
**Rapid Watershed Assessment
Resource Profile**

Zumbro River (MN) HUC: 07040004



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 Zumbro River 8-Digit Hydrologic Unit Code (HUC) subbasin is located within the Western Corn Belt Plains, North Central Hardwoods, and Driftless Area Ecoregions of Minnesota.

Approximately ninety eight percent of the 910,468 acres in this HUC are privately owned. The remaining acres are state, county, federal or conservancy land or covered by open water.

Assessment estimates indicate 2,730 farms in the watershed. Approximately forty two 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.

The main resource concerns in the watershed are sediment and erosion control, stormwater management, drinking and source water protection, waste management, nutrient management and wetland management.

Many of the resource concerns relate directly to topography, agricultural practices and increased development in the region resulting in flooding and increased sediment and pollutant (fecal coliform, nitrogen, phosphorus) loadings to surface and ground waters.



County Totals

County	Acres in HUC	% HUC
Goodhue	176,863	19.4%
Rice	29,860	3.3%
Wabasha	216,491	23.8%
Steele	17,021	1.9%
Dodge	233,130	25.6%
Olmsted	237,099	26.0%
Mower	3	0.0%
Total acres:	910,468	100%

Physical Description

The Zumbro River consists of three major branches (designated the North, Middle, and South) that drain portions of Olmsted, Dodge, Wabasha, Goodhue, Steele, Mower and Rice counties. Two branches come together near Oronoco, meeting with the third between Mazeppa and Zumbro Falls before converging with the Mississippi River near Wabasha and Kellogg.

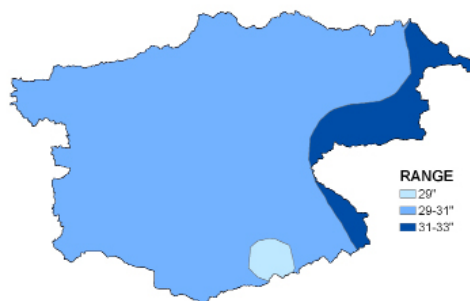
Zumbro river's North Fork begins in Rice County, about five miles east of Faribault. The Middle Fork rises in eastern Steele County and flows in a generally easterly direction about forty miles to join the South Fork north of Rochester. The South Fork's course through Rochester has been channelized as part of a flood control project, and is dammed in Wabasha County by the Lake Zumbro Hydroelectric Generating Plant to form Lake Zumbro.



Much of the drainage area is within a geologic region known as the 'Driftless Area', with topography comprised of a unique landform known as 'karst'. Karst features are characterized by numerous underground streams, sinkholes, blind valleys and springs, and are highly susceptible to groundwater contamination.

Average Precipitation

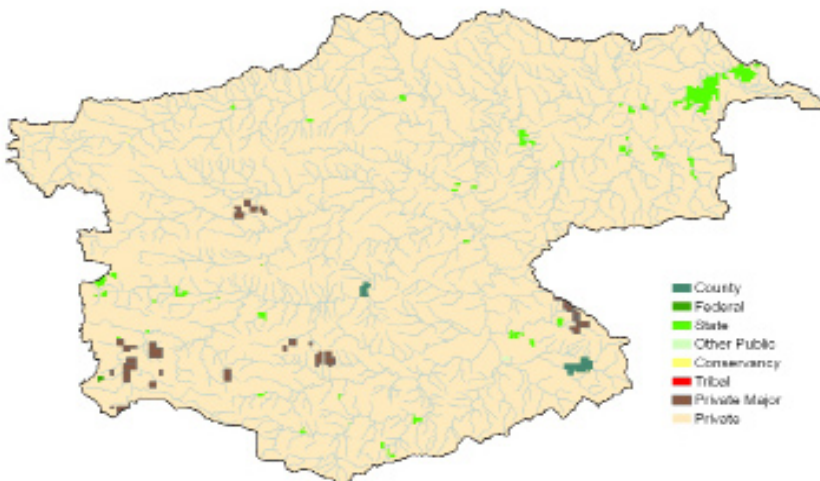
Precipitation in the Zumbro watershed ranges from 29 to 33 inches each year. The majority of the land use within the watershed is agricultural, with crop and pasture lands accounting for approximately 80% of the overall acres.



Predominate land covers / land uses are Row Crops (56%), Grass, Pasture & Hay (24%), Forest (9.7%), Residential / Commercial Development (8.5%), and Wetlands (1.5%).

Ownership

Ownership Type	Acres	% of HUC
Conservancy	44	0.0
County	1,785	0.2
Federal	477	0.1
State	9,695	1.1
Other	76	0.0
Tribal	-	-
Private Major	5,895	0.6
Private	892,497	98.0
Total Acres:	910,468	100



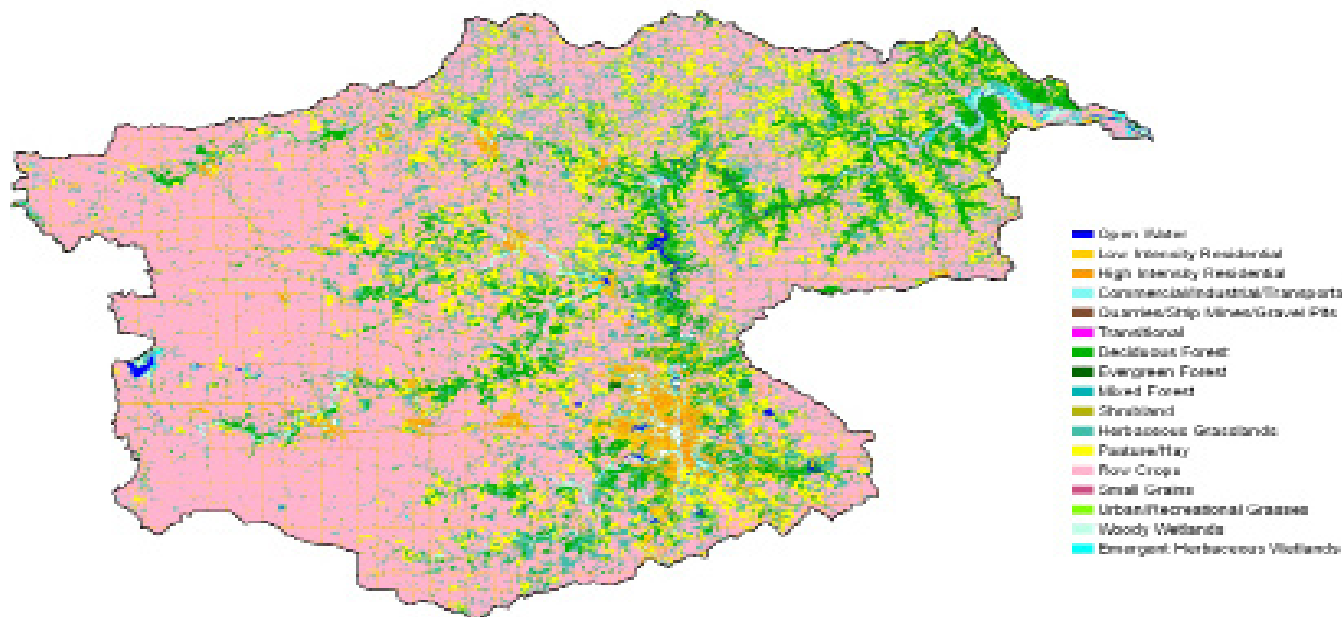
* Ownership totals derived from 2007 MN DNR GAP Stewardship data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The Zumbro watershed covers an area of 910,468 acres. Approximately ninety eight percent of the land in the watershed is owned by private landholders (892,497 acres). The second largest ownership type is State, with approximately 9,700 acres (1.1%), followed by Private Major with 5900 acres (0.6%), County with 1,785 acres (0.2%), Federal with 480 acres (0.1%), miscellaneous “Other Public” with 76 acres (<0.1%) and Conservancy comprises the smallest ownership class, with approximately 44 acres (<0.1%).

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

Land Use / Land Cover ¹²



Ownership / Land Use ¹³

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	% Public	Acres	% Private	Acres	% Tribal		
Forest	6,302	0.7%	82,214	9.0%	0	0.0%	88,516	9.7%
Grass, etc	2,343	0.3%	214,518	23.6%	0	0.0%	216,861	23.8%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	943	0.1%	508,115	55.8%	0	0.0%	509,059	55.9%
Shrub etc	0	0.0%	492	0.1%	0	0.0%	492	0.1%
Wetlands	1,433	0.2%	12,471	1.4%	0	0.0%	13,904	1.5%
Residential/Commercial	413	0.0%	77,304	8.5%	0	0.0%	77,717	8.5%
Open Water*	427	0.0%	3,487	0.4%	0	0.0%	3,914	0.4%
* ownership undetermined ** includes private-major								
Watershed Totals:	11,862	1.30%	898,602	98.7%	0	0.0%	910,468	100%

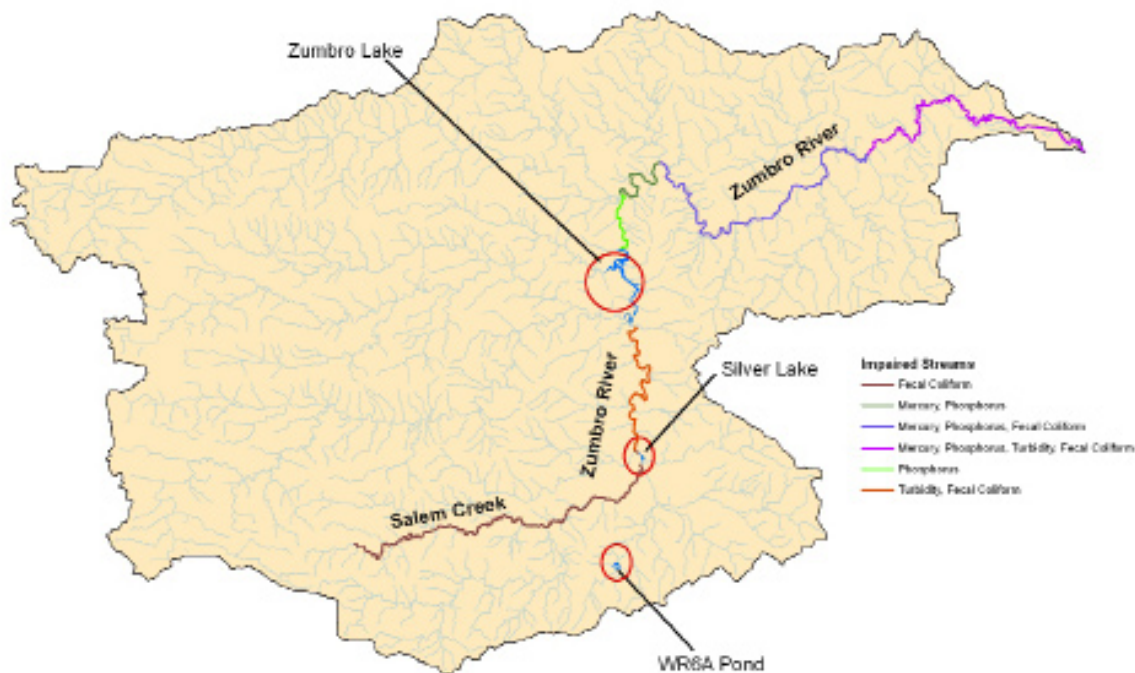
Physical Description (continued)

		ACRES	cu. ft/sec	
Stream Flow Data	USGS 05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER	2007 Total Avg.	305.9	
		May – Sept. 2007 Avg.	401	
Stream Data ¹⁴ (*Percent of Total HUC Stream Miles)		ACRES/MILES	PERCENT	
	Total Miles – Major (100K Hydro GIS Layer)	2,123	---	
	303d/TMDL Listed Streams (DEQ)	96.6	4.6%	
Riparian Land Cover/Land Use ¹⁵ (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Forest	9,291	18.1%	
	Grain Crops	0	0.0%	
	Grass, etc	14,548	28.4%	
	Orchards	0	0.0%	
	Row Crops	18,756	36.6%	
	Shrub etc	13	0.0%	
	Wetlands	3,977	7.8%	
	Residential/Commercial	3,311	6.5%	
	Open Water*	1,355	2.6%	
	Total Buffer Acres:	51,251	100%	
Crop and Pastureland Land Capability Class ¹⁶ (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	1 – slight limitations	39,600	6%	
	2 – moderate limitations	446,700	62%	
	3 – severe limitations	154,400	22%	
	4 – very severe limitations	36,700	5%	
	5 – no erosion hazard, but other limitations	6,600	1%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	18,600	3%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	14,300	2%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
	Total Croplands & Pasturelands	716,900	-	
	TYPE OF LAND	ACRES	% of Crop Lands	% of HUC
Irrigated Lands ¹⁷ (1997 NRI Estimates for Non-Federal Lands Only)	Cultivated Cropland / Pastureland	0	0%	0%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	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 States to identify and restore impaired waters. The primary tool for addressing impaired waters is a pollution reduction plan called a Total Maximum Daily Load, or TMDL.

2006 TMDL Listed Waters - Zumbro River Watershed¹⁸



Listed Stream	Impairment	Affected Use
Zumbro River; West Indian Cr To Mississippi R	Mercury, Phosphorus, Turbidity, Fecal Co	Aquatic Life, Recreation, Aquatic Consumption
Zumbro River; Cold Cr To West Indian Cr	Mercury, Phosphorus, Fecal Coliform	Aquatic Recreation and Aquatic Consumption
Salem Creek; Lower 15 Miles (Class 2C Portion)	Fecal Coliform	Aquatic Recreation
Zumbro River; N Fk Zumbro R To Cold Cr	Mercury, Phosphorus	Aquatic Consumption
Zumbro River; Zumbro Lk To North Fk Zumbro R	Phosphorus	Aquatic Consumption
Zumbro River, South Fork; Cascade Cr To Zumbro Lk	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Zumbro River, South Fk ; Silver Lk Dam To Cascade	Fecal Coliform	Aquatic Recreation
Zumbro River, South Fk ; Bear Cr To Oakwood Dam	Fecal Coliform	Aquatic Recreation
Zumbro River, South Fk; Salem Cr To Bear Cr	Fecal Coliform	Aquatic Recreation
Salem Creek; Lower 15 Miles (Class 2C Portion)	Fecal Coliform	Aquatic Recreation
Zumbro River, South Fk; Salem Cr To Bear Cr	Fecal Coliform	Aquatic Recreation
Mississippi River; St. Croix R To Chippewa R (Wi)	Mercury, Phosphorus, Turbidity	Aquatic Life and Aquatic Consumption
Vermillion River/Vermillion Slough	Mercury, Phosphorus, Turbidity	Aquatic Life and Aquatic Consumption

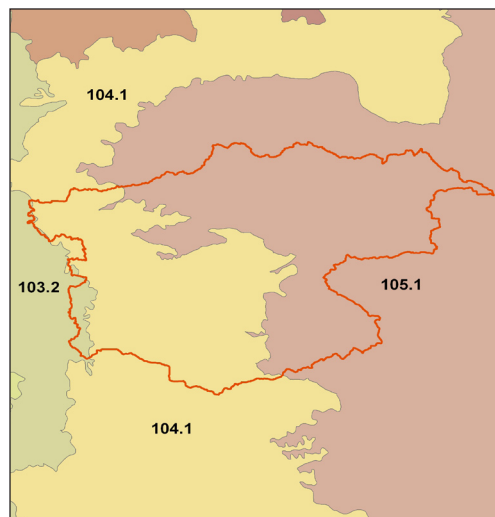
Listed Lake	Impairment	Affected Use
Silver	Mercury	Aquatic Consumption
Zumbro	Excess nutrients, Mercury	Aquatic Recreation and Aquatic Consumption
WR6A Pond	Mercury	Aquatic Consumption

Common Resource Areas

The Zumbro Watershed encompasses three common resource areas, 105.1, 104.1 and 103.2

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.

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 and wildlife habitat management.

Geology / Soils¹⁰

Bedrock of the watershed date to the Paleozoic Era, containing mainly Ordovician and Devonian Period sedimentary formations. In the western portion of the watershed, Ordovician and Devonian limestone, dolomite, sandstone and shale are commonly found in river valleys and road cuts. Cambrian age sandstones, shale and dolomites can be found in exposures along the river valley of Wabasha county to the east.

Many of these formations are between 570 and 225 million years old, formed in the bed of a warm shallow sea. This ancient environment saw many fluctuations in sea level, creating the distinct bands of stratified sedimentary rock. Limestone, and some dolomite rock formations are especially susceptible to weathering from water, and often form extensive underground drainage systems containing caverns, sinkholes and disappearing rivers. Often the underlying bedrock is a maze of fractures due to the brittle nature of the karst formations.

Other bedrock of significance is sandstone, found in an irregular band through the center of the watershed, running north to south. The St. Peter sandstone formation has a high infiltration rate for groundwater recharge, and is a source of ground water for many communities. The Decorah edge shale deposit, and the St. Lawrence edge of carbonate rock, are also a concern for groundwater recharge, particularly in Olmsted, Wabasha & Goodhue counties.

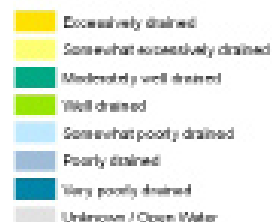
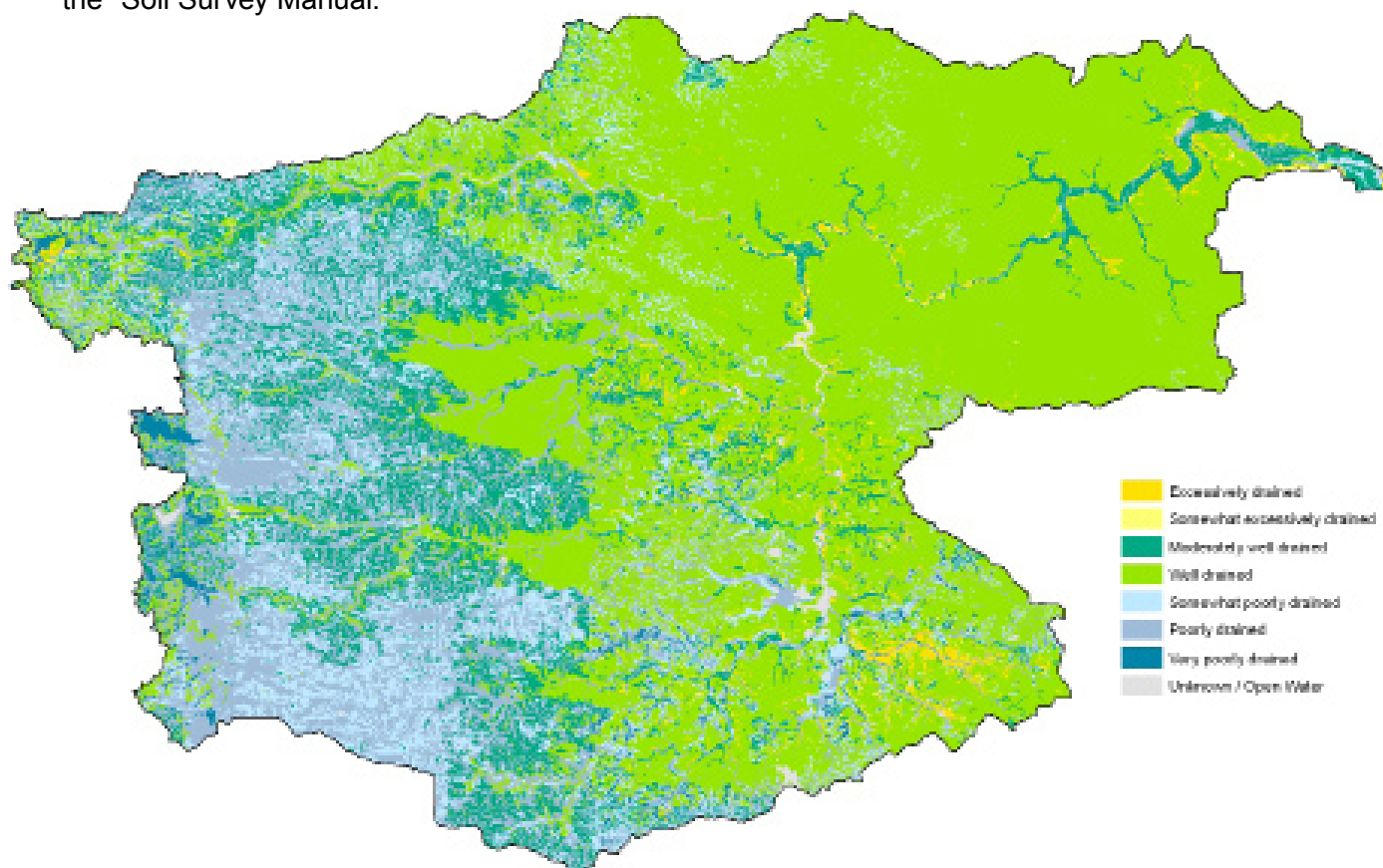
Generally, the depth to bedrock is greatest in the western third of the watershed, and gradually decreases toward the outlet of the Zumbro River. Depth values range from as deep as 300 feet in a portion of Steele and Dodge counties to a typical 0-100 feet in the eastern counties.

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 soildatamart.usda.gov
 download SSURGO certified soil tabular /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.”



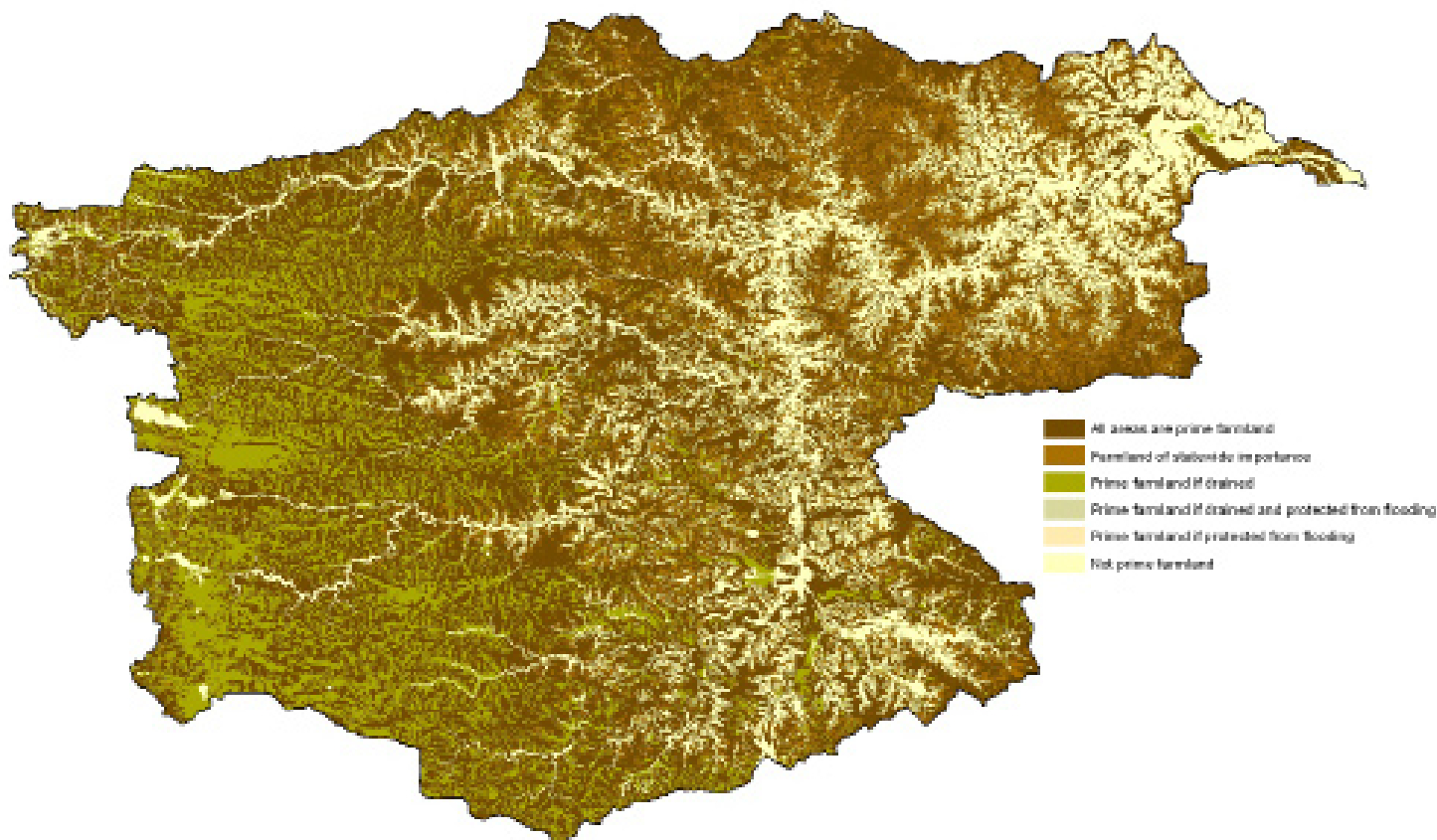
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Farmland Classification

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.



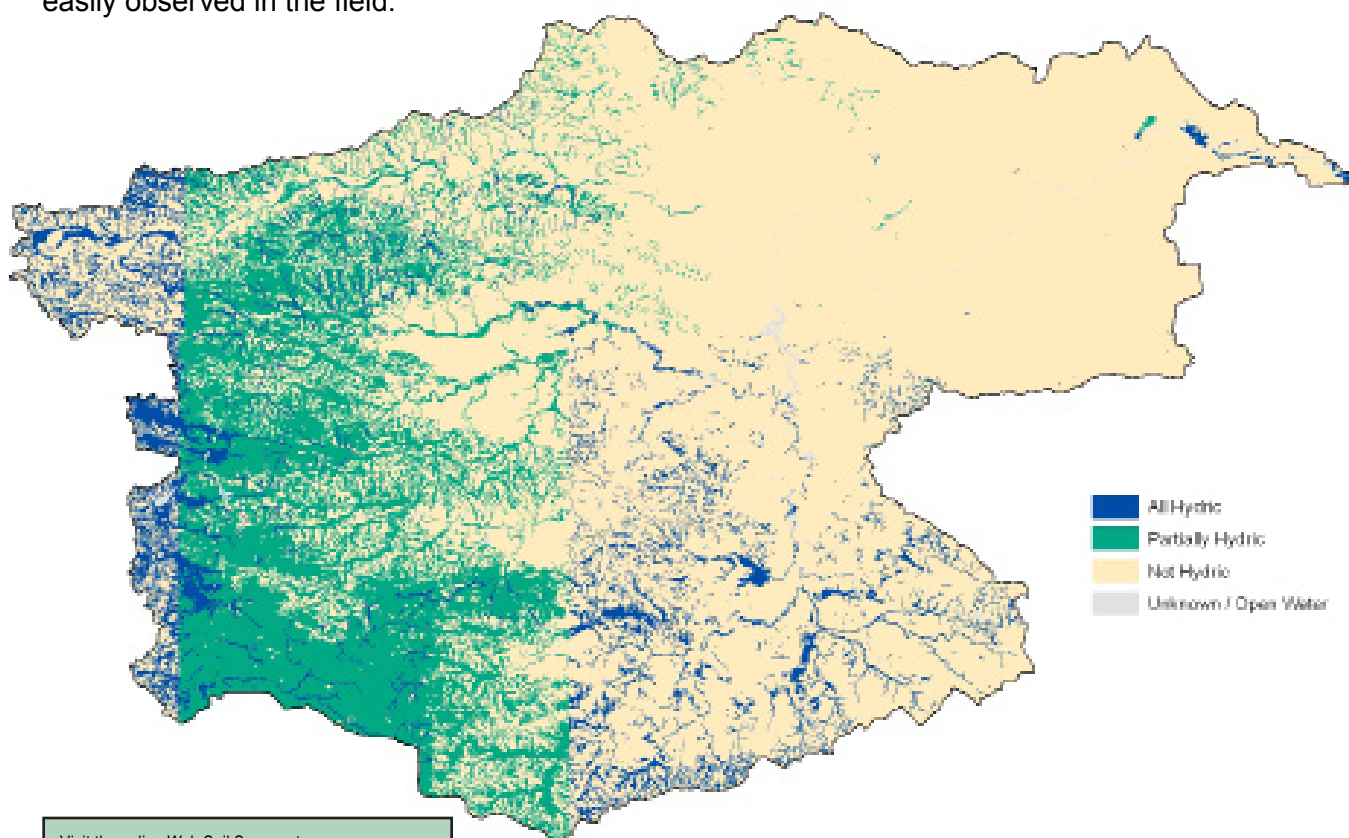
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Hydric Soils

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.



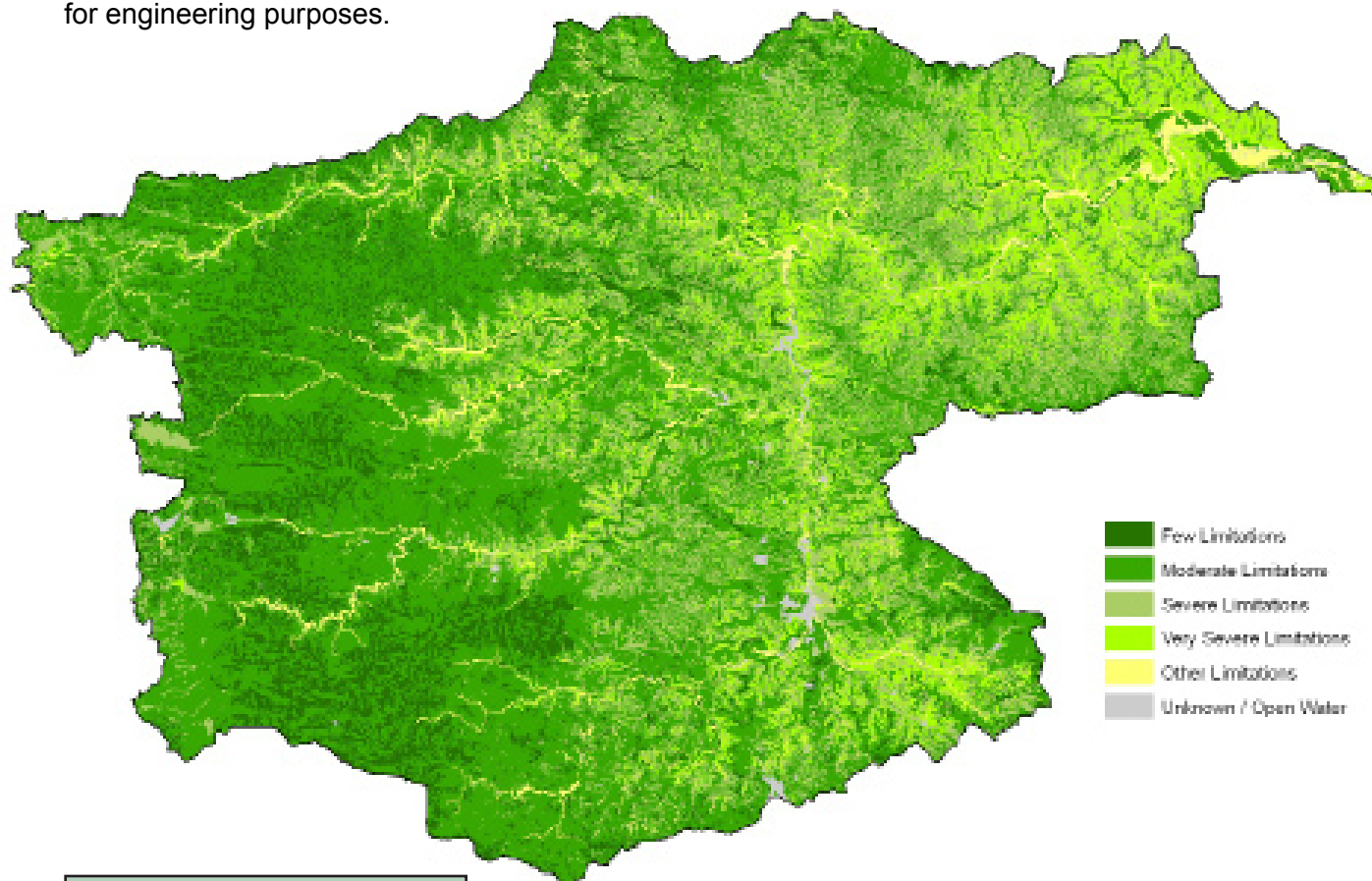
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Note: Historical Hydric Soil Determination Standards, scale, and methodology can vary on a county-to-county basis, leading to irregularities in thematic maps representing hydric soil determinations.

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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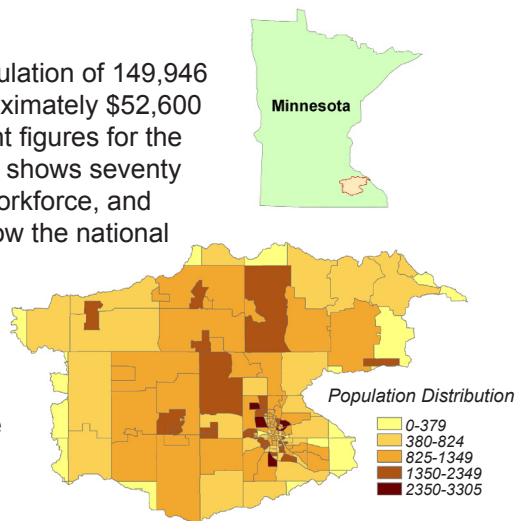
Performance Results System Data

PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTALS
Total Conservation Systems Planned (acres)	4,381	24,044	0	21,106	20,099	N/A	15,798	29,976	18,988	134,392
Total Conservation Systems Applied (acres)	5,161	18,967	0	22,805	22,805	N/A	13,863	20,889	24,276	128,766
Conservation Practices										
Total Waste Management (313) (numbers)	46	1	0	3	0	0	0	0	0	50
Riparian Forest Buffers (391) (acres)	20	241	98	184	121	42	0	0	25	731
Erosion Control Total Soil Saved (tons/year)	4,584	422,463	73,478	125,866	64,673	N/A	N/A	N/A	N/A	691,064
Total Nutrient Management (590) (Acres)	1,439	4,823	2,956	2,694	1,499	1,573	2,910	2,910	4,254	25,058
Pest Management Systems Applied (595A) (Acres)	130	1,325	461	712	695	388	985	2,282	2,937	9,915
Prescribed Grazing 528a (acres)	94	1,478	288	720	472	1,520	607	90	90	5,359
Tree & Shrub Establishment (612) (acres)	411	656	294	391	177	232	4	127	71	2,363
Residue Management (329A-C) (acres)	981	9,192	4,513	2,230	5,445	3,765	3,765	12,157	4,433	46,481
Total Wildlife Habitat (644 - 645) (acres)	4,061	3,968	1,652	4,278	1,615	2,852	4,278	7,071	7,472	37,247
Total Wetlands Created, Restored, or Enhanced (acres)	0	65	4	30	150	126	23	48	6	452
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	4,600	6,407	7,507	15,927	7,764	N/A	857	4,176	4,672	51,910
Wetlands Reserve Program	0	0	0	0	0	N/A	0	0	0	0
Environmental Quality Incentives Program	890	6,579	5,125	3,448	2,823	N/A	7,321	11,282	14,862	52,330
Wildlife Habitat Incentive Program	50	20	65	5	5	N/A	4	307	24	480
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

Socioeconomic and Agricultural Data (Relevant)

Estimations for the Zumbro River subbasin indicate a current population of 149,946 people. Median household income throughout the district is approximately \$52,600 annually, roughly 13% above the national average. Unemployment figures for the basin indicate an unemployment rate of 3.9 percent. Census data shows seventy two percent of the population over the age of 18 is active in the workforce, and approximately 6% of the residents in the watershed are living below the national poverty level.

Assessment estimates indicate 2,730 farms in the watershed. Approximately forty two 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 2,820 operators in the basin, sixty one percent are full time producers not reliant on off-farm income.



(MN) HUC# 7040004		Total Acres:	910,468
Population Data*	Watershed Population	149,946	
	Unemployment Rate	3.9%	
	Median Household Income	52,606	
	% below poverty level	6%	
	Median Value of Home	104,586	
Farms	# of Farms	2,730	
	# of Operators	2,820	Percent
	# of Full Time Operators	1,728	61%
	# of Part Time Operators	1,092	39%
	Total Crop/Pasturelands:	716,900	78.7%
Farm Size	1 to 179 Acres	792	42%
	180 to 499 Acres	672	36%
	500 to 999 Acres	259	14%
	1,000 Acres or more	151	8%
Livestock & Poultry	Cattle - Beef	14,668	1%
	Cattle - Dairy	30,412	3%
	Chicken	6,329	1%
	Swine	193,374	17%
	Turkey	318,115	28%
	Other	571,100	50%
	Animal Count Total:	1,133,998	
Chemicals (Acres Applied)	Total Permitted AFOs:	1,645	
	Insecticides	74,642	
	Herbicides	314,807	
	Wormicides	6,386	
	Fruiticides	2,460	
	Total Acres Treated	398,296	
	% State Chemical Totals	2.8%	

* 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

THREATENED AND ENDANGERED SPECIES ¹⁴

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, and candidate species as well as species of special concern that occur in the subbasin.

Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
<i>Acipenser fulvescens</i>	Lake Sturgeon	Zoological	<i>Emydoidea blandingii</i>	Blanding's Turtle	Zoological
<i>Acris crepitans</i>	Northern Cricket Frog	Zoological	<i>Eryngium yuccifolium</i>	Rattlesnake-master	Botanical
<i>Actinonaias ligamentina</i>	Mucket	Zoological	<i>Erythronium propullans</i>	Dwarf Trout Lily	Botanical
<i>Adoxa moschatellina</i>	Moschatel	Botanical	<i>Etheostoma microperca</i>	Least Darter	Zoological
<i>Alasmodonta marginata</i>	Elktoe	Zoological	<i>Falco peregrinus</i>	Peregrine Falcon	Zoological
<i>Allium cernuum</i>	Nodding Wild Onion	Botanical	<i>Floerkea proserpinacoides</i>	False Mermaid	Botanical
<i>Ammocrypta asprella</i>	Crystal Darter	Zoological	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Zoological
<i>Ammodramus henslowii</i>	Henslow's Sparrow	Zoological	<i>Hydrastis canadensis</i>	Golden-seal	Botanical
<i>Arnoglossum plantagineum</i>	Tuberous Indian-plantain	Botanical	<i>Ichthyomyzon fossor</i>	Northern Brook Lamprey	Zoological
<i>Asclepias sullivantii</i>	Sullivant's Milkweed	Botanical	<i>Jeffersonia diphylla</i>	Twinleaf	Botanical
<i>Asio flammeus</i>	Short-eared Owl	Zoological	<i>Lanius ludovicianus</i>	Loggerhead Shrike	Zoological
<i>Asplenium platyneuron</i>	Ebony Spleenwort	Botanical	<i>Lasmigona compressa</i>	Creek Heelsplitter	Zoological
<i>Baptisia alba</i>	White Wild Indigo	Botanical	<i>Lasmigona costata</i>	Fluted-shell	Zoological
<i>Baptisia bracteata</i> var. <i>leucophaea</i>	Plains Wild Indigo	Botanical	<i>Lespedeza leptostachya</i>	Prairie Bush Clover	Botanical
<i>Besseyia bullii</i>	Kitten-tails	Botanical	<i>Ligumia recta</i>	Black Sandshell	Zoological
<i>Buteo lineatus</i>	Red-shouldered Hawk	Zoological	<i>Minuartia dawsonensis</i>	Rock Sandwort	Botanical
<i>Cacalia suaveolens</i>	Sweet-smelling Indian-plantain	Botanical	<i>Mustela nivalis</i>	Least Weasel	Zoological
<i>Carex davisii</i>	Davis' Sedge	Botanical	<i>Napaea dioica</i>	Glade Mallow	Botanical
<i>Carex formosa</i>	Handsome Sedge	Botanical	<i>Notropis nubilus</i>	Ozark Minnow	Zoological
<i>Carex jamesii</i>	James' Sedge	Botanical	<i>Orobanche fasciculata</i>	Clustered Broomrape	Botanical
<i>Carex laevivaginata</i>	Smooth-sheathed Sedge	Botanical	<i>Panax quinquefolius</i>	American Ginseng	Botanical
<i>Carex laxiculmis</i>	Spreading Sedge	Botanical	<i>Pellaea atropurpurea</i>	Purple Cliff-brake	Botanical
<i>Carex plantaginea</i>	Plantain-leaved Sedge	Botanical	<i>Phegopteris hexagonoptera</i>	Broad Beech-fern	Botanical
<i>Carex sterilis</i>	Sterile Sedge	Botanical	<i>Pipistrellus subflavus</i>	Eastern Pipistrelle	Zoological
<i>Carex woodii</i>	Wood's Sedge	Botanical	<i>Platanthera flava</i> var. <i>herbiola</i>	Tubercled Rein-orchid	Botanical
<i>Cirsium hillii</i>	Hill's Thistle	Botanical	<i>Rhynchospora capillacea</i>	Hair-like Beak-rush	Botanical
<i>Clemmys insculpta</i>	Wood Turtle	Zoological	<i>Sanicula trifoliata</i>	Beaked Snakeroot	Botanical
<i>Coluber constrictor</i>	Eastern Racer	Zoological	<i>Scleria verticillata</i>	Whorled Nut-rush	Botanical
<i>Crotalus horridus</i>	Timber Rattlesnake	Zoological	<i>Seiurus motacilla</i>	Louisiana Waterthrush	Zoological
<i>Dendroica cerulea</i>	Cerulean Warbler	Zoological	<i>Solidago sciaphila</i>	Cliff Goldenrod	Botanical
<i>Desmodium nudiflorum</i>	Stemless Tick-trefoil	Botanical	<i>Tephrosia virginiana</i>	Goat's-rue	Botanical
<i>Dicentra canadensis</i>	Squirrel-corn	Botanical	<i>Trillium nivale</i>	Snow Trillium	Botanical
<i>Diplazium pycnocarpon</i>	Narrow-leaved Spleenwort	Botanical	<i>Valeriana edulis</i> ssp. <i>ciliata</i>	Valerian	Botanical
<i>Dryopteris goldiana</i>	Goldie's Fern	Botanical	<i>Venustaconcha ellipsiformis</i>	Ellipse	Zoological
<i>Empidonax virescens</i>	Acadian Flycatcher	Zoological	<i>Vitis aestivalis</i>	Silverleaf Grape	Botanical

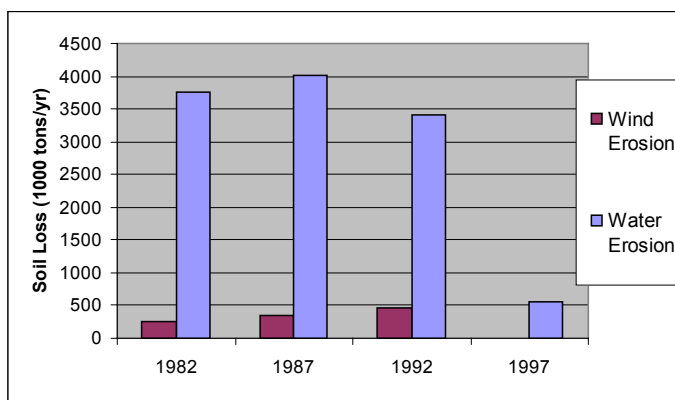
RESOURCE CONCERNS

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

- 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 retain water on the landscape to reduce flooding and subsequent soil erosion, and improve water resources.
- Stormwater Management.** Local districts recognize that stormwater runoff volume from impervious surfaces will likely increase as development of the watershed continues. Existing stormwater systems typically bypass treatment plants and discharge storm water directly into sinkholes and streams
- Drinking Water and Source Water Protection.** Parts of the region are particularly susceptible to groundwater contamination. Ease of infiltration, aging septic systems, abandoned wells and historical tiling practices threaten public drinking water supplies.
- Feedlot and 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 highly permeable soils will greatly reduce the effects of animal feed operations on area waters.
- Nutrient Management.** Excessive amounts of nutrients, namely phosphorus and nitrogen, contaminate groundwater and create nuisance algae presence in area waters. 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 and homogenic agricultural practices, priority is given to both wetland preservation and restoration. Wetlands that have been filled and drained retain their characteristic soil and hydrology, often allowing their natural functions to be reclaimed. Restoration is a complex process requiring planning, implementation, monitoring, and management.

NRI Soil Loss Estimates ^{/13}

- NRI estimates for sheet and rill erosion by water on the cropland and pastureland **decreased** by approximately 3,195,000 tons (85%) of soil between 1982 and 1997.
- NRI estimates indicate wind erosion rates **increased** by 259,100 tons (76%) between 1982 and 1992. No data was reported for 1997.



Watershed Projects, Plans and Monitoring

- **Agricultural Land Buffer Incentive Program**
Minnesota Department of Agriculture
- **South Fork Zumbro River Flood Control**
US Army Corps of Engineers
- **Southeast Minnesota Wastewater Initiative**
U of M, MPCA, BALMM
- **Lake Zumbro TMDL Study**
MN Pollution Control Agency
- **Lower Mississippi Regional TMDL Plan**
MN Pollution Control Agency
- **Zumbro River Storm Water Management Plan**
Olmsted County, City of Rochester
- **Driftless Area Restoration Effort**
Trout Unlimited, US Fish and Wildlife Service
- **Zumbro River Watershed Plan**
Zumbro River Watershed Partnership
- **Driftless Area Initiative**
DAI, NRCS, FSA, FWS, Forest Service, State DNRs
- **Working Lands for Wildlife and Water Quality**
Minnesota Board of Water and Soil Resources (Zumbro River)
- **Basin Alliance for the Lower Mississippi in MN**
(BALMM)
- **Mississippi River Env. Management Program**
US Army Corps of Engineers
- **Mississippi Source Water Protection Project**
Minnesota Department of Health
- **Mississippi River WS Forest Partnership**
USDA Forest Service
- **Mississippi River Watershed Fund**
USDA Forest Service / National Fish & Wildlife Federation
- **Mississippi River Basin W.Q. Plan**
Minnesota Pollution Control Agency
- **Weaver Dunes/Zumbro Delta Conservation Action Plan**
The Nature Conservancy
- **South Zumbro PL-566 Flood Control Project**
Natural Resources Conservation Service

Conservation Districts, Organizations & Partners

- **Basin Alliance for the Lower Mississippi in MN**
18 Wood Lake Drive SE Rochester, MN 55904
Phone (507) 280-3592
- **Dodge County SWCD**
916 2nd St SE, Dodge Center, MN 55927-9601
Phone (507) 374-6364
- **Goodhue County SWCD**
104 E 3rd Ave PO Box 335, Goodhue, MN 55027
Phone (651) 923-5300
- **Lake Zumbro Improvement Association**
P.O. Box 45 Oronoco, MN 55960
<http://lakezumbro.org>
- **Hiawatha Valley RC&D**
1485 Industrial Drive NW Rochester, MN 55901
Phone (507) 282-6153
- **Mower County SWCD**
1408 21st Ave NW Ste 2, Austin, MN 55912
Phone: (507) 434-2603
- **Olmsted County SWCD**
1485 Industrial Dr # 102, Rochester, MN 55901
Phone (507) 280-2850
- **Southeast Minnesota Wastewater Initiative**
863 30th Ave SE Rochester, MN 55904
Phone (507) 280-5575
- **Rice County SWCD**
30th St NW, Faribault, MN 55021
Phone: (507) 332-5408
- **South Zumbro Watershed Partnership**
2116 Campus Drive SE Rochester MN 55904
Phone: (507) 328-6723
- **Steele County SWCD**
235 Cedardale Dr SE, Owatonna, MN 55060-4417
Phone: (507) 451-6730
- **Trout Unlimited Hiawatha Chapter**
Web: <http://www.mntu.org/index.php>
Phone (507) 287-6101
- **Wabasha County SWCD**
611 Broadway Ave Ste 10, Wabasha, MN 55981
Phone (651) 565-4673
- **Zumbro Watershed Partnership, Inc.**
1485 Industrial Drive NW # 102 Rochester, MN 55901
Phone: (507) 259-7885

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. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). 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)

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. Bedrock Geology and Structure: Zumbro Watershed Partnership Management Plan, 9/30/2007.

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 (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/>. Where listed, 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.