

## Rapid Watershed Assessment

### Vermilion

(MN) HUC: 9030002



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 Vermilion 8-digit Hydrological Unit Code (HUC) Subbasin is located in the Northern Lakes and Forests ecoregion of Northern Minnesota. This watershed is 660,187 acres in size. The majority of the land in the watershed is publicly owned and managed by state and federal entities.

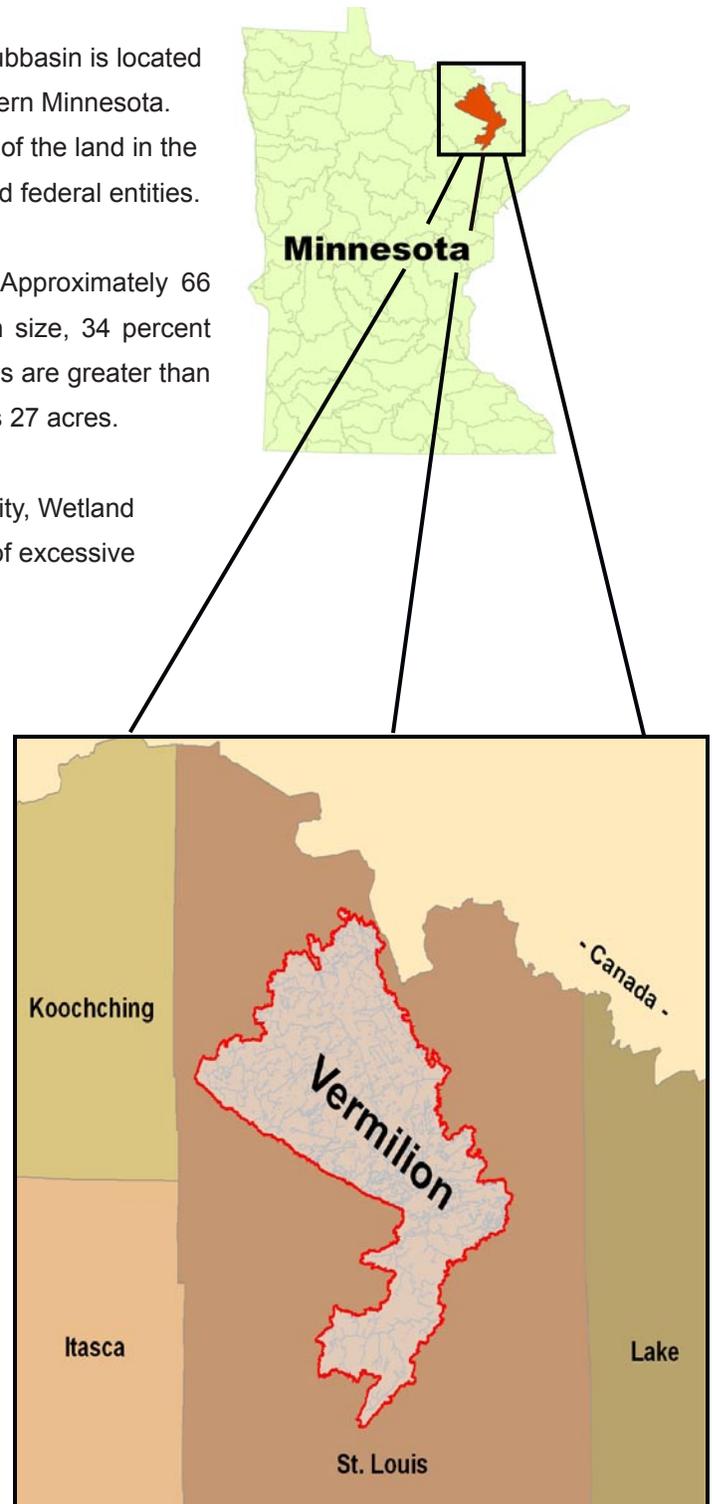
There are 149 Farms in the Vermilion watershed. Approximately 66 percent of the operations are less than 180 acres in size, 34 percent are 180 to 1,000 acres in size, and the remaining farms are greater than 1,000 acres. Average farm size throughout the basin is 27 acres.

Primary resource concerns include Surface water quality, Wetland management, Woodland Management, Management of excessive wetness, and the short growing season.

The entire watershed occurs within the boundaries of St. Louis county. As with many areas of Northern Minnesota, Principal industries include forest products harvesting, manufacturing, mining and tourism.

The Vermilion River watershed is the fifth largest watershed, in terms of size, in the Minnesota portion of the Rainy River Basin.

The greater Rainy River Basin is home to some of Minnesota's finest forest and water resources. Voyageurs National Park and the Boundary Waters Canoe Area Wilderness (BWCA) are located within the Basin, as are several of the state's most famous walleye fisheries and many top-notch trout streams.



## Physical Description

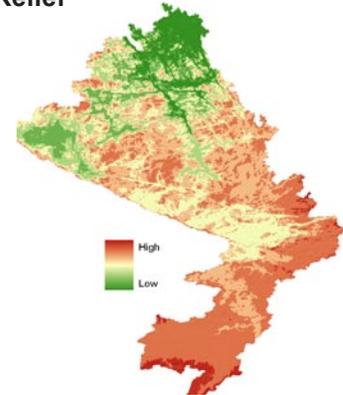
The Vermilion watershed includes two Ecological Classification System subsections. The watershed is located predominately in the Ecological Classification System's Border Lakes subsection, and partially in the subsection known as the Nashwauk Uplands.

The Vermilion River watershed has its headwaters in St. Louis County. Its waters flow from an elevation of 1,369 feet above msl at Lake Vermilion to Crane Lake at 1,135 feet above msl in the north end of the county. Average elevation in the watershed is estimated at 1,310 feet above sea level.

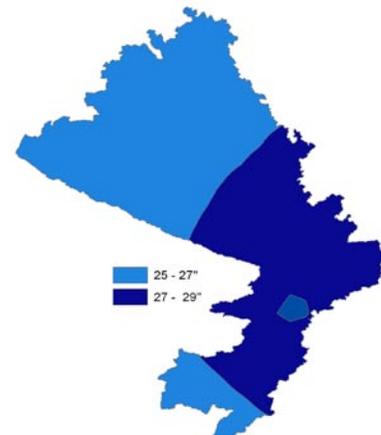
Precipitation in the watershed ranges from 25 to 29 inches annually. Most lands within this watershed are not highly erodible, and soils are often hydric. Much of the land in the subbasin is not suited or poorly suited to agricultural uses.

Development pressure is moderate throughout the subbasin, with occasional lands being parceled out for timber production or recreational uses. Recent years have seen increases in recreational shoreline and woodland development surrounding many of the area lakes.

Relief

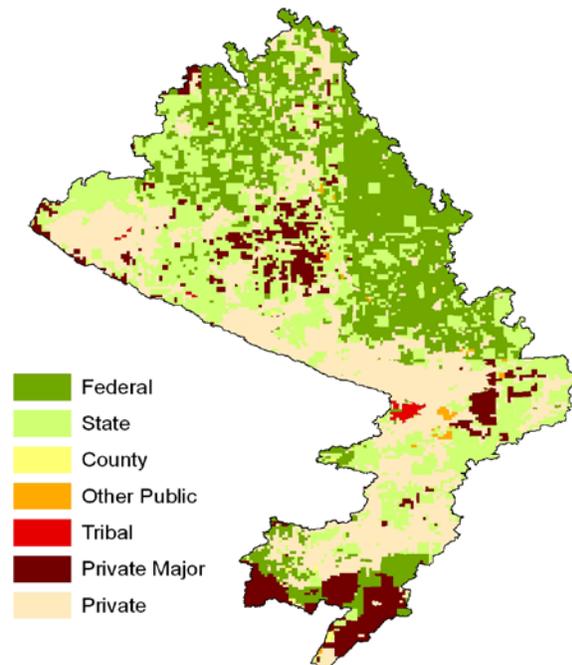


Average Precipitation (inches)



## Ownership

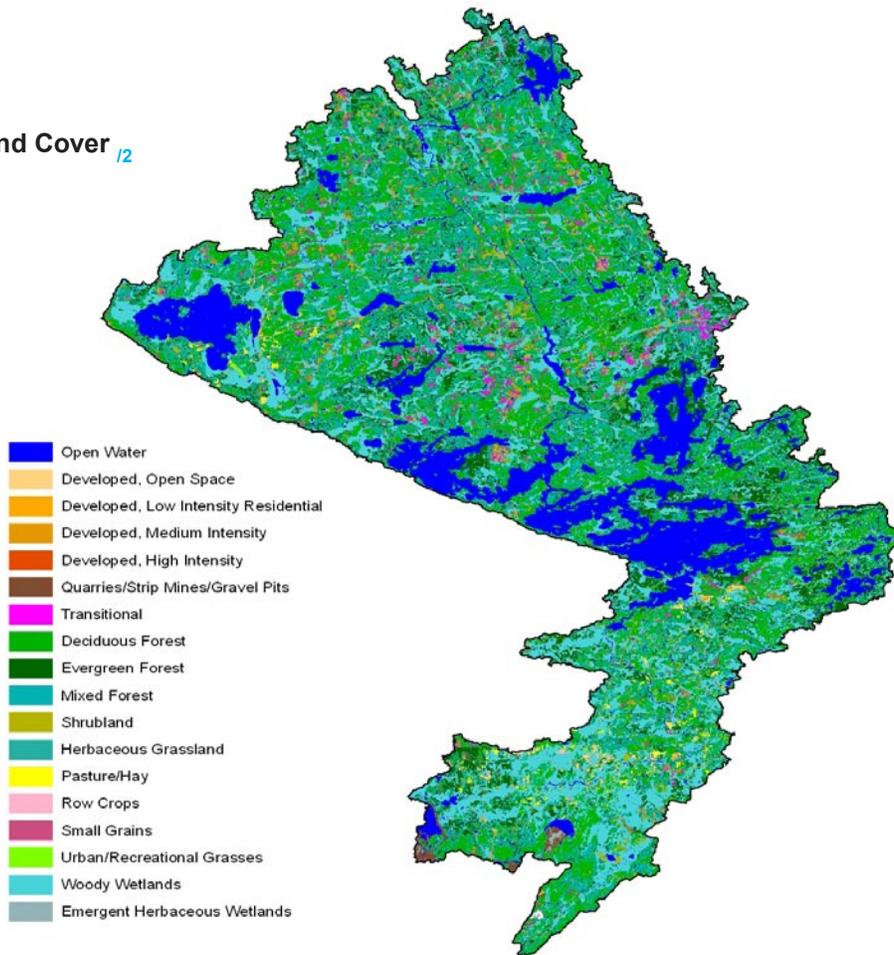
Ownership Type	Acres	% of HUC
Conservancy	-	-
County	1,803	0.3
Federal	187,763	28.4
State	207,619	31.4
Other	2,607	0.4
Tribal	2,426	0.4
Private Major	60,503	9.2
Private	197,466	29.9
<b>Total Acres:</b>	<b>660,187</b>	<b>100</b>



## Ownership / Land Use

The Vermilion watershed covers an area of 660,187 acres. The largest ownership type is State, with land holdings of 207,019 acres (31%), followed by Private land ownership of approximately 197,466 acres (30%). The third largest ownership type is Federal, with just over 187,760 acres (28%), followed by Private-Major (Corporate) with 60,503 acres (9.2%), Miscellaneous "Other Public" lands amounting to 2,607 acres (0.4%), and Tribally owned lands amounting to 2,426 acres (0.4%). County lands make up the smallest ownership percentage, with holdings of 1,803 Acres (0.3%). Land use by ownership type is represented in the table below.

### Land Use / Land Cover <sup>1/2</sup>



### Ownership / Land Use <sup>1/3</sup>

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	% Public	Acres	% Private	Acres	% Tribal		
Forest	298,909	45.3%	146,821	22.2%	1,607	0.2%	447,338	67.8%
Grass, etc	4,287	0.6%	5,582	0.8%	29	0.0%	9,898	1.5%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	295	0.0%	584	0.1%	16	0.0%	895	0.1%
Shrub etc	37,206	5.6%	24,837	3.8%	127	0.0%	62,170	9.4%
Wetlands	35,233	5.3%	13,432	2.0%	217	0.0%	48,881	7.4%
Residential/Commercial	1,632	0.2%	4,486	0.7%	68	0.0%	6,186	0.9%
Open Water*	21,940	3.3%	62,524	9.5%	361	0.1%	84,825	12.8%

\* ownership undetermined

\*\* includes private-major

<b>Watershed Totals:</b>	<b>399,501</b>	<b>60.51%</b>	<b>258,266</b>	<b>39.1%</b>	<b>2,426</b>	<b>0.4%</b>	<b>660,187</b>	<b>100%</b>
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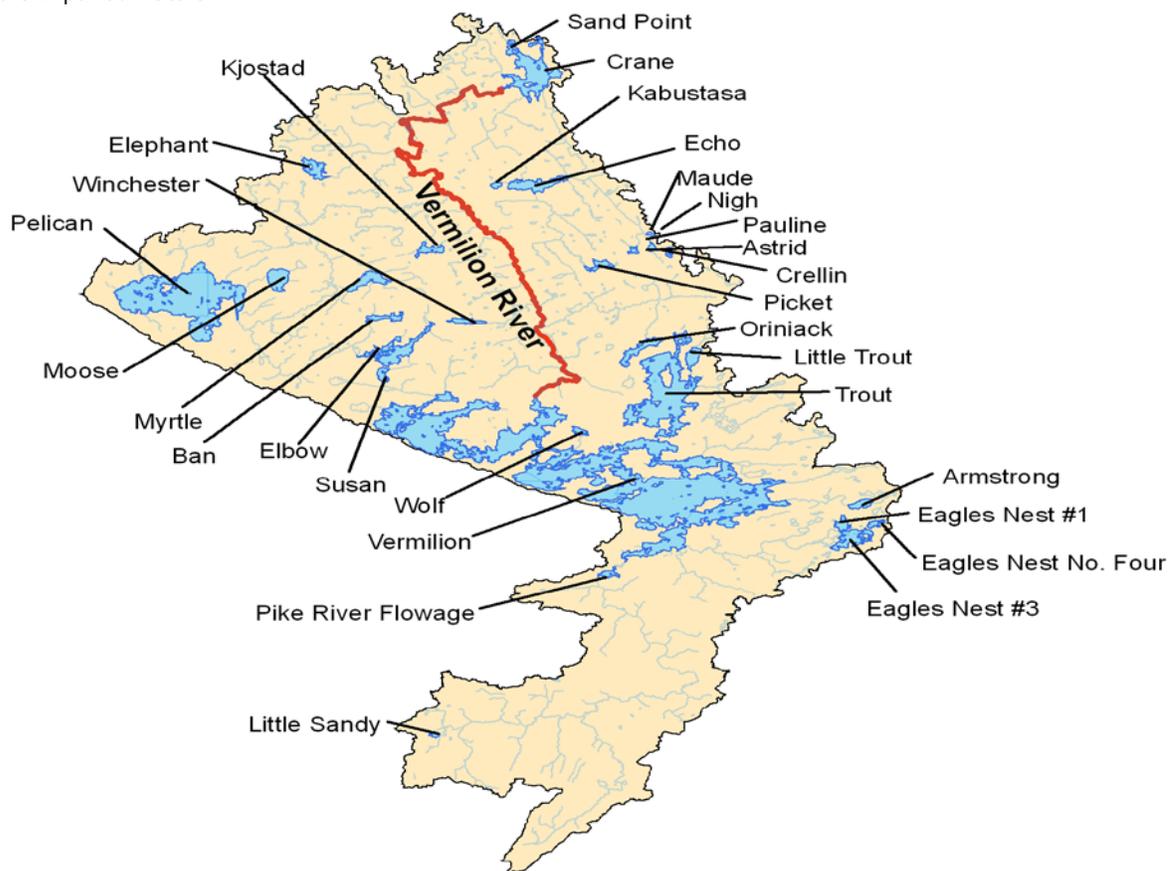
**Physical Description (continued)**

			cu. ft/sec	
<b>Stream Flow Data</b>	USGS 05129115 VERMILION RIVER NR CRANE LAKE, MN	<b>Total Avg.</b>	629.6	
		<b>May – Sept. Yield</b>	811	
<b>Stream Data</b> <sup>14</sup> (*Percent of Total HUC Stream Miles)		<b>ACRES/MILES</b>	<b>PERCENT</b>	
	Total Miles – (100K Hydro GIS Layer)	1581	---	
	Total Miles –303d/TMDL Listed Streams	42.6	2.7%	
<b>Riparian Land Cover/Land Use</b> <sup>15</sup> (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	<b>Land Use Type</b>	<b>Acres</b>	<b>Percent</b>	
	Forest	18,831	50.1%	
	Grain Crops	0	0.0%	
	Grass, etc	428	1.1%	
	Orchards	0	0.0%	
	Row Crops	14	0.0%	
	Shrub etc	1,546	4.1%	
	Wetlands	5,928	15.8%	
	Residential/Commercial	199	0.5%	
	Open Water*	10,651	28.3%	
		<b>Total Buffer Acres</b>	<b>37,597</b>	---
<b>Crop and Pastureland Land Capability Class</b> <sup>16</sup> (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	1 – slight limitations	0	0%	
	2 – moderate limitations	0	0%	
	3 – severe limitations	0	0%	
	4 – very severe limitations	0	0%	
	5 – no erosion hazard, but other limitations	0	0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	0	0%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
		<b>Total Crop &amp; Pastureland</b>	<b>0</b>	---
<b>Irrigated Lands</b> <sup>17</sup> (1997 NRI Estimates for Non-Federal Lands Only)	<b>TYPE OF LAND</b>	<b>ACRES</b>	<b>% of Irrigated Lands</b>	<b>% of HUC</b>
	Cultivated Cropland	0	0%	0%
	Uncultivated Cropland	0	0%	0%
	Pastureland	0	0%	0%
	<b>Total Irrigated Lands</b>	<b>0</b>	<b>0%</b>	<b>0%</b>

- NOT RATED -

## Assessment of Waters<sup>8</sup>

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.



Listed Waterbody	Impairment	Affected Use	Listed Waterbody	Impairment	Affected Use
Vermilion River Vermilion Lk to Hilda Cr	Mercury	Aquatic Consumption	Maude	Mercury	Aquatic Consumption
Vermilion River Hilda Cr to Pelican R	Mercury	Aquatic Consumption	Picket	Mercury	Aquatic Consumption
Vermilion River Pelican R to Crane Lk	Mercury	Aquatic Consumption	Echo	Mercury	Aquatic Consumption
Eagles Nest No. Four	Mercury	Aquatic Consumption	Crane	Mercury	Aquatic Consumption
Armstrong	Mercury	Aquatic Consumption	Sand Point	Mercury	Aquatic Consumption
Eagles Nest #1	Mercury	Aquatic Consumption	Kabustasa	Mercury	Aquatic Consumption
Eagles Nest #3	Mercury	Aquatic Consumption	Winchester	Mercury	Aquatic Consumption
Vermilion	Mercury	Aquatic Consumption	Little Sandy	Mercury	Aquatic Consumption
Little Trout	Mercury	Aquatic Consumption	Susan	Mercury	Aquatic Consumption
Nigh	Mercury	Aquatic Consumption	Ban	Mercury	Aquatic Consumption
Crellin	Mercury	Aquatic Consumption	Elbow	Mercury	Aquatic Consumption
Trout	Mercury	Aquatic Consumption	Kjostad	Mercury	Aquatic Consumption
Pike River Flowage	Mercury	Aquatic Consumption	Myrtle	Mercury	Aquatic Consumption
Wolf	Mercury	Aquatic Consumption	Moose	Mercury	Aquatic Consumption
Oriniack	Mercury	Aquatic Consumption	Elephant	Mercury	Aquatic Consumption
Pauline	Mercury	Aquatic Consumption	Pelican	Mercury	Aquatic Consumption
Astrid	Mercury	Aquatic Consumption			

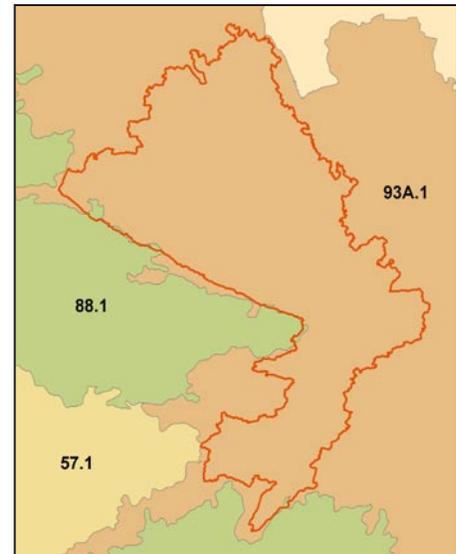
## Common Resource Areas

The Vermilion Watershed encompasses three Common Resource Areas, CRA 57.1, 88.1 and 93A.1.

**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 grass-land, 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.

**93A.1 Superior Upland Bedrock and Till Complex:** Gently sloping to very steep soils that generally formed in loamy, dense glacial till. Bedrock control is common and outcrops in many places, especially in the Boundary Water area. Bogs are common, both dysic and euc in reaction. Deciduous and coniferous forestland is the main land use. Small areas of cropland, pasture and hayland occur. Resource concerns are timber harvest management, wildlife habitat management, forage production, and riparian management.



Only the major CRA units are described above.

For further information, go to:

<http://soils.usda.gov/survey/geography/cra.html>

## Soils / Geology

Soil distribution and bedrock geology in the Vermilion watershed varies regionally and is most easily summarized according to ecological classification system subsection descriptions.

**Nashwauk Uplands:** The soils consist of sandy to fine-loamy glacial tills and outwash sands. Soils on the Nashwauk Moraine have a loamy cap with dense basal till below at depths of 20 to 40 inches. They are classified as boralfs (cold, well drained soils developed under forest vegetation). North of Giants Range, soils are coarse-loamy to sandy. The soils are a diverse mix of boralfs, orthents, and ochrepts (Anderson and Grigal 1984).

Thickness of glacial drift ranges from very thin to thick (greater than 100 feet). Along the northern edge of the Mesabi Range is a 200 to 400 foot highland of granite known as the Giants Range (Wright 1972); this ridge is covered with thin, discontinuous layer of glacial drift. Immediately to the south is the iron-formation of the range, which has been heavily mined, first for "soft" iron ore, and later for taconite (Wright 1972). The Precambrian (Late Archean and Early Proterozoic) bedrock includes gneiss, undifferentiated granite, and metamorphosed mafic to intermediate volcanic and sedimentary rocks (Morey 1976).

**Border Lakes:** The soils are derived from a mantle of acid, cobbly, and gravelly glacial till of variable depth. Coarse-loamy to coarse soil textures are most common. There are small areas of sandy and clayey lacustrine soil in the western portion of the subsection. About 5 percent of the unit is occupied by organic soils. The soils are classified as Ochrepts, with localized Aquents and Hemists (Anderson and Grigal 1984).

Thin glacial drift covers much of the subsection, and bedrock exposures are common (Department of Soil Science, University of Minnesota 1981b). The subsection has Precambrian-age (Late Archean and Early Proterozoic) bedrock, including gneiss, undifferentiated granite, and metamorphosed mafic to intermediate volcanic and sedimentary rocks (Sims et al. 1970c, Morey 1976).

## Drainage Classification

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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.”



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.

## Farmland Classification

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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

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

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



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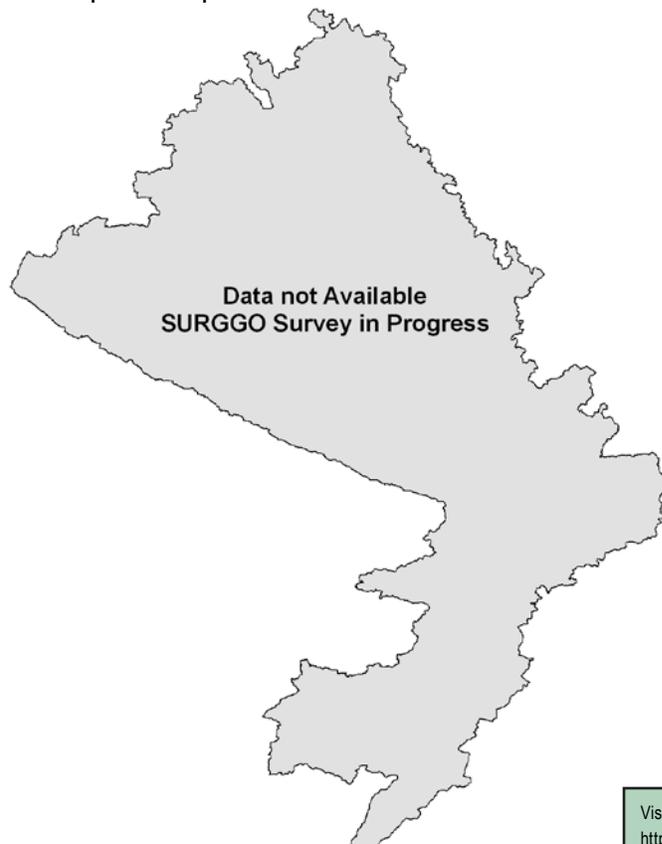
## Highly Erodible Land (HEL)

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

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

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



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## Land Capability Classification

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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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## RESOURCE CONCERNS

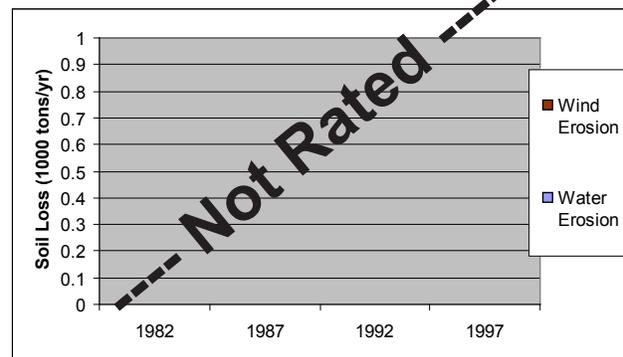
County Soil and Water Conservation Districts have identified the following concerns as top priorities for conservation and cost sharing efforts in the watershed:

- Surface Water Quality:** Enhancement of surface waters. Reduction of priority pollutants and sediments in surface waters will enhance economic development opportunities by preserving the environmental features that promote and attract tourists and fishermen to the area and improve the quality of water supply in the region.
- Wetland Management:** Natural wetland protection, wetland creation and restoration; and wetland construction for water quality improvement. Establishing high priority wetland areas and enforcing future wetlands legislation to take advantage of opportunities to enhance the wetland resources of the watershed will ensure the vitality of the resources and natural communities of the basin.
- Woodland Management:** Priorities include preventing, mitigating, or controlling diseases and pests on public and private forest lands, planting trees or shrubs, restoring prairies, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and many other practices or projects.
- Implementation and management of a geographic information system and geologic atlas** for counties in the region. A comprehensive database will enable expedient decisions in resource management, protection, and area planning.
- Management of Excessive Wetness:** Hydric nature of much of the basin's soils limits productivity and viability of land for agricultural and some silvicultural uses. Efforts such as tiling, species selection, critical planting, and wetland mitigation aid in combating the wetness common to much of the area.
- Short Growing Season:** Given the short growing season, timely planting, management of moisture, and appropriate seed selection is crucial for a successful crop. Planting delay and short-time concentrated precipitation in the growth season are the main causes of yield reduction.



## NRI Erosion Estimates <sup>13</sup>

- NRI Estimates for wind erosion and sheet and rill erosion are not available at the 8-digit HUC level for this sub-basin.



**THREATENED AND ENDANGERED SPECIES** <sup>14</sup>

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, candidate species and species of special concern that occur in the basin.



Scientific Name	Common Name	Type
<i>Acipenser fulvescens</i>	Lake Sturgeon	Vertebrate Animal
<i>Botrychium lanceolatum</i>	Triangle Moonwort	Vascular Plant
<i>Botrychium minganense</i>	Mingan Moonwort	Vascular Plant
<i>Botrychium pallidum</i>	Pale Moonwort	Vascular Plant
<i>Caloplaca parvula</i>	A Species of Lichen	Fungus
<i>Caltha natans</i>	Floating Marsh-marigold	Vascular Plant
<i>Cicindela denikei</i>	Laurentian Tiger Beetle	Invertebrate Animal
<i>Claytonia caroliniana</i>	Carolina Spring-beauty	Vascular Plant
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	Vascular Plant
<i>Eleocharis quinqueflora</i>	Few-flowered Spike-rush	Vascular Plant
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Vertebrate Animal
<i>Ichthyomyzon fossor</i>	Northern Brook Lamprey	Vertebrate Animal
<i>Lobaria quercizans</i>	Smooth lungwort	Fungus
<i>Myotis septentrionalis</i>	Northern Myotis	Vertebrate Animal
<i>Potamogeton vaseyi</i>	Vasey's Pondweed	Vascular Plant
<i>Rhynchospora fusca</i>	Sooty-colored Beak-rush	Vascular Plant
<i>Sparganium glomeratum</i>	Clustered Bur-reed	Vascular Plant
<i>Sticta fuliginosa</i>	Peppered moon lichen	Fungus
<i>Subularia aquatica</i>	Awlwort	Vascular Plant

**Socioeconomic and Agricultural Data (Relevant)**

The Vermilion subbasin has a population of approximately 6,300 people. Median household income throughout the district is slightly more than \$37,750 annually, roughly 81% of the national average. Unemployment in the subbasin is estimated at 5.0%, and approximately 12% of the residents in the watershed are below the national poverty level.



There are 149 Farms in the Vermilion watershed. Approximately 66 percent of the operations are less than 180 acres in size, 34 percent are 180 to 1,000 acres in size, and the remaining farms are greater than 1,000 acres. Average farm size throughout the basin is 27 acres. Of the 144 operators in the watershed, fifty two percent are full-time producers not reliant on off farm income.

<b>(MN) HUC# 9030002</b>		<b>Total Acres:</b>	<b>660,187</b>
<b>Population Data*</b>	Watershed Population	6,300	
	Unemployment Rate	5.0%	
	Median Household Income	37,758	
	% below poverty level	12%	
	Median Value of Home	74,600	
<b>Farm Data</b>	# of Farms	149	
	# of Operators	144	<b>Percent</b>
	# of Full Time Operators	75	52%
	# of Part Time Operators	69	48%
	<b>Total Cropland Acres</b>	<b>13,598</b>	<b>2.1%</b>
<b>Farm Size</b>	1 to 49 Acres	39	26%
	50 to 179 Acres	59	40%
	180 to 499 Acres	42	28%
	500 to 999 Acres	9	6%
	1,000 Acres or more	1	1%
	<b>Average Farm Size</b>	<b>27</b>	
<b>Livestock &amp; Poultry*</b>	Cattle - Beef	869	22%
	Cattle - Dairy	192	5%
	Chicken	541	14%
	Swine	79	2%
	Turkey	19	0%
	Other	2,193	56%
	<b>Animal Count Total:</b>	<b>3,893</b>	
	<b>Total Permitted AFOs:</b>	<b>37</b>	
<b>Chemicals (Acres Applied)</b>	Insecticides	894	
	Herbicides	7,132	
	Wormicides	0	
	Fruiticides	73	
	<b>Total Acres Treated</b>	<b>8,100</b>	
	<b>% State Chemical Totals</b>	<b>0.1%</b>	

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

## Watershed Projects, Plans and Monitoring

- Long-term water quality monitoring in the Greater Rainy River Watershed. The Northeast Region Sustainable Development Partnership joined with the Minnesota DNR and seven partners in both Canada and the United States to support water quality monitoring and environmental education involving an interagency, inter-scholastic and international cooperation. Koochiching County Environmental Services is the project coordinator. The sponsoring entity was the Rainy / Rapid River Board
- Tomorrow's Habitat for the Wild and Rare: Little Fork Vermilion Uplands; An Action Plan for Minnesota Wildlife, Minnesota DNR. Study outlining 67 Species in Greatest Conservation Need (SGCN). Though occurring in an adjacent area, the Study provides suggestions on priority conservation actions to maintain, enhance, and protect the key habitats for the SGCN's occurring within the region.
- Vermilion River Management Plan, St. Louis County, MPCA. a comprehensive river initiative for northern Minnesota concentrating on the historic preservation and riparian restoration of the Vermilion River. Plan seeks to balance needs in the watershed as they relate to wetlands, tourism, zoning, roads, river access and the mix of government authority.
- Minntac Water Inventory Reduction EIS, Minntac, MPCA. The objective is to determine how potential changes in surface water hydrology and water quality may affect aquatic organisms and communities in St. Louis County, Minnesota impacted by discharge from the Minntac tailings basin. Considers the impacts on state and federal threatened and endangered aquatic invertebrate species, and other sensitive invertebrate species of concern within the Dark River, Sturgeon River, and Little Fork River drainage, and the Sandy River and Pike River drainage into and including Lake Vermilion.
- Vermillion River Plan (Implementation), MPCA and International Joint Commission. Goals may include delineation of specific stream segments to be restored or protected, loading reductions to be achieved, type and amount of habitat to be restored, identification of water management issues and problems, conservation district goals, priority issues and waters, and coordination of citizen monitoring programs and efforts.
- Bois Forte Nett Lake Restoration Project, Phase I. Phase I of the Nett Lake Restoration Program involves the physical removal of rooted emergent plant communities and restoration of opportunity space for wild rice re-colonization. This is a stabilizing measure, intended to stop or reduce the rate of wild rice production decline. Phase II of the program was implemented in 2006. This phase will include more intensive land management actions to reduce beaver impoundment and stagnancy.
- Lake Vermilion Study, Sportmans Club of Lake Vermilion, NRRI / UMD. The Sportsmen's Club of Lake Vermilion initiated a study to evaluate effect of taconite tailing basins in the area on the lake's water quality.



## Conservation Districts, Organizations & Partners

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| <ul style="list-style-type: none"> <li>               • <b>Bois Forte Department of Natural Resources</b><br/>               5344 Lakeshore Drive Nett Lake, MN 55772<br/>               Phone: 218-757-3261             </li> </ul>                 | <ul style="list-style-type: none"> <li>               • <b>Sportsmen's Club of Lake Vermilion</b><br/>               P.O. Box 456 Cook, MN 55723<br/> <a href="http://www.lakevermilion.com/SCLV/index.html">http://www.lakevermilion.com/SCLV/index.html</a> </li> </ul>               |
| <ul style="list-style-type: none"> <li>               • <b>Iron Range Resources</b><br/>               4261 Hwy 53 South Eveleth, MN 55734-0441<br/>               Phone 218-744-7400             </li> </ul>  | <ul style="list-style-type: none"> <li>               • <b>North St. Louis County SWCD</b><br/>               307 1st St. S. Suite 114 Virginia MN 55792<br/>               Phone 218-742-9504             </li> </ul>  |
| <ul style="list-style-type: none"> <li>               • <b>Natural Resources Research Institute</b><br/>               5013 Miller Trunk Highway Duluth, MN 55811<br/>               Phone 218-720-4294             </li> </ul>                      | <ul style="list-style-type: none"> <li>               • <b>South St. Louis County SWCD</b><br/>               215 North 1st Avenue East, # 301, Duluth, MN 55802<br/>               Phone 218-723-4867             </li> </ul>  |
| <ul style="list-style-type: none"> <li>               • <b>International Joint Commission Great Lakes Office</b><br/>               100 Ouellette Ave., 8th Floor Windsor, ON N9A 6T3<br/>               Phone: 519-257-6733             </li> </ul> | <ul style="list-style-type: none"> <li>               • <b>Rainy River First Nations</b><br/>               Box 450 Emo, ON P0W 1E0<br/>               Phone 807-482-2479 Fax: (807) 482-2603             </li> </ul>   |
| <ul style="list-style-type: none"> <li>               • <b>MPCA Regional Office - Duluth</b><br/>               525 Lake Avenue S. # 400 Duluth, MN 55802<br/>               Phone 218-723-4660 or 800-657-3864             </li> </ul>              | <ul style="list-style-type: none"> <li>               • <b>Rainy River Basin Water Resources Center</b><br/>               Rainy River Community College<br/>               1501 Highway 71 International Falls, MN 56649<br/>               Phone 218-285-2218             </li> </ul> |

## 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: 20010631; 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)

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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/>. 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.