Rapid Watershed Assessment
Kettle River
(MN) HUC: 07030003

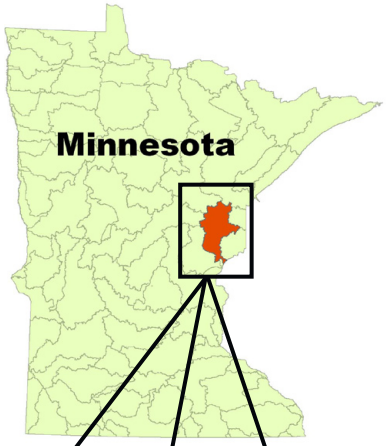
DRAFT

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.

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).
To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Introduction

The Kettle River 8-Digit Hydrologic Unit Code (HUC) subbasin is located in the Minnesota/Wisconsin Upland till plain portion of the Northern Lakes and Forest ecoregion of Minnesota. This largely forested watershed is 672,235 acres in size. Approximately seventy five percent of the land in this HUC is privately owned, and the remainder is tribal, state or federally owned land or held by major corporate interests.

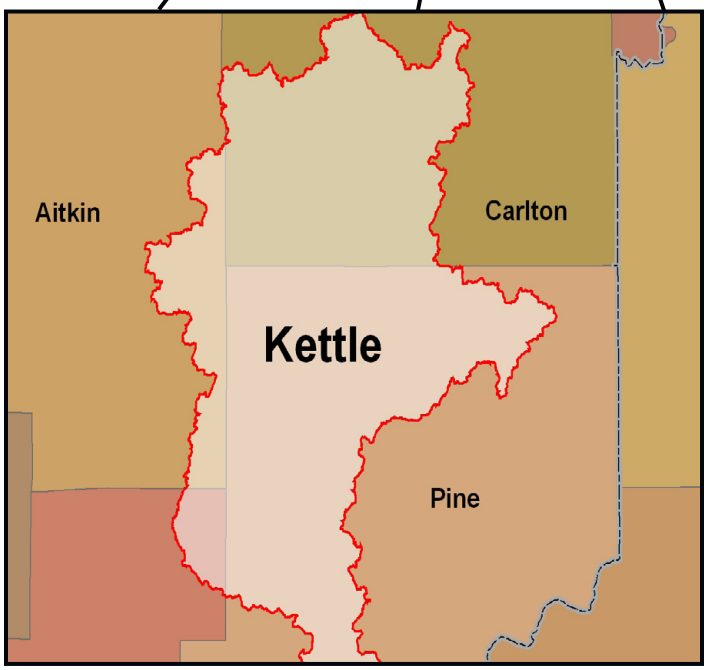


Assessment estimates indicate 796 farms located in the watershed. Approximately forty two percent of the operations are less than 180 acres in size, thirty six percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Fifty one percent of the producers are full time operators and do not rely on off-farm income.

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

County Totals

County	*Acres in HUC*	*% HUC*
Aitkin	67,320	10.0%
Carlton	229,645	34.2%
Pine	354,753	52.8%
Kanabec	20,517	3.1%
Total acres:	**672,235**	**100%**



The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).
To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Physical Description

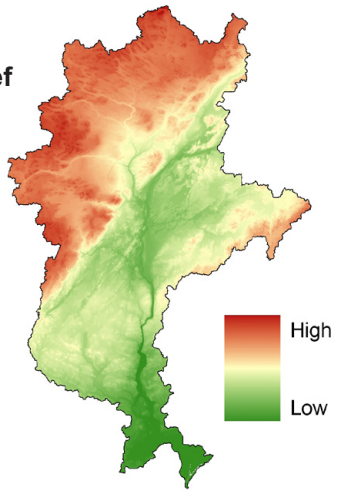
Elevation in the subbasin ranges from 816 to 1437 feet above mean sea level (MSL). The highest values largely occur in the and Northwestern portions of the watershed, while lower values are found across the Southwestern and central regions.

Precipitation in the watershed ranges from 29 to 31 inches annually. Evaporation estimates are between 28 to 32 inches annually (Minnesota State Climatologists Office, 1999).

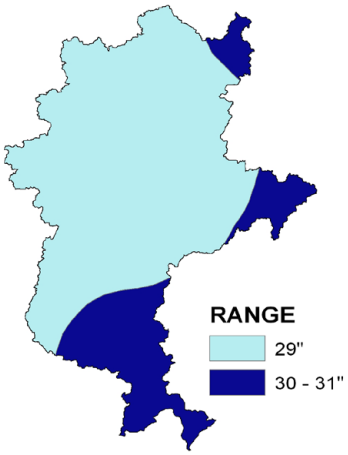
Much of the land within this HUC is not considered highly erodible, and is moderately suited to agricultural uses. Predominate land uses / land covers are Forest (55%), Wetlands (19%), Grass Pasture/Hay (18%), and Residential/Commercial Development (3.4%).

Agricultural land use within the Kettle River watershed accounts for approximately 20% of the available acres. Development pressure is largely moderate, with some farms, timberland, resorts and lakeshore being parceled out for development, recreation, or vacation homes.

Relief

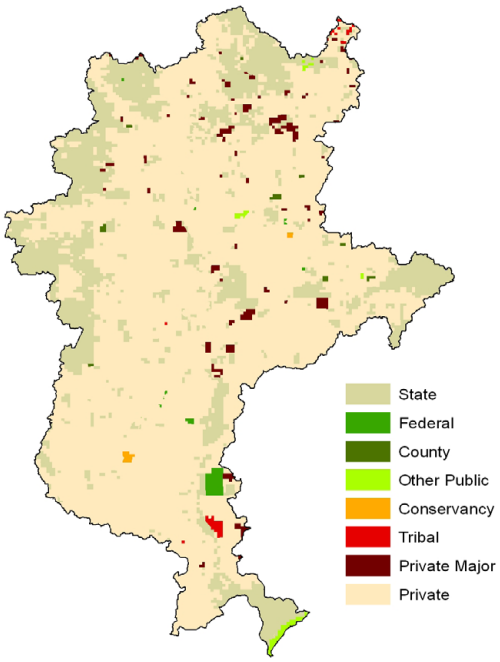


Average Precipitation



Ownership[1]

Ownership Type	Acres	% of HUC
Conservancy	659	0.1
County	1,157	0.2
Federal	2,666	0.4
State	151,700	22.6
Other Public	2,083	0.3
Tribal	1,629	0.2
Private Major	9,514	1.4
Private	502,828	74.8
Total Acres:	**672,235**	**100**



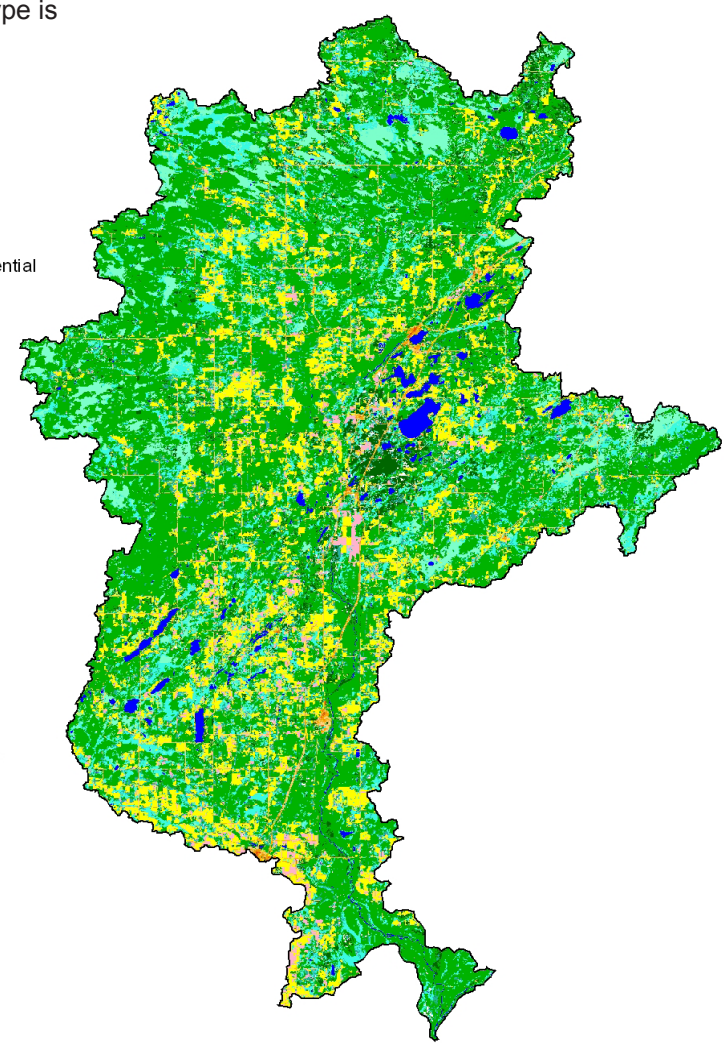
* Ownership totals derived from MN GAP Stewardship Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The watershed covers an area of 672,235 acres. Slightly less than seventy five percent of the land in the watershed is owned by private landholders (502,828 acres). The second largest ownership type is State, with approximately 151,700 acres (22.6%), followed by Private-Major (Corporate), with 9,519 acres (1.4%), Federal with 2,666 acres (0.4%), Miscellaneous "Other Pubic" lands amounting to 2,083 acres (0.3%) Tribal with 1,629 acres (0.2%), County with 1,157 acres (0.2%), and conservancy lands amounting to 659 acres (0.1%). Land use by ownership type is represented in the table below.

Land Use / Land Cover /2

- Open Water
- Developed, Open Space
- Developed, Low Intensity Residential
- Developed, Medium Intensity
- Developed, High Intensity
- Quarries/Strip Mines/Gravel Pits
- Transitional
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrubland
- Herbaceous Grassland
- Pasture/Hay
- Row Crops
- Small Grains
- Urban/Recreational Grasses
- Woody Wetlands
- Emergent Herbaceous Wetlands



Ownership / Land Use /3

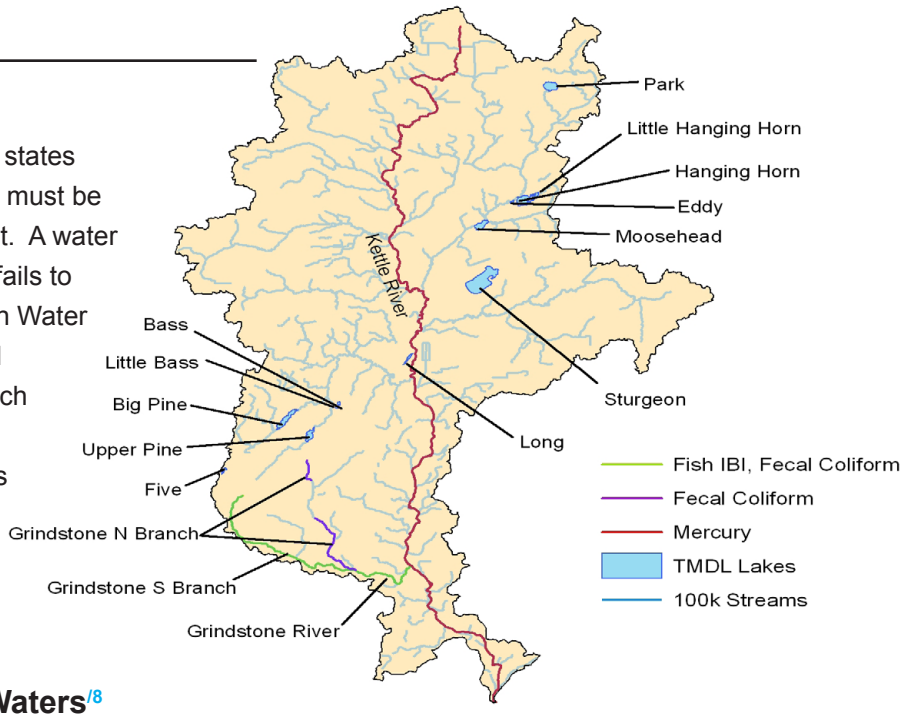
	Public		Private**		Tribal			
Landcover/Use	Acres	% Public	Acres	% Private	Acres	% Tribal	Total Acres	Percent
Forest	103,949	15.5%	265,087	39.4%	1,041	0.2%	370,077	55.1%
Grass, etc	4,381	0.7%	118,833	17.7%	86	0.0%	123,300	18.3%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	493	0.1%	12,590	1.9%	28	0.0%	13,110	2.0%
Shrub etc	718	0.1%	2,370	0.4%	4	0.0%	3,092	0.5%
Wetlands	43,449	6.5%	82,961	12.3%	299	0.0%	126,710	18.8%
Residential/Commercial	1,675	0.2%	21,422	3.2%	57	0.0%	23,154	3.4%
Open Water*	1,809	0.3%	10,869	1.6%	112	0.0%	12,790	1.9%
* ownership undetermined			** includes private-major					
Watershed Totals:	**156,473**	**23.28%**	**514,133**	**76.5%**	**1,627**	**0.2%**	**672,235**	**100%**

Physical Description (continued)

		ACRES	cu. ft/sec	
Stream Flow Data	USGS 05336700 KETTLE RIVER BELOW SANDSTONE, MN	**2007 Total Avg.**	305.0	
		May – Sept. Avg.	192.8	
Stream Data[4] *(*Percent of Total HUC Stream Miles)*		**Miles**	**Percent**	
	Total Miles – Major (100K Hydro GIS Layer)	780.9	---	
	303d/TMDL Listed Streams (DEQ)	114.7	14.7%	
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	9,126	48.4%	
	Grain Crops	0	0.0%	
	Grass, etc	2,085	11.0%	
	Orchards	0	0.0%	
	Row Crops	212	1.1%	
	Shrub etc	75	0.4%	
	Wetlands	5,510	29.2%	
	Residential/Commercial	418	2.2%	
	Open Water	1,448	7.7%	
	Total Buffer Acres:	**18,874**	--	
Crop and Pastureland Land Capability Class[6] *(Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)*	**1** – slight limitations	0	0%	
	2 – moderate limitations	75,400	44%	
	3 – severe limitations	33,000	19%	
	4 – very severe limitations	38,200	22%	
	5 – no erosion hazard, but other limitations	0	0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	15,200	9%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	11,100	6%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
	Total Croplands & Pasturelands	**172,900**	**-**	
	TYPE OF LAND	**ACRES**	**% of Irrigated Lands**	**% of Cropland**
Irrigated Lands[7] *(1997 NRI Estimates for Non-Federal Lands Only)*	**Cultivated Cropland / Pastureland**	778	100%	0.1%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	778	---	0.1%

Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.



2006 Minnesota 303d Listed Waters[8]

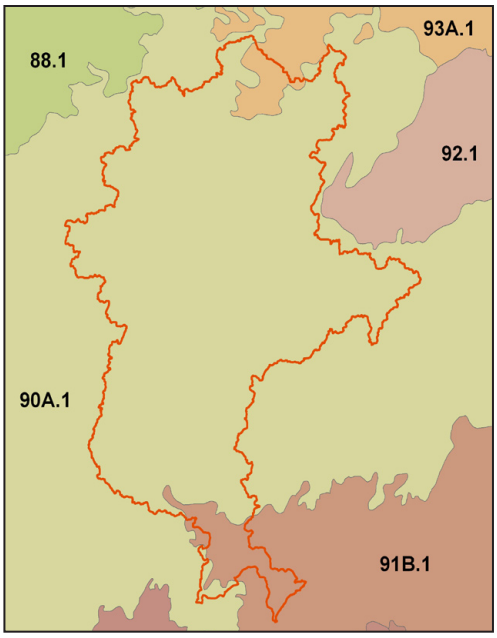
Waterbody Name	Impairment	Affected Use
Grindstone River Grindstone Reservoir to Kettle R	Fish IBI, Fecal Coliform	Aquatic Life and Aquatic Recreation
Kettle River Grindstone R to St. Croix R	Mercury	Aquatic Consumption
Kettle River Willow R to Pine R	Mercury	Aquatic Consumption
Kettle River Moose Horn R to Willow R	Mercury	Aquatic Consumption
Kettle River Birch Cr to Moose Horn R	Mercury	Aquatic Consumption
Kettle River Gillespie Brook to Split Rock R	Mercury	Aquatic Consumption
Kettle River Dead Moose R to Gillespie Brook	Mercury	Aquatic Consumption
Kettle River Headwaters to W Br Kettle R	Mercury	Aquatic Consumption
Grindstone River, South Branch Headwaters to Grind	Fish IBI, Fecal Coliform	Aquatic Life and Aquatic Recreation
Kettle River (Below Dam) Skunk Cr to Grindstone R	Mercury	Aquatic Consumption
Kettle River Dam (at Sandstone) to Skunk Cr	Mercury	Aquatic Consumption
Kettle River Pine R to Dam (at Sandstone)	Mercury	Aquatic Consumption
Kettle River W Br Kettle R to Dead Moose R	Mercury	Aquatic Consumption
Grindstone River, North Branch Headwaters to Grind	Fecal Coliform	Aquatic Recreation
Grindstone River, North Branch T42 R21W S33, north	Fecal Coliform	Aquatic Recreation
Kettle River Split Rock R to Carlton/Pine County l	Mercury	Aquatic Consumption
Kettle River Carlton/Pine County line to Birch Cr	Mercury	Aquatic Consumption
Park	Excess nutrients, Mercury	Aquatic Consumption
Little Hanging Horn	Mercury	Aquatic Consumption
Hanging Horn	Mercury	Aquatic Consumption
Eddy	Excess nutrients, Mercury	Aquatic Consumption
Moosehead	Mercury	Aquatic Consumption
Five	Mercury	Aquatic Consumption
Sturgeon	Mercury	Aquatic Consumption
Long	Mercury	Aquatic Consumption
Little Bass	Mercury	Aquatic Consumption
Bass	Mercury	Aquatic Consumption
Upper Pine	Mercury	Aquatic Consumption
Big Pine	Mercury	Aquatic Consumption

Common Resource Areas

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.

The Kettle River Watershed encompasses three common resource areas, CRA 90A.1, 91B.1, and 93A.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.



91B.1 Anoka Sand Plain and 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.

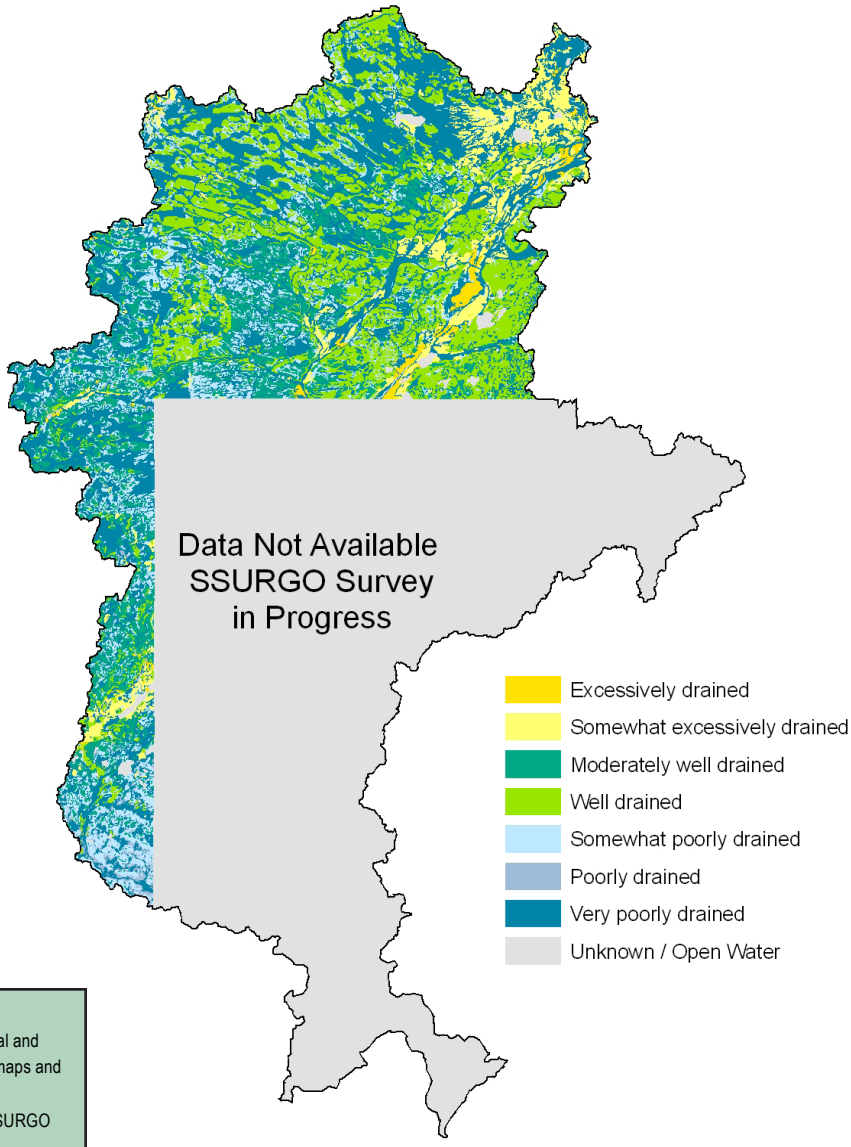
Only the major CRA units are described above.
For further information, go to:
http://soils.usda.gov/survey/geography/cra.html

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 euic 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

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."



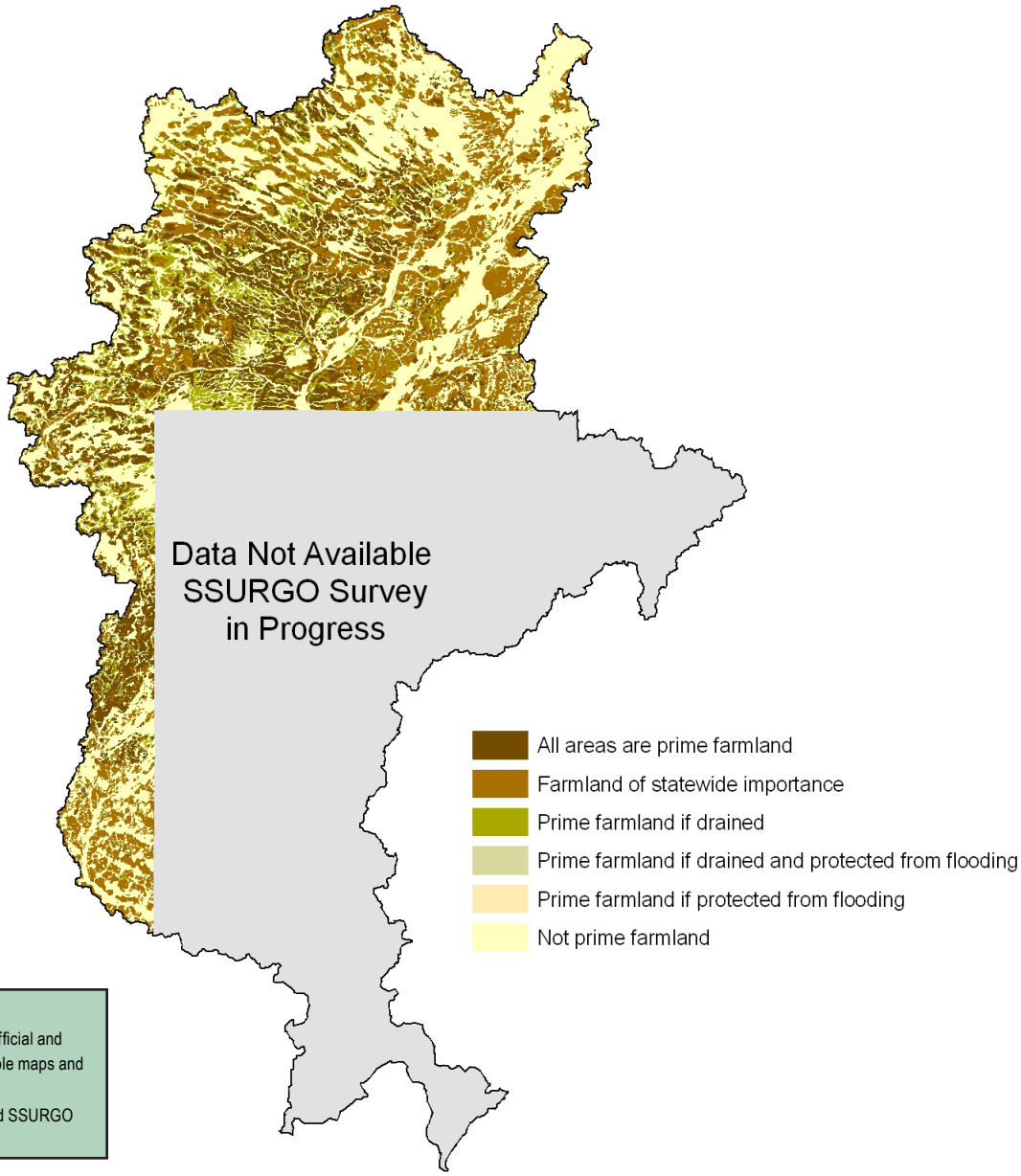
Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Farmland Classification

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

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

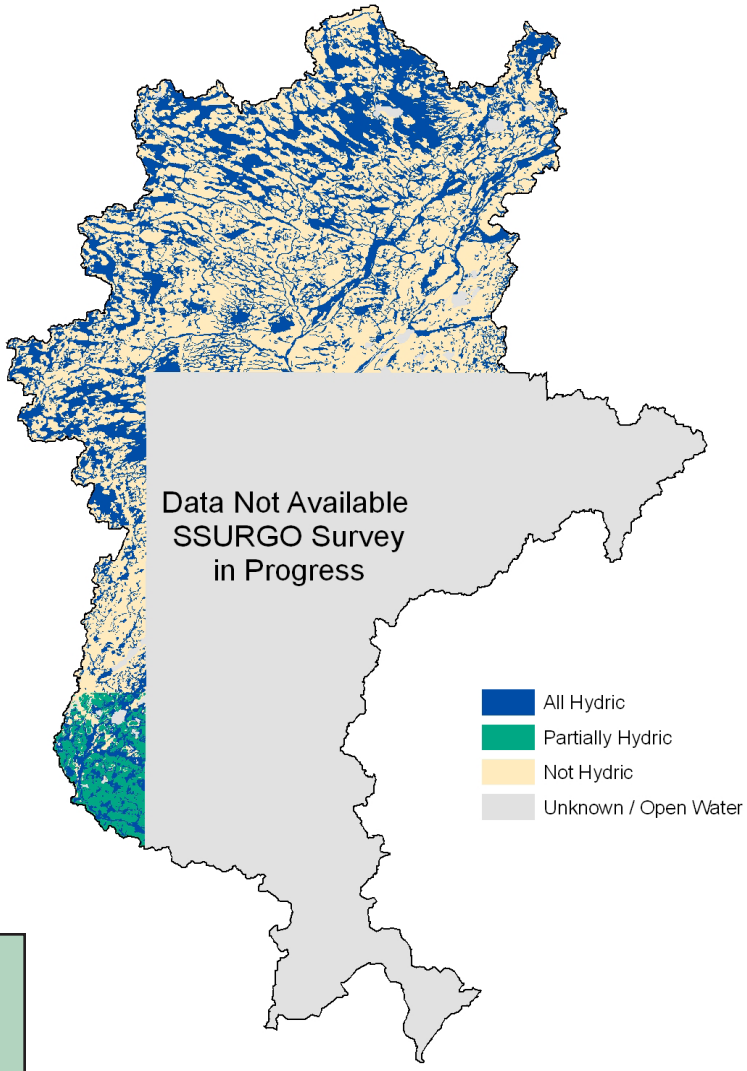


Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Hydric Soils

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

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

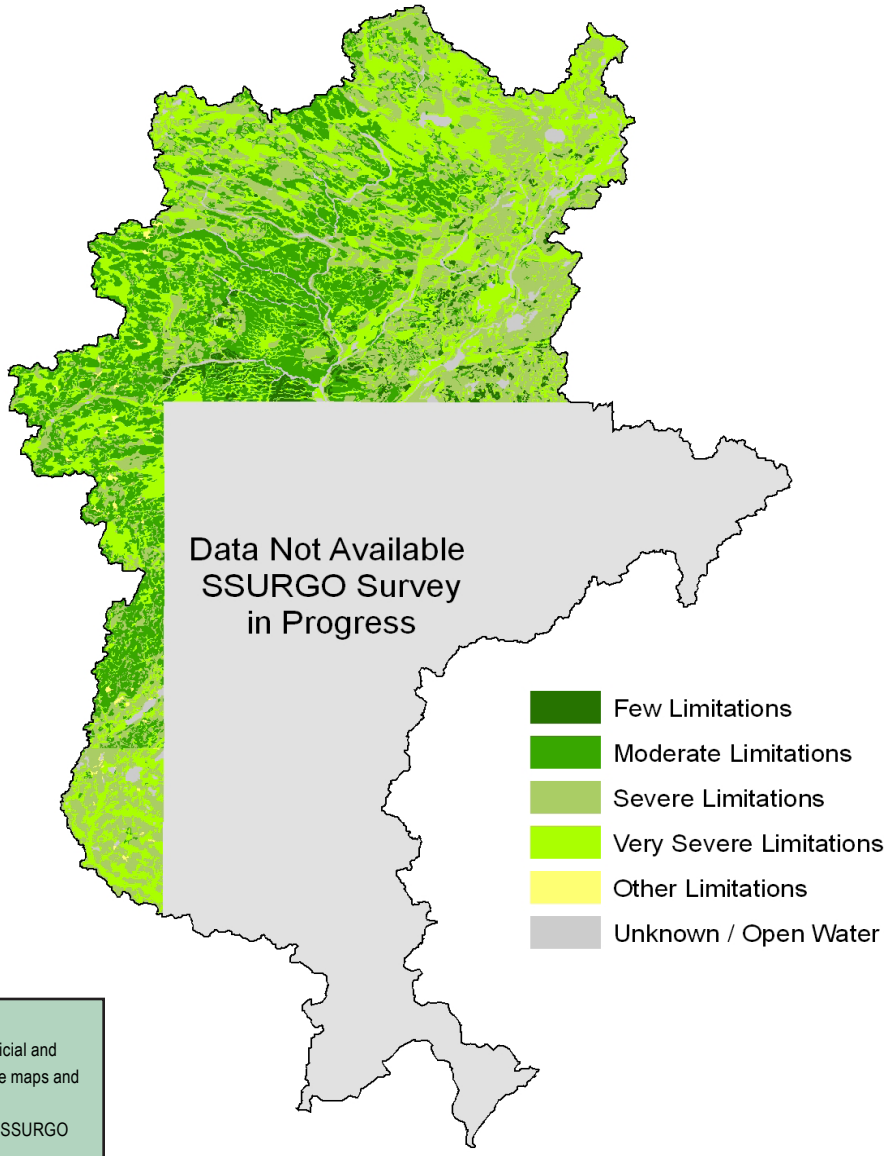


Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

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.



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.

Performance Results System Data

Watershed Name: Kettle				Watershed Number: 07030003						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
Total Conservation Systems Planned (acres)	200	3,879	0	932	2,927	N/A	4,688	5,034	3,584	21,244
Total Conservation Systems Applied (acres)	0	672	0	296	296	N/A	3,148	3,050	2,833	10,295
Conservation Practices										
Total Waste Management (313) (numbers)	0	3	0	0	0	0	0	0	0	3
Riparian Forest Buffers (391) (acres)	0	0	23	23	55	10	0	0	0	111
Erosion Control Total Soil Saved (tons/year)	0	0	3,340	18	1,183	N/A	N/A	N/A	N/A	4,541
Total Nutrient Management (590) (Acres)	0	261	0	23	278	240	191	191	180	1,364
Pest Management Systems Applied (595A) (Acres)	0	0	0	23	3	0	95	0	0	121
Prescribed Grazing 528a (acres)	0	120	0	0	137	0	0	382	382	1,021
Tree & Shrub Establishment (612) (acres)	18	75	100	265	336	105	18	23	28	968
Residue Management (329A-C) (acres)	0	0	0	0	0	0	0	17	26	43
Total Wildlife Habitat (644 - 645) (acres)	3	187	103	265	600	227	265	816	514	2,980
Total Wetlands Created, Restored, or Enhanced (acres)	0	0	0	0	40	34	0	20	49	143
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	0	126	50	23	6	N/A	0	325	41	571
Wetlands Reserve Program	0	0	0	0	0	N/A	0	0	0	0
Environmental Quality Incentives Program	0	47	126	0	1,417	N/A	1,969	2,173	1,838	7,570
Wildlife Habitat Incentive Program	0	0	51	0	46	N/A	390	63	217	767

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 basin.

Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
Acipenser fulvescens	Lake Sturgeon	Zoological	Lasmigona costata	Fluted-shell	Zoological
Actinonaias ligamentina	Mucket	Zoological	Ligumia recta	Black Sandshell	Zoological
Agapetus tomus	A Caddisfly	Zoological	Lysimachia quadrifolia	Whorled Loosestrife	Botanical
Alasmidonta marginata	Elktoe	Zoological	Marpissa grata	A Jumping Spider	Zoological
Botrychium lanceolatum	Triangle Moonwort	Botanical	Myotis septentrionalis	Northern Myotis	Zoological
Botrychium oneidense	Blunt-lobed Grapefern	Botanical	Najas gracillima	Thread-like Naiad	Botanical
Botrychium rugulosum	St. Lawrence Grapefern	Botanical	Obovaria olivaria	Hickorynut	Zoological
Botrychium simplex	Least Moonwort	Botanical	Panax quinquefolius	American Ginseng	Botanical
Buteo lineatus	Red-shouldered Hawk	Zoological	Percina evides	Gilt Darter	Zoological
Cladium mariscoides	Twig-rush	Botanical	Pituophis catenifer	Gopher Snake	Zoological
Clemmys insculpta	Wood Turtle	Zoological	Pleurobema coccineum	Round Pigtoe	Zoological
Cyclonaias tuberculata	Purple Wartyback	Zoological	Poa paludigena	Bog Bluegrass	Botanical
Decodon verticillatus	Waterwillow	Botanical	Potamogeton bicupulatus	Snailseed Pondweed	Botanical
Elliptio dilatata	Spike	Zoological	Potamogeton vaseyi	Vasey's Pondweed	Botanical
Emydoidea blandingii	Blanding's Turtle	Zoological	Pyrola minor	Small Shinleaf	Botanical
Fimbristylis autumnalis	Autumn Fimbristylis	Botanical	Seiurus motacilla	Louisiana Waterthrush	Zoological
Haliaeetus leucocephalus	Bald Eagle	Zoological	Solidago sciaphila	Cliff Goldenrod	Botanical
Hydrocotyle americana	American Water-pennywort	Botanical	Sparganium glomeratum	Clustered Bur-reed	Botanical
Ichthyomyzon gagei	Southern Brook Lamprey	Zoological	Tsuga canadensis	Eastern Hemlock	Botanical
Juncus stygius var. americanus	Bog Rush	Botanical	Utricularia purpurea	Purple-flowered Bladderwort	Botanical
Lasmigona compressa	Creek Heelsplitter	Zoological			

RESOURCE CONCERNS

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

- **Soil Quality, Excessive Erosion.** Soil erosion from exposed surface areas, streambank and lakeshore areas, and roadside erosion are major conservation issues in the watershed.

- **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 in red-clay areas, 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.

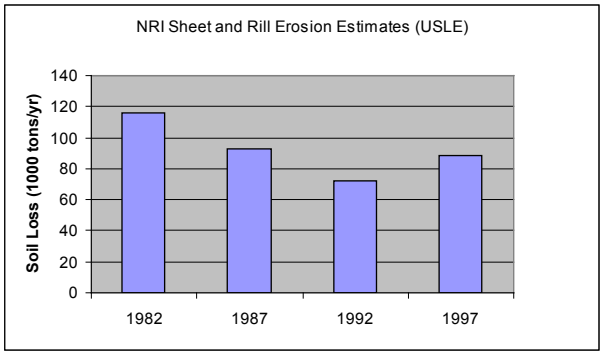
- **Ground Water Quality.** Nutrients, Organics, Animal and Human Wastewater managment. Aging septic systems, feedlot runoff, nutrient runoff, tilling practices, improper closure of old manure pits, and abandoned wells all pose threats to groundwater quality throughout the region. Improved management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

- **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 for Sheet and rill erosion by water on cropland pastureland **decreased** by approximately 27,200 tons of soil annually (23.5%) between the 1982 and 1997 reporting periods. /13



Socioeconomic and Agricultural Data (Relevant)

Estimations for the Kettle River subbasin indicate a current population of approximately 18,330 people. Median household income throughout the district is $35,774 yearly, roughly 77% of the national average. Unemployment in the subbasin is estimated at 6.1%, and approximately 10% of the residents in the watershed are living below the national poverty level.

Assessment estimates indicate 796 farms located in the watershed. Approximately forty two percent of the operations are less than 180 acres in size, thirty six percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Of the 772 operators in the basin, fifty one percent are full time producers not reliant on off farm income.

(MN) HUC# 7030003		Total Acres:	672,235
Population Data*	Watershed Population	18,328	
	Unemployment Rate	6.1%	
	Median Household Income	35,774	
	% below poverty level	10%	
	Median Value of Home	87,400	
Farm Data	# of Farms	796	
	# of Operators	772	**Percent**
	# of Full Time Operators	397	51%
	# of Part Time Operators	375	49%
	Total Cropland Acres	**172,900**	25.7%
Farm Size	1 to 49 Acres	34	20%
	50 to 179 Acres	72	42%
	180 to 499 Acres	51	30%
	500 to 999 Acres	11	6%
	1,000 Acres or more	4	2%
	Average Farm Size	46	
Livestock & Poultry	Cattle - Beef	6,268	22%
	Cattle - Dairy	3,322	12%
	Chicken	2,058	7%
	Swine	925	3%
	Turkey	71	0%
	Other	15,890	56%
	Animal Count Total:	**28,535**	
	Total Permitted AFOs:	**99**	
Chemicals (Acres Applied)	Insecticides	1,659	
	Herbicides	12,821	
	Wormicides	0	
	Fruiticides	563	
	Total Acres Treated	**15,043**	
	% State Chemical Totals	**0.1%**	

* 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

- **Biological & Toxicological Assessment**
  Minnesota Pollution Control Agency
- **Carlton County Water Management Plan**
  Carlton County SWCD
- **Carlton County Comprehensive Plan**
  Carlton County Joint Powers Board, ARDC
- **Grindstone River Watershed Monitoring**
  Pine County SWCD, MN Dep of Natural Resources
- **Nemadji River Basin Project**
  USDA_NRCS, US Forest Service
- **Pine County Comprehensive Plan**
  Pine County SWCD
- **Conservation Action Planning (CAP)**
  The Nature Conservancy
- **Sediment Research and Monitoring**
  US Geological Survey, St Mary's University
- **Water Quality Monitoring**
  Friends of the St. Croix Headwaters
- **Lakescaping for WIldlife and Water Quality Initiative**
  MN Department of Natural Resources, MN Waters
- **Kanabec County Comprehensive Local Water Plan**
  Minnesota Pollution Control Agency
- **MN Forest Bird Diversity Initiative**
  NRRI, Minnesota Department of Natural Resources
- **Mussel Resource Survey**
  Minnesota Department of Natural Resources
- **Red Clay Project**
  Carlton County SWCD
- **White Pine Restoration Project**
  University of Minnesota
- **Phosphorus Index Study: St Croix Basin**
  University of Minnesota, US Geological Survey
- **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

- **Aitkin County SWCD**
  130 Southgate Dr, Aitkin, MN 56431
  Phone (218) 927-6565
- **Carlton County SWCD**
  115 5th St S, Carlton, MN 55718-0029
  Phone (218) 384-3891
- **Cromwell-Wright Monitoring Group**
  Box 7 Hwy 72 & 210 Cromwell, Minnesota 55726
  Phone (218) 644-3716
- **Friends of the St. Croix Headwaters**
  PO Box 276 Gordon, WI 54838
  http://fotsch.org
- **Friends of the Mississippi River**
  360 N Robert St Saint Paul, MN 55101
  Phone (651) 222-2193
- **Kanabec SWCD**
  2008 Mahogany St Ste 3, Mora, MN 55051
  Phone (320) 679-3982
- **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
- **Natural Resources Research Institute**
  5013 Miller Trunk Highway Duluth, MN 55811
  Phone (218) 720-4294
- **Pine County SWCD**
  260 Morris Ave N, Hinkley, MN 55037
  Phone (320) 384-7431

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.

All data is provided "as is." There are no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for general planning purposes only.

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 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.

All data is provided "as is." There are no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for general planning purposes only.