

Rapid Watershed Assessment

Beaver - Lester

(MN) HUC: 04010102



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.

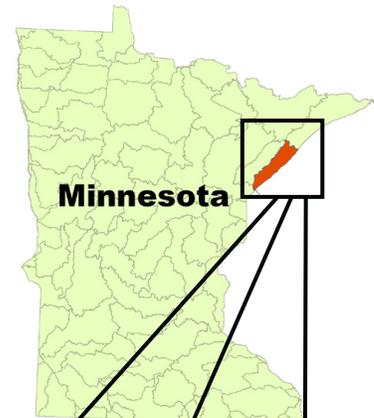
Introduction

The Beaver-Lester 8-Digit Hydrologic Unit Code (HUC) subbasin is located in the Northern Lakes and Forest ecoregion of Minnesota. This largely forested watershed is 402,371 acres in size. Approximately forty five percent of the land in this HUC is privately owned, and the remainder is state, county, and federal land or held by corporate interests.

Assessment estimates indicate 33 farms located in the watershed. Approximately sixty six percent of the operations are less than 180 acres in size, thirty three percent are from 180 to 1000 acres in size, and no farms in this HUC appear to be greater than 1000 acres in size. Of the 20 operators in the watershed, 47 percent are full-time producers not reliant on off-farm income.

The main resource concerns throughout the watershed are sheet and rill erosion, streambank, lakeshore and roadside erosion, ground and surface water quality and quantity, shoreline management, woodland management, stormwater management and wetland management.

Thermal pollution of designated trout streams from beaver infestation is also a major resource concern for Lake Superior Tributary Streams.



County Totals

County	Acres in HUC	% HUC
St. Louis	139,265	34.6%
Lake	263,106	65.4%
Total acres:	402,371	100%

Physical Description

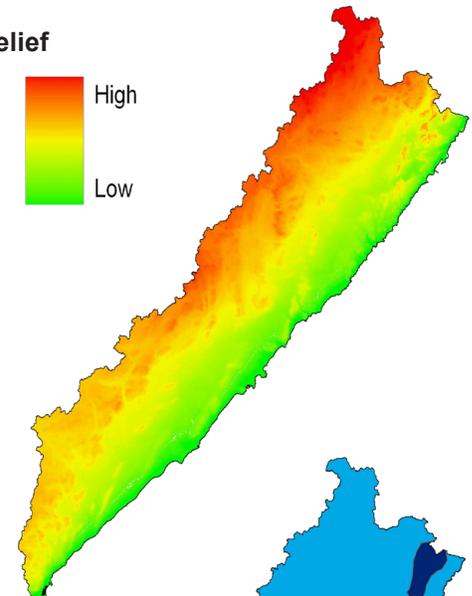
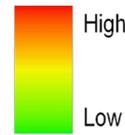
Average elevation in the Beaver- Lester subbasin is approximately 874 feet above mean sea level (msl), with elevations ranging from as high as 1250 feet above msl, to Minnesota's Lowest elevation, Lake Superior, at 607 ft above msl.

Precipitation in the watershed ranges from 27 to 31 inches annually. Evaporation estimates are between 28 to 32 inches annually (Minnesota State Climatologists Office, 1999).

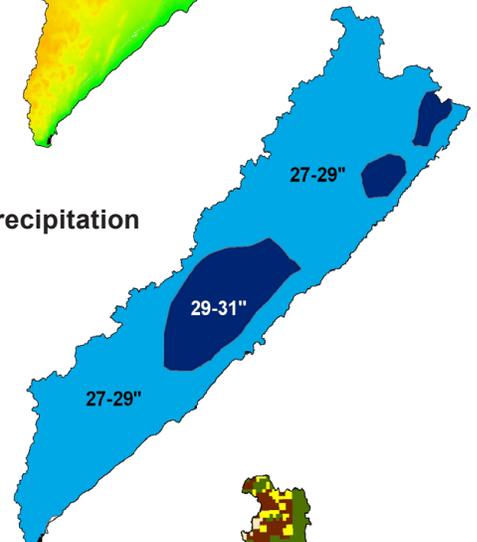
Much of the land within this HUC is not considered highly erodible, and is poorly suited to agricultural uses. Predominate land uses / land covers are Forest (85.0%), Residential/ Commercial Development (4.9%), Grass/Pasture/Hay (3.5%), and Wetlands (3.2%)

Agricultural land use is scarce, with agricultural lands accounting for less than four percent of the watershed acres. Development pressure is moderate, with some timberland, resorts and lakeshore being parceled out for recreation, lake or country homes.

Relief

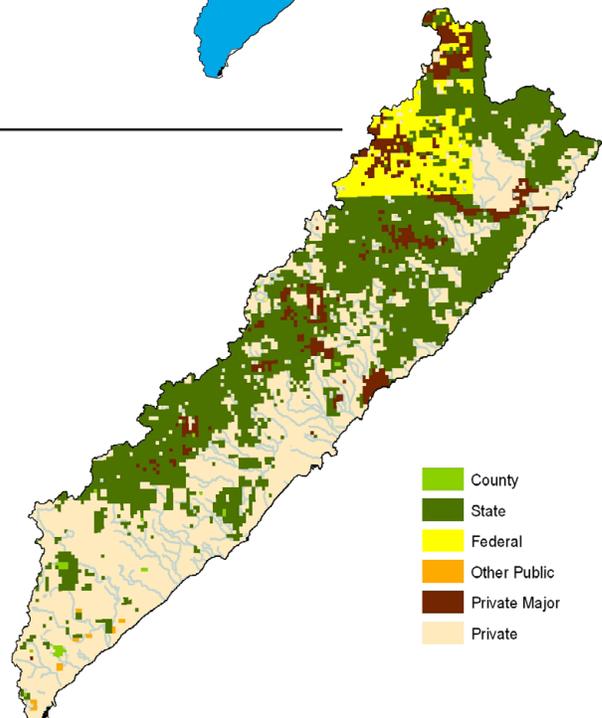


Precipitation



Ownership

Ownership Type	Acres	% of HUC
Conservancy	-	-
County	1,203	0.3
Federal	26,563	6.6
State	169,775	42.2
Other Public	756	0.2
Tribal	-	-
Private Major	23,702	5.9
Private	180,373	44.8
Total Acres:	402,371	100

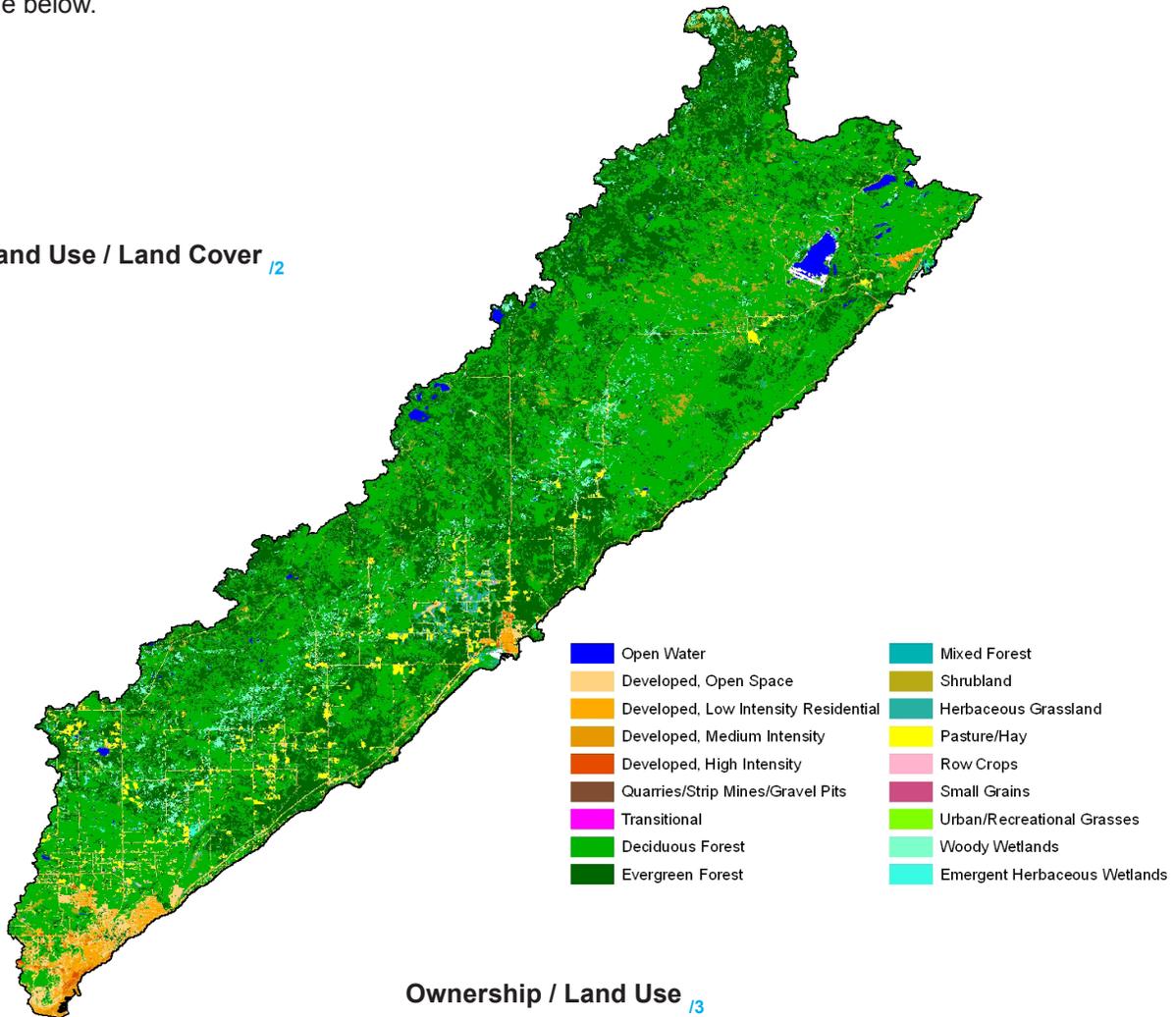


* Ownership totals derived from 2007 MN DNR GAP Stewardship Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The watershed covers an area of 402,371 acres. Slightly less than forty five percent of the land in the watershed is Privately owned (180,373 acres). The second largest ownership type is State, with approximately 169,775 acres (42.2%), followed by Federal with 26,563 acres (6.6%), Private Major with 23,702 acres (5.9%), and County with 1,203 acres (0.3%). There are 756 acres of miscellaneous "Other" Public Lands that account for the smallest ownership class. Land use by ownership type is represented in the table below.

Land Use / Land Cover ^{/2}



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

Ownership / Land Use ^{/3}

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	% Public	Acres	% Private	Acres	% Tribal		
Forest	182,787	45.4%	159,056	39.5%	0	0.0%	341,843	85.0%
Grass, etc	1,813	0.5%	12,225	3.0%	0	0.0%	14,038	3.5%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	90	0.0%	439	0.1%	0	0.0%	529	0.1%
Shrub etc	5,766	1.4%	3,732	0.9%	0	0.0%	9,498	2.4%
Wetlands	5,219	1.3%	7,602	1.9%	0	0.0%	12,821	3.2%
Residential/Commercial	1,607	0.4%	18,120	4.5%	0	0.0%	19,727	4.9%
Open Water*	885	0.2%	2,861	0.7%	0	0.0%	3,746	0.9%
Watershed Totals:	198,165	49.27%	204,036	50.7%	0	0.0%	402,371	100%

* ownership undetermined

** includes private-major

Physical Description (continued)

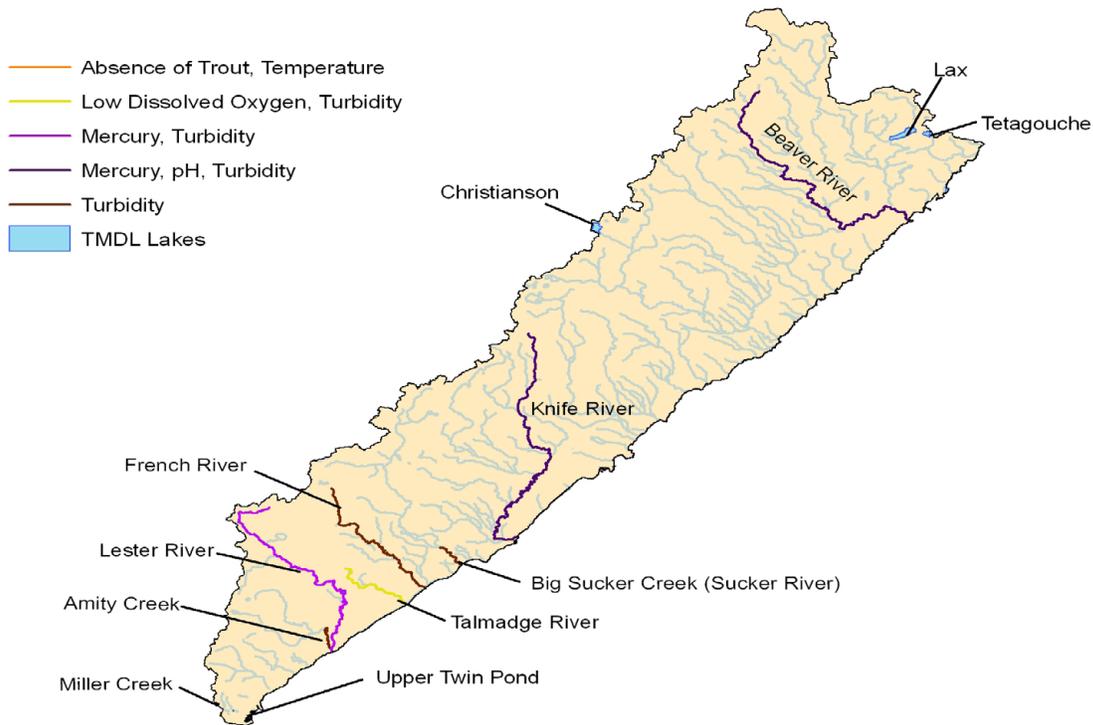
				cu. ft/sec		
Stream Flow Data	USGS 04015330 KNIFE RIVER NEAR TWO HARBORS, MN	2007 Total Avg.	70.6			
		May – Sept. Avg.	57.6			
		MILES	PERCENT			
Stream Data¹⁴ (*Percent of Total HUC Stream Miles)	Total Miles – Major (100K Hydro GIS Layer)	763.4	---			
	303d/TMDL Listed Streams (DEQ)	86.9	11.4%			
Riparian Land Cover/Land Use¹⁵ (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Land Use Type	Acres	Percent			
	Forest	16,027	86.6%			
	Grain Crops	0	0.0%			
	Grass, etc	402	2.2%			
	Orchards	0	0.0%			
	Row Crops	9	0.1%			
	Shrub etc	226	1.2%			
	Wetlands	636	3.4%			
	Residential/Commercial	679	3.7%			
	Open Water*	519	2.8%			
		Total Buffer Acres:	18,498	100%		
Crop and Pastureland Land Capability Class¹⁶ (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	1 – slight limitations	0	0%			
	2 – moderate limitations	1,400	13%			
	3 – severe limitations	8,200	77%			
	4 – very severe limitations	0	0%			
	5 – no erosion hazard, but other limitations	1,100	10%			
	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%			
		Total Croplands & Pasturelands	10,700	-		
		TYPE OF LAND	ACRES	% of Irrigated Lands	% of Cropland	
Irrigated Lands¹⁷ (1997 NRI Estimates for Non- Federal Lands Only)	Cultivated Cropland / Pastureland	0	0%	0%		
	Uncultivated Cropland	0	0%	0%		
	Total Irrigated Lands	0	---	0%		

Assessment of Waters

The federal Clean Water Act (CWA) requires states to adopt water-quality standards to protect waters from pollution. These standards define how much of a pollutant can be in the water and still allow it to meet designated uses, such as drinking water, fishing and swimming.

The standards are set on a wide range of pollutants, including bacteria, nutrients, turbidity and mercury. A water body is “impaired” if it fails to meet one or more water quality standards. The Minnesota Pollution Control Agency performs assessment activities, lists impaired waters, and conducts TMDL studies in Minnesota. The agency also coordinates closely with other state and local agencies on restoration activities.

2006 Minnesota 303d Listed Waters - Beaver - Lester



Listed Stream	Impairment	Affected Use
Beaver River Headwaters to Lk Superior	Mercury, pH, Turbidity	Aquatic Consumption and Aquatic Life
Knife River Headwaters to Lk Superior	Mercury, pH, Turbidity	Aquatic Consumption and Aquatic Life
French River Headwaters to Lk Superior	Turbidity	Aquatic Life
Talmadge River Headwaters to Lk Superior	Low Dissolved Oxygen	Aquatic Life
Amity Creek Unnamed Cr to Lester R	Turbidity	Aquatic Life
Lester River T52 R14W S23, north line to Lk Superior	Mercury, Turbidity	Aquatic Consumption and Aquatic Life
Big Sucker Creek Unnamed Cr to Lk Superior	Turbidity	Aquatic Life
Miller Creek Headwaters to Lk Superior	Absence of Trout, Temperature	Aquatic Life
Lake Superior	Mercury, PCBs	Aquatic Consumption
Lake Christianson	Mercury	Aquatic Consumption
Lake Lax	Mercury	Aquatic Consumption
Upper Twin Pond	Mercury, PCBs	Aquatic Consumption

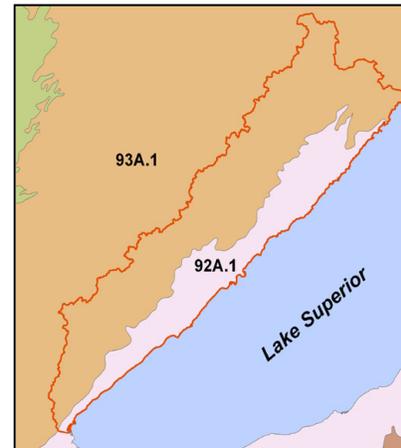
Common Resource Areas

The Beaver-Lester Watershed encompasses two common resource areas, CRA 93A.1 and 92.1.^{/9}

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.

92.1 - Lake Superior Clay Plain: Gently sloping to steep, clayey and loamy lakebed deposits with deep v-shaped ravines. Well drained to somewhat poorly drained clayey soils with some organic soils. Mixed deciduous and coniferous forest predominate, with significant areas of forage based cropland and grazing land. Primary resource concerns are forestland, cropland productivity, wetland habitat restoration, erosion control on deeply incised streams along with urban expansion.



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

Geology / Soils^{/10}

The North Shore's geology is spectacular, with long ridges sloping towards the lake and the Sawtooth Mountains crowding the shoreline. Streams leap through cracks in the bedrock and form waterfalls, cascades and rapids over the ancient rocks.

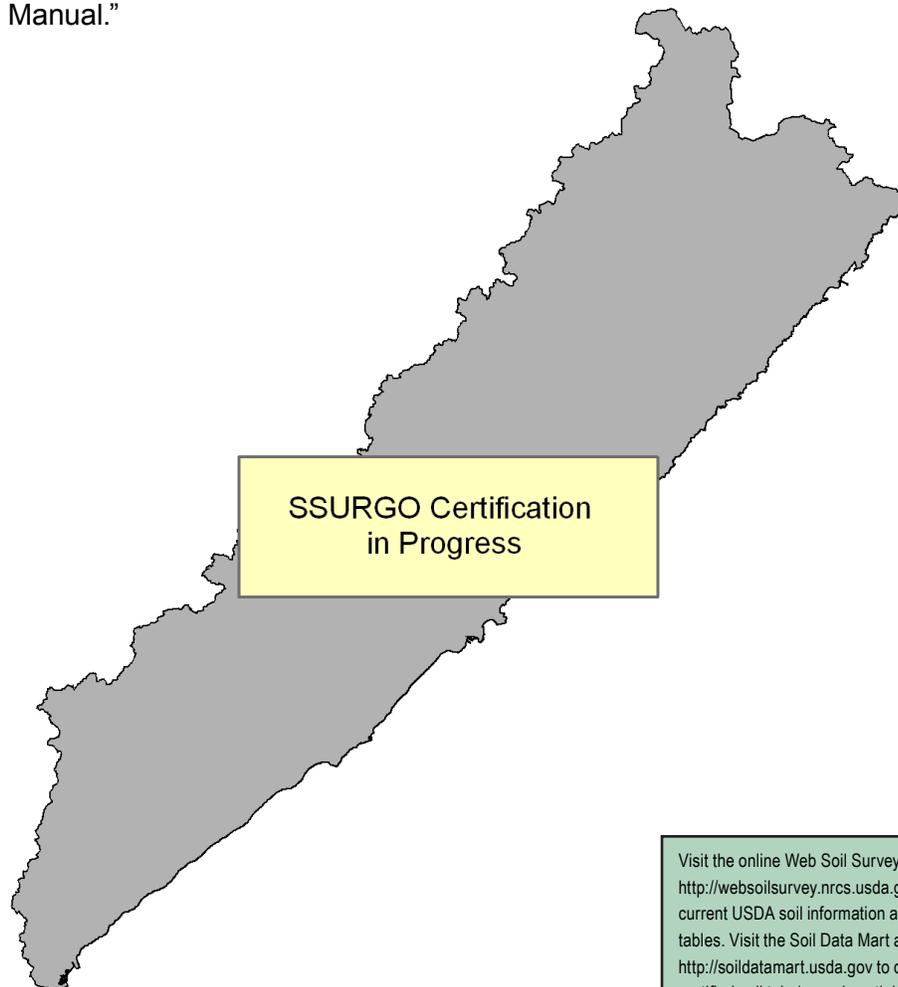
Bedrock in the watershed is a complex of Precambrian volcanic and metamorphosed sedimentary rocks extensively intruded by dikes and sills. Bedrock in the North Shore area is predominantly a very thick succession of southeastward-dipping lava flows, the North Shore volcanic group, that overlies the metamorphosed sedimentary rocks exposed in the extreme northern part of the watershed. This rock sequence is intruded by numerous dikes and sills and by the Duluth Complex, which forms the bedrock in much of the area.

Unconsolidated glacial sediments in the Lake Superior watershed consist largely of red to brown sandy and stony till, outwash and ice-contact deposits of sand and gravel, and red silty to clayey glacial lake deposits. These sediments were laid down by advances and subsequent wasting of several ice sheets that moved southwestward out of the Lake Superior trough. The deposits are less than 50 ft (15m) thick over most of the North Shore area and less than 6 ft (1.8 m) in much of the area, especially along the lakeshore in the northern part. Numerous wetlands, associated with the high water table and hummocky topography of glacial terrain, occur in the watershed. Many of the wetlands contain shallow peat deposits.

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.”



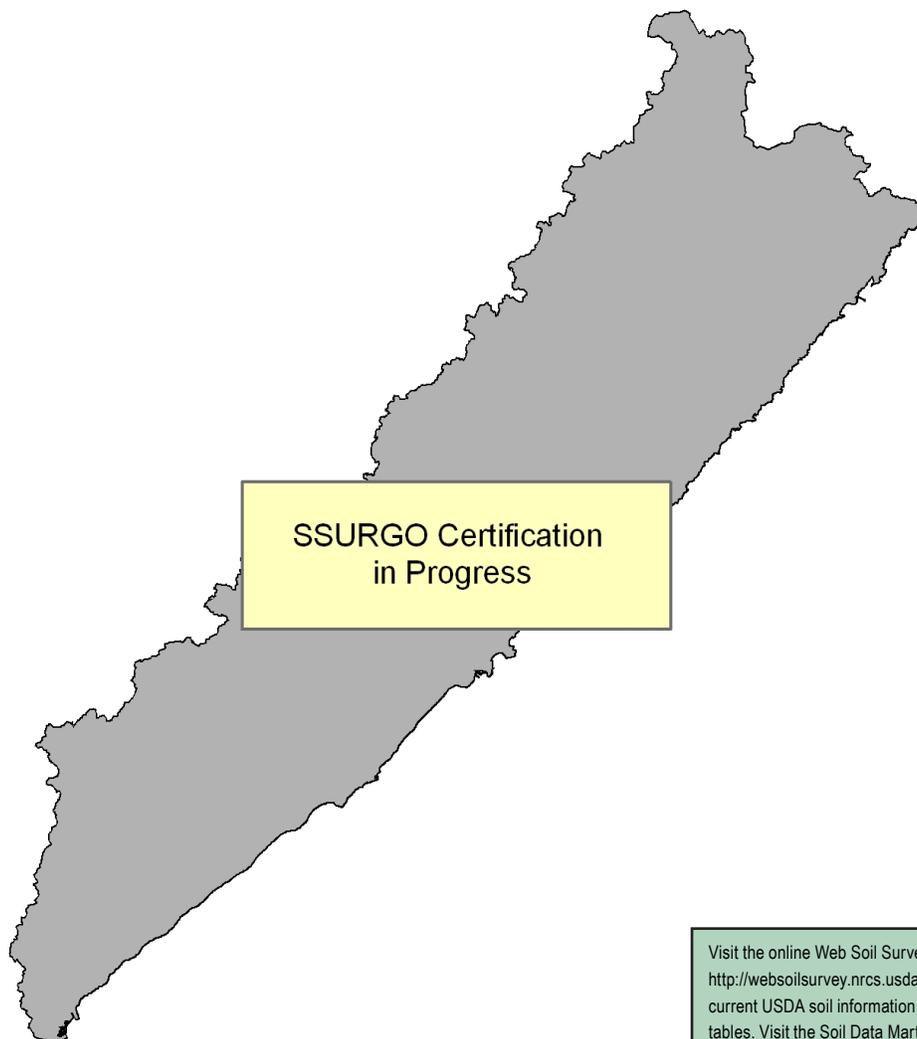
Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.

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.



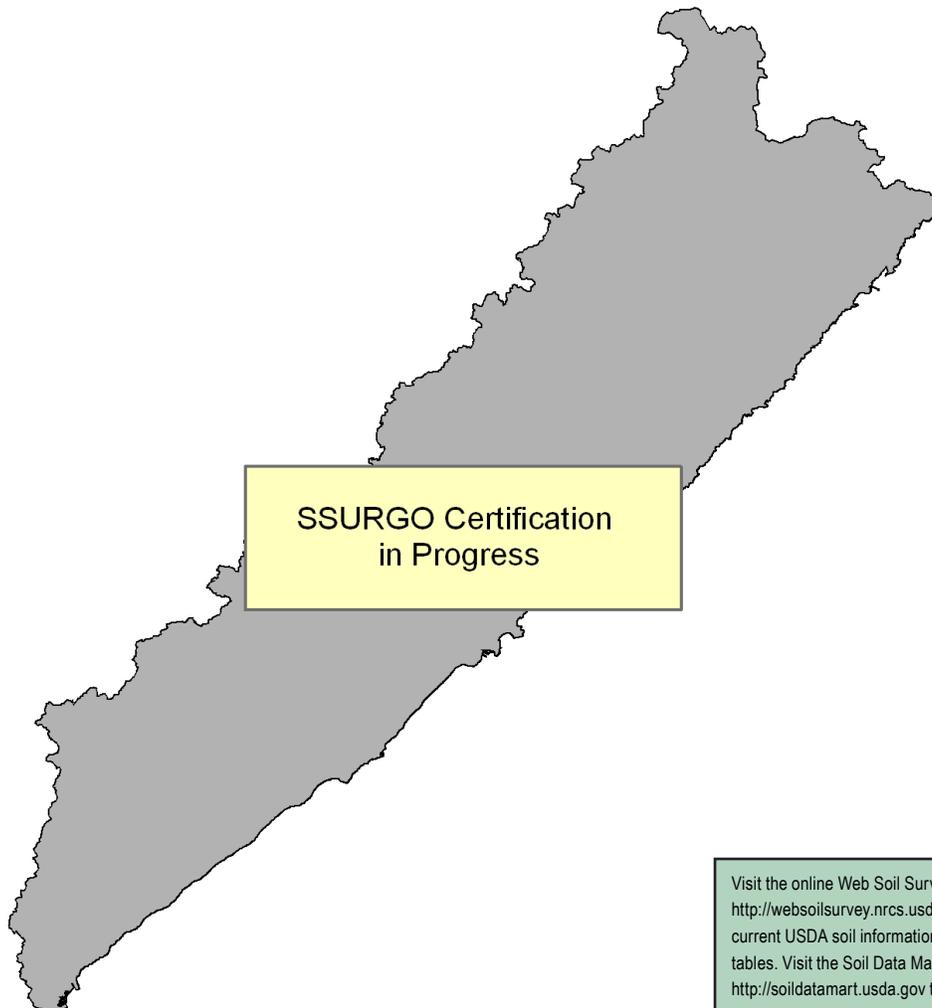
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Hydric Soils

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

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

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field.



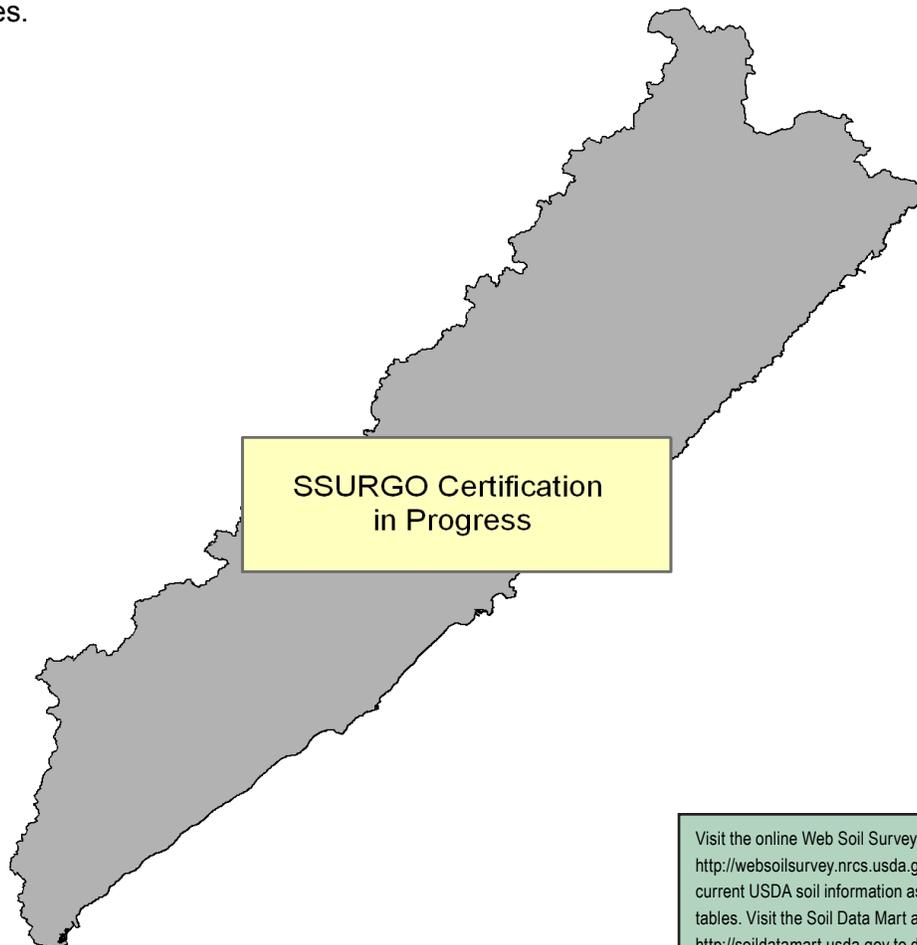
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Highly Erodible Land (HEL)

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 EI of 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.

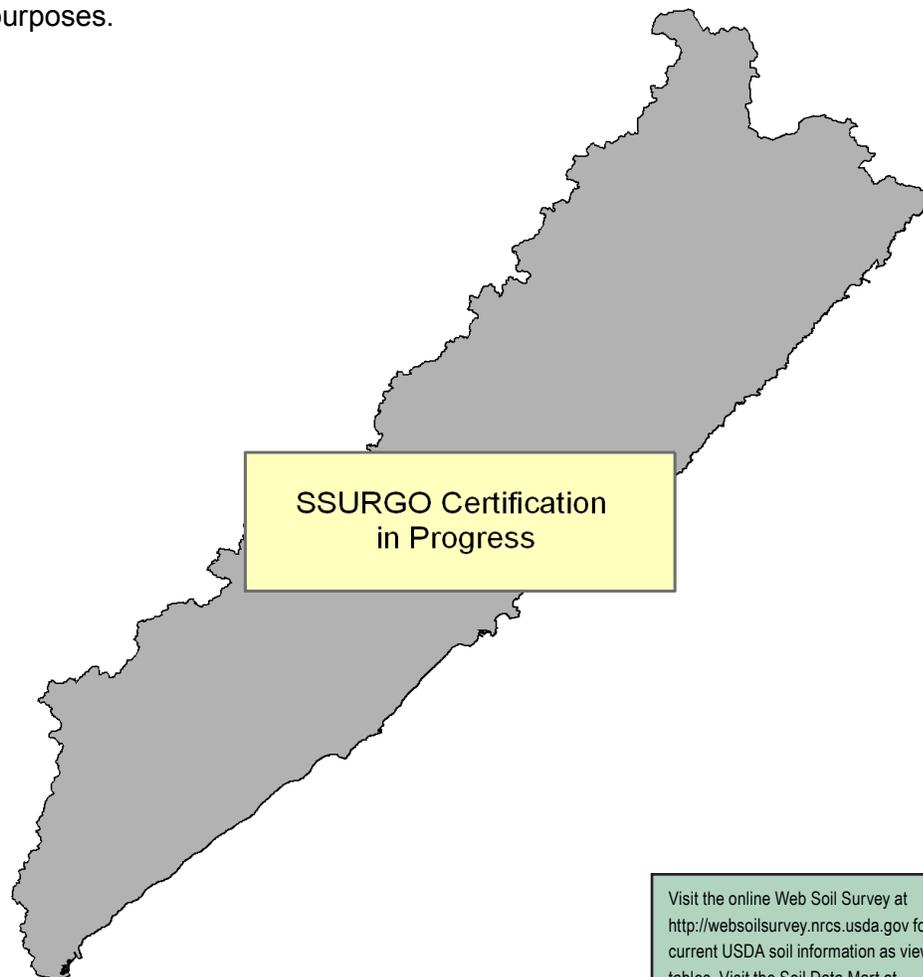


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Land Capability Classification

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: Beaver - Lester				Watershed Number: 04010102						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
Total Conservation Systems Planned (acres)	0	278	0	60	0	N/A	73	701	342	1,454
Total Conservation Systems Applied (acres)	0	278	0	55	55	N/A	29	5	234	656
Conservation Practices										
Total Waste Management (313) (numbers)	0	0	0	0	0	0	0	0	0	0
Riparian Forest Buffers (391) (acres)	0	19	16	0	13	0	0	0	0	48
Erosion Control Total Soil Saved (tons/year)	0	0	99	0	0	N/A	N/A	N/A	N/A	99
Total Nutrient Management (590) (Acres)	0	0	0	0	0	0	0	0	0	0
Pest Management Systems Applied (595A) (Acres)	0	0	0	0	0	0	0	0	0	0
Prescribed Grazing 528a (acres)	0	0	0	48	0	0	0	0	0	48
Tree & Shrub Establishment (612) (acres)	0	1	0	0	63	163	0	0	23	250
Residue Management (329A-C) (acres)	0	0	0	0	0	0	0	0	0	0
Total Wildlife Habitat (644 - 645) (acres)	0	294	35	7	0	6	7	0	1	350
Total Wetlands Created, Restored, or Enhanced (acres)	0	1	1	0	0	0	0	1	1	4
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	0	0	0	0	0	N/A	0	0	121	121
Wetlands Reserve Program	0	0	0	0	0	N/A	0	0	0	0
Environmental Quality Incentives Program	0	81	0	55	47	N/A	29	5	234	451
Wildlife Habitat Incentive Program	0	0	50	0	0	N/A	0	0	0	50
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

RESOURCE CONCERNS

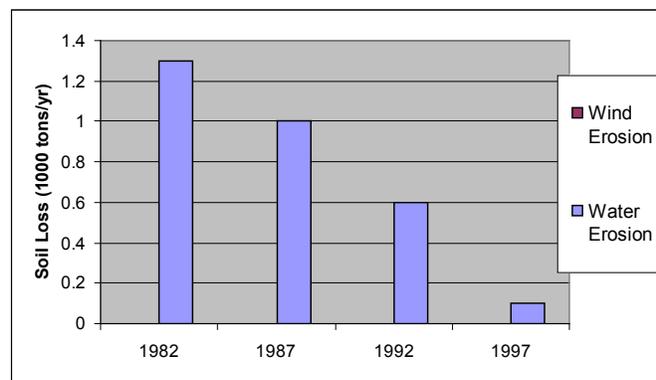
County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- 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.** Management opportunities include planting trees or shrubs, restoring prairies, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and many other practices or projects.
- Surface Water Quality, Nutrients, Priority Pollutants.** Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing a fish community with depressed populations and limited diversity. Mercury levels are affecting the health of Aquatic communities, and affecting the consumption of fish in many area lakes.
- Surface / Groundwater Quality and Quantity.** Local districts seek to assist local government, land-owners, and interest groups to make land and water use decisions regarding potential impacts to water quality and quantity in the face of growing land use changes.
- Shoreline Management.** Priority is given to promoting the environmental protection and orderly growth of the North Shore of Lake Superior. Local districts seek to regulate and manage the density of development on and adjacent to shorelines, and develop and enforce wastewater and stormwater regulations within the "North Shore Management Zone".
- 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.
- Stormwater Management.** Local districts recognize that runoff volume will likely increase as development of the watershed continues. Runoff is increasing in both developing and developed areas of the watershed. Priority actions include identification of sites where storm water discharge has a high potential adversely affecting important natural resources, and separation of sanitary and storm water conveyance structures.
- Thermal Pollution of Designated Waters.** Thermal pollution of designated trout water from beaver infestation is a major resource concern for Lake Superior tributary streams.



NRI Erosion Estimates

- NRI Estimates for Sheet and rill erosion by water on the cropland and pastureland decreased by approximately 1,200 tons (92%) between 1982 and 1997.
- At the time of reporting NRI estimates for wind erosion rates between the years 1982-1997 are not available for this HUC. ¹³



THREATENED AND ENDANGERED SPECIES 14

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



Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
<i>Adoxa moschatellina</i>	Moschatel	Botanical	<i>Listera auriculata</i>	Auricled Twayblade	Botanical
<i>Agrostis geminata</i>	Twin Bentgrass	Botanical	<i>Lobaria quercizans</i>	Smooth lungwort	Botanical
<i>Allium schoenoprasum</i> var. <i>sibiricum</i>	Wild Chives	Botanical	<i>Luzula parviflora</i> ssp. <i>melanocarpa</i>	Small-flowered Woodrush	Botanical
<i>Anaptychia setifera</i>	Hanging fringe lichen	Botanical	<i>Myotis septentrionalis</i>	Northern Myotis	Zoological
<i>Arabis holboellii</i> var. <i>retrofracta</i>	Holboell's Rock-cress	Botanical	<i>Parmelia stictica</i>	A Species of Lichen	Botanical
<i>Arnica lonchophylla</i>	Long-leaved Arnica	Botanical	<i>Pinguicula vulgaris</i>	Butterwort	Botanical
<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	Botanical	<i>Pipistrellus subflavus</i>	Eastern Pipistrelle	Zoological
<i>Botrychium lanceolatum</i>	Triangle Moonwort	Botanical	<i>Platanthera clavellata</i>	Club-spur Orchid	Botanical
<i>Botrychium mormo</i>	Goblin Fern	Botanical	<i>Poa wolfii</i>	Wolf's Bluegrass	Botanical
<i>Botrychium pallidum</i>	Pale Moonwort	Botanical	<i>Polygonum viviparum</i>	Alpine Bistort	Botanical
<i>Botrychium simplex</i>	Least Moonwort	Botanical	<i>Polystichum braunii</i>	Braun's Holly Fern	Botanical
<i>Buteo lineatus</i>	Red-shouldered Hawk	Zoological	<i>Potamogeton vaseyi</i>	Vasey's Pondweed	Botanical
<i>Callitriche heterophylla</i>	Larger Water-starwort	Botanical	<i>Pyrola minor</i>	Small Shinleaf	Botanical
<i>Carex pallescens</i>	Pale Sedge	Botanical	<i>Rhynchospora fusca</i>	Sooty-colored Beak-rush	Botanical
<i>Carex scirpoidea</i>	Northern Single-spike Sedge	Botanical	<i>Sagina nodosa</i> ssp. <i>borealis</i>	Knotty Pearlwort	Botanical
<i>Claytonia caroliniana</i>	Carolina Spring-beauty	Botanical	<i>Salix pellita</i>	Satiny Willow	Botanical
<i>Clemmys insculpta</i>	Wood Turtle	Zoological	<i>Saxifraga paniculata</i>	Encrusted Saxifrage	Botanical
<i>Crataegus douglasii</i>	Black Hawthorn	Botanical	<i>Sorex fumeus</i>	Smoky Shrew	Zoological
<i>Draba arabisans</i>	Rock Whitlow-grass	Botanical	<i>Sparganium glomeratum</i>	Clustered Bur-reed	Botanical
<i>Eleocharis nitida</i>	Neat Spike-rush	Botanical	<i>Torreyochloa pallida</i>	Torrey's Manna-grass	Botanical
<i>Emydoidea blandingii</i>	Blanding's Turtle	Zoological	<i>Tsuga canadensis</i>	Eastern Hemlock	Botanical
<i>Euphrasia hudsoniana</i>	Hudson Bay Eyebright	Botanical	<i>Viola lanceolata</i>	Lance-leaved Violet	Botanical
<i>Falco peregrinus</i>	Peregrine Falcon	Zoological	<i>Waldsteinia fragarioides</i>	Barren Strawberry	Botanical
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Zoological	<i>Woodsia alpina</i>	Alpine Woodsia	Botanical
<i>Huperzia porophila</i>	Rock Clubmoss	Botanical	<i>Woodsia glabella</i>	Smooth Woodsia	Botanical
<i>Juniperus horizontalis</i>	Creeping Juniper	Botanical			

Socioeconomic and Agricultural Data (Relevant)

Estimations for the Beaver - Lester subbasin indicate a current population of approximately 71,417 people. Median household income throughout the district is \$40,417 yearly, roughly 87% of the national average. Unemployment is estimated at 4.5%, and approximately 9% of the residents in the watershed live below the national poverty level.



Assessment estimates indicate 33 farms located in the watershed. Approximately sixty six percent of the operations are less than 180 acres in size, thirty three percent are from 180 to 1000 acres in size, and no farms in this HUC appear to be greater than 1000 acres in size. Of the 39 operators in the watershed, 52 percent are full-time producers not reliant on off-farm income.

(MN) HUC# 4010102		Total Acres:	402,371
Population Data*	Watershed Population	71,771	
	Unemployment Rate	4.5%	
	Median Household Income	40,417	
	% below poverty level	9%	
	Median Value of Home	75,100	
Farms	# of Farms	33	
	# of Operators	39	Percent
	# of Full Time Operators	20	52%
	# of Part Time Operators	19	48%
	Total Crop/Pasturelands:	10,700	2.7%
Farm Size	1 to 49 Acres	9	26%
	50 to 179 Acres	13	40%
	180 to 499 Acres	9	27%
	500 to 999 Acres	2	6%
	1,000 Acres or more	0	0%
Livestock & Poultry	Cattle - Beef	212	22%
	Cattle - Dairy	40	4%
	Chicken	129	13%
	Swine	32	3%
	Turkey	4	0%
	Other	540	56%
	Animal Count Total:	958	
Total Permitted AFOs:	8		
Chemicals (Acres Applied)	Insecticides	189	
	Herbicides	1,505	
	Wormicides	0	
	Fruiticides	15	
	Total Acres Treated	1,709	
	% State Chemical Totals	0.0%	

* 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

- **Miller Creek Watershed Project**
Miller Creek Task Force
- **Lake Superior Shoreline Stabilization**
Cook, Lake, and St Louis County SWCD
- **Lake Superior Coastal Program**
MN DNR, NOAA
- **North Shore Land Use Planning Project**
MN DNR, MN Lake Superior Coastal Zone Program
- **Watershed Guardian Program**
Area SWCDs, Citizens, Cargill Inc.
- **Lake Superior Shoreline Stabilization Project**
Minnesota Board of Water and Soil Resources
- **Lake Superior Erosion Control/Bluff Stability**
Lake Superior Association of SWCDs
- **Storm Water Management Plan**
City of Duluth, US EPA
- **Enhancement of Lake Superior's Water Quality**
North Shore Management Board
- **Lake Superior Management Plan**
Lake Superior Binational Program
- **Rainbow Trout Mngmt. in MN Waters of Lake Superior**
MN Department of Natural Resources
- **Weber Stream Restoration Initiative**
University of MN Duluth, NRRI, MN Sea Grant

* 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

- **Arrowhead Region Development Commission**
221 West 1st Street Duluth, MN 55802
Phone (218) 722-5545
- **Great Lakes Commission**
2805 S. Ind. Hwy, Suite 100 Ann Arbor, MI 48104
Phone: (734) 971-9135
- **Lake County SWCD**
601 3rd Ave, PO Box 14, Two Harbors, MN 55616
Phone (218) 834-8370
- **Laurentian RC&D**
4850 Miller Trunk Highway Duluth, MN 55811
Phone (218) 720-5225
- **Miller Creek Joint Powers Board**
5255 Maple Grove Rd Hermantown, MN 55811
Phone (218) 722-2421
- **Minnesota Sea Grant**
2305 E 5th Street Duluth, MN 55805
Phone (218) 726-8106
- **Minnesota Pollution Control Agency - Duluth**
525 Lake Avenue S, Suite 400 Duluth, MN 55802
Phone: (218) 723-4663
- **North Shore Management Board c/o ARDC**
221 W 1st St. Duluth, MN 55802
Phone 1-800-232-0707
- **Save Lake Superior Association**
1902 St. Louis Avenue #319, Duluth, MN 55802
Phone (218) 727-4554
- **South St Louis SWCD**
215 No 1st Ave E Rm 301, Duluth, MN 55802
Phone (218) 723-4867

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: <http://www.nrcs.usda.gov/technical/NRI/>
8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.

Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Additional Information on listed individual projects can be obtained from the noted parties.