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## Rapid Watershed Assessment

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### Mississippi Headwaters

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### (MN) HUC: 7010101



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

Derived from the Ojibwe word misi-ziibi (“Great River”), the Mississippi River begins its 2,320 mile long journey to the Gulf of Mexico at Lake Itasca in the 1,255,105 acre Mississippi Headwaters subbasin.

This largely forested watershed is located in the Northern Lakes and Forest ecoregion of Minnesota. Approximately 44 percent of the land in this HUC is privately owned, and the remainder is tribal, state, county or federally owned public land.

The main resource concerns in the basin are wind and water soil erosion, surface water quality, woodland management, groundwater quality, wetland management, and pasture and grazing land management. Associated with the resource concerns are increased pollutant and sediment loadings to surface waters resulting in declining levels of dissolved oxygen. Declining wildlife habitat is also a concern.



### County Totals

<b>County</b>	<b>Acres in HUC</b>	<b>% HUC</b>
Beltrami	413,151	32.9%
Clearwater	123,387	9.8%
Itasca	397,207	31.6%
Cass	153,120	12.2%
Hubbard	158,439	12.6%
Becker	9,801	0.8%
<b>Total acres:</b>	<b>1,255,105</b>	<b>100%</b>

## Physical Description

Average elevation in the Mississippi Headwaters subbasin is 1,331 feet above sea level, with the highest values being in the Western and extreme Southwestern portions of the watershed, while the lowest are found across the Southeastern regions.

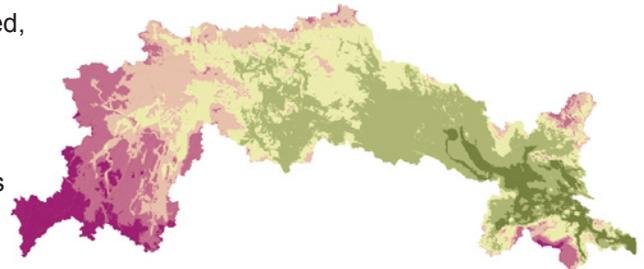
Precipitation in the watershed ranges from 25 to 27 inches annually. Evaporation estimates are between 30 to 32 inches each year (Minnesota State Climatologists Office, 1999).

Predominate land uses and land covers are Forest (58%), Wetlands (15%), Open Water (14.3%) Grass/Pasture/Hay (6.4%), and Residential / Commercial development (2.9%).

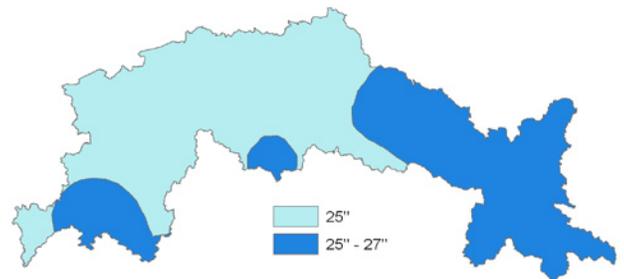
Agricultural land use within the watershed is moderate, accounting for approximately 10% of the available acres. There are 586 Farms in the watershed. Fifty two percent of the producers are full time operators not reliant on off-farm income.

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

**Relief**

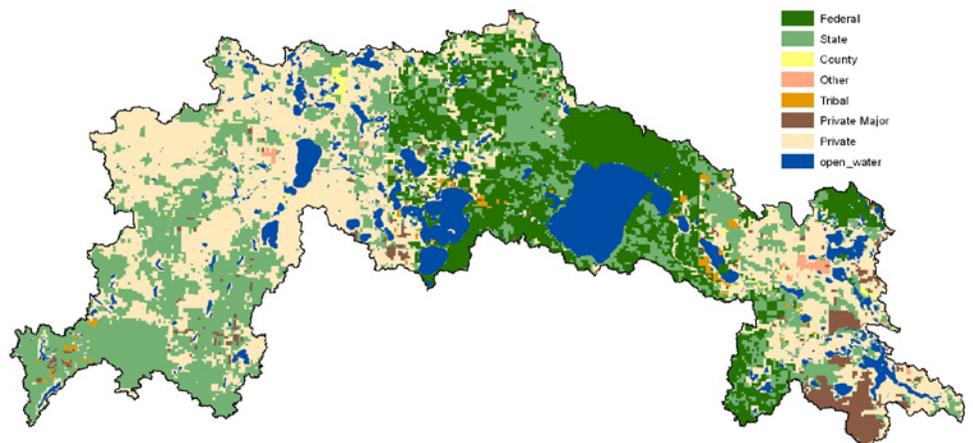


**Average Precipitation**



## Ownership

Ownership Type	Acres	% of HUC
Conservancy	-	-
County	5,288	0.4
Federal	225,472	18.0
State	452,915	36.1
Other	4,880	0.4
Tribal	10,599	0.8
Private Major	39,917	3.2
Private	516,035	41.1
<b>Total Acres:</b>	<b>1,255,105</b>	<b>100</b>

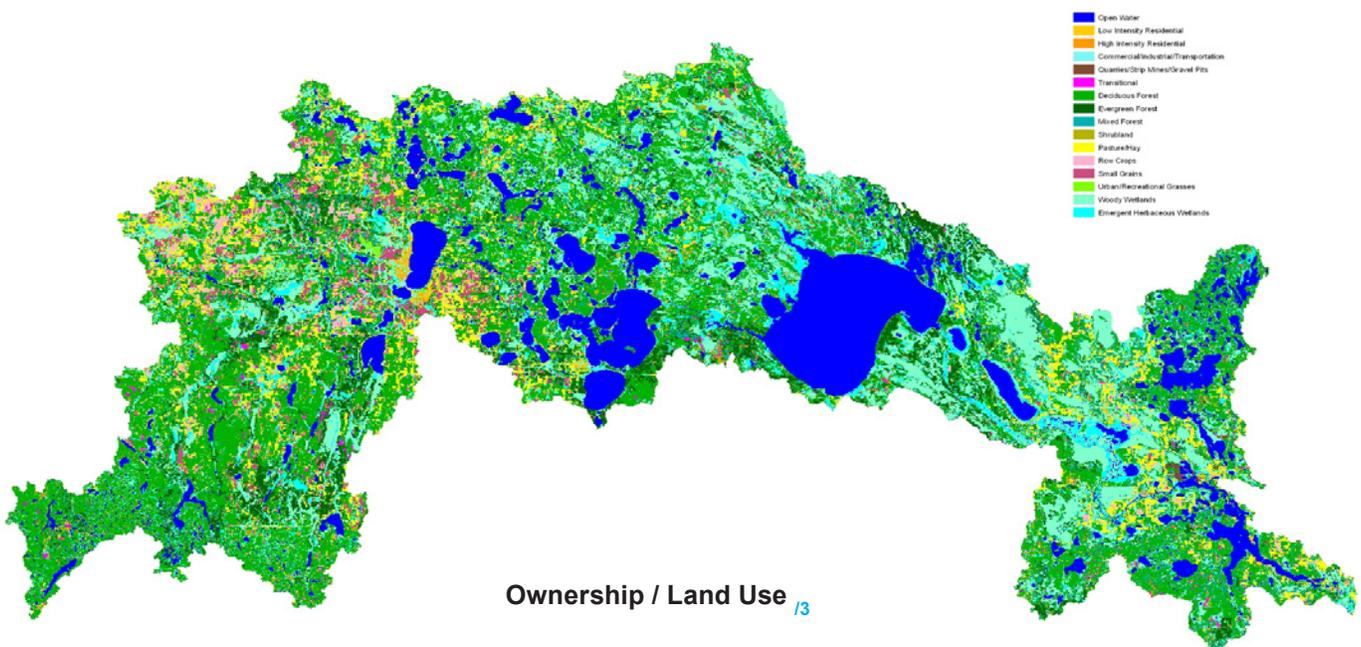


\* Ownership totals derived from 2007 MN DNR GAP Stewardship and Iowa GAP Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

## Ownership / Land Use

The Mississippi Headwaters watershed covers an area of 1,255,105 acres. Approximately forty one percent of the land in the watershed is owned by private landholders (516,035 acres). The second largest ownership type is State, with approximately 452,915 acres (36%), followed by Federal with 225,472 acres (18%), Private Major with 39,917 acres (3%), and Tribal, with 10,599 acres (0.8%). County lands account for the smallest ownership percentage, with 5,288 acres (0.4%), though there are an additional 4,880 acres of miscellaneous “Other” Public lands (0.4%). Ownership data shows no major conservancy land holdings in the region. 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	% Public	Acres	% Private	Acres	% Tribal		
Forest	432,247	34.4%	285,976	22.8%	5,771	0.5%	723,994.18	57.68%
Grass, etc	4,477	0.4%	78,726	6.3%	165	0.0%	83,368.27	6.64%
Orchards	0	0.0%	0	0.0%	0	0.0%	0.00	0.00%
Row Crops	1,845	0.1%	13,690	1.1%	61	0.0%	15,595.66	1.24%
Shrub etc	11,702	0.9%	14,683	1.2%	128	0.0%	26,513.47	2.11%
Wetlands	134,729	10.7%	53,056	4.2%	2,206	0.2%	189,991.03	15.14%
Residential/Commercial	7,236	0.6%	28,635	2.3%	403	0.0%	36,273.93	2.89%
Open Water*	28,762	2.3%	150,281	12.0%	327	0.0%	179,369.23	14.29%

\* ownership undetermined

\*\* includes private-major

<b>Watershed Totals:</b>	<b>620,999</b>	<b>49.48%</b>	<b>625,047</b>	<b>49.8%</b>	<b>9,060</b>	<b>0.7%</b>	<b>1,255,105.77</b>	<b>100.00%</b>
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**Physical Description (continued)**

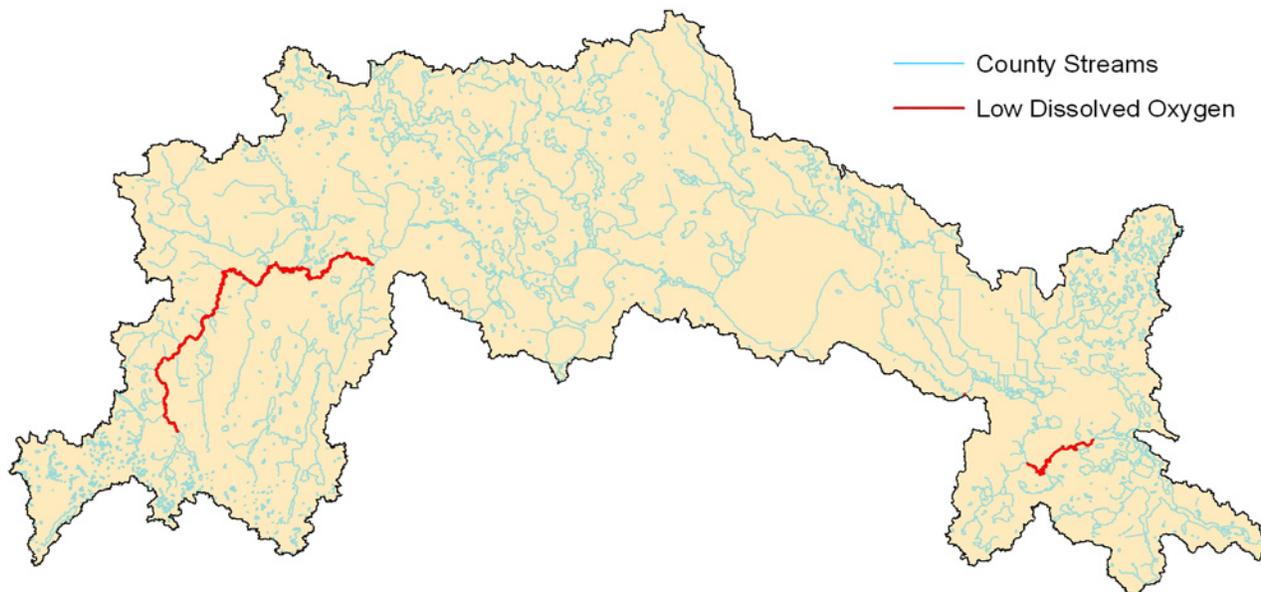
		ACRES	cu. ft/sec		
<b>Stream Flow Data</b>	USGS 05200510 MISSISSIPPI RIVER NEAR BEMIDJI, MN	<b>Total Avg.</b>	233.5		
		<b>May – Sept. Avg</b>	788		
		ACRES/MILES	PERCENT		
<b>Stream Data<sup>14</sup></b> (*Percent of Total HUC Stream Miles)	Total Miles – Major (100K Hydro GIS Layer)	2,380.8	---		
	303d/TMDL Listed Streams (DEQ)	64.8	2.7%		
<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)	Forest	21,085	38.5%		
	Grain Crops	0	0.0%		
	Grass, etc	1,062	1.9%		
	Orchards	0	0.0%		
	Row Crops	326	0.6%		
	Shrub etc	802	1.5%		
	Wetlands	14,927	27.2%		
	Residential/Commercial	758	1.4%		
	Open Water*	15,873	28.9%		
		<b>Total Buffer Acres:</b>	<b>54,832</b>	<b>100%</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>	0	0%		
	<b>2 – moderate limitations</b>	31,300	26%		
	<b>3 – severe limitations</b>	53,500	45%		
	<b>4 – very severe limitations</b>	29,200	24%		
	<b>5 – no erosion hazard, but other limitations</b>	0	0%		
	<b>6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest</b>	3,500	3%		
	<b>7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat</b>	2,400	2%		
	<b>8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply</b>	0	0%		
		<b>Total Croplands &amp; Pasturelands</b>	<b>119,900</b>	<b>---</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.

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.

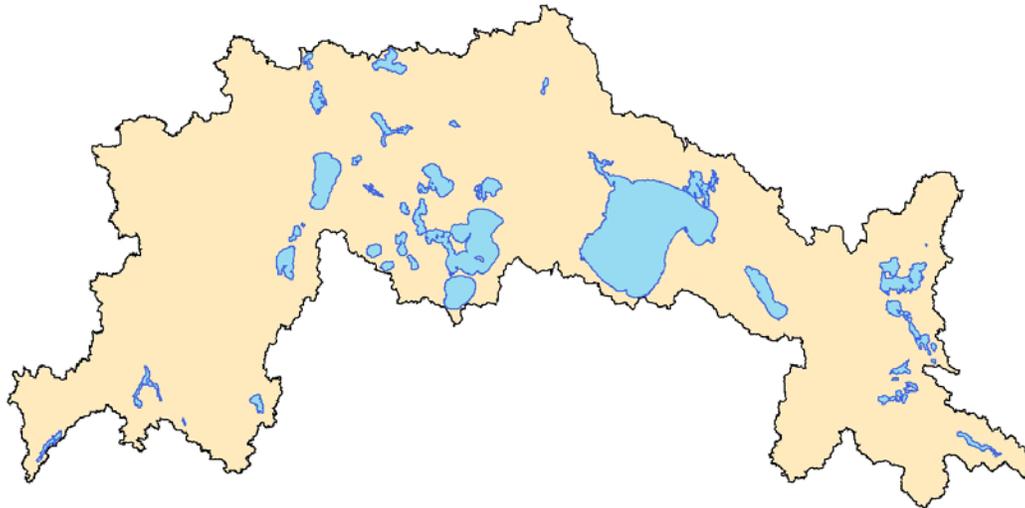
### 2006 Minnesota 303d Listed Streams - Mississippi Headwaters



Listed Stream / Reach <sup>18</sup>	Impairment	Affected Use
Leech Lake River; Bear R to Mississippi R	Low Dissolved Oxygen	Aquatic Life
Mississippi River; Vermillion R to Black Water/ Pokegoma Lk	Low Dissolved Oxygen	Aquatic Life
Mississippi River; Headwaters to Schoolcraft R	Low Dissolved Oxygen	Aquatic Life

Assessment of Waters (continued)

**2006 Minnesota 303d Listed Lakes - Mississippi Headwaters**



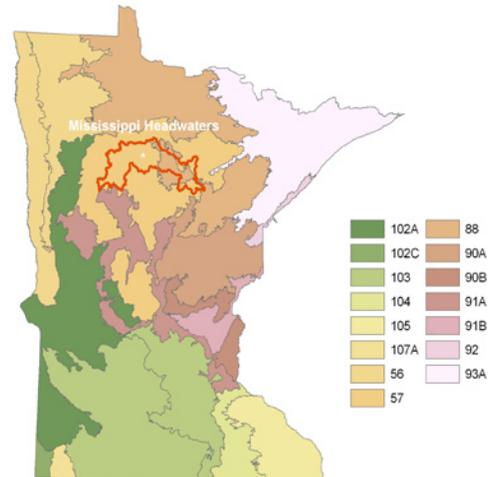
Listed Lake	Impairment	Affected Use	Listed Lake	Impairment	Affected Use
Bad Medicine	Mercury	Aquatic Consumption	Itasca	Mercury	Aquatic Consumption
Kitchi	Mercury	Aquatic Consumption	Midge	Mercury	Aquatic Consumption
Cass	Mercury	Aquatic Consumption	Grace	Mercury	Aquatic Consumption
Andrusia	Mercury	Aquatic Consumption	Plantagenet	Mercury	Aquatic Consumption
Big	Mercury	Aquatic Consumption	George	Mercury	Aquatic Consumption
South Twin	Mercury	Aquatic Consumption	Beauty	Mercury	Aquatic Consumption
Wolf	Mercury	Aquatic Consumption	Pokegama	Mercury	Aquatic Consumption
Swenson	Mercury	Aquatic Consumption	Forsythe	Mercury	Aquatic Consumption
Turtle River	Mercury	Aquatic Consumption	Blackwater	Mercury	Aquatic Consumption
Gull	Mercury	Aquatic Consumption	Guile	Mercury	Aquatic Consumption
Bemidji	Mercury	Aquatic Consumption	Long	Mercury	Aquatic Consumption
Stump	Mercury	Aquatic Consumption	Loon	Mercury	Aquatic Consumption
Big Bass	Mercury	Aquatic Consumption	Little Bass	Mercury	Aquatic Consumption
Carr	Mercury	Aquatic Consumption	Bass	Mercury	Aquatic Consumption
Marquette	Mercury	Aquatic Consumption	Lucky	Mercury	Aquatic Consumption
Turtle	Mercury	Aquatic Consumption	Rice	Mercury	Aquatic Consumption
Julia	Mercury	Aquatic Consumption	Deer	Mercury	Aquatic Consumption
Winnibigoshish	Mercury	Aquatic Consumption	Moose	Mercury	Aquatic Consumption
Pike Bay	Mercury	Aquatic Consumption	Ball Club	Mercury	Aquatic Consumption
Little Wolf	Mercury	Aquatic Consumption	Cut Foot Sioux	Mercury	Aquatic Consumption
Elk	Mercury	Aquatic Consumption	Decker	Excess Nutrients	Aquatic Recreation

## Common Resource Areas

The Mississippi Headwaters Watershed encompasses three common resource areas, CRA 91A.1, 88.1, and 57.1.<sup>9</sup>

**57.1 Northern Minnesota Till Moraine:** Rolling glacial moraine and associated outwash with short, choppy and complex slopes. Soils are generally loamy with some clayey and sandy soils included. Organic soils occur in depressions. Land use is cropland, pasture timber and recreation. Numerous lakes occur in this region. Main crops are small grain, soybeans and forage crops. Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water and wind erosion and water quality impacts.

**88.1 Northern Minnesota Glacial Lake Basins:** Nearly level to gently sloping areas formed in lake washed till, lacustrine and organic soil material. Generally the soils are silty, clayey and loamy with small amounts of sandy and gravelly soils on beach ridges. Timber land is the main use. Scattered cropland and grazing land for beef and dairy are present. Cropland is used mostly for small grain, silage and hay. Resource concerns include management of excessive wetness, short growing season, pasture 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>

**91A.1 Central Minnesota Outwash:** Nearly level to gently sloping well drained sandy soils on outwash plains and stream terraces. There are also numerous poorly and very poorly drained mineral and organic soils. Irrigated crop land, pasture and hayland are the major land uses. Forestland is common in parts. Corn, soybeans, edible beans and potatoes are the primary irrigated crops. Forage crops are also extensively grown. Resource concerns are wind erosion water quality, nutrient management, improperly managed grazing.

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

Soils within the watershed are primarily Alfisols, which generally form underneath deciduous forests underlain by silty sands, and are present in woodland and mixed woodland and cropland areas. Entisols, which are sandy soils commonly found in glacial outwash and alluvium and Histosols, which are commonly yellow-brown to dark brown organic soils found in wetlands.

Bedrock geology in the watershed the consists of primarily Precambrian crystalline rocks (Sims and Morey, 1972, Stark et al, 1996). The Mississippi River (Headwaters) Watershed lies within calcareous glacial deposits associated with the Des Moines Lobe and the Wadena Lobe Associations.

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.

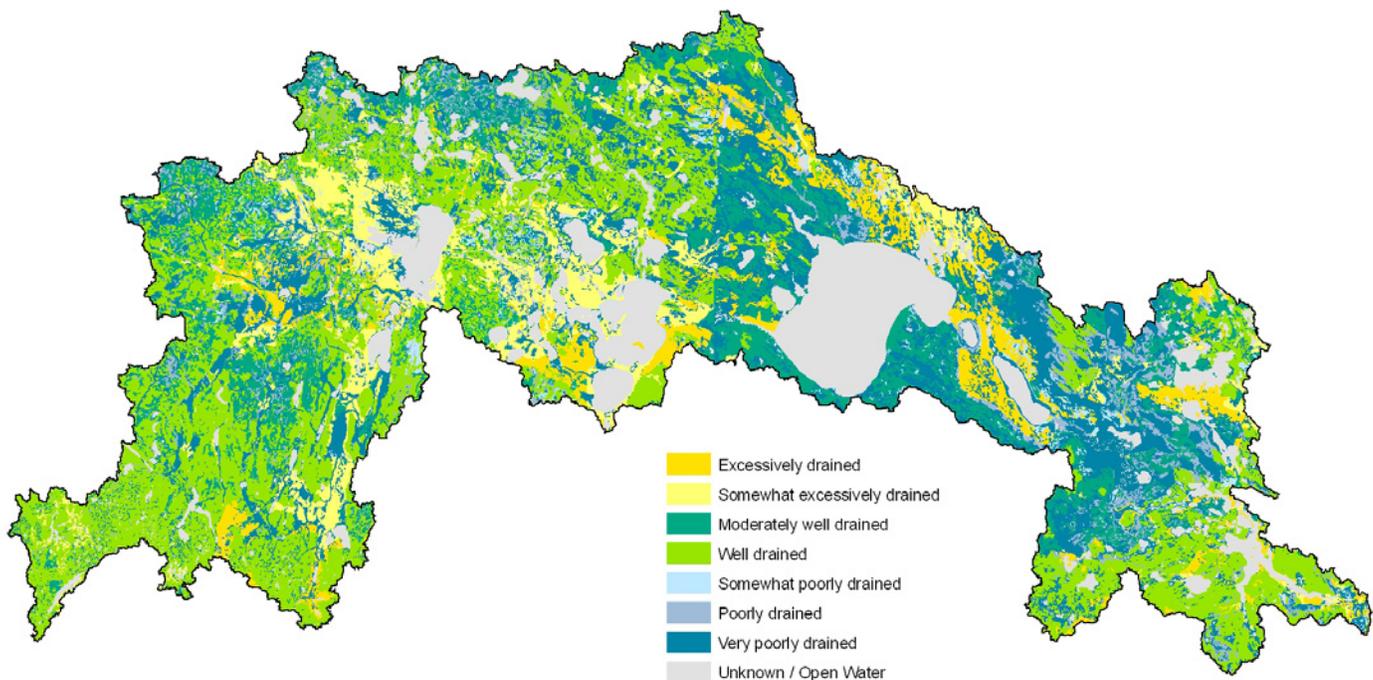
## Drainage Classification

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

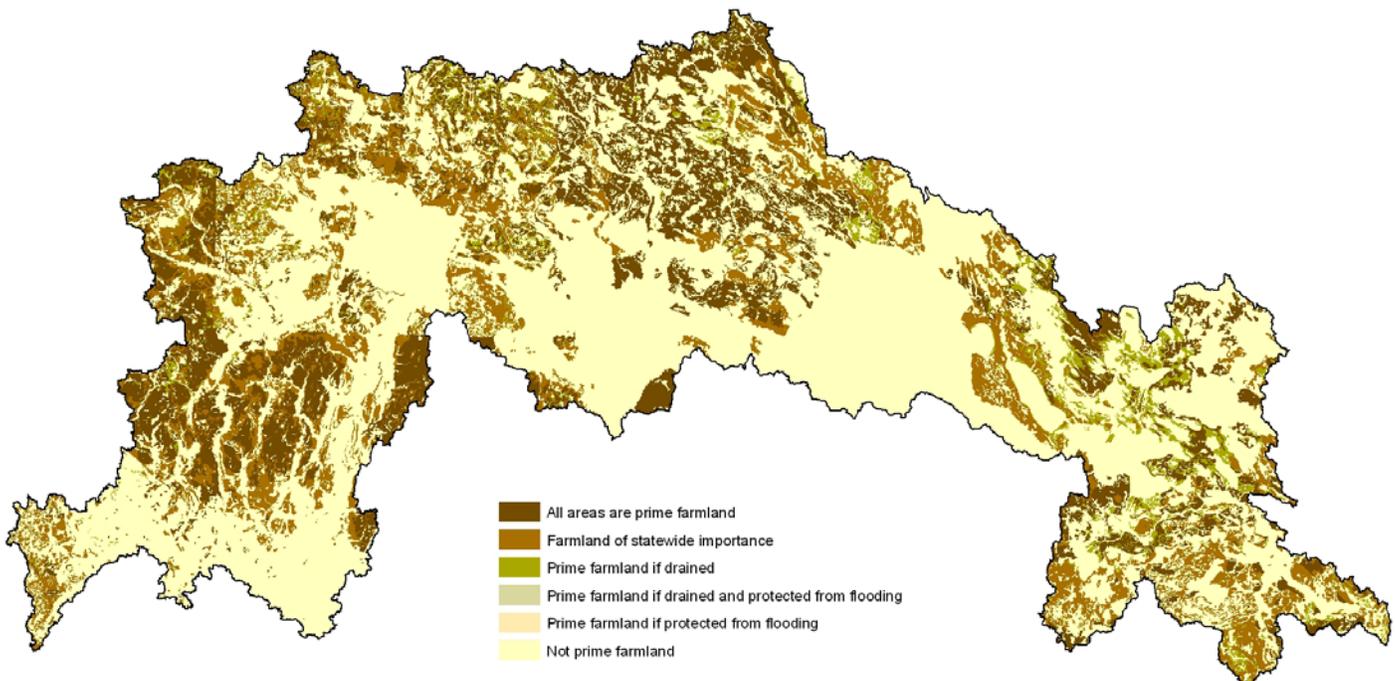
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

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.



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.



## Hydric Soils

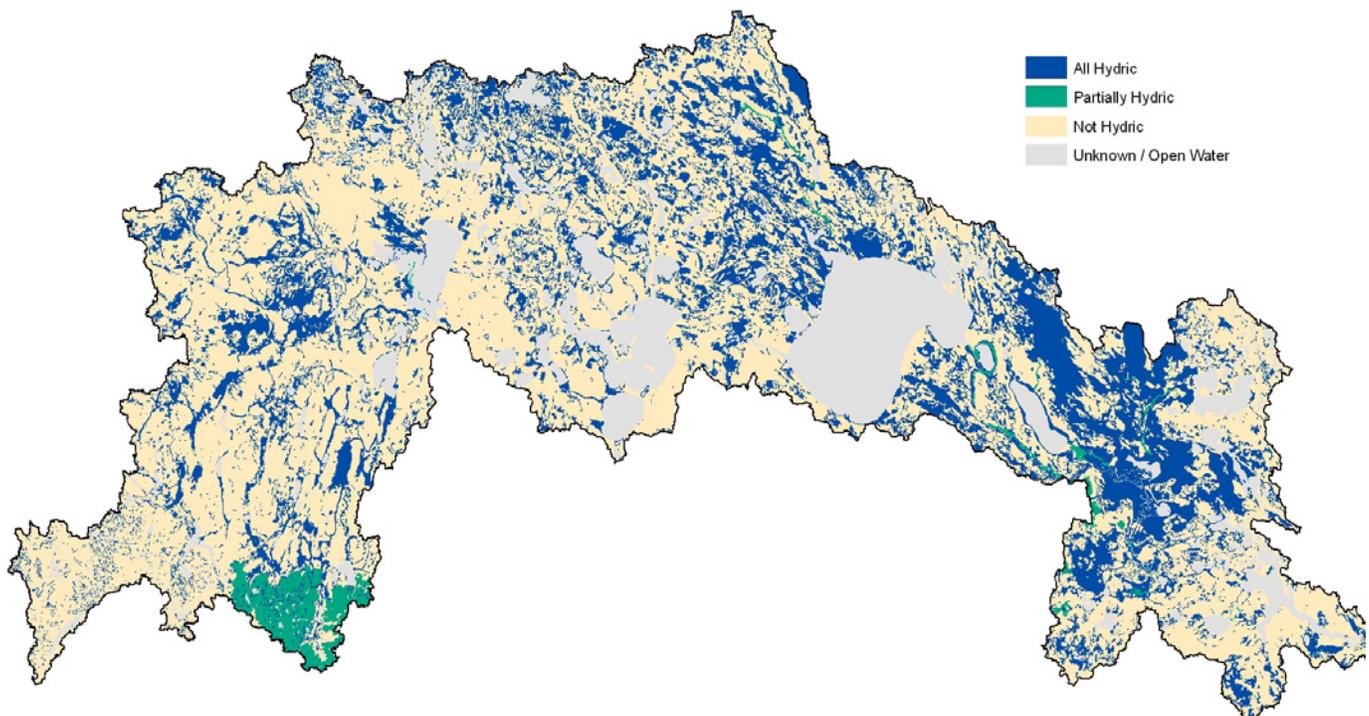
This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may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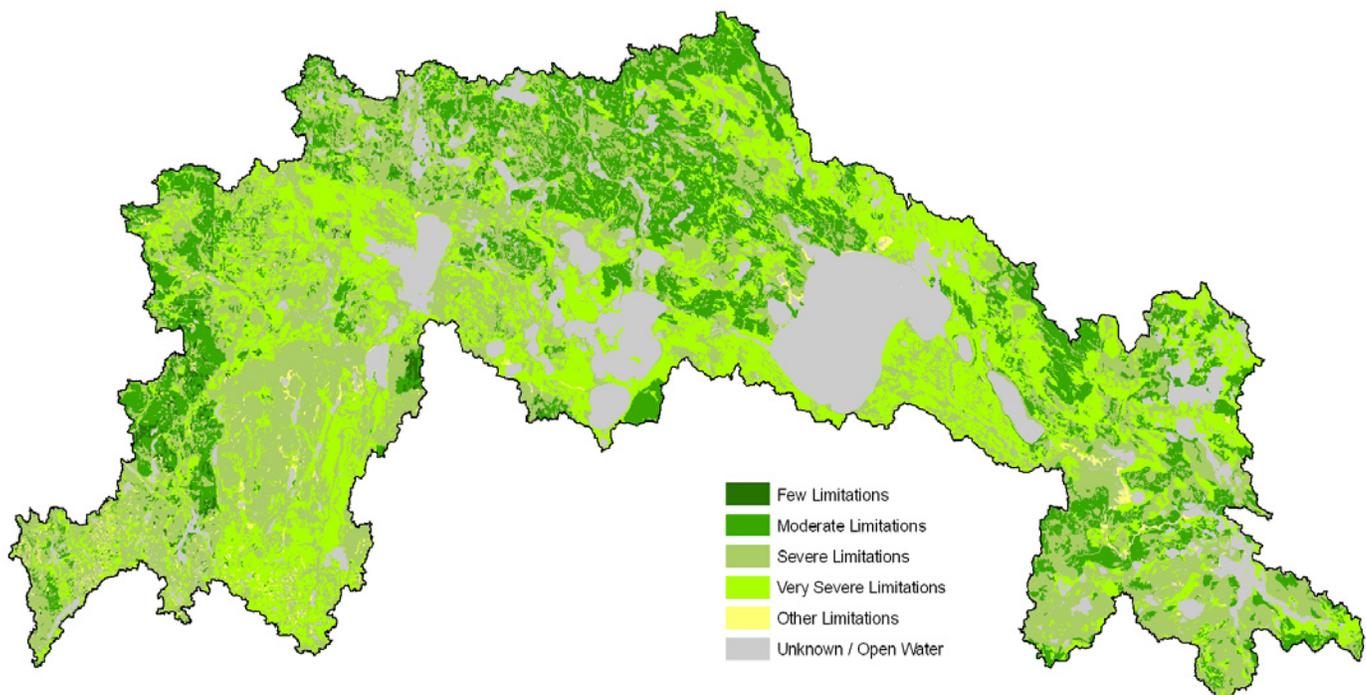
## Land Capability Classification

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.



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## Socioeconomic and Agricultural Data (Relevant)

The Mississippi Headwaters subbasin has a population of just over 48,400 people. Median household income throughout the district is nearly \$36,000 yearly, roughly 76% of the national average. Sixty one percent of the population over the age of 18 is active in the workforce, and the unemployment rate is estimated to be near 6%. Approximately 13% of the residents in the watershed live below the national poverty level.



There are 586 Farms in the watershed. Approximately forty five percent of the operations are less than 180 acres in size, fifty percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres. Of the 558 operators in the basin, approximately fifty two percent are full-time producers not reliant on off farm income.

<b>(MN) HUC# 7010101</b>		<b>Total Acres:</b>	<b>1,255,105</b>
<b>Population Data*</b>	Watershed Population	48,410	
	Unemployment Rate	6%	
	Median Household Income	35,900	
	% below poverty level	13%	
	Median Value of Home	81,150	
<b>Farms</b>	# of Farms	586	
	# of Operators	558	<b>Percent</b>
	# of Full Time Operators	290	52%
	# of Part Time Operators	267	48%
	<b>Total Crop/Pasturelands:</b>	<b>119,900</b>	<b>9.6%</b>
	1 to 179 Acres	344	45%
	180 to 499 Acres	297	39%
	500 to 999 Acres	85	11%
	1,000 Acres or more	45	6%
<b>Livestock &amp; Poultry</b>	Cattle - Beef	7,624	23%
	Cattle - Dairy	1,052	3%
	Chicken	2,063	6%
	Swine	1,431	4%
	Turkey	3,298	10%
	Other	17,915	54%
	<b>Animal Count Total:</b>	<b>33,384</b>	
	<b>Total Permitted AFOs:</b>	<b>76</b>	
<b>Chemicals (Acres Applied)</b>	Insecticides	4,837	
	Herbicides	13,383	
	Wormicides	0	
	Fruiticides	18	
	<b>Total Acres Treated</b>	<b>18,238</b>	
	<b>% State Chemical Totals</b>	<b>0.1%</b>	

\* Calculated at the block group or county level, depending on the level of data available

**Performance Results System and Other Data**

Watershed Name: Mississippi Headwaters				Watershed Number: 7010101						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
<b>Total Conservation Systems Planned (acres)</b>	134	13,485	0	1,025	1,945	N/A	2,083	1,929	668	21,269
<b>Total Conservation Systems Applied (acres)</b>	0	25,577	0	597	597	N/A	1,601	946	2,075	31,393
<b>Conservation Practices</b>										
<b>Total Waste Management (313) (numbers)</b>	0	0	0	0	0	0	0	0	0	0
<b>Riparian Forest Buffers (391) (acres)</b>	20	0	0	0	16	13	0	6	0	55
<b>Erosion Control Total Soil Saved (tons/year)</b>	104	65,893	1,010	388	891	N/A	N/A	N/A	N/A	68,286
<b>Total Nutrient Management (590) (Acres)</b>	0	160	23	317	376	38	44	44	38	1,040
<b>Pest Management Systems Applied (595A) (Acres)</b>	0	0	0	0	274	0	0	0	0	274
<b>Prescribed Grazing 528a (acres)</b>	250	105	50	217	82	70	426	336	336	1,872
<b>Tree &amp; Shrub Establishment (612) (acres)</b>	0	88	18	240	69	588	222	28	834	2,087
<b>Residue Management (329A-C) (acres)</b>	0	0	900	0	0	0	0	0	0	900
<b>Total Wildlife Habitat (644 - 645) (acres)</b>	0	37	383	520	278	57	520	439	392	2,626
<b>Total Wetlands Created, Restored, or Enhanced (acres)</b>	0	0	45	3	0	2	0	0	0	50
<b>Acres enrolled in Farmbill Programs</b>										
<b>Conservation Reserve Program</b>	0	25,514	130	107	57	N/A	40	44	0	25,892
<b>Wetlands Reserve Program</b>	0	0	0	0	0	N/A	0	0	0	0
<b>Environmental Quality Incentives Program</b>	0	25,480	53	103	226	N/A	808	602	342	27,614
<b>Wildlife Habitat Incentive Program</b>	0	0	37	0	0	N/A	6	10	3	56
<b>Farmland Protection Program</b>	0	0	0	0	0	N/A	0	0	0	0

## THREATENED AND ENDANGERED SPECIES OF THE BASIN /14

Scientific Name	Common Name	Type
<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	Zoological
<i>Asio flammeus</i>	Short-eared Owl	Zoological
<i>Botrychium lanceolatum</i>	Triangle Moonwort	Botanical
<i>Botrychium minganense</i>	Mingan Moonwort	Botanical
<i>Botrychium mormo</i>	Goblin Fern	Botanical
<i>Botrychium oneidense</i>	Blunt-lobed Grapefern	Botanical
<i>Botrychium pallidum</i>	Pale Moonwort	Botanical
<i>Botrychium rugulosum</i>	St. Lawrence Grapefern	Botanical
<i>Botrychium simplex</i>	Least Moonwort	Botanical
<i>Buteo lineatus</i>	Red-shouldered Hawk	Zoological
<i>Ceraclea vertreesi</i>	Vertrees's Ceracleon Caddisfly	Zoological
<i>Chilostigma itascae</i>	Headwater Chilostigman Caddisfly	Zoological
<i>Coturnicops noveboracensis</i>	Yellow Rail	Zoological
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	Botanical
<i>Dryopteris goldiana</i>	Goldie's Fern	Botanical
<i>Eleocharis olivacea</i>	Olivaceous Spike-rush	Botanical
<i>Eleocharis quinqueflora</i>	Few-flowered Spike-rush	Botanical
<i>Emydoidea blandingii</i>	Blanding's Turtle	Zoological
<i>Etheostoma microperca</i>	Least Darter	Zoological
<i>Falco peregrinus</i>	Peregrine Falcon	Zoological
<i>Fimbristylis autumnalis</i>	Autumn Fimbristylis	Botanical
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Zoological
<i>Hemidactylium scutatum</i>	Four-toed Salamander	Zoological
<i>Lasmigona compressa</i>	Creek Heelsplitter	Zoological
<i>Ligumia recta</i>	Black Sandshell	Zoological
<i>Lobaria quercizans</i>	Smooth lungwort	Botanical
<i>Malaxis monophyllos</i> var. <i>brachypoda</i>	White Adder's-mouth	Botanical
<i>Malaxis paludosa</i>	Bog Adder's-mouth	Botanical
<i>Najas gracillima</i>	Thread-like Naiad	Botanical
<i>Notropis anogenus</i>	Pugnose Shiner	Zoological
<i>Oxyethira ecornuta</i>	A Caddisfly	Zoological
<i>Oxyethira itascae</i>	A Caddisfly	Zoological
<i>Platanthera clavellata</i>	Club-spur Orchid	Botanical
<i>Poa wolfii</i>	Wolf's Bluegrass	Botanical
<i>Potamogeton vaginatus</i>	Sheathed Pondweed	Botanical
<i>Potamogeton vaseyi</i>	Vasey's Pondweed	Botanical
<i>Ranunculus lapponicus</i>	Lapland Buttercup	Botanical
<i>Scirpus clintonii</i>	Clinton's Bulrush	Botanical
<i>Setodes guttatus</i>	A Caddisfly	Zoological
<i>Sparganium glomeratum</i>	Clustered Bur-reed	Botanical
<i>Subularia aquatica</i>	Awlwort	Botanical
<i>Tomenthypnum falcifolium</i>	Curved-leaved golden moss	Botanical
<i>Torreyochloa pallida</i>	Torrey's Manna-grass	Botanical
<i>Waldsteinia fragarioides</i>	Barren Strawberry	Botanical
<i>Wilsonia citrina</i>	Hooded Warbler	Zoological

## RESOURCE CONCERNS

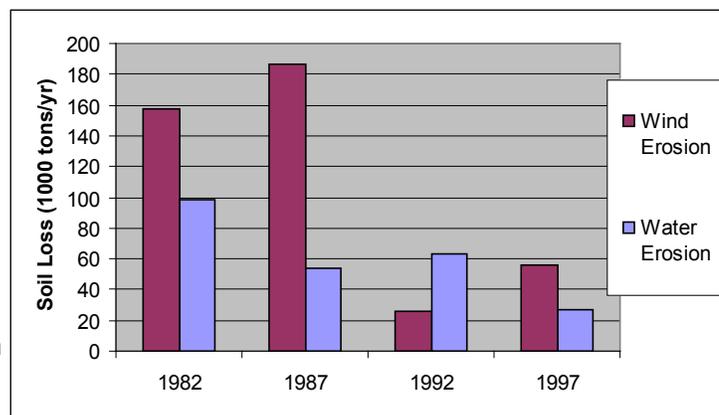
County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- **Soil Quality, Excessive Sheet and Rill Erosion.** Soil Erosion and Deposition has ranked as a moderate to high concern in counties in the watershed.
- **Woodland Management.** Management opportunities include planting trees or shrubs, restoring prairies, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and many other practices or projects.
- **Surface Water Quality, Nutrients, Priority Pollutants.** 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 a fish community with depressed populations and limited diversity. Mercury and PCB levels are affecting Aquatic consumption, aquatic life, and aquatic recreation.
- **Pasture and Grazing Land Management.** The majority of agricultural land in the basin is dedicated to forage production for grazing livestock, and management of these lands has been identified as a priority by local EQIP workgroups in multiple counties within the basin.
- **Ground Water Quality, Nutrients, Organics, Animal and Human Wastewater management.** Aging septic systems, feedlot runoff, nutrient runoff, tilling practices, and abandoned wells all pose threats to groundwater quality throughout the region. Improved management of wastewater ensures safe water for all uses.
- **Wetland Management, Gully 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 removing flood-prone lands from production all serve to lessen the impact of flooding and improve drainage.



### NRI Soil Loss Estimates <sup>/13</sup>

- Sheet and rill erosion by water on the cropland and pastureland declined by approximately 71,500 tons (72.66%) of soil from 1982 to 1997 (USLE).
- NRI estimates indicate wind erosion rates decreased by 101,600 tons (64.55%) between 1982 and 1997 (WEQ).



## Watershed Projects, Plans and Monitoring

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- **Biological & Toxicological Assessment**  
Minnesota Pollution Control Agency
- **Erosion Inventory of Mississippi Headwaters**  
Mississippi Headwaters Board
- **Mississippi River Env. Management Program**  
US Army Corps of Engineers
- **Mississippi River Watch**  
Mississippi Headwaters Board
- **Mississippi River Defense Network**  
Legislative Commission on Minnesota Resources
- **Upper Mississippi River Initiative**  
National Audobon Society
- **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

## Conservation Districts, Organizations & Partners

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- **Becker County SWCD**  
809 8th St. S.E. Detroit Lakes, MN 56501  
Phone: 218-846-7360
- **Beltrami County SWCD**  
3217 Bemidji Ave North Suite #3, Bemidji, MN 56601  
Phone (218) 755-4339
- **Cass County SWCD**  
303 Minnesota Avenue W Walker, MN 56484-3000  
Phone (218) 547-7399
- **Clearwater County SWCD**  
312 Main Ave N Ste 3, Bagley, MN 56621  
Phone (218) 694-6845
- **Hubbard County SWCD**  
212 1/2 - 2nd St W, Park Rapids, MN 56470  
Phone (218) 732-0121
- **Friends of the Mississippi River**  
360 N Robert St Saint Paul, MN 55101  
Phone (651) 222-2193
- **Itasca County SWCD**  
1889 E Hwy 2, Grand Rapids, MN 55744  
Phone (218) 326-0017
- **Mississippi Headwaters Board**  
Cass Co. Courthouse Box 3000 Walker, MN 56484  
Phone (218) 547-7263
- **North Central Minnesota Joint Powers Board**  
3217 Bemidji Ave N Suite 3 Bemidji, MN 56601  
Phone (218) 755-4339
- **National Fish and Wildlife Foundation**  
1 Federal Drive Minneapolis MN 55111  
Phone 612-713-5185
- **South Central Comprehensive Water Plan  
Joint Powers Board** P.O. Box 248, New Ulm,  
MN 56073 Phone 507-233-6642
- **USDA Forest Service North East Area**  
1992 Folwell Ave. St. Paul MN 55108  
Phone 651-649-5239

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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.

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 block group 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/>.

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Further information on individual projects can be obtained through the listed party.