Rapid Watershed Assessment
Upper St. Croix
(MN/WI) HUC: 07030001

DRAFT

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.

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Introduction

The Upper St. Croix 8-Digit Hydrologic Unit Code (HUC) subbasin is located predominately in the Minnesota/Wisconsin Upland Till Plain portions of the Northern Lakes and Forest Ecoregion. This largely forested watershed is 1,316,404 acres in size.

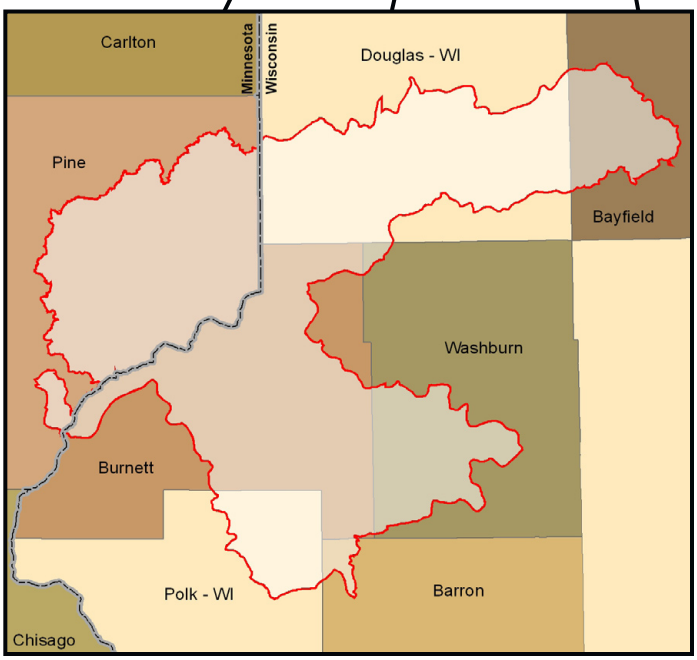
Approximately sixty two percent of the land in this HUC is privately owned, and the remainder is state, federal and county land, or held by corporate interests.

Assessment estimates indicate 1,291 farms located in the watershed. Sixty five percent of the operations are less than 180 acres in size, thirty three percent are from 180 to 1000 acres in size, and the remaining farms are larger than 1000 acres. Average farm size is 57 acres. Of the 1,216 operators in the basin, fifty percent are full-time producers not reliant on off-farm income.

The main resource concerns throughout the watershed are Woodland Management, Surfacewater Quality, Streambank Stabilization, Groundwater Quality and Quantity, Stormwater Management and Wetland management.

County Totals

County	Acres in HUC	% HUC
Pine	350,291	26.6%
Bayfield	84,273	6.4%
Douglas - WI	304,891	23.2%
Burnett	358,713	27.2%
Washburn	128,783	9.8%
Polk - WI	77,600	5.9%
Barron	11,881	0.9%
Total acres:	**1,316,404**	**100%**



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Physical Description

The Upper St. Croix River, located in both Wisconsin and Minnesota, begins its course in northwestern Wisconsin's Douglas County at Upper St. Croix Lake.The northern reaches of the river and its major tributary, the Namekagon river, are under federal protection as the St. Croix National Scenic Riverway.

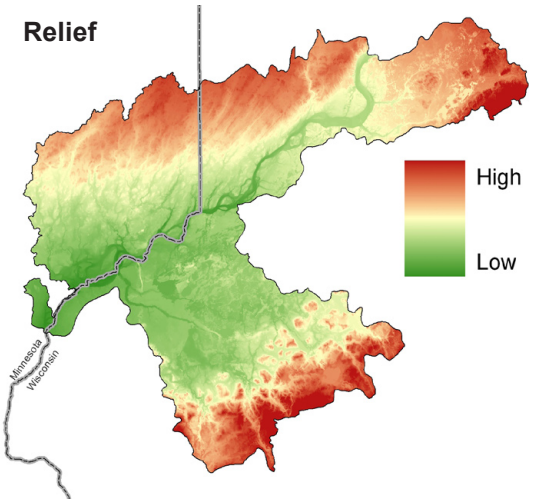
Elevation in the watershed ranges from a high of 1530 feet to a low of 790 feet above sea level, with the lowest levels occuring across the central portions of the basin along the river channels. Average precipitation in the watershed ranges from 29 to 33 inches each year.

Predominate land uses / land covers are Forest (63%), Wetlands (14%), Grass/Pasture/Hay (13%), Open Water (3.4%), and Residential/Commercial Development (3.2%).

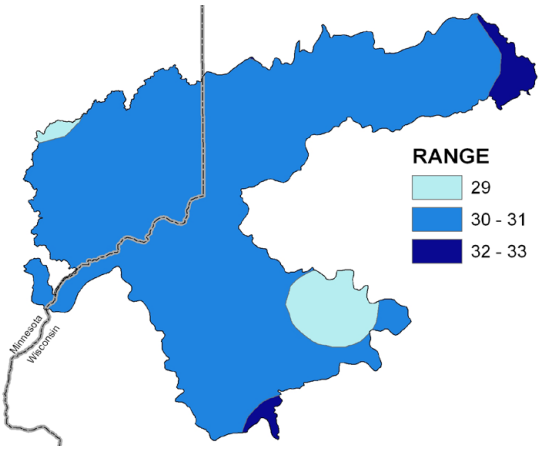
Land use within the watershed is modestly agricultural, accounting for approximately sixteen percent of the available acres.

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

Relief

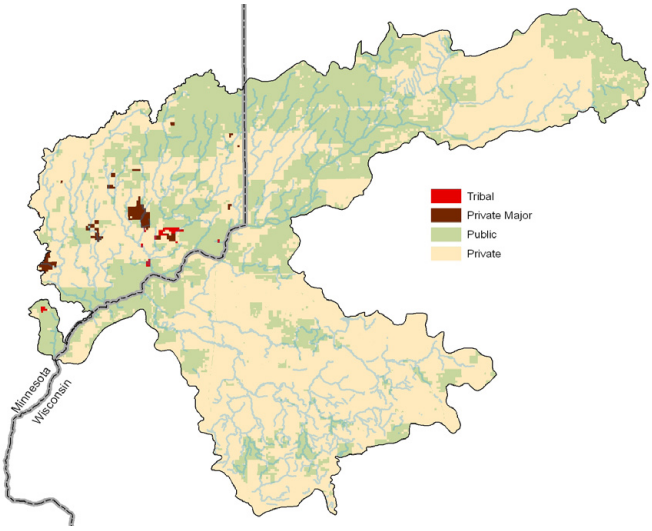


Average Precipitation



Ownership[1]

Ownership Type	Acres	% of HUC
Public	484,800	25.3
Tribal	1,891	0.1
Private Major	8,528	0.6
Private	821,185	62.4
Total Acres:	**1,316,404**	**100**

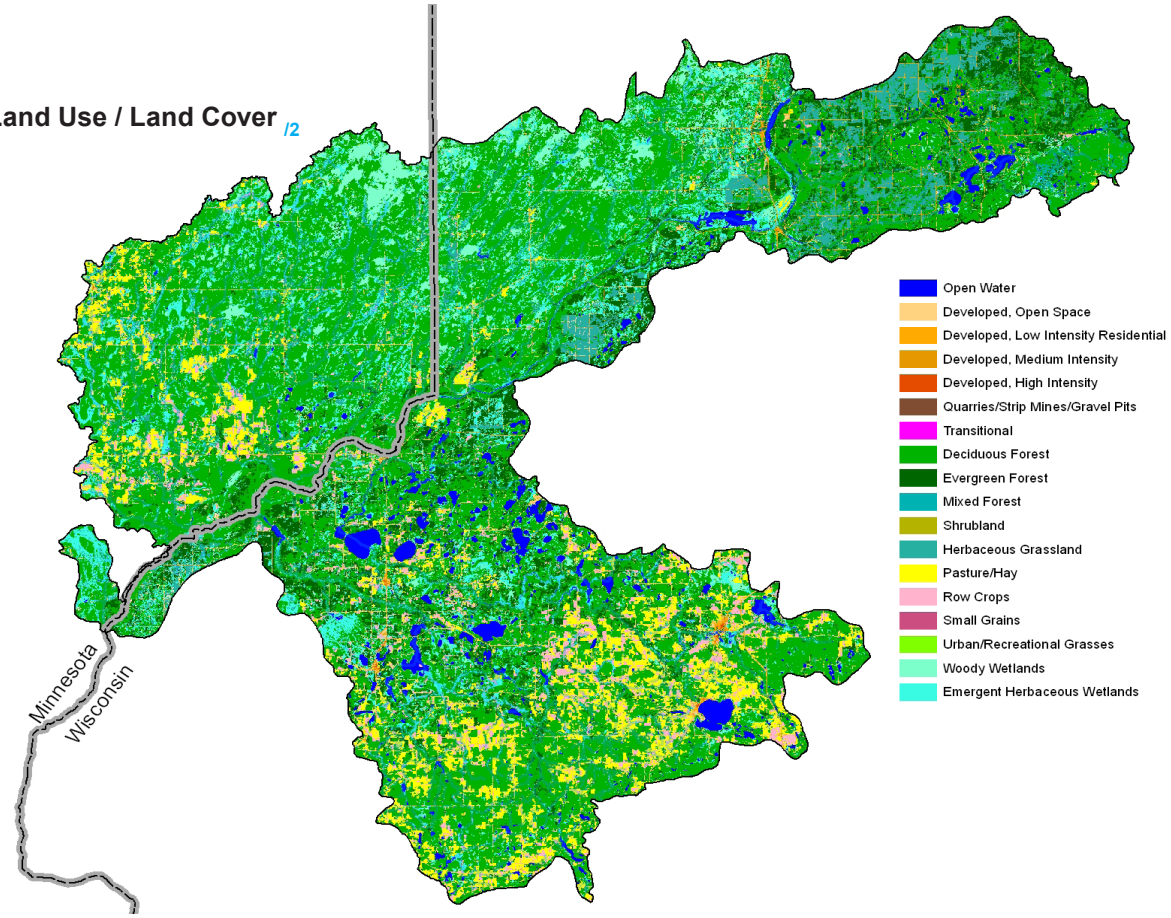


* Ownership totals derived from MN/WI GAP Stewardship Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The watershed covers an area of approximately 1,316,404 acres. Sixty two percent of the land in the watershed is Privately owned (821,185 acres). The second largest ownership type is Public (Federal, County, State and Municipal entities), with approximately 484,800 acres (36.8%), followed by Private Major (Corporate) with 8,528 acres (0.6%), and Tribal, with 1,891 acres (0.1%). Land use by ownership type is represented in the table below.

Land Use / Land Cover /2



Ownership / Land Use /3

	Public		Private**		Tribal			
Landcover/Use	**Acres**	**% Public**	**Acres**	**% Private**	**Acres**	**% Tribal**	**Total Acres**	**Percent**
Forest	346,135	26.3%	483,808	36.8%	1,517	0.1%	831,460	63.2%
Grass, etc	21,952	1.7%	146,074	11.1%	43	0.0%	168,069	12.8%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	1,710	0.1%	35,564	2.7%	8	0.0%	37,282	2.8%
Shrub etc	2,338	0.2%	2,630	0.2%	2	0.0%	4,970	0.4%
Wetlands	95,525	7.3%	91,660	7.0%	287	0.0%	187,472	14.2%
Residential/Commercial	6,590	0.5%	34,922	2.7%	22	0.0%	41,533	3.2%
Open Water*	5,877	0.4%	39,140	3.0%	12	0.0%	45,028	3.4%
Watershed Totals:	**484,800**	**36.8%**	**833,797**	**63.4%**	**1,891**	**0.1%**	**1,316,404**	**100%**

* ownership undetermined ** includes private-major

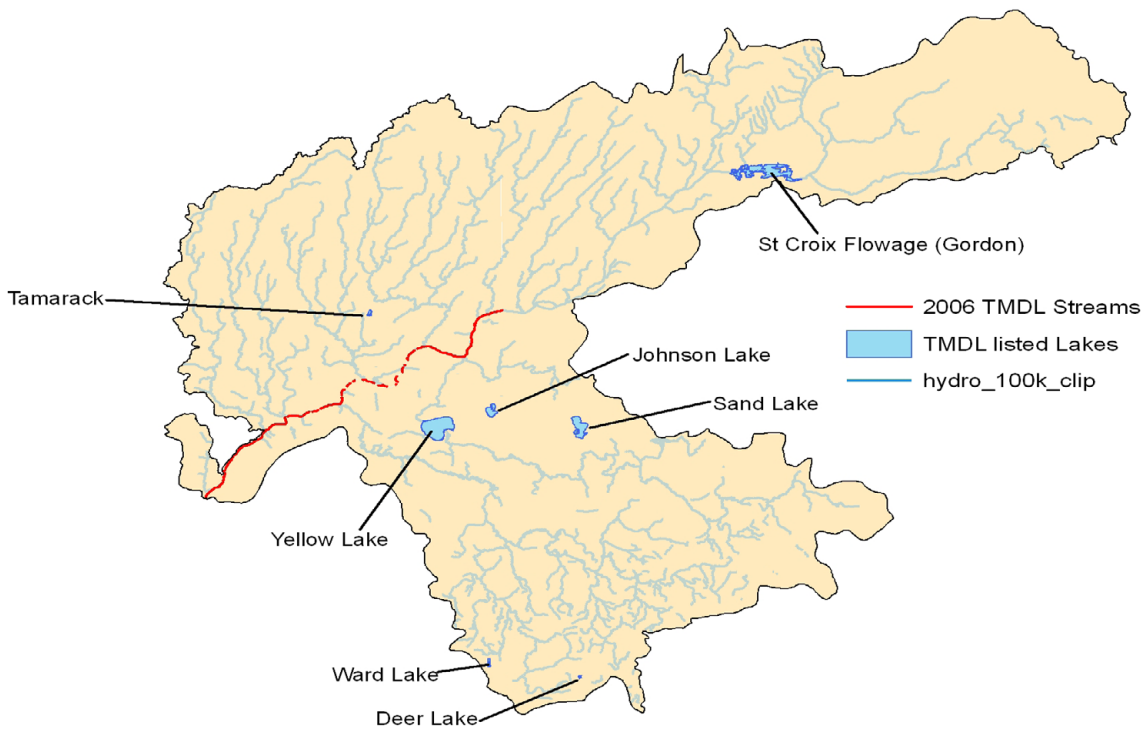
Physical Description (continued)

			cu. ft/sec	
Stream Flow Data	USGS 05333500 ST. CROIX RIVER NEAR DANBURY, WI	**Total Avg.**	783.3	
		May – Sept. Avg.	664.2	
Stream Data[4] *(*Percent of Total HUC Stream Miles)*		**Miles**	**Percent**	
	Total Miles – Major (100K Hydro GIS Layer)	1,332	---	
	303d/TMDL Listed Streams (DEQ)	25.4	1.9%	
Riparian Land Cover/Land Use[5] *(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)*	**Land Use Type**	**Acres**	**Percent**	
	Forest	17,313	53.9%	
	Grain Crops	0	0.0%	
	Grass, etc	2,545	7.9%	
	Orchards	0	0.0%	
	Row Crops	707	2.2%	
	Shrub etc	82	0.3%	
	Wetlands	7,923	24.7%	
	Residential/Commercial	587	1.8%	
	Open Water*	2,984	9.3%	
	Total Buffer Acres:	**32,141**	100%	
Crop and Pastureland Land Capability Class[6] *(MN portion NRI Non-irrigated Land Capability Classification)*	**1** – slight limitations	0	0%	
	2 – moderate limitations	6,200	16%	
	3 – severe limitations	16,600	43%	
	4 – very severe limitations	11,300	29%	
	5 – no erosion hazard, but other limitations	0	0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	2,600	7%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	2,000	5%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
	MN Croplands & Pasturelands	**38,700**	-	
	TYPE OF LAND	**Acres**	**Percent**	**% of Cropland**
Irrigated Lands[7] *(1997 NRI Estimates for Non-Federal Lands Only)*	**Cultivated Cropland / Pastureland**	1,236.1	0%	0%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	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) and Wisconsin DNR to identify and restore impaired waters.

2006 303d Listed Waters - Upper St. Croix Watershed[8]

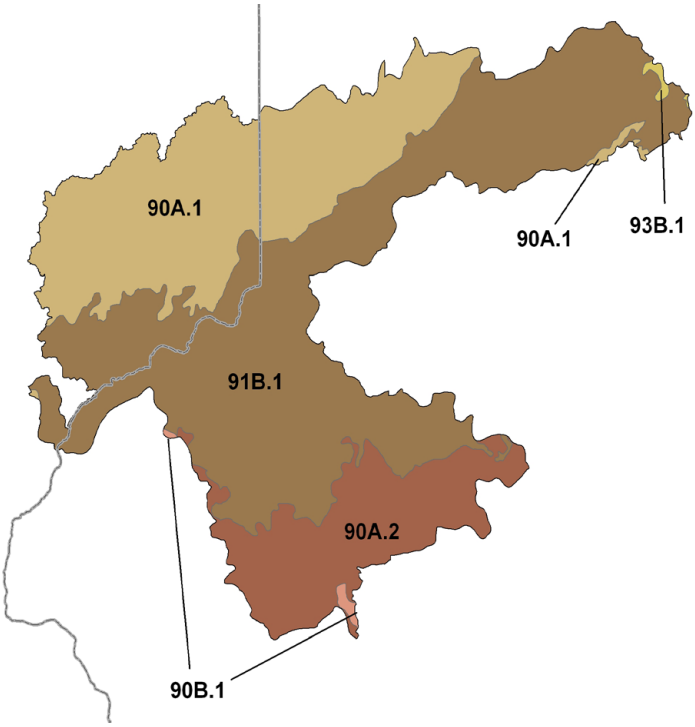


Waterbody Name	Impairment	Affected Use
St Croix River Kettle R to Snake R	Mercury, PCB	Aquatic Consumption
St Croix River Bear Cr to Kettle R	Mercury, PCB	Aquatic Consumption
St Croix River Sand Cr to Bear Cr	Mercury, PCB	Aquatic Consumption
St Croix River Clam R to Sand Cr	Mercury, PCB	Aquatic Consumption
St Croix River Crooked Cr to Clam R	Mercury, PCB	Aquatic Consumption
St Croix River Lower Tamarack R to Crooked Cr	Mercury, PCB	Aquatic Consumption
St Croix River Yellow R (WI) to Lower Tamarack R	Mercury, PCB	Aquatic Consumption
St Croix River Upper Tamarack R to Yellow R (WI)	Mercury, PCB	Aquatic Consumption
St Croix River MN/WI border to Upper Tamarack R	Mercury, PCB	Aquatic Consumption
Kettle River Grindstone R to St. Croix R	Mercury	Aquatic Consumption
Tamarack	Mercury	Aquatic Consumption

Common Resource Areas

Upper St. Croix encompasses five Common Resource Areas, 90A.1, 90A.2, 90B.1, 91B.1, and 93B.1[9]

90A.1 Loamy Till Ground Moraines and Drumlins: Nearly level to moderately steep, loamy, sandy, and organic soils. Mixed deciduous and coniferous forest is the primary land use with some glacial lakes and wetlands. Scattered cropland and grazing land are present. Cropland productivity is limited by the short length of the growing season. Primary resource concerns are timber management, wildlife habitat, recreation and agricultural forage production. Surface water quality is a localized concern.



90A.2 Northwest Wisconsin Ground Moraine: Gently and strongly sloping loamy soils underlain by dense acid loamy till. Cropland, grazing land and mixed deciduous and coniferous forest are the predominant land uses. Dairy and beef livestock production are the predominant agricultural enterprises with some cash grain. Lakes and wetlands are common. Primary resource concerns are soil erosion and nutrient management on cropland, surface and groundwater quality, shore land habitat management, and the demand for recreational properties on the lakes.

90B.1 Dense Till Ground Moraine: Nearly level and gently sloping moderately well and somewhat poorly drained loamy soils underlain by loamy glacial residuum and bedrock. Mostly cropland and grazing land, with areas of mixed deciduous and coniferous forest, wetlands, and a few lakes. Dairy and beef production with some cash grain are the primary agricultural enterprises. Primary resource concerns include nutrient management, cropland soil erosion, grazing land productivity, and forestry management.

91B.1 Northwest Wisconsin Outwash: Gently sloping to moderately steep outwash plains and moraines. Soils range from excessively drained sandy soils to very poorly drained organic soils. Mostly deciduous and coniferous forestland, pasture with more cropland in the western part. The primary resource concerns are forestland productivity, erosion control on cropland and timbered areas during harvest, upland wildlife habitat management, and recreation.

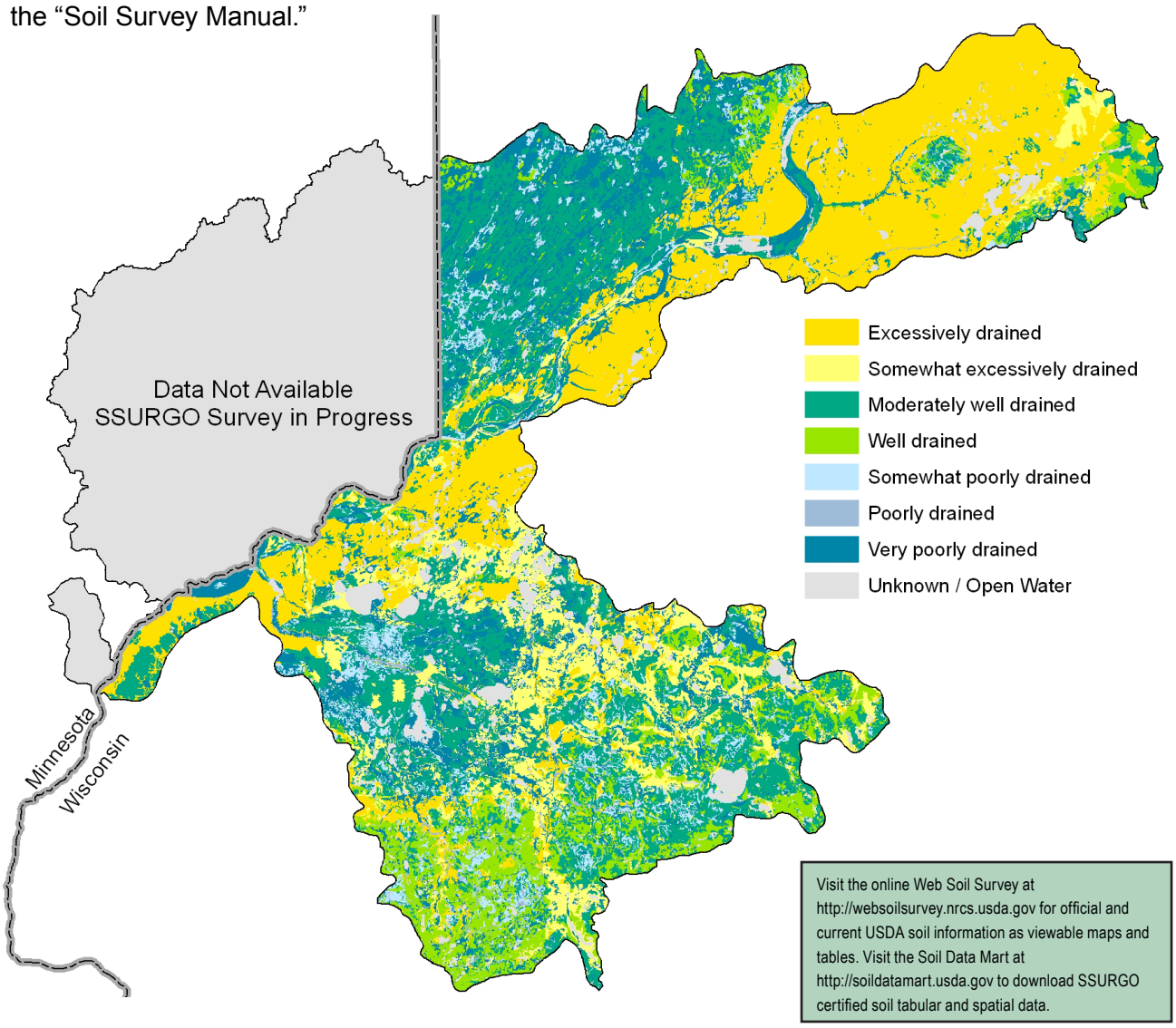
93B.1 Wingar and Morse Moraines: Gently sloping loamy and organic soils over acid sandy loam till and outwash. Mostly deciduous and coniferous forest, with common lakes and wetlands. Dominant land use is forestland and recreation. The primary resource concerns are soil erosion, groundwater quality, surface water quality, forestland productivity and wildlife habitat.

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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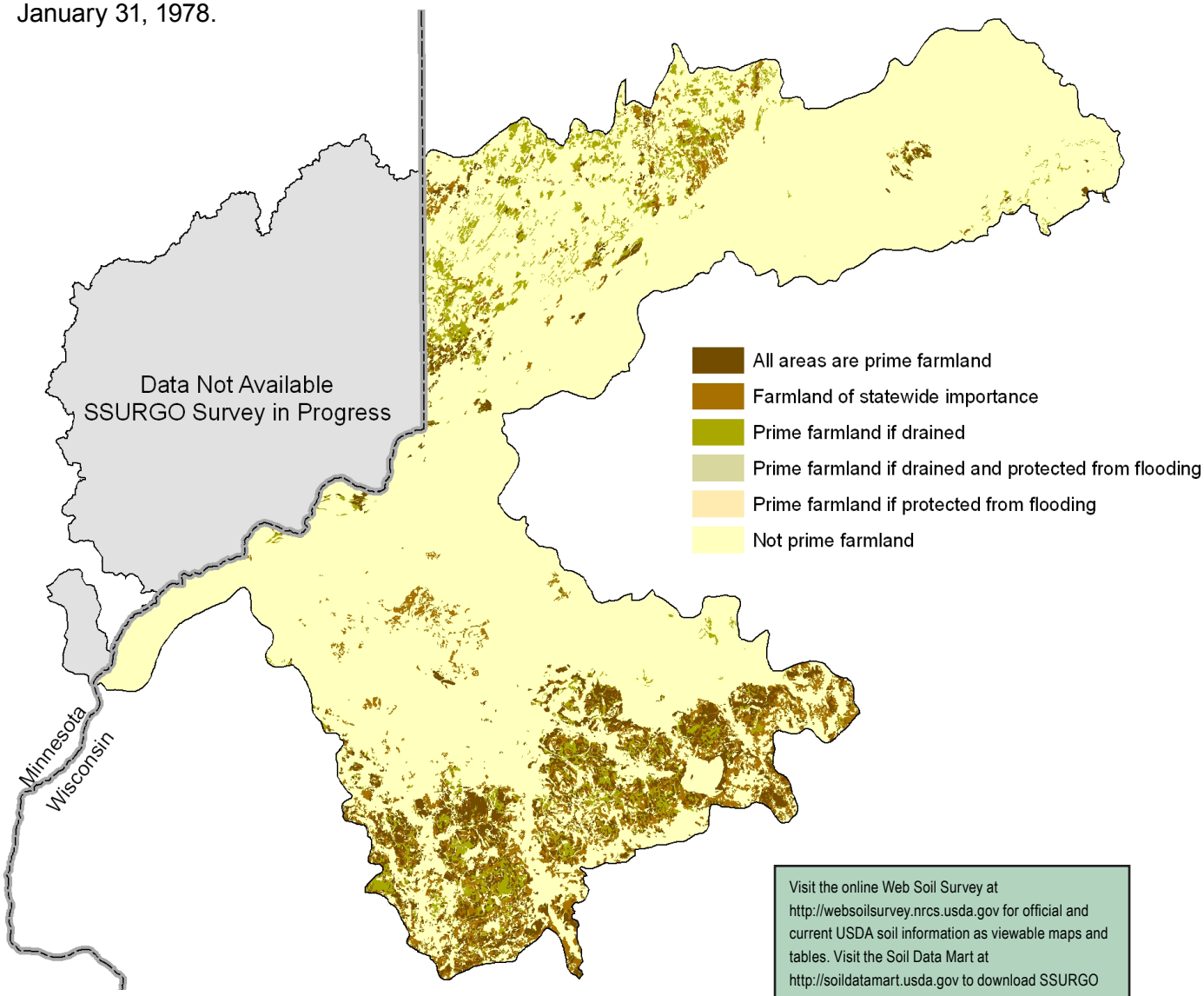
Note: Historical Drainage Class Determination Standards, scale, and methodology can vary on a county-to-county basis, leading to irregularities in thematic maps representing drainage classification determinations.

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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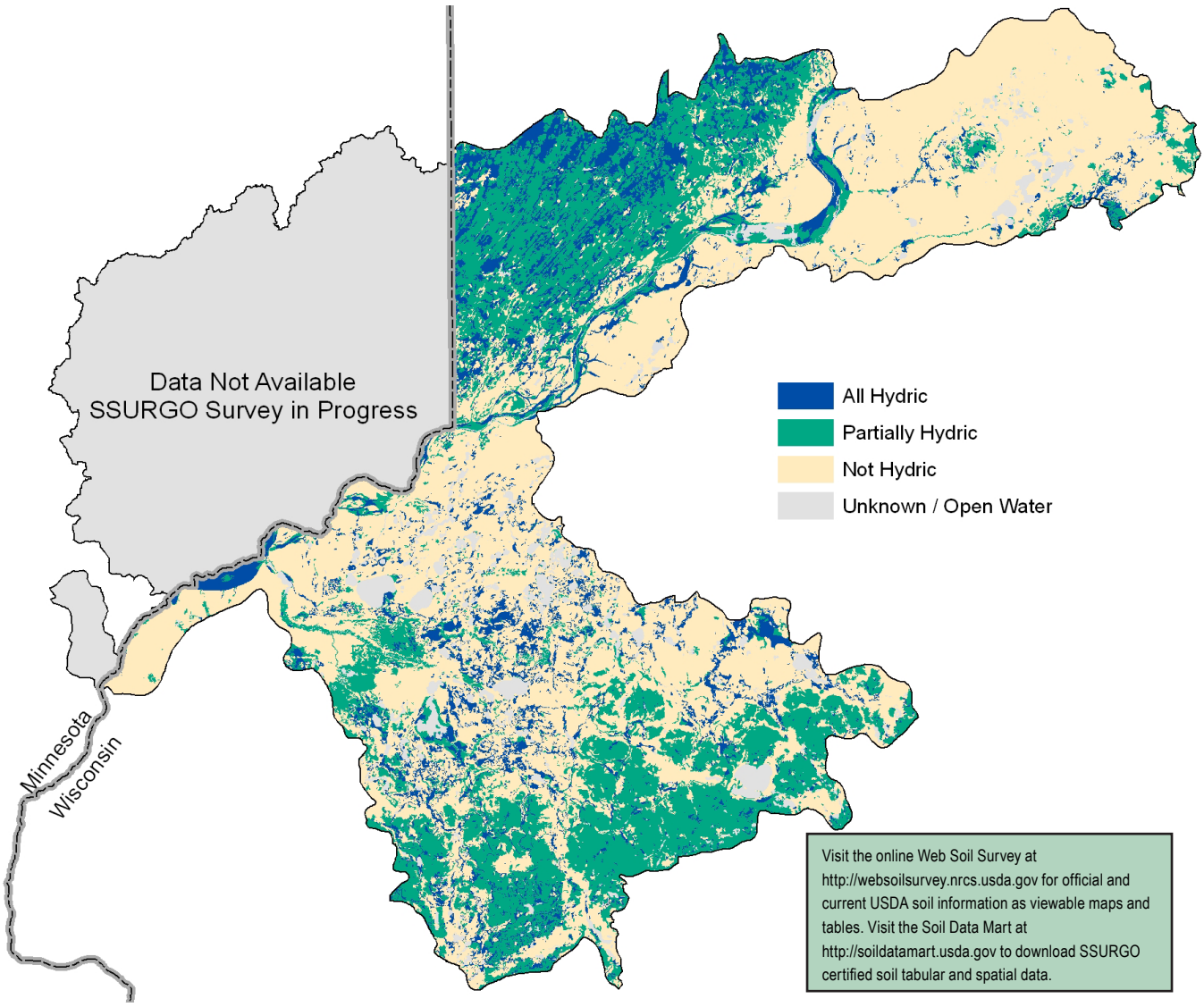
Hydric Soils

This rating provides an indication of the proportion of the map uni 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 dominantly non–hydric soils may therefore have inclusions of hyd 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 sa ration, flooding, or ponding long enough during the growing seaso to develop anaerobic conditions in the upper part" (Federal Regis 1994). These soils, under natural conditions, are either saturated inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



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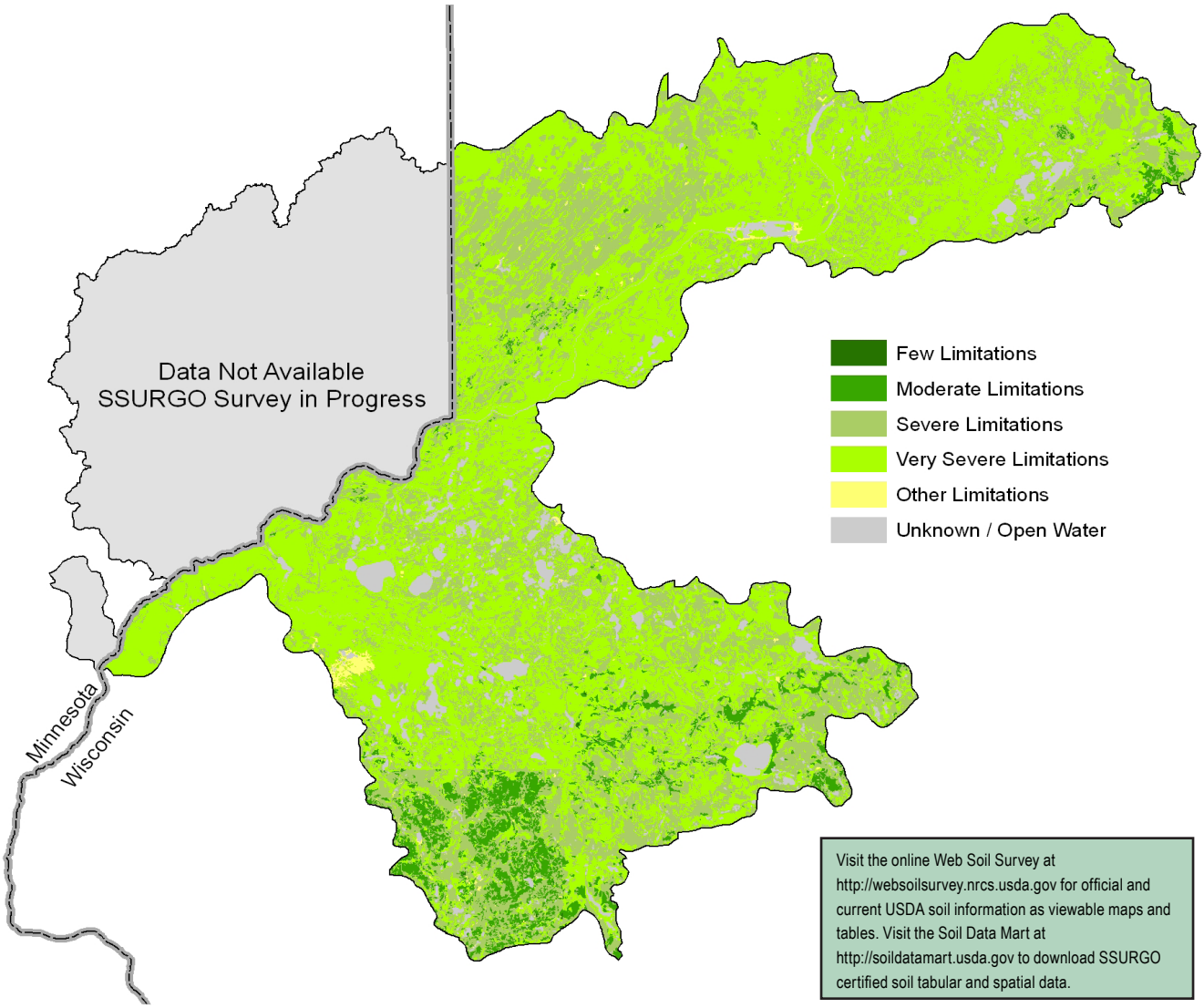
Land Capability Classification

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

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



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Performance Results System Data

Watershed Name: Upper St. Croix				Watershed Number: 07030001						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	MN & WI TOTALS
Total Conservation Systems Planned (acres)	545	15,495	2,738	1,992	868	N/A	4,357	3,027	1,995	31,017
Total Conservation Systems Applied (acres)	503	2,150	2,497	2,134	1,915	N/A	4,985	1,222	3,704	19,110
Conservation Practices										
Total Waste Management (313) (numbers)	0	0	2	0	0	0	1	0	0	3
Riparian Forest Buffers (391) (acres)	0	1	40	55	44	0	0	0	0	140
Erosion Control Total Soil Saved (tons/year)	218	22,674	534	318	1,137	N/A	N/A	N/A	N/A	24,881
Total Nutrient Management (590) (Acres)	418	20	1,313	717	642	989	0	0	601	4,700
Pest Management Systems Applied (595A) (Acres)	524	0	0	0	0	0	0	0	508	1,032
Prescribed Grazing 528a (acres)	0	1,500	31	436	32	583	236	448	448	3,714
Tree & Shrub Establishment (612) (acres)	7	15	643	392	396	46	25	8	69	1,601
Residue Management (329A-C) (acres)	41	3,372	551	34	68	550	584	91	125	5,416
Total Wildlife Habitat (644 - 645) (acres)	55	217	514	578	281	197	16	298	1,965	4,121
Total Wetlands Created, Restored, or Enhanced (acres)	0	9	39	24	29	0	62	0	0	163
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	115	66	99	364	103	N/A	0	0	0	747
Wetlands Reserve Program	0	0	0	35	0	N/A	0	0	0	35
Environmental Quality Incentives Program	0	1,719	2,266	259	1,579	N/A	3,833	553	3,037	13,246
Wildlife Habitat Incentive Program	31	43	210	0	16	N/A	1,079	224	614	2,217
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

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:

- **Woodland Management.** Districts seek to manage timber harvest and forestry practices to maintain 40% or less open space in riparian and priority areas. Management opportunities include planting trees or shrubs, timber stand improvement, timber sales, conversion to coniferous forests, enhancing wildlife habitat, and more.

- **Surface Water Quality, Nutrients, Sediment & Priority Pollutants.** Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing a fish community with depressed populations and limited diversity. Sediment, Mercury and other heavy metal levels are affecting the health of Aquatic communities, and affecting the consumption of fish in many areas of concern.

- **Ground Water Quality.** Nutrients, Organics, Animal and Human Wastewater managment. Aging septic systems, feedlot runoff, nutrient runoff, tilling practices, improper closure of old manure pits, and abandoned wells all pose threats to groundwater quality throughout the region. Improved management of wastewater ensures safe water for all uses.

- **Ground Water Quantity.** Land alterations have transformed the flow, retention, and replenishment of the hydrologic cycle. Pattern tiling, ditching, wetland removal, development, stormwater drainage, excessive groundwater use, etc. have resulted in the cumulative effect of rapidly transporting a greater amount of water to major rivers and streams, and away from groundwater recharge potential.

- **Streambank Stabilization.** Stabilizing stream banks can prevent the loss of land or damage to utilities, roads, buildings or other facilities adjacent to a watercourse, and prevent the loss of stream bank vegetation, reduce sediment loads to streams, maintain the capacity of the stream channel, improve the stream for recreational use or as habitat for fish and wildlife, and control unwanted meander of a river or stream.

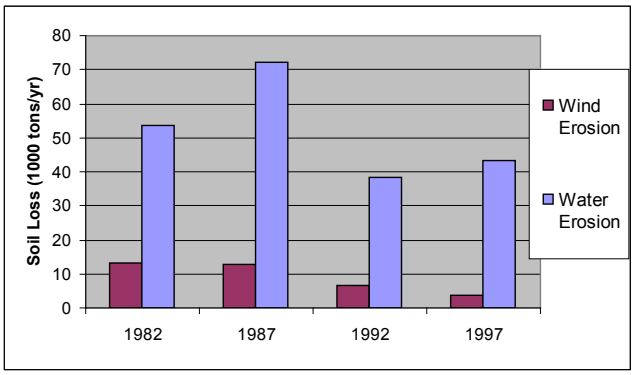
- **Stormwater Management.** Local districts recognize that runoff volume will likely increase as development of the watershed continues. Districts seek to require that peak runoff rates be kept below the capacity of downstream conveyance facilities through the use of retention measures.

- **Wetland Management.** Area groups recognize that development and logging have had major impacts on wetlands. Physical changes have taken place, wildlife and plant species composition have been altered, greatly changing the function and value of the areas plentiful wetlands.

NRI Erosion Estimates

- NRI estimates indicate sheet and rill erosion in the basin declined19.9% between 1982 and 1997, a reduction of 10,700 tons.

- Estimates for wind erosion indicate a reduction of 9,500 tons between 1982 and 1997 (72%). /13



THREATENED AND ENDANGERED SPECIES OF THE BASIN /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, candidate species and species of special concern that occur in the Minnesota portion of the basin.

Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
Acipenser fulvescens	Lake Sturgeon	Zoological	Hemidactylium scutatum	Four-toed Salamander	Zoological
Actinonaias ligamentina	Mucket	Zoological	Hydrocotyle americana	American Water-pennywort	Botanical
Agapetus tomus	A Caddisfly	Zoological	Ichthyomyzon gagei	Southern Brook Lamprey	Zoological
Alasmidonta marginata	Elktoe	Zoological	Lasmigona compressa	Creek Heelsplitter	Zoological
Botrychium lanceolatum	Triangle Moonwort	Botanical	Lasmigona costata	Fluted-shell	Zoological
Botrychium oneidense	Blunt-lobed Grapefern	Botanical	Ligumia recta	Black Sandshell	Zoological
Botrychium rugulosum	St. Lawrence Grapefern	Botanical	Lysimachia quadrifolia	Whorled Loosestrife	Botanical
Botrychium simplex	Least Moonwort	Botanical	Malaxis monophyllos var. brachypoda	White Adder's-mouth	Botanical
Buteo lineatus	Red-shouldered Hawk	Zoological	Najas gracillima	Thread-like Naiad	Botanical
Cicindela patruela patruela	Northern Barrens Tiger Beetle	Zoological	Obovaria olivaria	Hickorynut	Zoological
Cirsium hillii	Hill's Thistle	Botanical	Ophiogomphus susbehcha	St. Croix Snaketail	Zoological
Cladium mariscoides	Twig-rush	Botanical	Panax quinquefolius	American Ginseng	Botanical
Clemmys insculpta	Wood Turtle	Zoological	Percina evides	Gilt Darter	Zoological
Coturnicops noveboracensis	Yellow Rail	Zoological	Pituophis catenifer	Gopher Snake	Zoological
Cumberlandia monodonta	Spectaclecase	Zoological	Pleurobema coccineum	Round Pigtoe	Zoological
Cycleptus elongatus	Blue Sucker	Zoological	Poa paludigena	Bog Bluegrass	Botanical
Cyclonaias tuberculata	Purple Wartyback	Zoological	Potamogeton bicupulatus	Snailseed Pondweed	Botanical
Decodon verticillatus	Waterwillow	Botanical	Potamogeton vaseyi	Vasey's Pondweed	Botanical
Dendroica cerulea	Cerulean Warbler	Zoological	Seiurus motacilla	Louisiana Waterthrush	Zoological
Desmodium nudiflorum	Stemless Tick-trefoil	Botanical	Simpsonaias ambigua	Salamander Mussel	Zoological
Eleocharis olivacea	Olivaceous Spike-rush	Botanical	Torreyochloa pallida	Torrey's Manna-grass	Botanical
Elliptio dilatata	Spike	Zoological	Tsuga canadensis	Eastern Hemlock	Botanical
Emydoidea blandingii	Blanding's Turtle	Zoological	Utricularia purpurea	Purple-flowered Bladderwort	Botanical
Falco peregrinus	Peregrine Falcon	Zoological	Waldsteinia fragarioides	Barren Strawberry	Botanical
Haliaeetus leucocephalus	Bald Eagle	Zoological			

Socioeconomic and Agricultural Data (Relevant)

Estimations for the Upper St. Croix subbasin indicate a current population of approximately 33,918 people. Median household income throughout the area is $35,607yearly, or 77% of the national average. Unemployment is estimated at 5.9%, and approximately 10% of the residents in the watershed live below the national poverty level.

Assessment estimates indicate 1,291 farms located in the watershed. Approximately sixty five percent of the operations are less than 180 acres in size, thirty three percent are from 180 to 1000 acres in size, and the remaining farms are larger than 1000 acres. Average farm size is 57 acres. Of the 1,216 operators in the basin, fifty percent are full-time producers not reliant on off-farm income.

(MN) HUC# 7030001		Total Acres:	1,316,404
Population Data*	Watershed Population	33,918	
	Unemployment Rate	5.9%	
	Median Household Income	35,607	
	% below poverty level	10%	
	Median Value of Home	85,043	
Farm Data	# of Farms	1,291	
	# of Operators	1,216	**Percent**
	# of Full Time Operators	608	50%
	# of Part Time Operators	608	50%
	Total Cropland Acres	**143,077**	10.9%
Farm Size	1 to 49 Acres	527	22%
	50 to 179 Acres	1,034	43%
	180 to 499 Acres	628	26%
	500 to 999 Acres	157	7%
	1,000 Acres or more	54	2%
	Average Farm Size	**57**	
Livestock & Poultry	Cattle - Beef	8,349	6%
	Cattle - Dairy	8,760	6%
	Chicken	4,225	3%
	Swine	886	1%
	Turkey	47,023	33%
	Other	74,269	52%
	Animal Count Total:	143,512	
	Total Permitted AFOs (MN):	59	
Chemicals (Acres Applied)	Insecticides	1,282	
	Herbicides	10,274	
	Wormicides	0	
	Fruiticides	434	
	Total Acres Treated (MN Portion)	11,990	

* 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

Watershed Projects, Plans and Monitoring

- **Water Quality Monitoring**
  Friends of the St. Croix Headwaters
- **Phosphorus Index Study: St Croix Basin**
  University of Minnesota, US Geological Survey
- **Historic Land Use Reconstruction Project**
  Minnesota Pollution Control Agency, SLRCAC
- **Sediment Research and Monitoring**
  US Geological Survey, St Mary's University
- **Upper Mississippi Water Level Management**
  US Army Corps of Engineers
- **Conservation Action Planning (CAP)**
  The Nature Conservancy
- **Historic Resource Study**
  National Park Service
- **St. Croix Living History Project**
  Friends of the St. Croix Headwaters
- **Mussels of the St. Croix River Study**
  US FIsh and Wildlife Service
- **Upper St. Croix Lake Project**
  Upper St Croix Lake Association
- **Baseline and Pesticide Monitoring in USC Rivers**
  University of Wisconsin Stevens Point CWSE
- **Upper St Croix Watershed Alliance**
  Friends of the St. Croix Headwaters
- **St. Croix Basin Water Resources Team**
  MN Pollution Control Agency
- **St. Croix River Conservation Collaborative**
  University of Wisconsin, MN & WI Partners

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

Conservation Districts, Organizations & Partners

- **Ashland/ Bayfield Land Conservation Dept.**
  315 Sanborn Ave, Suite 100 Ashland, WI 54806
  715/682-7187
- **Barron County SWCD**
  330 East LaSalle Ave #221 Barron, WI 54812
  Phone (715) 537-6315
- **Burnett Land & Water Conservation Department**
  7410 County Rd K, #109 Siren, WI 54872
  Phone (715) 349-2186
- **Douglas Land & Water Conservation Department**
  1313 Belknap Street Superior, Wisconsin 54880
  Phone (715) 395-1266
- **Friends of the St. Croix Headwaters**
  PO Box 276 Gordon, WI 54838
  http://fotsch.org
- **Minnesota Department of Natural Resources**
  2305 E 5th Street Duluth, MN 55805
  Phone (218) 726-8106
- **Minnesota USDA/NRCS**
  375 Jackson Street #600 Saint Paul, MN 55101
  Phone (651) 602-7900
- **Pine County SWCD**
  260 Morris Ave N, Hinkley, MN 55037
  Phone (320) 384-7431
- **Polk Land & Water Conservation Department**
  100 Polk County Plaza, #120 Balsam Lake, WI 54810
  Phone (715) 485-8699
- **Washburn Land & Water Conservation Department**
  202 Vine Street Spooner, WI 54801
  Phone (715) 635-2453
- **Wisconsin Department of Natural Resources**
  101 S. Webster Street Madison,WI 53707
  Phone (608) 266-2621
- **Wisconsin USDA/NRCS**
  8030 Excelsior Drive Madison, WI 53717
  Phone (608) 662-4422

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. 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. USGS Gap Analysis Program - Wisconsin Stewardship Data: U.S. Geological Survey; Upper Midwest Environmental Sciences Center Publication Date: 9/1/2005

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. SSURGO - Nonirrigated Capability Class - Land Classification:This data is a derived product from the digital soil survey and generally is the most detailed level of soil geographic data developed by the National Cooperative Soil Survey. All the county layers were dissolved with single-part option using the attribute field, then merged into one layer using ArcMap 9.1 by MN NRCS RWA Staff to create this final product at the HUC8 Level. Land capability Classification was then extracted to areas classified as Crop and Pasture Land in the processed 2001 NLCD data.

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.

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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.

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/easementsummary.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 county in the HUC or by percent of block group area in the HUC, depending on the level of data available. Data were also taken from 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.

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