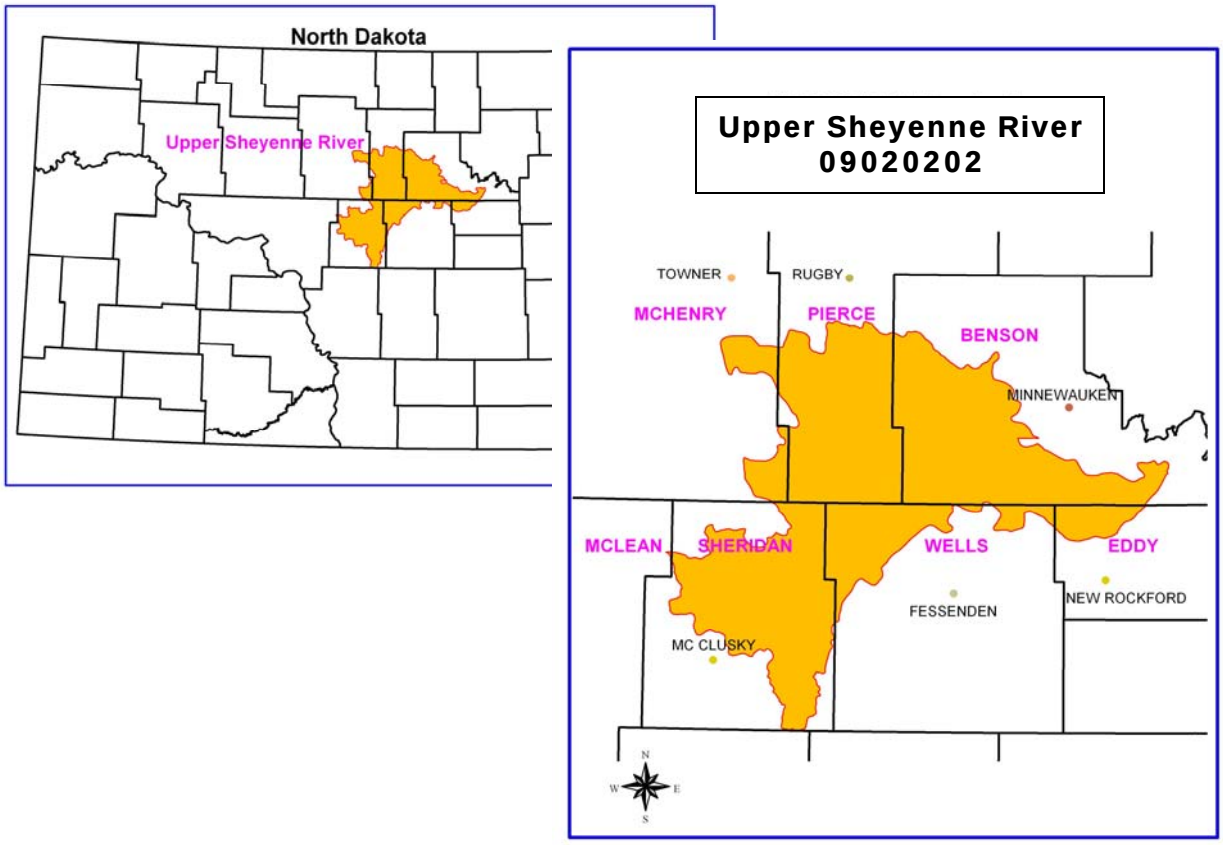
Upper Sheyenne River 09020202

8-Digit Hydrologic Unit Profile

August 2006

Introduction

The Upper Sheyenne River 8-Digit Hydrologic Unit Code (HUC) (09020202) sub-basin is approximately 1,252,400 acres covering parts of seven counties (Benson, Eddy, McHenry, McLean, Pierce, Sheridan, and Wells) in the Souris-Red-Rainy Region – Red River Sub-Region. Of the 1,252,400 acres, Benson County contains 28%, Eddy 3%, McHenry 5%, McLean <1%, Pierce 26%, Sheridan 27%, and Wells 11%. There are 802 farms in the sub-basin.



This sub-basin encompasses commodities ranging from sunflower, canola, corn and soybeans, and multiple small grain crops to beef cattle and swine.

Conservation assistance is provided by six NRCS service centers, one soil survey office, and four Resource Conservation & Development offices.

Produced by the Natural Resources Planning Staff Bismarck, ND

Physical Description

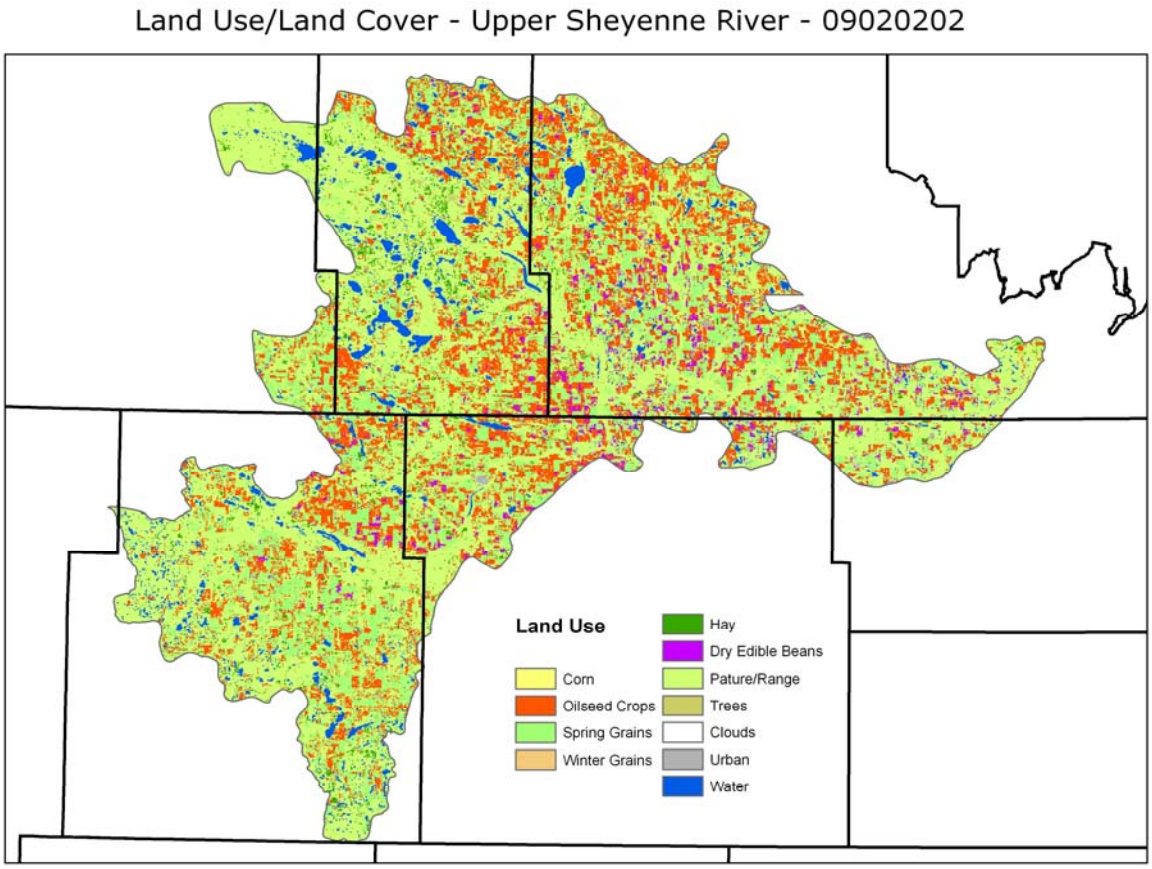
The following table and map show land cover / land use within the sub-basin.

Land Cover / Land Use *(National Resources Inventory [NRI])*[1]	Acres	Percent of HUC
Forestland	0	0%
Cropland	655,700	52%
Conservation Reserve Program (CRP) Land [2] [a]	95,900	8%
Tame Grass/Hayland	53,700	4%*
Pastureland	19,000	2%
Rangeland	280,900	23%
Urban/Farmstead/ Transportation Land	104,900	8%
Water/Wetlands	26,600	2%*
Federal Lands	15,700	1%*
Minor Lands **	NA	NA
North Dakota HUC Totals [b]	1,252,400	100%*

** Less than one percent of total acres. See below for special considerations.*
*** Minor land includes farmsteads, windbreaks, marshland, etc.*
a: Estimate from Farm Service Agency records and include CRP/CREP.
b: Totals may not add due to rounding and small unknown acreages.

Irrigated Land *(ND State Water Commission Estimates)*	7,000	<1%

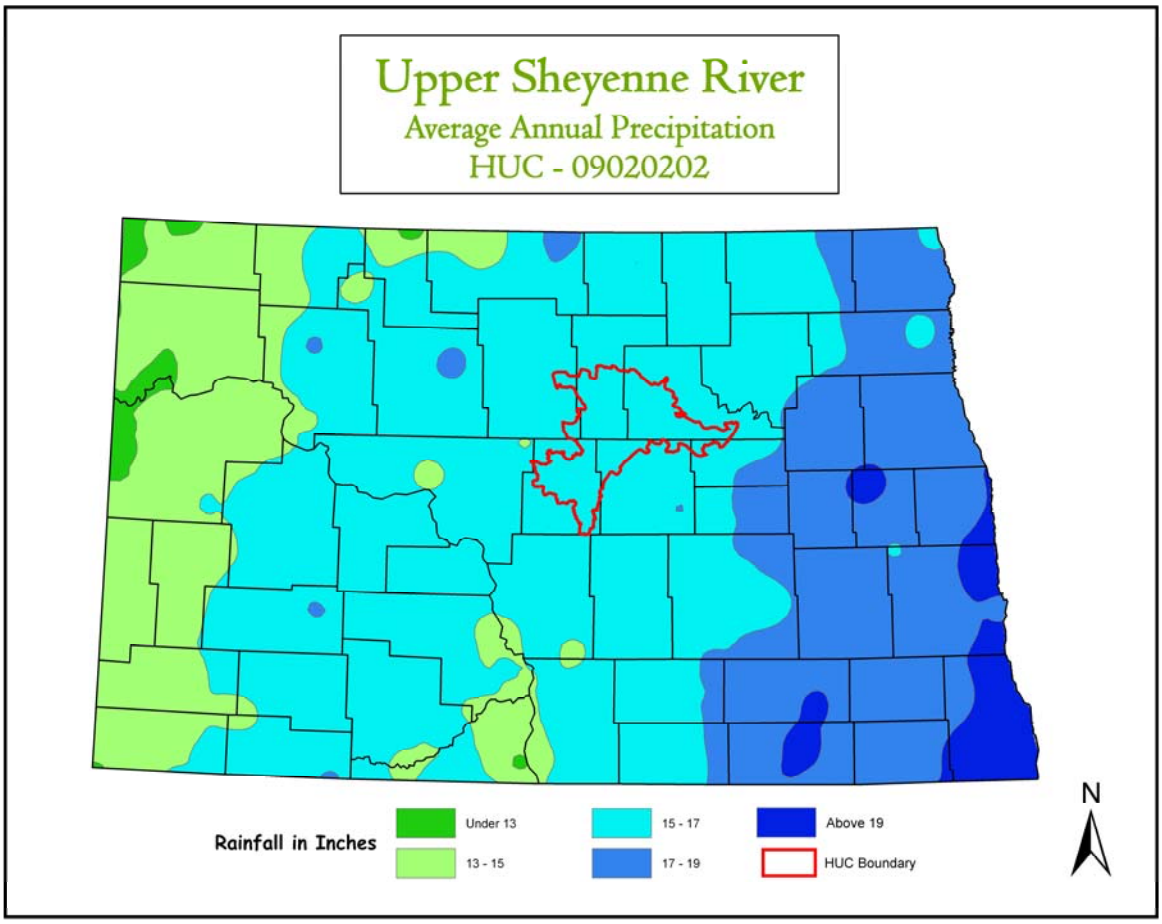
Physical Description – Continued



The above map was developed from U.S. Geologic Survey's (USGS) ND Gap Analysis Program data.[3]

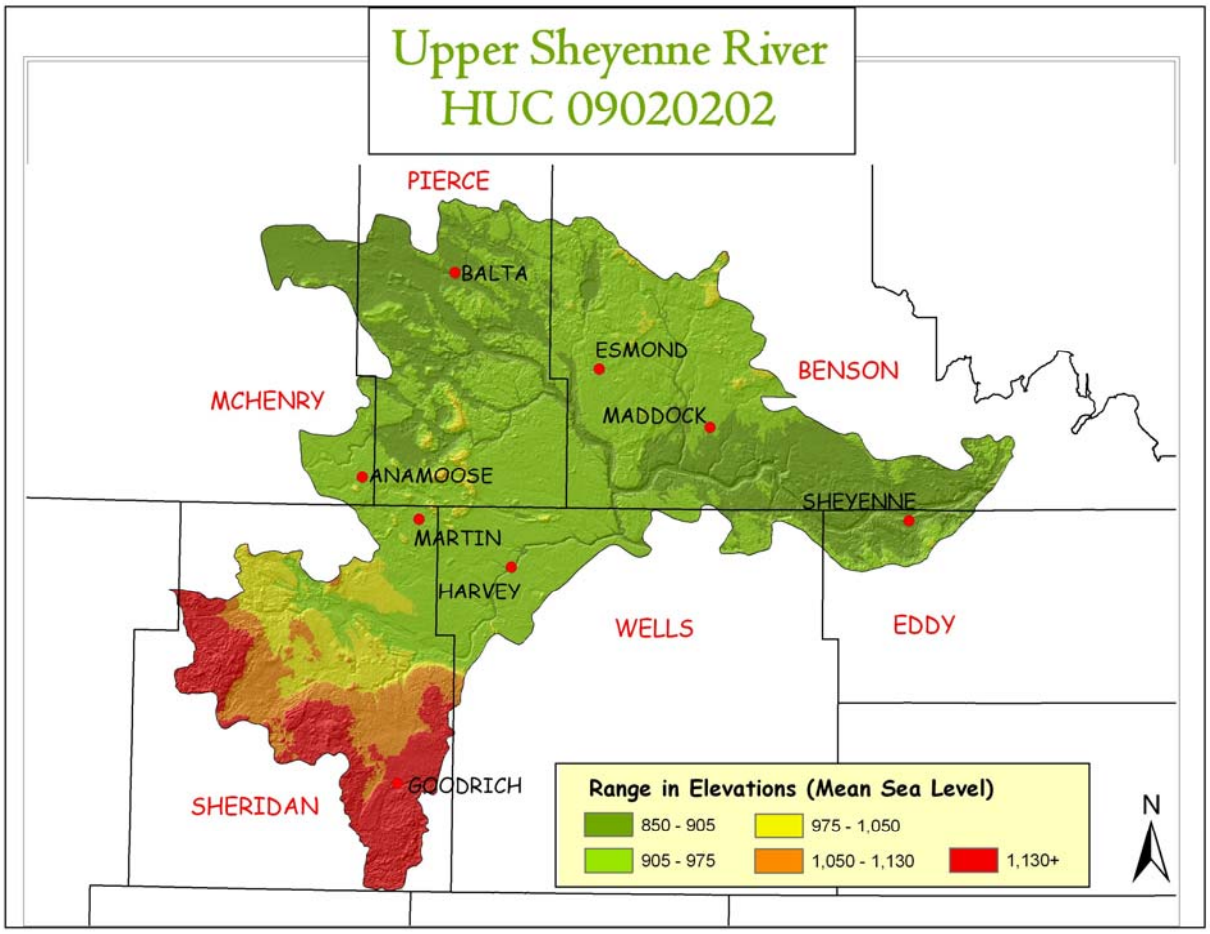
Physical Description – Continued

The following map is a plot of 1961-1990 annual average precipitation contours from National Oceanic and Atmospheric Administration (NOAA) Cooperative stations and (where appropriate) USDA-NRCS Snowpack Telemetry (SNOTEL) Stations. Christopher Daly used the PRISM (**P**arameter-elevation **R**egressions on **I**ndependent **S**lopes **M**odel) model to generate the gridded estimates from which this map was derived: the modeled grid was approximately 4x4 km latitude/longitude, and was resampled to 2x2 km using a Gaussian filter. Mapping was performed by Jenny Weisberg and Nathaniel DeYoung. Funding was provided by USDA-NRCS National Water and Climate Center. (4/20/98)



Physical Description – Continued

The sub-basin is part of the Souris-Red-Rainy River Region - Red River Sub-Region. All drainage patterns flow to the east ending at the Red River, which flows north into Canada. The following map shows the relief for the sub-basin.[4]



Physical Description – Continued

The North Dakota Department of Health collects water quality data on major water bodies. The following table shows the total miles of streams and acres of lakes/reservoirs within the sub-basin and also the miles and acres that have a water quality limitation. The second part of the table shows the livestock numbers, feeding operations, and permitted operations. Also included is the livestock numbers for all cattle, beef cows, dairy cows, hogs and pigs, and sheep and lambs. The livestock numbers were extrapolated from 2002 Agricultural Census county data to 8-digit HUC's.

		Units	North Dakota [5]	Upper Sheyenne Sub-basin[6]	Upper Sheyenne as percent of North Dakota	Impaired Water Quality (303d)[7]	Percent Impaired* Upper Sheyenne
Water Quality Data **Percent of Total Miles and acres in HUC*	Total – Major Water bodies						
	Rivers/Streams	Miles	56,687	1,543	2.7%	91	5.9%
	Lakes/Reservoirs	Acres	434,658	4,993	1.1%	161	3.2%

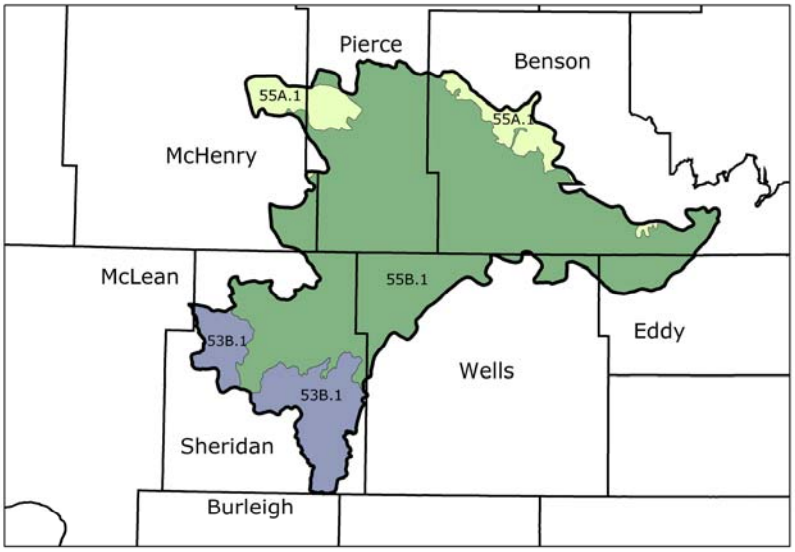
Animal Feeding Facilities – North Dakota Department of Health Permit[8]					
Animal Type	**Dairy**	**Beef**	**Swine**	**Other**	**Total**
Number of Animal Feeding Operations	3	8	1	1	13
Number of Animals	350	2,856	150	150	3,506
Number of State Permitted Operations					

Livestock Numbers (rounded to nearest 100)[9]					
	Cattle and Calves	Beef Cows	Dairy Cows	Hogs and Pigs	Sheep and Lambs
North Dakota	1,873,200	982,300	34,500	138,800	114,000
Upper Sheyenne River	47,100	23,300	700	800	1,700
Upper Sheyenne River as a percent of North Dakota	2.5%	2.4%	2.0%	0.6%	1.5%

Physical Description – Continued

Common Resource Areas (CRAs) are geographical areas where resource concerns, problems, or treatments are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information were used to determine the geographic boundaries. CRAs are subsets of Major Land Resource Areas. The following map[10] shows the CRAs for Upper Sheyenne River sub-basin with the descriptions below.

Common Resource Area (CRA) Map
Upper Sheyenne River
09020202



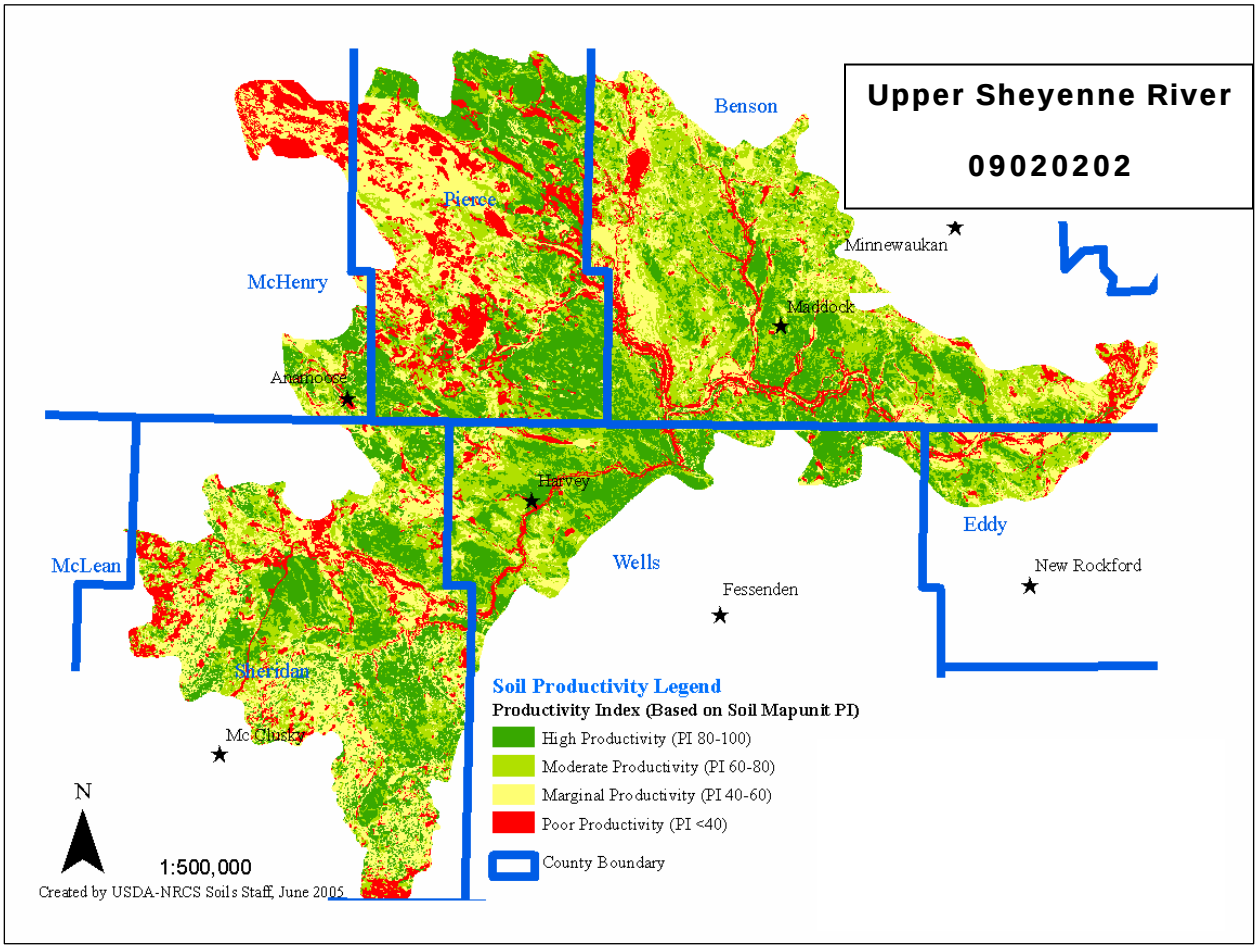
53B.1 – Central Dark Brown Glaciated Plains: The Central Dark Brown Glaciated Plains are a nearly level to rolling with steeper areas along rivers. This region marks a transition to drier conditions. Land use is a mosaic of cropland and rangeland. Soil textures range from the dominant loamy glacial till to areas of coarse textured outwash and fine textured lacustrine materials. Most soils are moderately deep and deep, well drained and moderately well drained, and have a frigid temperature regime.

55A.1 – Northern Black Glaciated Drift Plain: The Northern Black Glaciated Drift Plain is a nearly level to undulating landscape composed of glacial till and lacustrine sediments. Temporary and seasonal wetlands are numerous throughout the area. A very short growing season and the coldest January temperatures in Northern Plains limit agriculture.

55B.1 – Central Black Glaciated Drift Plain: The Central Black Glaciated Drift Plains are a gently rolling to undulating landscape with a thick layer of glacial till. Temporary and seasonal wetlands are numerous throughout the area. These soils are very fertile, but agricultural success is subject to annual climatic fluctuations. Most of the soils are deep, well drained and moderately well drained, sandy to clayey, and have a frigid temperature regime.

Soil Productivity [11]

The Upper Sheyenne River sub-basin has a wide variety of soil productivities. In the northwest part of the sub-basin, there is a large area of wind blown sands from Glacial Lake Souris. This is a large continuous area of marginal and poor productivity. The remainder of the sub-basin contains various combinations of marginal to high productivity.



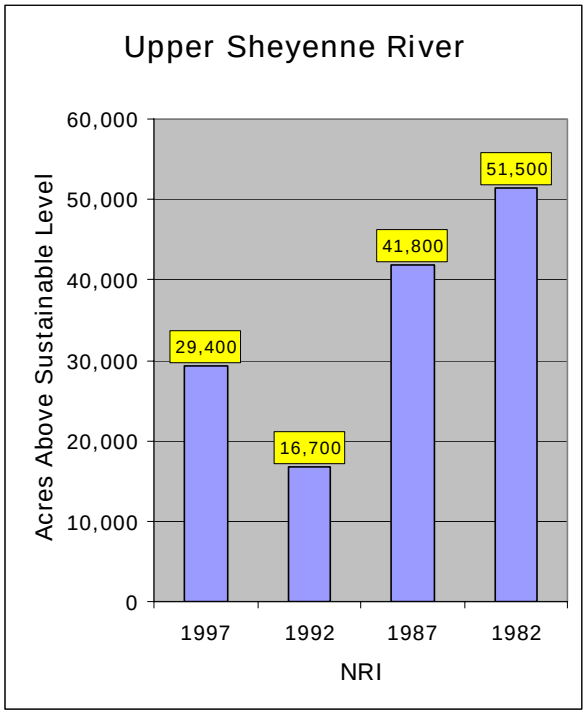
Common Land Unit

The entire sub-basin has the common land unit digitized by Farm Services Agency (FSA).

Resource Concerns

One of the goals of the NRCS is to look at an area to help quantify the types and amounts of resources that may be of concern. This helps in identifying priority areas for the types and amounts of assistance to be given to a particular watershed.

- The acres of land above sustainable levels have decreased by 22,100 acres from 1982 to 1997.
- NRI estimates indicate no acres of the sub-basin agricultural lands still had water erosion rates above a sustainable level in 1997.
- NRI estimates show 29,400 acres of the sub-basin agricultural lands still had wind erosion rates above a sustainable level in 1997.
- Controlling erosion not only sustains the long-term productivity of the land, but also affects the amount of soil, pesticides, fertilizer, and other organic material that move into the basin's waters.
- Through NRCS programs many farmers and ranchers have applied conservation practices to reduce the effects of erosion by water. As a result, erosion rates on cultivated cropland were 1.34 tons/acre/year in 1997.



- NRI estimates indicate 84,900 acres of Highly Erodible Land (HEL) in 1997 compared to 109,800 acres in 1987. This is nearly a 23% reduction in HEL being farmed.
- There are six 303(d) listed streams, lakes, and reservoirs listed for sediment, siltation, nutrients, dissolved oxygen and eutrophication. Stream reaches listed for sediment are affected by erosion on cropland and from eroded stream banks.
- Conservation practices that can be used to address these water quality issues include erosion control, nutrient and pest management, grazing management, and riparian buffers.

Resource Concerns – Continued

The following table shows the different projects, plans, studies, and assessments conducted within the sub-basin.

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		**NRCS Watershed Plans, Studies & Assessments**	
Name	**Status**	**Name**	**Status**
None	NA	None	NA
NDDH TMDLs		**Soil Conservation District Assessments and Studies**	
Number Listed		**Name**	**Status**
Lakes/Reservoirs – 2	Streams – 4	Upper Sheyenne River - WRAS	Ongoing

EPA 319 Watershed Projects	
Name	**Status**
Upper Sheyenne River NDSU Livestock I&E and Technical Assistance Red River Riparian Area	Ongoing Ongoing Ongoing

Soil

- Sandy soils and steep soils still require conservation practices to control excessive soil erosion.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are needed.
- Soil health, especially compaction on heavier or fine textures soils and organic matter on sandy soils are two resource concerns.
- Soil erosion and low organic matter remain resource concerns.

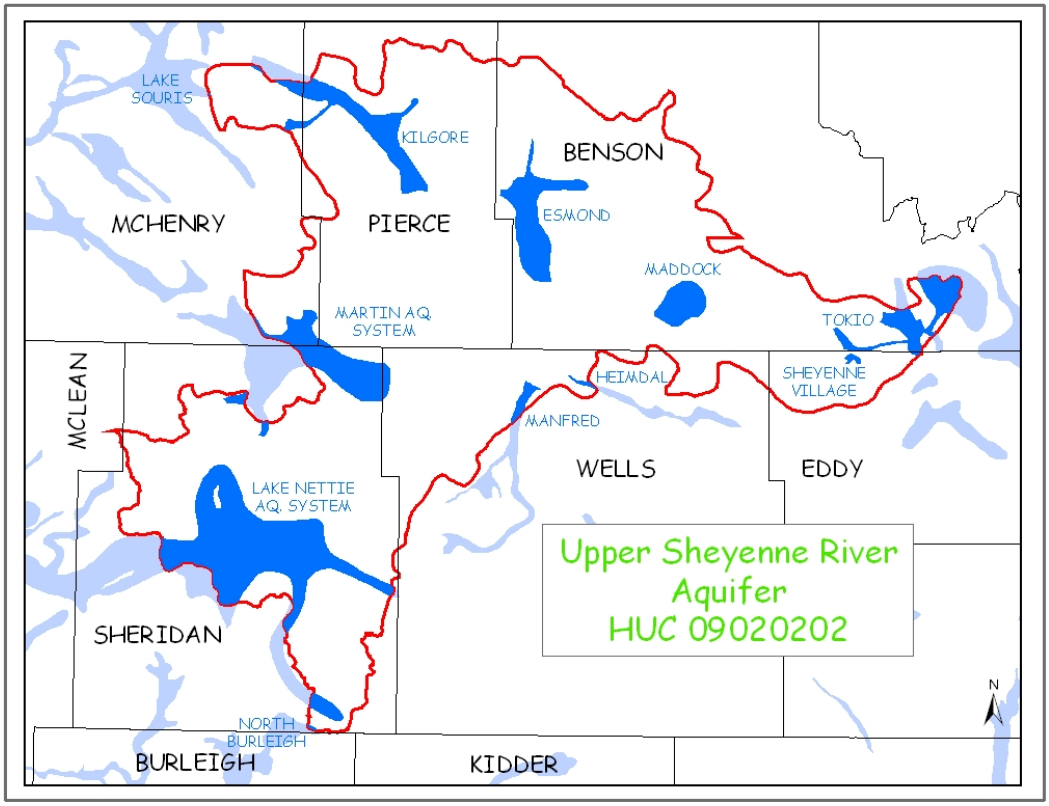
Water

- Sediment and nutrients are primary water quality pollutants impairing the watershed streams and lakes.
- The Sheyenne River has a large number of livestock operations on or near the river, which have some water quality impacts from nutrient loading.
- There are several shallow aquifers that are considered sensitive to nitrate and pesticide loading.
- Flooding does occasionally occur and impact crop production.
- Water conservation and water quality (potential for pesticide contamination) are issues on irrigated cropland.
- **Wellhead Protection Areas**[12] – there are eight protection areas located in the sub-basin.

Resource Concerns – Continued

Water (cont)

- **Aquifers**[13] - There are ten glacial drift aquifers (Lake Nettie Aquifer System, Martin Aquifer System, Kilgore, Esmond, Maddock, Tokieo, Sheyenne Village, Heimdal, Manfred, and North Burleigh) located below the Upper Sheyenne sub-basin. There is also one deep aquifer (New Rockford) located below the sub-basin. These aquifers are the water source for eight water systems.



Animals

- Threatened and endangered species are listed in the table below.

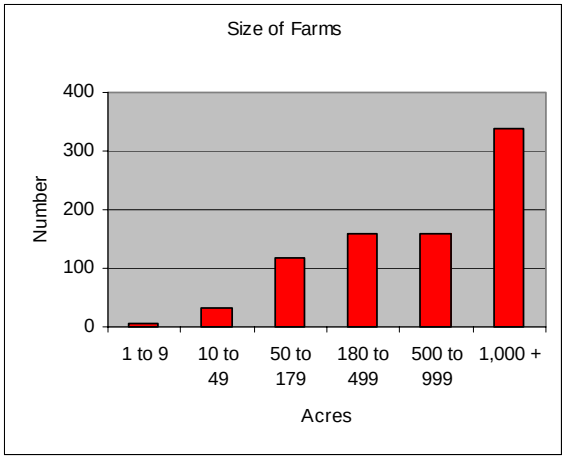
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	Grey Wolf	None	None
Birds	Bald Eagle, Piping Plover	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	Dakota Skipper
Plants	None	None	None
Critical Habitat – Piping Plover			

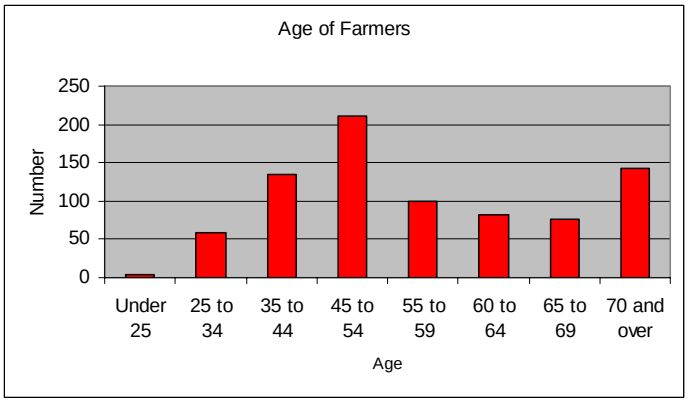
Census and Social Data[14]

Number of Farms: 730

Number of Operators:

- Average Age: 55
- Full-Time Operators: 72%
- Part-Time Operators: 28%





Estimated Level of Willingness and Ability to Participate in Conservation:
MODERATE

Limited Resource and Beginning Farmer

Six percent (45) of the operators are minority producers. Limited Resource Farmers are also estimated at seven percent (52). These percentages point to the potential need for special technical assistance targeted to reach people who (1) may lack experience with government farm programs, (2) have good stewardship intentions but lack management skills, and (3) lack the time to visit an NRCS field office and seek assistance.

References

[1] USDA-NRCS, NRI data.
[2] USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
[3] USDI-US Geologic Services, ND GAP analysis data, 2005.
[4] USDA-NRCS, Natural Resources Planning Staff, 30 meter Relief Data GIS data layer, 2002.
[5] ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
[6] ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
[7] ND Department of Health, Environmental Health Section, Water Quality Division, List of Section 303(d) TMDL Waters for the Red River Basin in North Dakota, 2006.
[8] ND Department of Health, Environmental Health Section, Water Quality Division, Animal Feeding Operations Program data, 2006.
[9] 2002 Census of Agriculture, North Dakota, State and County Data Volume 1, Geographic Area Series Part 34, U.S. Department of Agriculture, National Agricultural Statistics Service, June 2004. (county data was prorated to HUC by the percent of a HUC in a county)
[10] USDA-NRCS, Natural Resources Planning Staff, Common Resource Area GIS data layer, 2004.
[11] USDA-NRCS, Natural Resources Planning Staff, Soils Productivity GIS data layer, 2005.
[12] ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
[13] ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
[14] 2002 Census of Agriculture, North Dakota, State and County Data Volume 1, Geographic Area Series Part 34, U.S. Department of Agriculture, National Agricultural Statistics Service, June 2004. (county data was prorated to HUC by the percent of a HUC in a county)