
Cannon	Excess nutrients	Aquatic Recreation
Roberds	Excess nutrients	Aquatic Recreation
Circle	Excess nutrients	Aquatic Recreation
Union	Excess nutrients	Aquatic Recreation
French	Mercury	Aquatic Consumption
Mazaska	Excess nutrients, Mercury	Aquatic Recreation and Aquatic Consumption
Hunt	Mercury	Aquatic Consumption
Shields	Mercury	Aquatic Consumption
Clear	Excess nutrients, Mercury	Aquatic Recreation and Aquatic Consumption
Loon	Mercury	Aquatic Consumption

## Common Resource Areas

Cannon River Watershed encompasses four common resource areas, 105.1, 104.1, 103.2, and 103.1 <sup>/9</sup>

**105.1 Driftless Loess Hills and Bedrock:** Highly dissected hills and valleys. Well drained and moderately well drained silty soils over bedrock residuum. Predominantly cropland and grazing land on ridge tops and valley bottoms with a mix of dairy, beef and cash grain agricultural enterprises. Deciduous forest on steep side slopes. Primary resource concerns are cropland soil erosion, surface water quality, grazing land and forestland productivity, stream bank erosion, and erosion during timber harvest.



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

**104.1 Silty and Loamy Mantled Firm Till Plain:** Gently sloping to very steep dissected till plain. Soils are predominantly well drained and are formed in thin silty material over loamy till, underlain by sedimentary bedrock. Cropland and grazing land on ridge tops and valley bottoms with a mix of dairy, beef and cash grain agricultural enterprises. Deciduous forest on side slopes. Primary resource concerns are cropland erosion, surface water quality, grazing land and woodland productivity, and soil erosion during timber harvest.

**103.2 Iowa and Minnesota Rolling Prairie/Forest Moraines:** Primarily loamy glacial till soils with some potholes, outwash and flood plains. Gently undulating to rolling with relatively short, complex slopes. Organic soils occur in the larger basins. Primary land use is cropland. Corn, soybeans, and hay are the major crops. Native vegetation was dominantly mixed tall grass prairie and deciduous trees. Resource concerns are water and wind erosion, nutrient management, water quality & wildlife habitat management.

**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.

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

The area is a loess-capped plateau, deeply dissected by river valleys. The greatest relief occurs nearing the Mississippi River, where relief is up to 600 feet. In the east, loess lies directly on bedrock. In the southeast, loess overlies red clayey residuum that was formed directly from limestone or sandstone. Paleozoic sedimentary rocks are exposed in valley walls, but are generally mantled with colluvium or loess. Topography is controlled by underlying glacial till along the western edge of the subsection, where loess is several feet thick. As glacial drift thins to the east, topography is largely bedrock controlled (Dept. of Soil Science, Univ. of Minnesota 1973). Sinkholes are common in the southwestern portion of the subsection.

Depth of drift over bedrock varies from 0 to 50 feet. Bedrock is exposed in river and stream valleys. In general, sediment thickness varies by landscape position. Large exposures of bedrock occur in the steep ravines. These exposures are primarily Ordovician dolomite, limestone, and sandstone with Cambrian sandstone, shale, and dolomite exposed along the valley walls of the Mississippi River (Morey 1981, Sims et al. 1966). Devonian dolomite and limestone are more locally exposed along the western edge of the subsection.

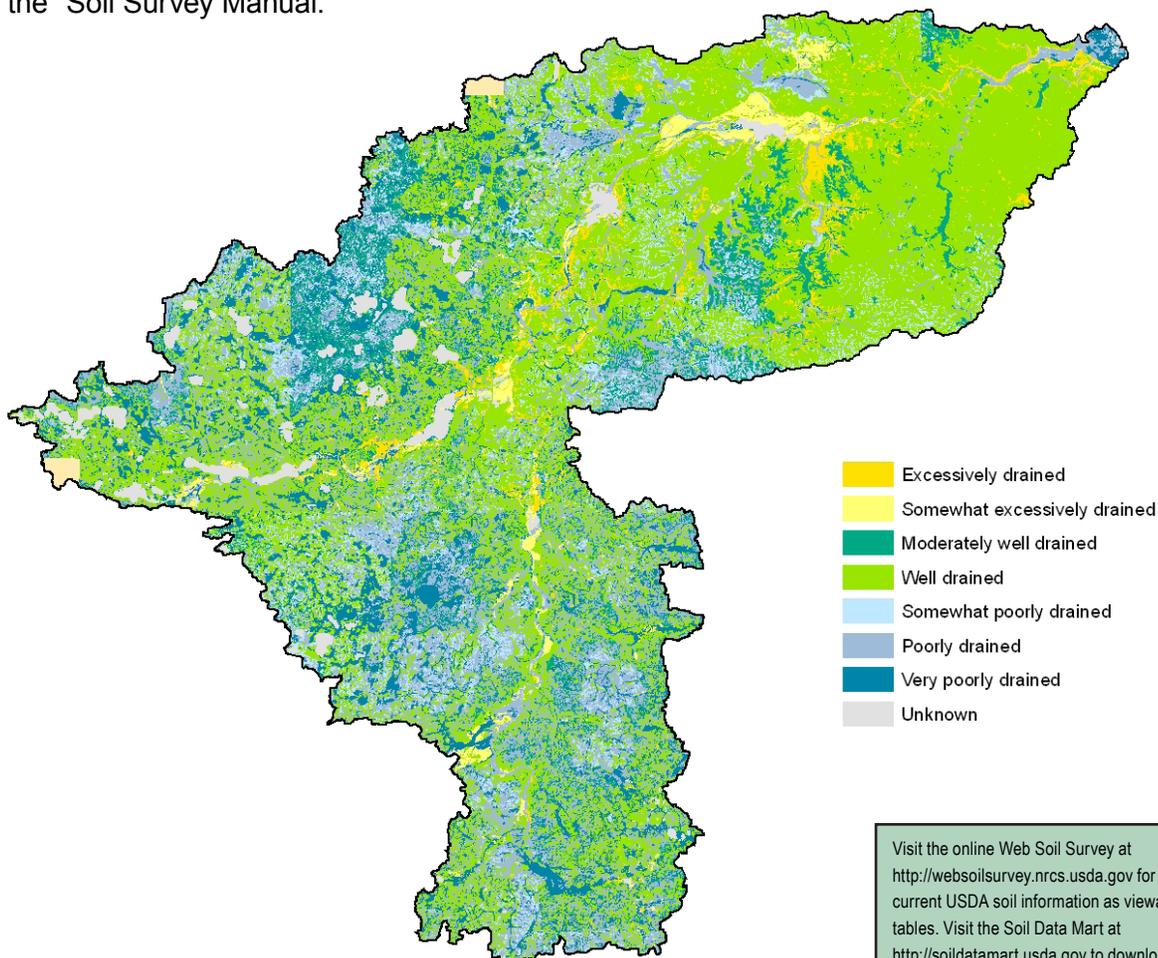
Loess thickness is variable; loess deposits range from 30 feet thick on broad ridgetops, to less than a foot on valley walls. The predominant soils are Udalfs, with localized Aquents along the floodplains of major rivers (Cummins and Grigal 1981). Cambrian siltstones, sandstones, and shales influence soil properties.

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.”



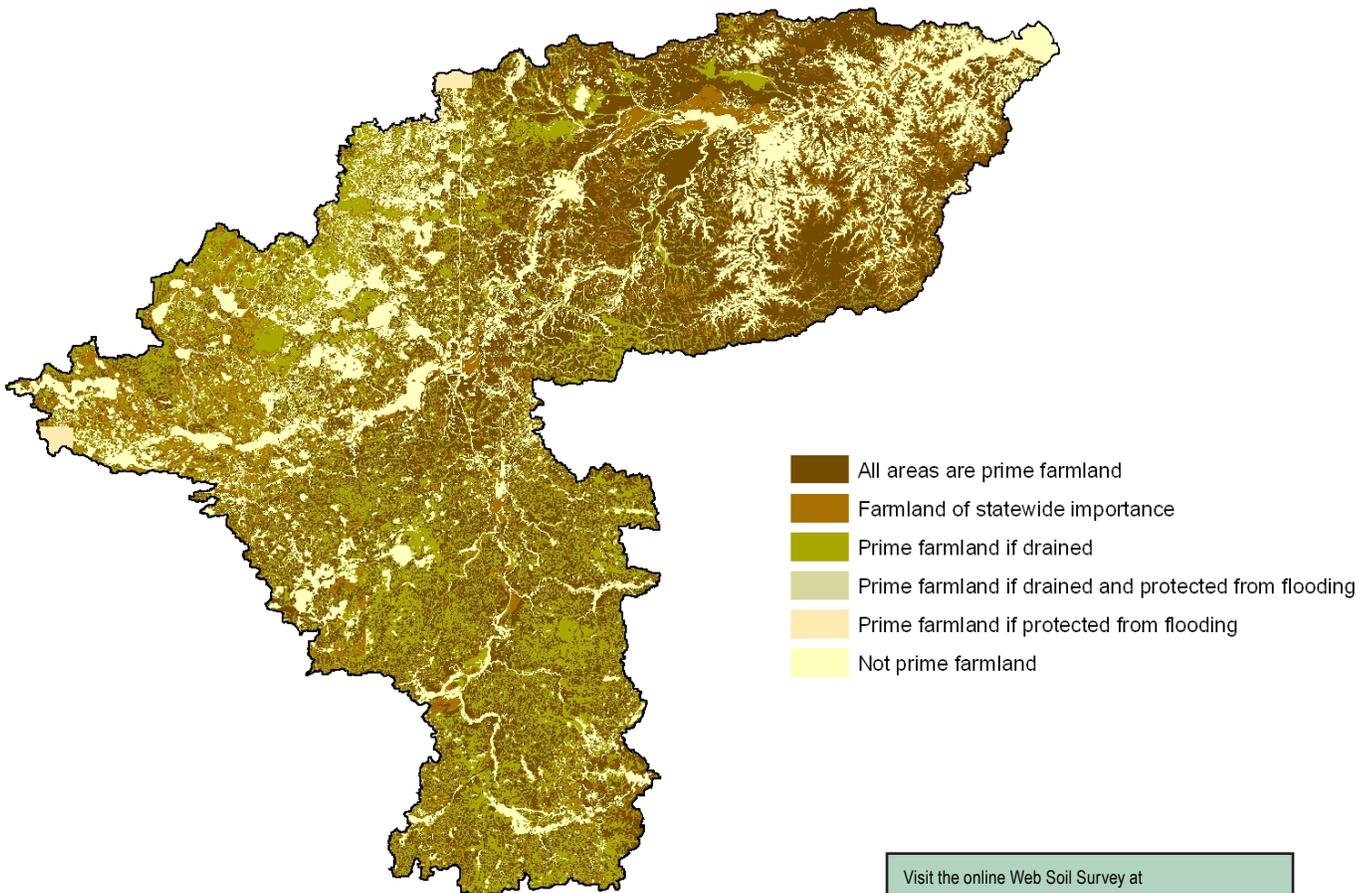
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## Farmland Classification

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.



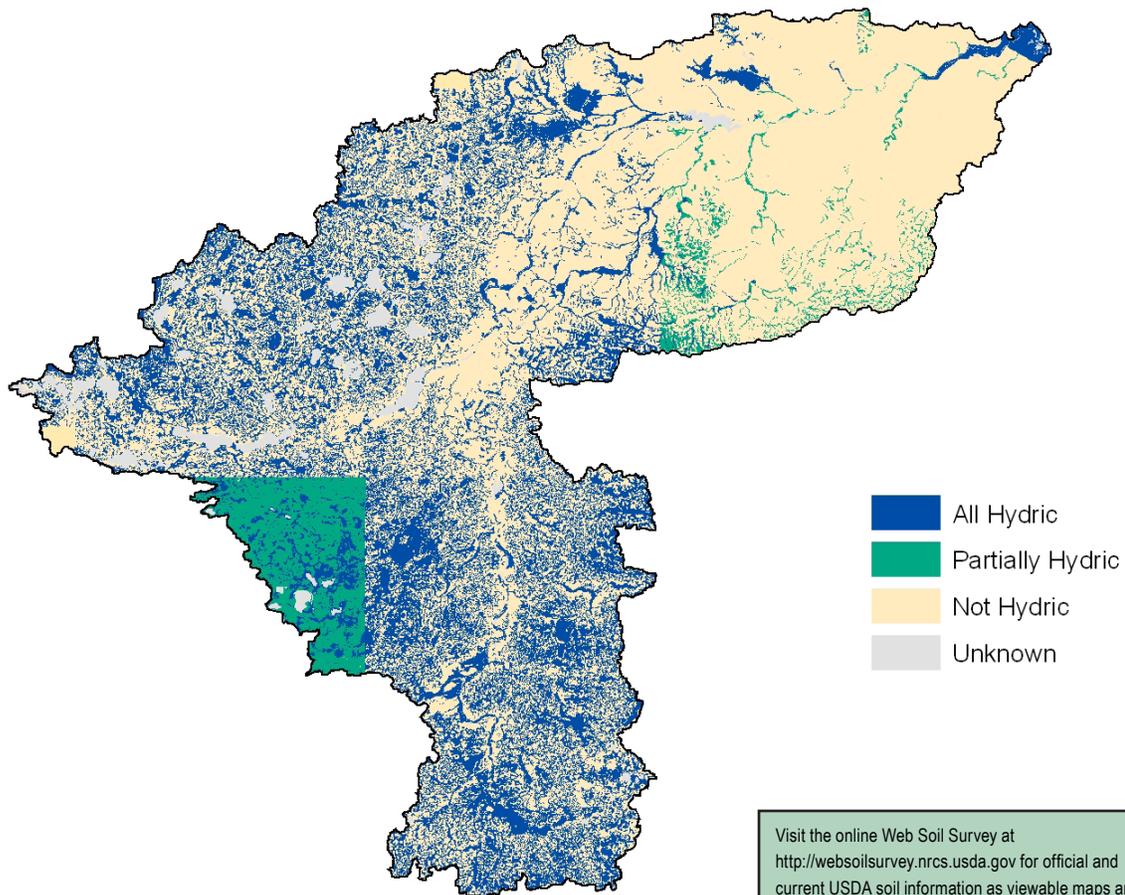
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## Hydric Soils

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.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field.

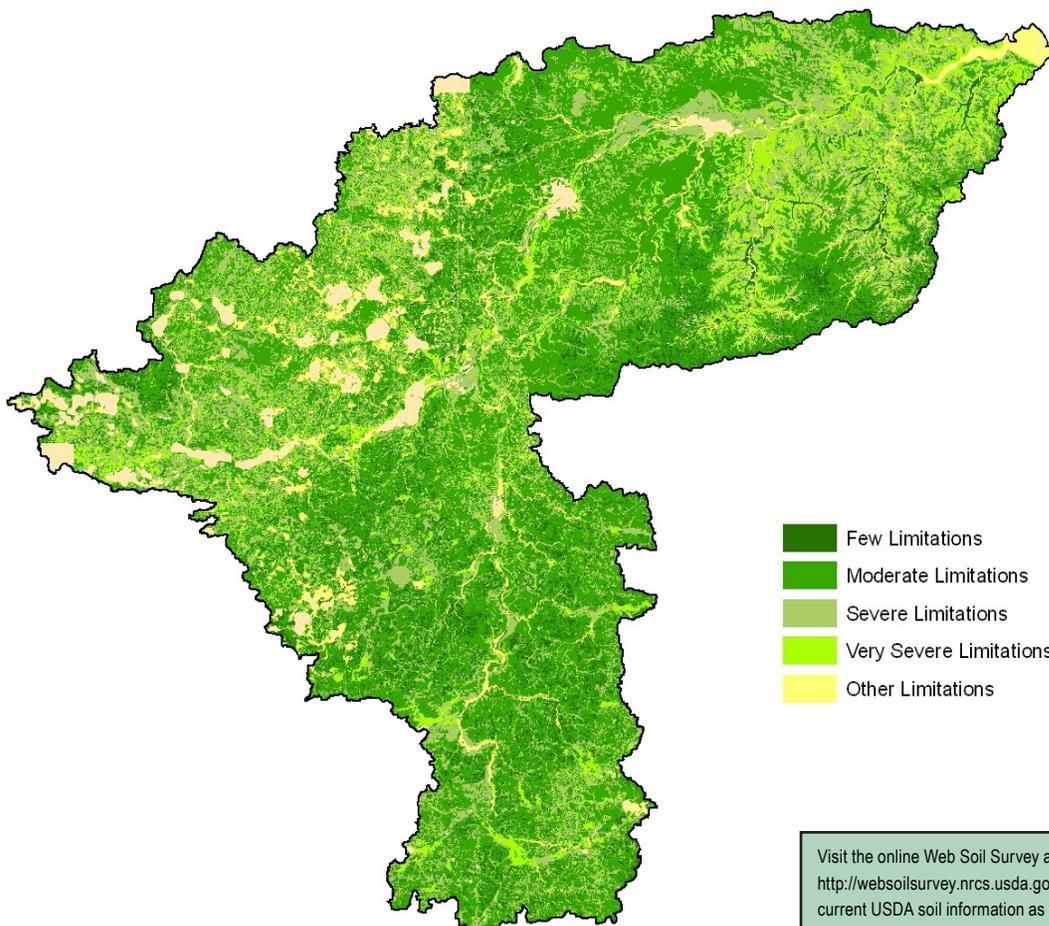


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## Land Capability Classification

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.



- Few Limitations
- Moderate Limitations
- Severe Limitations
- Very Severe Limitations
- Other Limitations

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**Performance Results System Data**

Watershed Name: Cannon				Watershed Number: 7040002						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
<b>Total Conservation Systems Planned (acres)</b>	1,388	21,898	247	24,372	20,638	N/A	14,267	33,003	28,964	144,777
<b>Total Conservation Systems Applied (acres)</b>	1,382	17,689	236	17,437	17,437	N/A	16,818	32,357	29,152	132,508
<b>Conservation Practices</b>										
<b>Total Waste Management (313) (numbers)</b>	2	1	1	2	2	0	2	1	0	11
<b>Riparian Forest Buffers (391) (acres)</b>	29	114	83	289	23	76	163	12	0	789
<b>Erosion Control Total Soil Saved (tons/year)</b>	6,349	107,525	91,872	138,219	76,851	N/A	N/A	N/A	N/A	420,816
<b>Total Nutrient Management (590) (Acres)</b>	560	6,060	590	3,473	4,752	2,520	1,773	1,773	2,415	23,916
<b>Pest Management Systems Applied (595A) (Acres)</b>	0	1,078	0	1,433	423	0	0	538	194	3,666
<b>Prescribed Grazing 528a (acres)</b>	55	208	0	0	0	131	166	246	246	1,052
<b>Tree &amp; Shrub Establishment (612) (acres)</b>	402	456	686	738	549	139	46	337	181	3,534
<b>Residue Management (329A-C) (acres)</b>	44	9,419	9,020	6,831	4,583	7,831	7,831	20,503	7,236	73,298
<b>Total Wildlife Habitat (644 - 645) (acres)</b>	5,811	3,923	2,524	7,045	6,068	2,090	7,045	10,083	13,867	58,456
<b>Total Wetlands Created, Restored, or Enhanced (acres)</b>	63	284	669	876	1,278	864	1,053	533	857	6,477
<b>Acres enrolled in Farmbill Programs</b>										
<b>Conservation Reserve Program</b>	1,282	8,347	3,992	8,982	8,398	N/A	1,199	4,801	7,368	44,369
<b>Wetlands Reserve Program</b>	0	20	2,222	1,235	843	N/A	939	416	287	5,962
<b>Environmental Quality Incentives Program</b>	0	944	1,020	1,853	4,405	N/A	10,443	20,007	16,332	55,004
<b>Wildlife Habitat Incentive Program</b>	0	0	0	160	13	N/A	0	145	110	428
<b>Farmland Protection Program</b>	0	236	236	0	0	N/A	0	0	0	472

## Socioeconomic and Agricultural Data (Relevant)

Estimations for the Cannon River subbasin indicate a current population of just under 194,000 people. Median household income throughout the district is approximately \$48,190 annually, roughly 104% of the national average. Seventy two percent of the population over the age of 18 is active in the workforce, and approximately 7% of the residents in the watershed are below the national poverty level.

Assessment estimates indicate 3,172 Farms in the watershed. Approximately sixty five percent of the operations are less than 180 acres in size, thirty percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size.



<b>(MN) HUC#07040002</b>		<b>Total Acres:</b>	<b>941,143</b>
<b>Population Data *</b>	Watershed Population	193,998	
	Unemployment Rate	4.01%	
	Median Household Income	48,192	
	% below poverty level	7%	
	Median Value of Home	111,160	
<b>Farms</b>	# of Farms	3,172	
	# of Operators	3,172	<b>Percent</b>
	# of Full Time Operators	1,870	59%
	# of Part Time Operators	1,302	41%
	<b>Total Crop/Pasturelands:</b>	<b>688,700</b>	<b>73.18%</b>
<b>Farm Size</b>	1 to 49 Acres	1152	36%
	50 to 179 Acres	934	29%
	180 to 499 Acres	691	22%
	500 to 999 Acres	242	8%
	1,000 Acres or more	154	5%
<b>Livestock &amp; Poultry</b>	Cattle - Beef	73,284	3%
	Cattle - Dairy	67,061	3%
	Chicken	706,443	30%
	Swine	413,596	17%
	Turkey	1,087,815	46%
	Other	24,057	1%
	<b>Animal Count Total:</b>	<b>2,372,256</b>	
<b>Total Permitted AFOs:</b>	<b>2,002</b>		
<b>Chemicals (Acres Applied)</b>	Insecticides	65,393.38	
	Herbicides	393,737.18	
	Wormicides	1,870.33	
	Fruiticides	3,779.54	
	<b>Total Acres Treated</b>	<b>464,780.43</b>	
	<b>% State Chemical Totals</b>	<b>3.26%</b>	

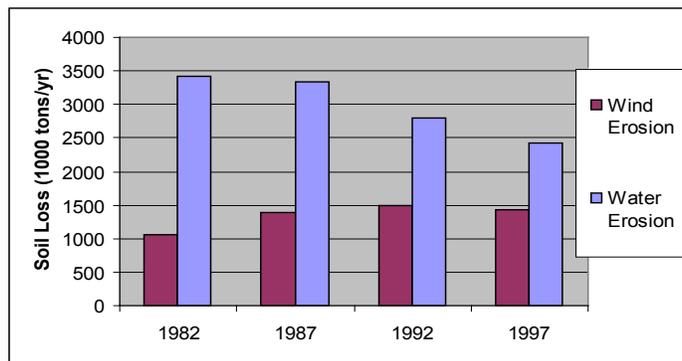
\* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

## 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, Surface Water Quality - Excessive Sheet & Rill Erosion.** Soil Erosion and Deposition has ranked as a top concern in each county in relation to both soil quality and surface water quality.
- **Animal Waste Management.** Managing farms to minimize excess nutrients, pathogens, and odors released into the environment is important to the health of surface and ground water. Setback of open tile intakes and placement of agricultural waste systems in high priority riparian areas and areas with coarse grained soils will greatly reduce the effects of animal feed operations on area waters.
- **Stormwater Management.** Local districts recognize that runoff volume will likely increase as development of the watershed continues. It is suggested that Urban districts seek to require that peak runoff rates be kept below the capacity of downstream conveyance facilities through the use of retention facilities.
- **Sediment and Erosion Control.** Excessive amounts of suspended solids from cropland, urban lands, streambanks and streambeds is a primary threat to area waters. Working hand-in-hand with stormwater pollution and prevention plans and nutrient management plans, counties in the watershed seek to minimize disturbances and prevent adjacent properties and waterbodies from receiving sediment deposits.
- **Groundwater Protection, Water quality.** The Cannon River region is particularly susceptible to groundwater contamination as a result of its permeable silt loam soils. Ease of infiltration, aging septic systems, abandoned wells and historical tiling practices threaten public drinking water supplies.
- **Nutrient Management.** Excessive amounts of nutrients, namely phosphorus, create a fairly constant nuisance algae presence in the majority of area lakes. Major contributors are cropland, urban grasses, municipal wastewater, aging or non-compliant septic systems, and internal cycling.
- **Wetland Management.** Due to the historical draining of much of the areas wetlands, homgenic agricultural practices and documented pressures within shoreland areas, priority is given to both wetlands preservation and restoration. Restoration of wetlands, dam repair and placing flood-prone lands in CRP/RIM all serve to lessen the impact of flooding and sedimentation, and improve drainage.

- Sheet and rill erosion by water on the cropland and pastureland have **decreased** by approximately 1,005,400 tons (29.38%) of soil from 1982 to 1997.
- NRI estimates indicate wind erosion rates **increased** by 372,700 tons (35.54%) between 1982 and 1997. <sup>13</sup>



Federally Listed Threatened And Endangered Species <sup>14</sup>	
ENDANGERED SPECIES	CANDIDATE SPECIES
Animals - Higgins Eye Pearly Mussel Plants - Dwarf Trout Lily, Kittentails (besseya bullii)	None
THREATENED SPECIES	PROPOSED SPECIES
Animals - Bald Eagle Plants - Prairie Bush-clover	None
<b>Essential Habitat</b> - North Facing Slopes and Floodplains in Deciduous forests - Dwarf Trout Lily, Native Prairie with well drained soils - Prairie Bush-clover Deep waters of the Mississippi River w/ sand/gravel, gravel or clay/sand. substrate for Higgins Eye Pearly Mussel	

## Watershed Projects, Plans and Monitoring

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- **Agricultural Land Buffer Incentive Program**  
Minnesota Department of Agriculture
- **The Big Woods Project**  
Rice County Citizens, MN DNR
- **Byllesby Reservoir Phosphorus TMDL**  
Minnesota Pollution Control Agency, CRWP
- **Healthy Waters Task Force**  
Cannon River Watershed Partnership
- **Lake Volney Water Quality Improvement Project**  
Le Sueur County, Montgomery Sportsman Club, MN DNR
- **Lakescaping Incentive Policy and Program**  
MN DNR, MPCA.
- **Straight River Fecal Coliform Reduction Project**  
Basin Alliance for the Lower Mississippi in Minnesota
- **River Friendly Business Program**  
Cannon River Watershed Partnership
- **Trout Brook/North Cannon Sed. Control Project**  
North Cannon River Watershed Management Org.
- **Low Impact Devel. Ordinances - Cannon WS**  
Study by CRWP, Funding from MPCA
- **Mississippi River Defense Network**  
Legislative Commission on Minnesota Resources
- **Mississippi River Watch**  
Mississippi Headwaters Board
- **Mississippi River Env. Management Program**  
US Army Corps of Engineers
- **Upper Mississippi River Basin Planning**  
Minnesota Pollution Control Agency
- **Upper Mississippi Source Water Protection Project**  
Minnesota Department of Health
- **Upper Mississippi River WS Forest Partnership**  
USDA Forest Service
- **Upper Mississippi River Watershed Fund**  
USDA Forest Service / National Fish & Wildlife Federation
- **Upper Mississippi River Basin W.Q. Plan**  
Minnesota Pollution Control Agency

## Conservation Districts, Organizations & Partners

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- **Blue Earth County SWCD**  
1160 Victory Dr Ste 3, Mankato, MN 56001-5307  
Phone (507) 345-4744
- **Dakota County SWCD**  
4100 220th St W 102, Farmington, MN 55024  
Phone (651) 480-7777
- **Dodge County SWCD**  
42 E Main St Dodge Center, MN 55927  
Phone (507) 374-6364
- **Freeborn County SWCD**  
1400 W Main St, Albert Lea, MN 56007  
Phone (507) 373-5607
- **Goodhue County SWCD**  
104 E 3rd Ave, PO Box 335, Goodhue, MN 55027  
Phone (651) 923-5300
- **Le Sueur County SWCD**  
181 W Minnesota St, Le Center, MN 56057  
Phone (507) 357-4879
- **Rice County SWCD**  
1810 - 30th St NW, Faribault, MN 55021  
Phone (507) 332-5408
- **Scott County SWCD**  
7151 W 190th St Ste 125, Jordan, MN 55352-2103  
Phone (952) 492-5425
- **Steele County SWCD**  
235 Cedardale Dr SE, Owatonna, MN 55060-4417  
Phone (507) 451-6730
- **Cannon River Watershed Partnership**  
8997 Eaves Avenue Northfield, MN 55057  
Phone (507) 786-8400
- **North Cannon River Watershed Management Org.**  
4100 220th St. West, Suite 102 Farmington, MN 55024  
Phone (651) 480-7777
- **Carleton College Environmental & Tech Studies**  
One North College St. Northfield, MN 55057  
Phone (507) 646-5769
- **St. Olaf College Environmental Studies**  
Science Center 266 Northfield, MN 55057  
Phone (507) 646-3397
- **Trout Unlimited Twin Cities Chapter**  
PO Box 390207  
Edina, MN 55439-0207

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## Footnotes / Bibliography

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.

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>. Additional Information on listed individual projects can be obtained from the noted parties.