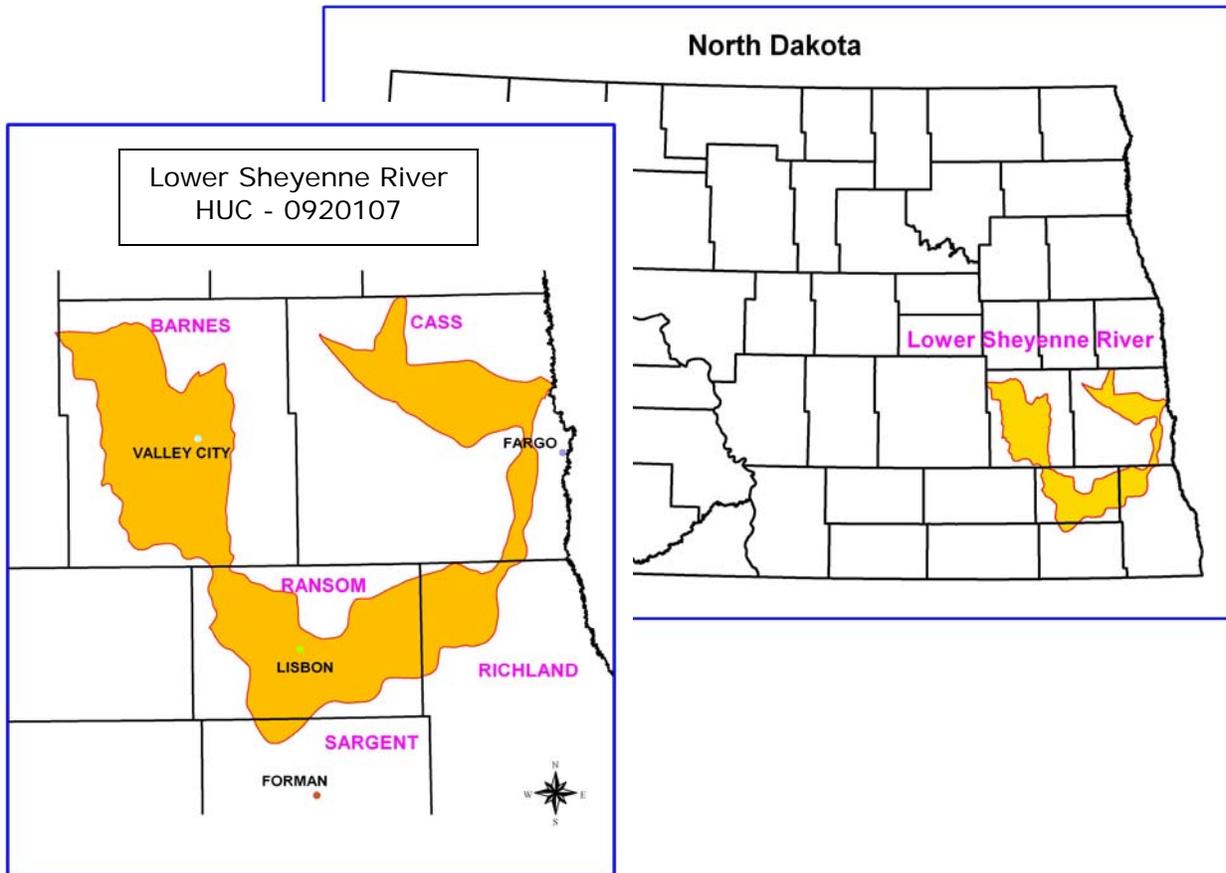


### Introduction

The Lower Sheyenne River 8-Digit Hydrologic Unit Code (HUC) (09020204) sub-basin is approximately 1,043,100 acres covering parts of six counties (Barnes, Cass, Ransom, Richland, Sargent, and Stutsman) in the Souris-Red-Rainy Region – Red River Sub-Region. Of the 1,043,100 acres, Barnes County contains 36%, Cass 21%, Ransom 31%, Richland 11%, Sargent 1%, and Stutsman <1%. There are approximately 935 farms in the sub-basin.



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

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

# Lower Sheyenne River 09020204 *8-Digit Hydrologic Unit Profile*

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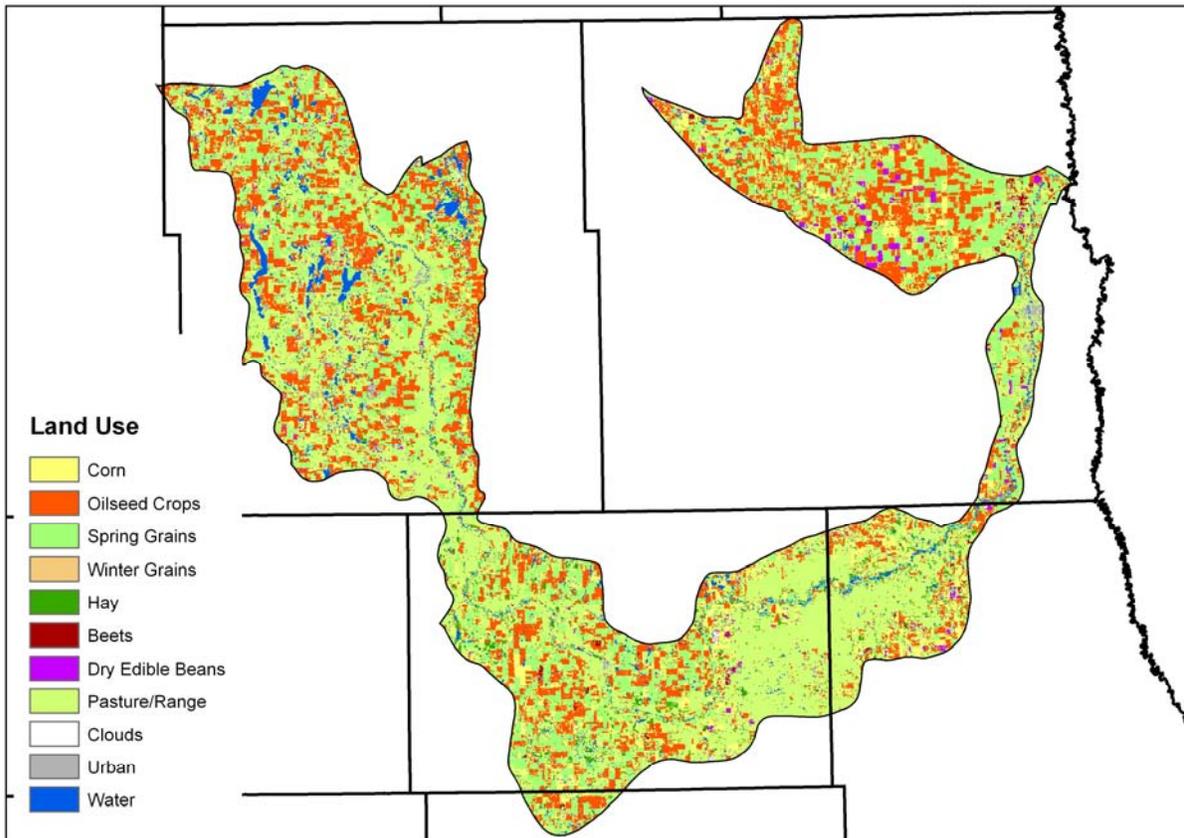
## Physical Description

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

Land Cover/ Land Use ( <i>National Resources Inventory [NRI]</i> ) <sup>1</sup>	Acres	Percent of HUC
Forestland	15,900	1%
Cropland	721,700	69%
Conservation Reserve Program (CRP) Land <sup>2 a</sup>	54,800	5%
Tame Grass/Hayland	39,900	4%
Pastureland	50,600	5%
Rangeland	58,300	6%
Urban/Farmstead/ Transportation Land	19,200	2%
Water/Wetlands	9,600	1%*
Federal Lands	73,100	7%
Minor Lands **	NA	NA
<b>North Dakota HUC Totals</b> <sup>b</sup>	1,043,100	100%*
<p><i>* 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.</i></p>		
<b>Irrigated Land</b> <i>(ND State Water Commission Estimates)</i>	14,000	1%

## Physical Description – Continued

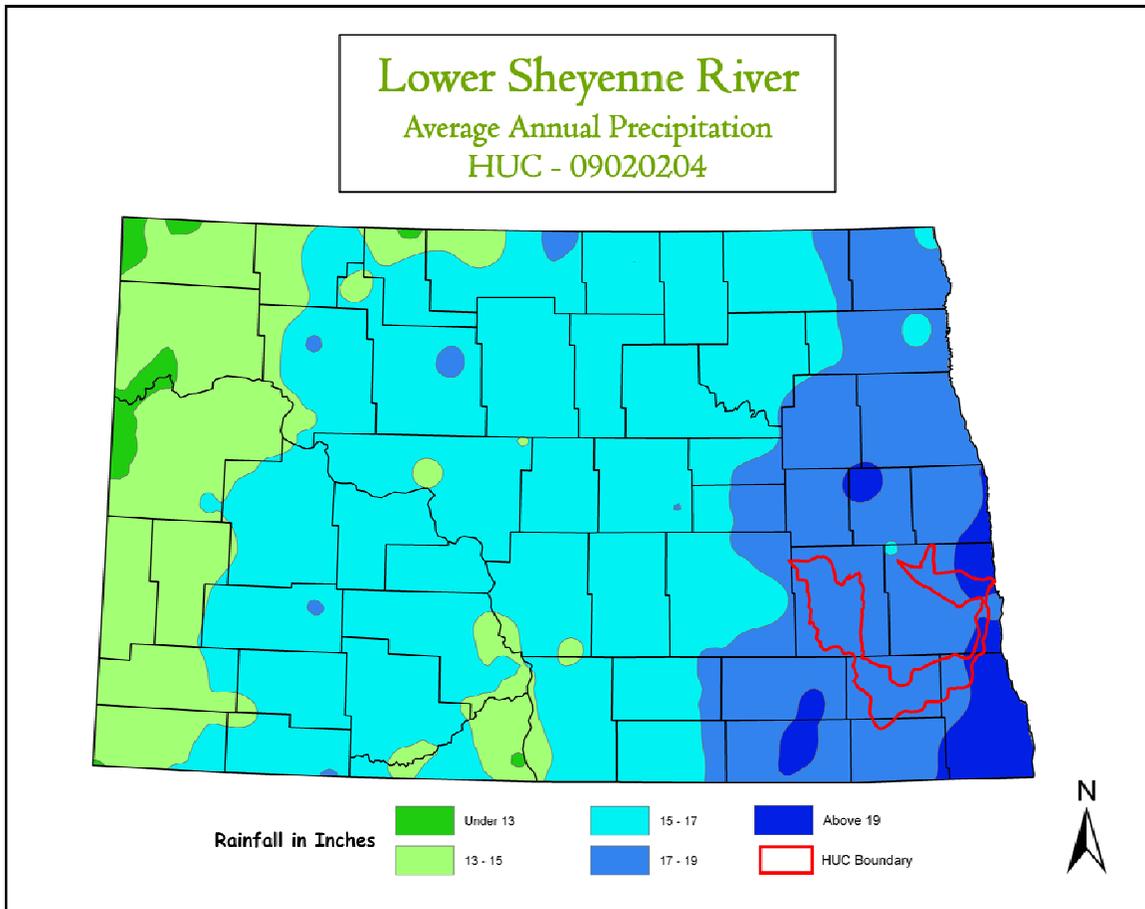
Land Use/Land Cover - Lower Sheyenne River - 09020204



The above map was developed from U.S. Geologic Survey's (USGS) ND Gap Analysis Program data.<sup>3</sup>

### 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)

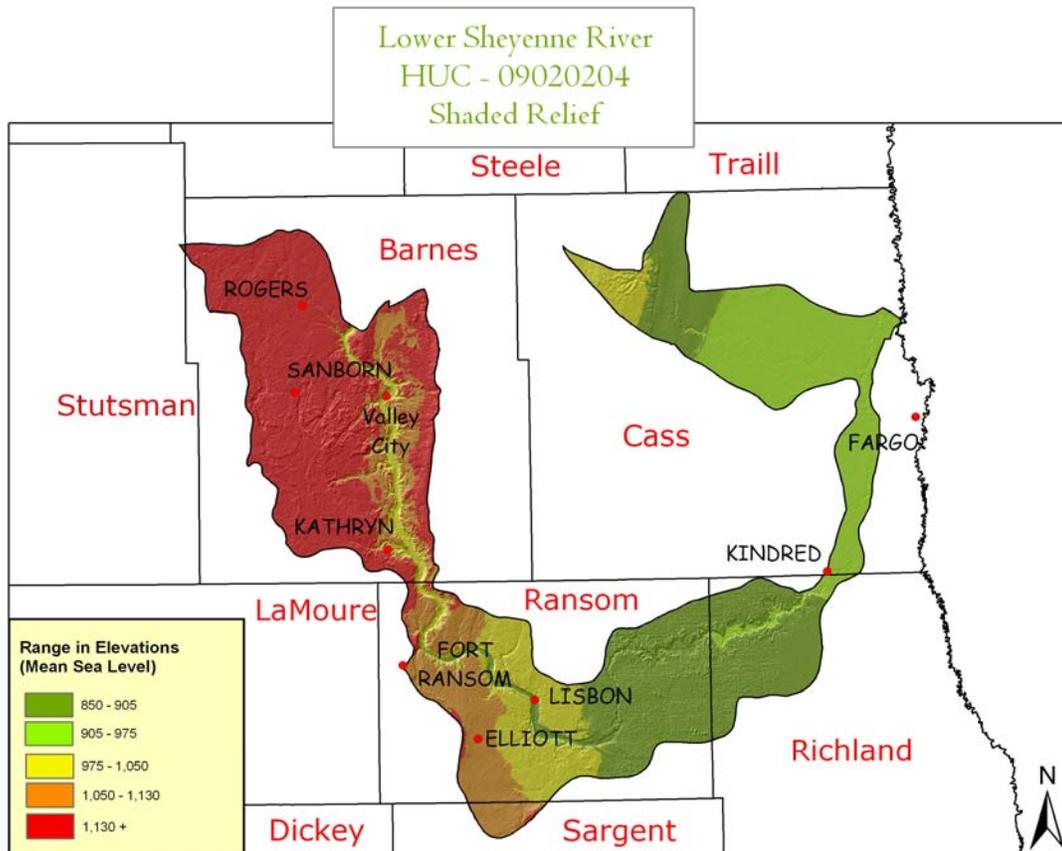


# Lower Sheyenne River 09020204 8-Digit Hydrologic Unit Profile

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## 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.<sup>4</sup>



### 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 <sup>5</sup>	Lower Sheyenne Sub-basin <sup>6</sup>	Lower Sheyenne as percent of North Dakota	Impaired Water Quality (303d) <sup>7</sup>	Percent Impaired* Lower Sheyenne
<b>Water Quality Data</b>	Total – Major Water bodies						
	Rivers/Streams	Miles	56,687	1,574	2.8%	256	16.3%
	Lakes/Reservoirs	Acres	434,658	1,001	25.2%	252	25.2%

*\*Percent of Total Miles and acres in HUC*

<b>Animal Feeding Facilities – North Dakota Department of Health Permit<sup>8</sup></b>					
Animal Type	Dairy	Beef	Swine	Other	Total
<b>Number of Animal Feeding Operations</b>	7	21	15	13	56
<b>Number of Animals</b>	978	3,829	6,073	1,821	12,701
<b>Number of State Permitted Operations</b>					

<b>Livestock Numbers (rounded to nearest 100)<sup>9</sup></b>					
	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
Lower Sheyenne River	34,400	16,600	600	18,300	2,700
Lower Sheyenne River as a percent of North Dakota	1.8%	1.7%	1.7%	13.2%	2.4%

### 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<sup>10</sup> shows the CRAs for Lower Sheyenne River sub-basin with the descriptions below.

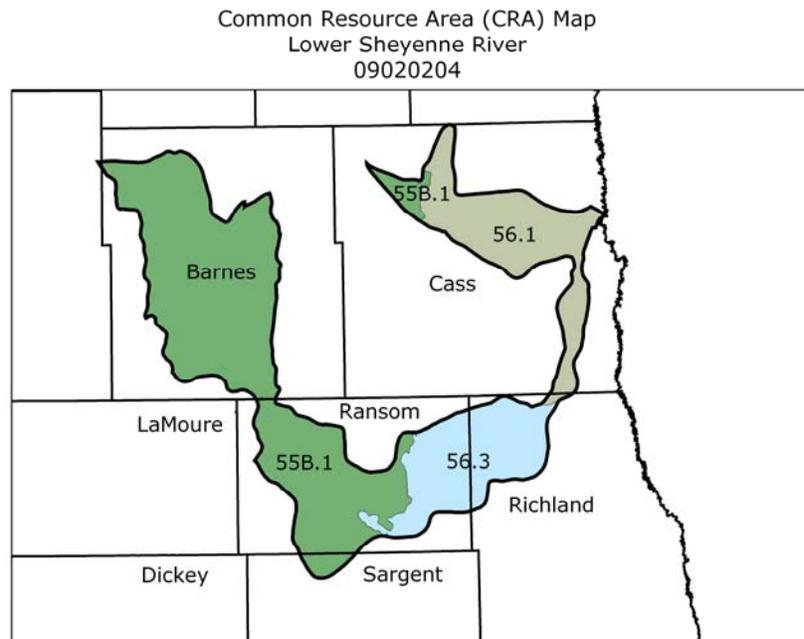
#### **55B.1 – Central Black**

**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.

#### **56.1 – Red River Valley:**

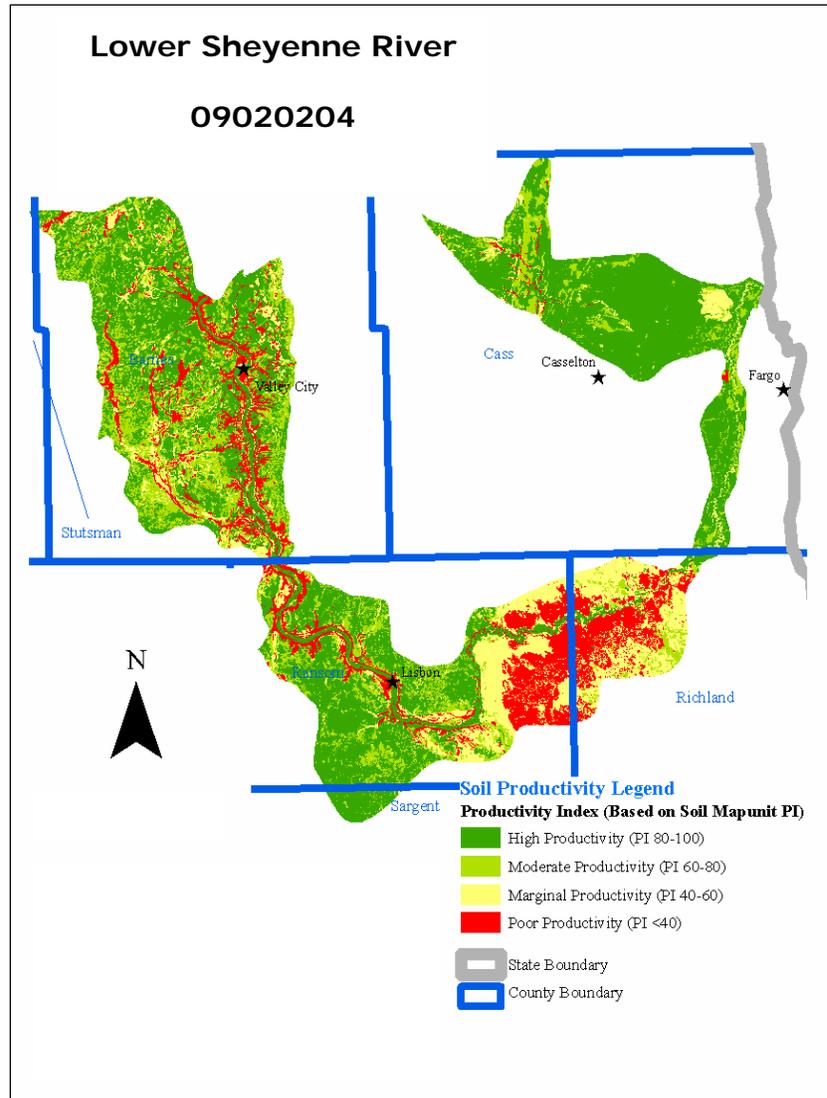
The Red River Valley (Glaciated Lake Agassiz) is an extremely flat landscape composed of thick lacustrine sediments. Soils range from silty to clayey in texture. Most soils have a high water table and are very productive. Saline soils exist in places. Most areas are farmed with main crops being small grain, sugar beets, and soybeans. The native vegetation was tall grass prairie. Primary resource concerns are soil erosion and deposition by wind.

**56.3 – Sheyenne Delta of the Red River Valley:** The Sheyenne Delta landscape ranges from strongly rolling sand dunes in the northeastern edge, to nearly level high water table sandy soils of the south. A risk of wind erosion exists throughout this area. The area is used for range and cropland. A portion of the Sheyenne Delta is in the Sheyenne National Grassland.



### Soil Productivity <sup>11</sup>

The Lower Sheyenne river sub-basin is separated by the poor to marginal productivity soils of the Sheyenne Delta. The soils to the west and north of the Sheyenne Delta are predominately highly productive glacial till soils with some exceptions being the poor productivity of the flood plains. The soils to the east and north of the delta are the highly productive soils of the Glacial Lake Agassiz.



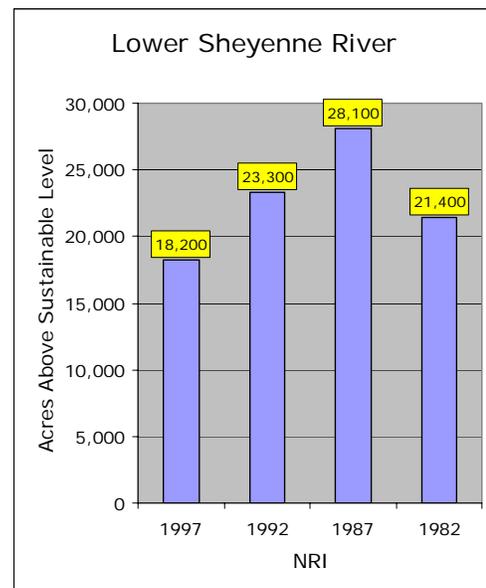
### Common Land Unit

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

### Resource Concerns

One of the goals of NRCS is to look at an area to help quantify the types and amounts of resources that may be of concern. This helps to identify 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 almost 10,000 acres from 1987 to 1997.
- ❖ NRI estimates indicate 2,600 acres of the sub-basin agricultural lands still had water erosion rates above a sustainable level in 1997.
- ❖ NRI estimates show 15,600 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 1.1 tons/acre/year in 1997.
- ❖ NRI estimates indicate 37,300 acres of Highly Erodible Land (HEL) in 1997 compared to 44,200 acres in 1987. This is nearly a 16% reduction in HEL being farmed.
- ❖ Seventy-five percent of all 303(d) listed stream, lake, and reservoir acres are listed for sediment and siltation. Total Fecal Coliform was exceeding State water quality standards on twenty-five percent. Stream reaches listed for sediment are affected by erosion on croplands and from 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.

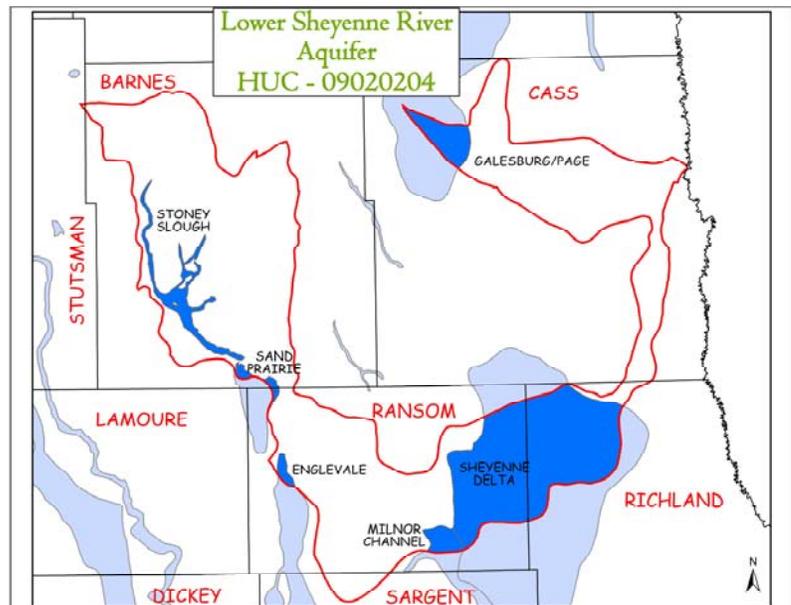
Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		NRCS Watershed Plans, Studies & Assessments	
Name	Status	Name	Status
Swan-Buffalo	Complete	none	NA
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs – 2	Streams – 10	Ransom County - Sheyenne River Sheyenne River WRAS	Ongoing Ongoing
EPA 319 Watershed Projects			
Name		Status	
Sheyenne River - Barnes County 319		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 still 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

- **Aquifers**<sup>12</sup> - There are six aquifers (Galesburg/Page, Sheyenne Delta, Milnor Channel, Englevale, Sand Prairie, and Stoney Slough) located below the Lower Sheyenne sub-basin.
- **Wellhead Protection Areas**<sup>13</sup> – there are ten protection areas located in the sub-basin.





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### **Resource Concerns - Continued**

#### **Water (cont.)**

- 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 and Total Fecal Coliform.
- There are four shallow aquifers that are considered sensitive to nitrate and pesticide loading.
- Flooding in the valley does occasionally occur and impact crop production.
- Water conservation and water quality (potential for pesticide contamination) are issues on irrigated cropland.

#### **Air**

- Air quality from industrial facilities is a concern.

#### **Plants**

- Major concerns are controlling invasive weeds and maintaining good pasture condition.
- Direct seeding and annual cropping has been successful in the higher rainfall (12 inches plus) zone.
- Conventional tillage systems are still utilized.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- The private, non-industrial forestland is associated with small woodlots or rural homesites which are not actively managed for timber production.
- North Dakota and U.S. Forest Service have public land within the watershed that is utilized by ranchers.

#### **Animals**

- Threatened and endangered species can be seen in the table provided below.

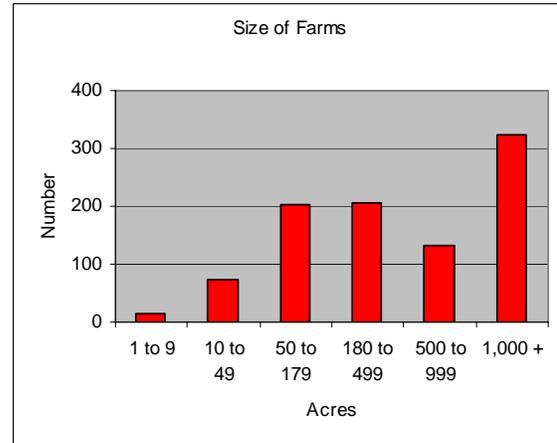
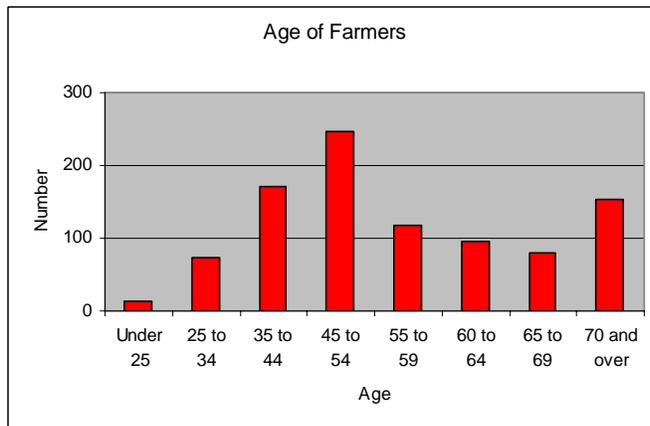
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	None	None
Birds	Bald Eagle,	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	Dakota Skipper
Plants	Western Prairie Fringed Orchid	None	None
Amphibians and Reptiles	None	None	None
Critical Habitat - None			

## Census and Social Data<sup>14</sup>

**Number of Farms: 954**

**Number of Operators:**

- Average Age: 54
- Full-Time Operators: 69%
- Part-Time Operators: 31%



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

**MODERATE**

**Limited Resource and Beginning Farmer**

Almost 4 percent of the operators are minority producers. Limited Resource Farmers are estimated at 5 percent. Although rather low percentages, these facts 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.

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### **References**

- <sup>1</sup> USDA-NRCS, NRI data.
- <sup>2</sup> USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- <sup>3</sup> USDI-US Geologic Services, ND GAP analysis data, 2005.
- <sup>4</sup> USDA-NRCS, Natural Resources Planning Staff, 30 meter Relief Data GIS data layer, 2002.
- <sup>5</sup> ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
- <sup>6</sup> ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
- <sup>7</sup> 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.
- <sup>8</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Animal Feeding Operations Program data, 2006.
- <sup>9</sup> 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)
- <sup>10</sup> USDA-NRCS, Natural Resources Planning Staff, Common Resource Area GIS data layer, 2004.
- <sup>11</sup> USDA-NRCS, Natural Resources Planning Staff, Soils Productivity GIS data layer, 2005.
- <sup>12</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- <sup>13</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
- <sup>14</sup> 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)