

# Cedar River 10130205

## 8-Digit Hydrologic Unit Profile

February 2008

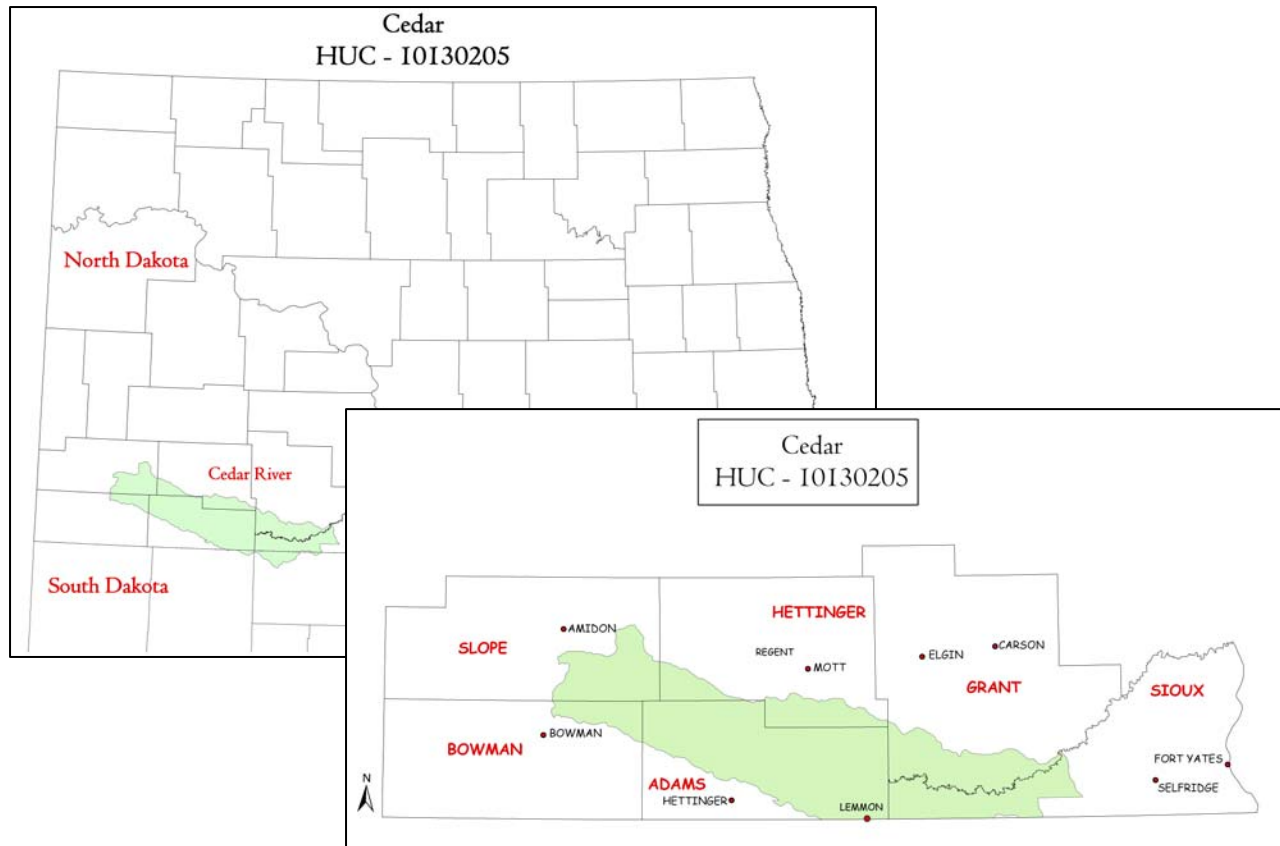
### Introduction

The Cedar River 8-Digit Hydrologic Unit Code (HUC) (10130205) sub-basin includes land in North and South Dakota. There are approximately 1,120,359 acres in the entire sub-basin. This sub-basin is located in the Missouri Region, Missouri-Oahe Sub-Region, Cannonball-Heart-Knife Basin.

This report addresses only the portion located within North Dakota. The Cedar River portion in North Dakota is approximately 1,065,600 acres covering parts of six counties (Adams, Bowman, Grant, Hettinger, Sioux, and Slope). Of the 1,065,600 acres, Adams County contains 44%, Grant 16%, Sioux 14%, Slope 11%, Hettinger 9%, and Bowman 6%. There are approximately 550 farms in the sub-basin. The following two maps show the entire sub-basin and also the portion of the sub-basin located within North Dakota.

This sub-basin encompasses commodities ranging from alfalfa, wheat, corn, peas/lentils, sunflowers, barley, and oats to beef cattle, swine, poultry, and bees.

Conservation assistance is provided by five Natural Resources Conservation Service (NRCS) Service Centers and the Dakota West Resource Conservation & Development (RC&D) Office.



*Produced by  
the Natural  
Resources  
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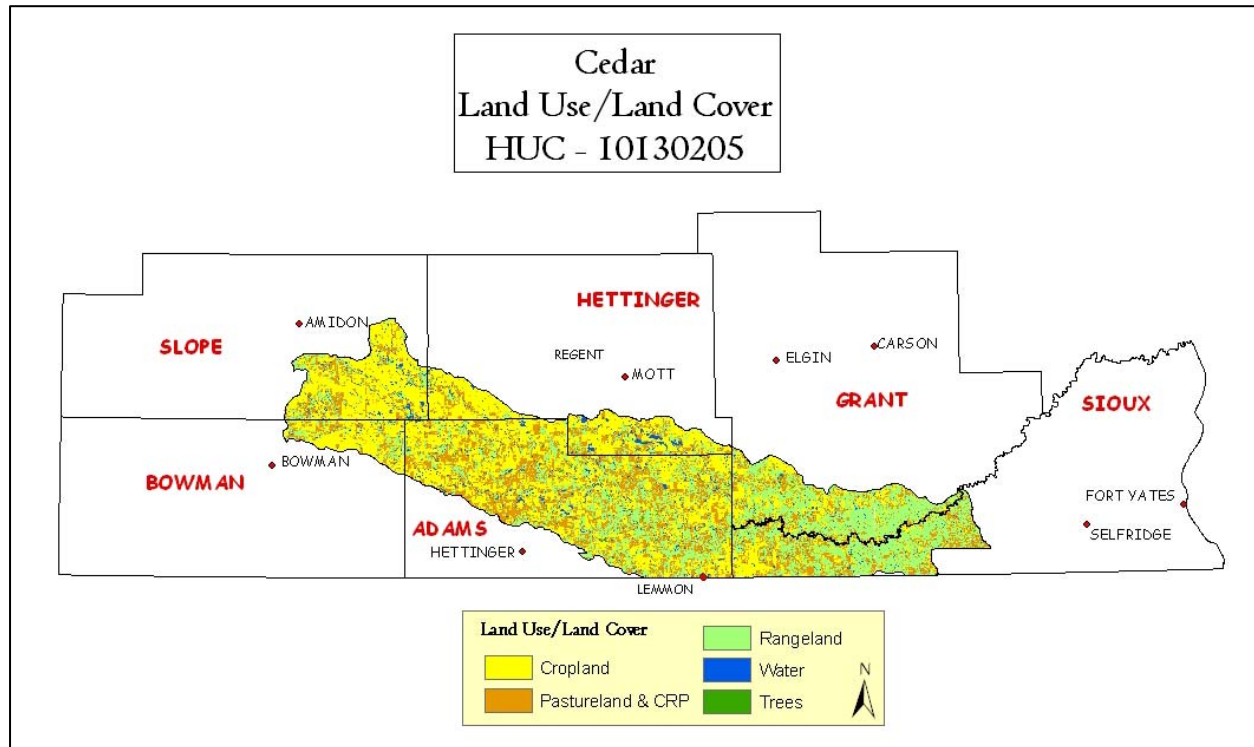
### **Physical Description**

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

<b>Land Use/ Land Cover (<i>National Resources Inventory [NRI]</i>)<sup>1</sup></b>	<b>Acres</b>	<b>Percent of HUC</b>
Forestland	0	0 %
Cropland	406,100	38 %
Conservation Reserve Program (CRP) Land <sup>2</sup> <a href="#">a</a>	105,200	10 %
Tame Grass/Hayland	91,400	9 %
Pastureland	48,700	5 %
Rangeland	380,700	36 %
Urban/Farmstead/ Transportation Land	25,300	2 %
Water/Wetlands	3,900	0 %
Federal Lands	4,300	0 %
<b>North Dakota HUC Totals</b> <sup>b</sup>	<b>1,065,600</b>	<b>100%</b>
<p><i>* Less than one percent of total acres. See below for special considerations. 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>(Farm Services Agency)<sup>3</sup></i>	<b>&lt;500</b>	<b>&lt;1%</b>

## Physical Description – Continued

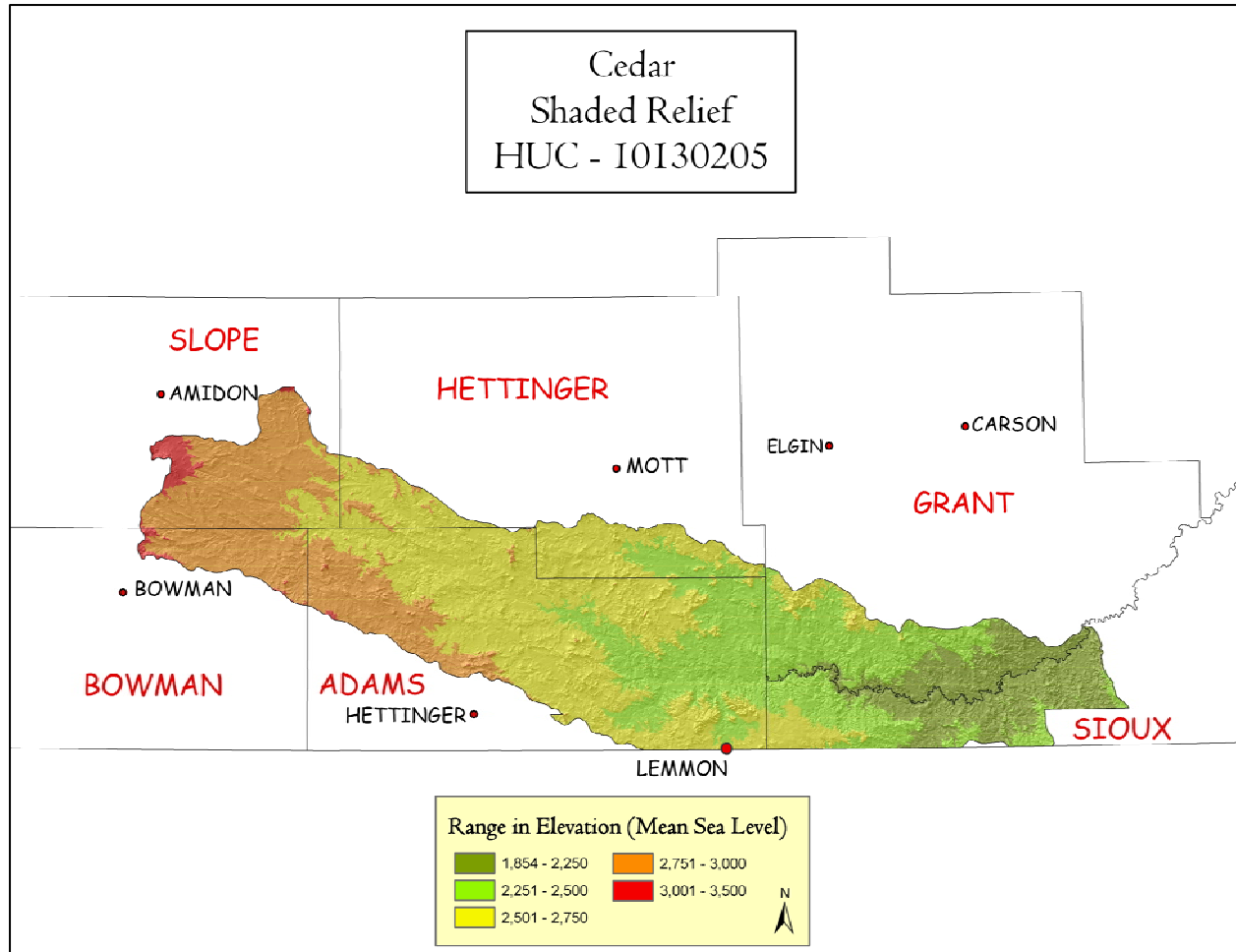
### Land Use/Land Cover Map



The above map was developed from U.S. Geologic Survey's (USGS) ND Gap Analysis Program data.<sup>4</sup>

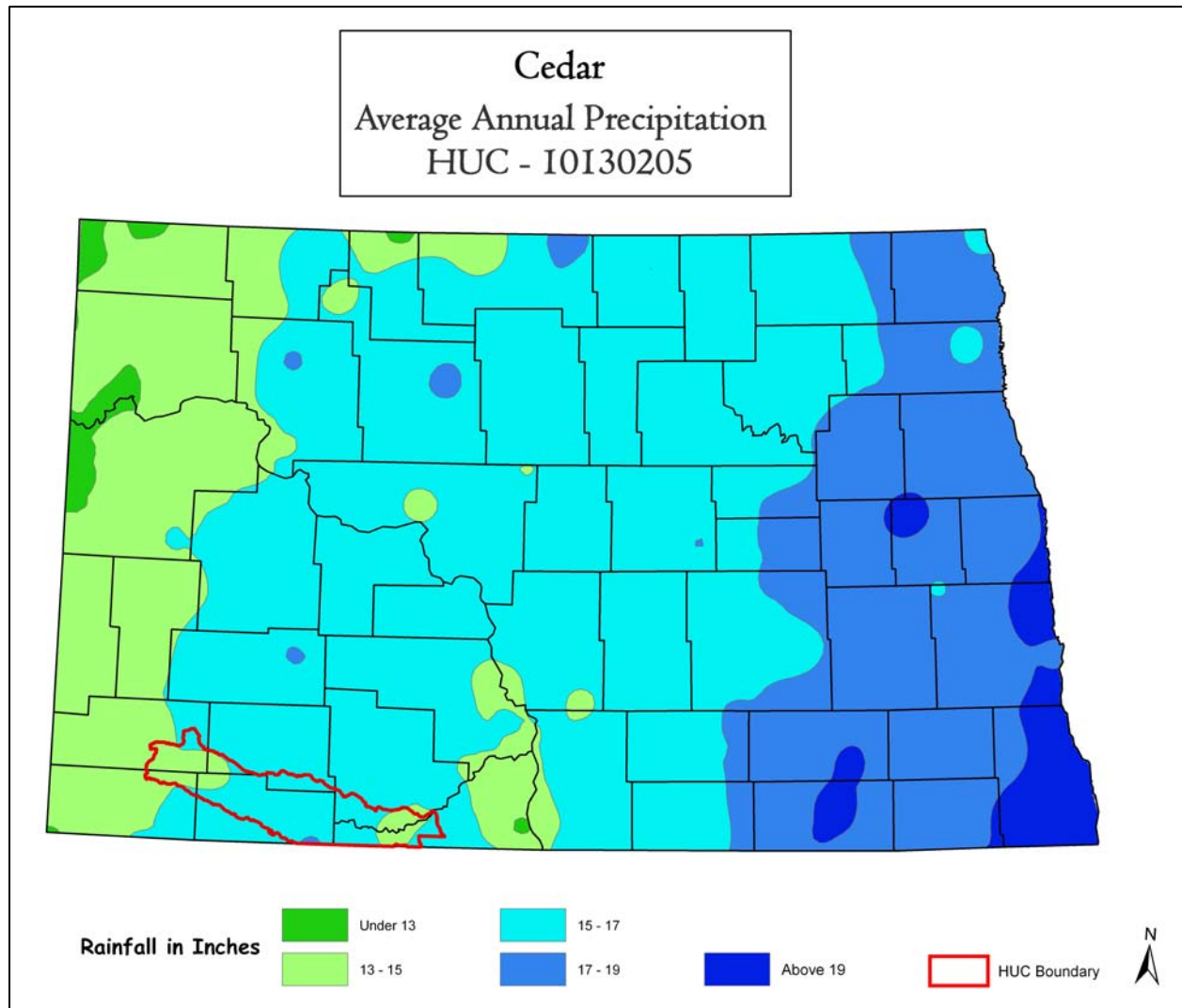
## Physical Description – Continued

The sub-basin is part of the Missouri River Region - Missouri-Oahe Sub-Region. Cedar River flows east into the Cannonball River which flows into the Missouri River. The following map shows the relief for the sub-basin.<sup>5</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)



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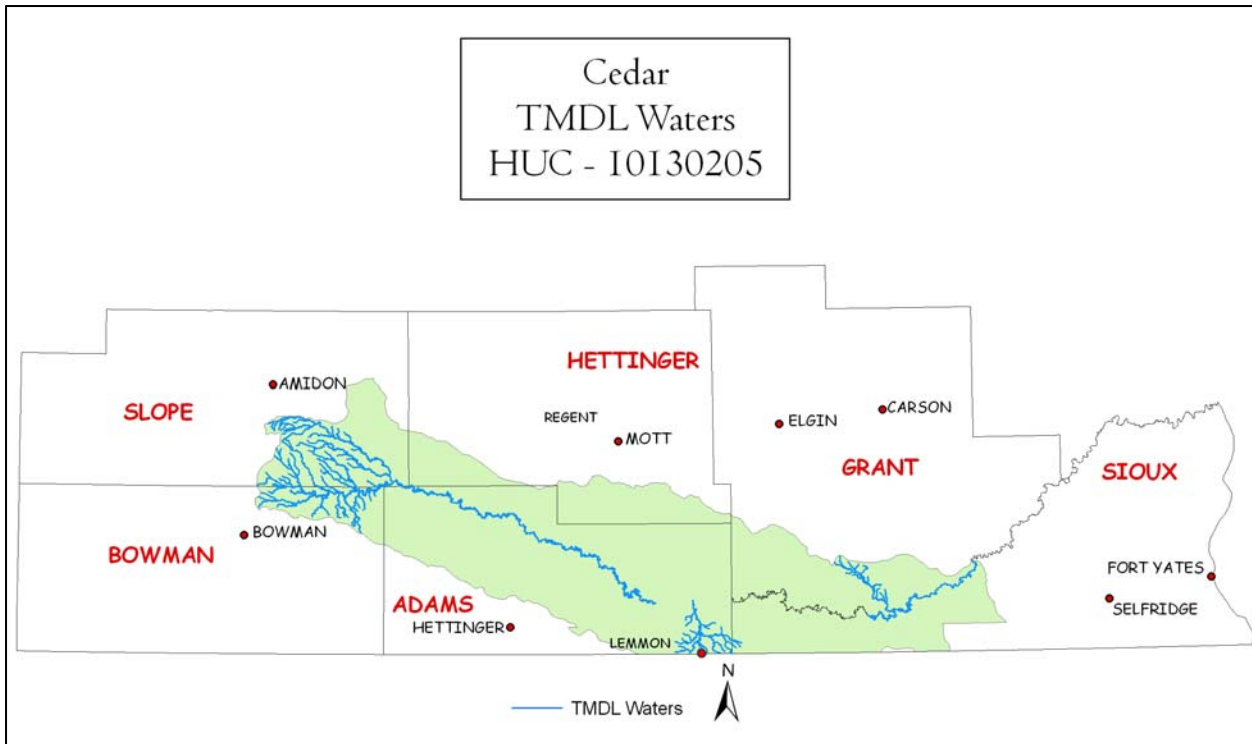
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### **Physical Description – Continued**

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 with a water quality limitation. A map showing the Total Maximum Daily Load (TMDL) waters within the watershed follows the table. TMDL is the amount of a particular pollutant a stream, lake, estuary, or other waterbody can "handle" without violating State water quality standards.

		Units	Cedar River Sub-basin <sup>6</sup>	Cedar River Impaired Water Quality (303d) <sup>7</sup>	Percent Impaired* Cedar River
<b>Water Quality Data</b> <i>*Percent of Total Miles and acres in HUC</i>	Total – Major Water Bodies				
	Rivers/Streams	Miles	710.4	504.6	71.0%
	Lakes/Reservoirs	Acres	253.5	198.5	78.3%



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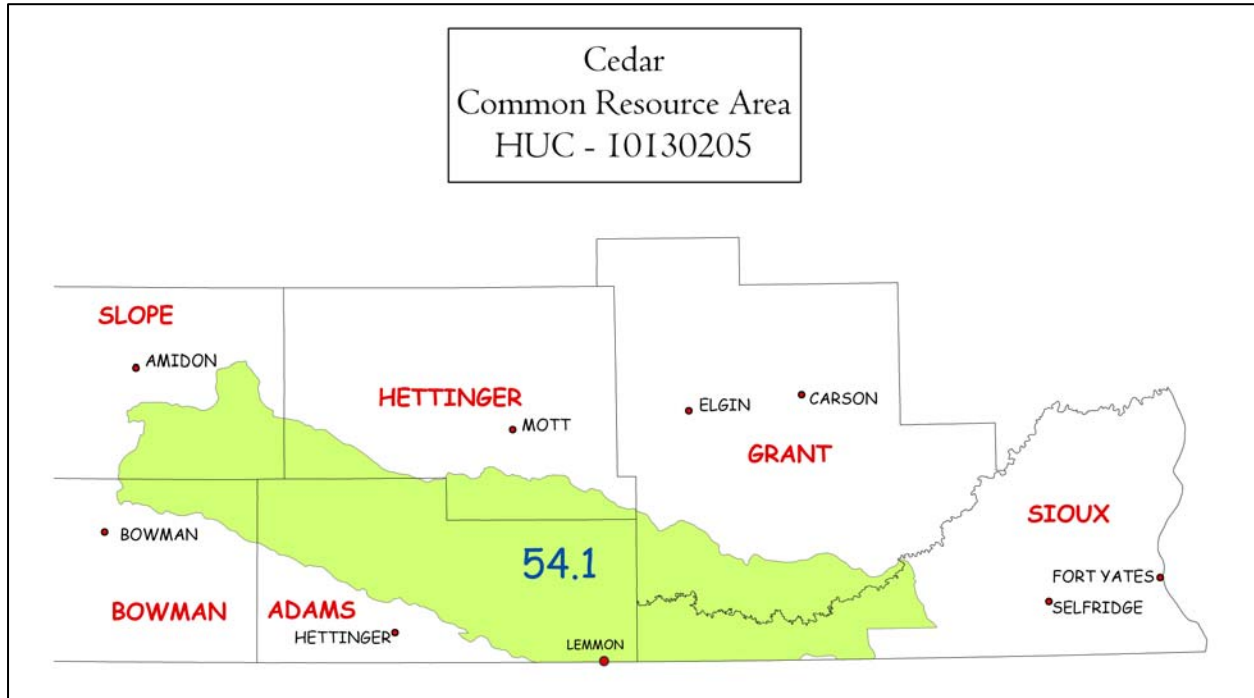
The following two tables show feeding operations, permitted operations, and livestock numbers. The first table lists the number of animal feeding operations and animals as tracked by the North Dakota Department of Health. The second table shows livestock numbers for all cattle, beef cows, dairy cows, hogs and pigs, and sheep and lambs. These livestock numbers were extrapolated from 2002 Agricultural Census county data to 8-digit HUC's.

<b>Animal Feeding Facilities – North Dakota Department of Health Permit<sup>8</sup></b>					
Animal Type	Dairy	Beef	Swine	Other	Total
Number of Animal Feeding Operations	0	16	1	3	20
Number of Animals	0	9211	20	27	9258
<b>Number of State Permitted Operations</b>					10

<b>Livestock Numbers (rounded to nearest 100)<sup>9</sup></b>					
	Cattle and Calves	Beef Cows	Dairy Cows	Hogs and Pigs	Sheep and Lambs
<b>North Dakota</b>	1,873,200	982,300	34,500	138,800	114,000
<b>Cedar River</b>	54,200	27,700	700	2,000	12,200
<b>Cedar River as a percent of North Dakota</b>	2.9%	2.8%	2.0%	1.4%	10.7%

### **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 Cedar River sub-basin with the descriptions below.

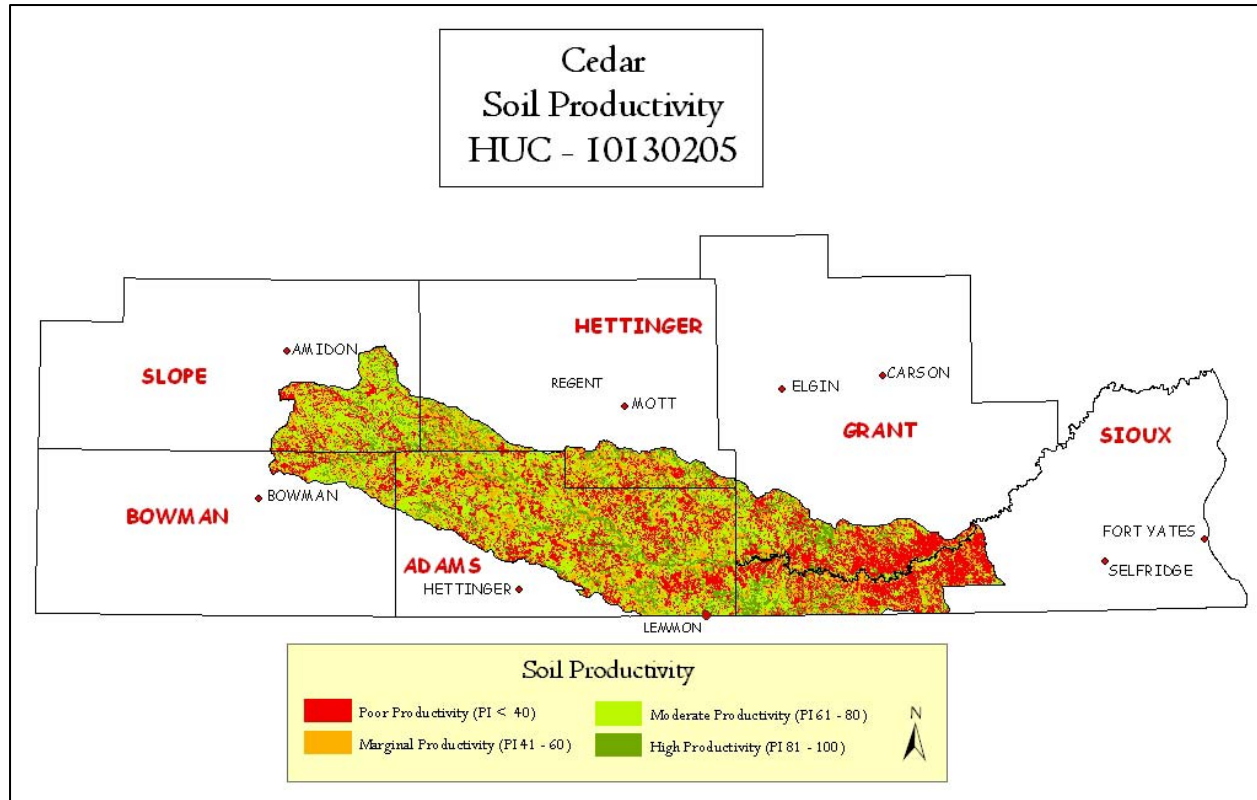


**54.1 – Rolling Soft Shale Plain:** The Rolling Soft Shale Plain is a semiarid rolling plain with soils formed from shale, siltstone, and sandstone. Native grasses cover areas of steep or broken topography, while cultivated and forage crops dominate other parts of the landscape. Most soils are moderately deep and deep, well drained and moderately well drained, loamy and clayey, and have a frigid temperature regime. The area was largely unaffected by glaciation and retains a moderately dissected stream drainage pattern.



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

The Cedar River sub-basin has two distinct soil productivity regions using spring wheat as the standard. The western region (about  $\frac{3}{4}$  of the sub-basin) consists of soils that range from poor productivity to moderate productivity. The remainder of the region is dominated by sodic and saline soils with poor productivity.



### **Ecological Sites** <sup>12</sup>

An ecological site is defined as a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation<sup>13</sup>. Currently, there are 23 identified ecological sites occurring within this watershed. Annual above ground production during years of normal precipitation ranges from a high of 5900 pounds air dry material on the wet land ecological site to a low of 800 pounds air dry material on the very shallow ecological site.

The health of these ecological sites and their ability to produce the desired products such as clean water, forage for grazing animals, and/or habitat for wildlife is directly related to the ability of each site to cycle water, capture energy (sunlight), and cycle nutrients. The ability of the site to maintain or recover these ecological processes (water cycle, energy flow and nutrient cycle) is closely tied to management (past and present) and weather. Using the *Indicators of Rangeland Health*<sup>14</sup>, protocols to evaluate the current status of these processes is the critical first step in assessing the rangeland resources within the watershed.

### Common Land Unit

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

### Resource Concerns

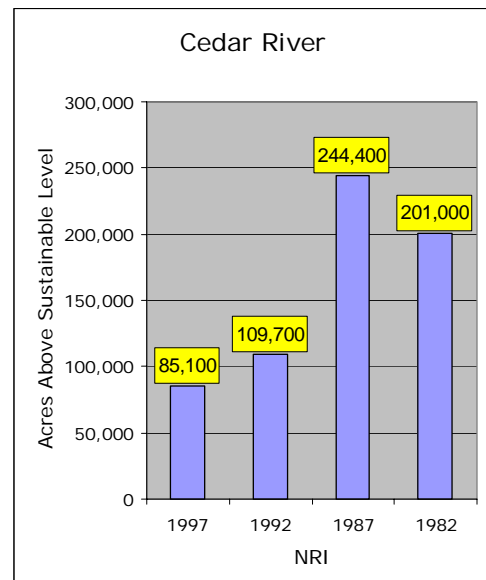
One of the goals of NRCS is to help quantify the types and amounts of resources that may be of concern in an area. This helps identify priority areas for the types and amounts of assistance given to a particular watershed.

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
NA	NA	Duck Creek Riparian Assessment	Completed 1997
		Chanta Peta Creek SVAP	Completed 2001
		Middle Cedar Creek SVAP	Completed 2001
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 1	Streams - 10		
EPA 319 Watershed Projects			
Name		Status	
Cedar Creek WRAS		Ongoing	
Cedar Lake Watershed Assessment		Completed	
Cedar/Crooked Creek TMDL Development Project		Completed	

### **Soil**

- NRI estimates indicate there was a 19 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed.
- The cultivated cropland acreage experiencing erosion rates above sustainable levels decreased to 85,100 acres in 1997, as compared to 201,000 acres in 1982.
- The cultivated cropland acreage experiencing wind erosion rates above sustainable levels decreased to 59,100 acres in 1997, as compared to 151,900 acres in 1982.



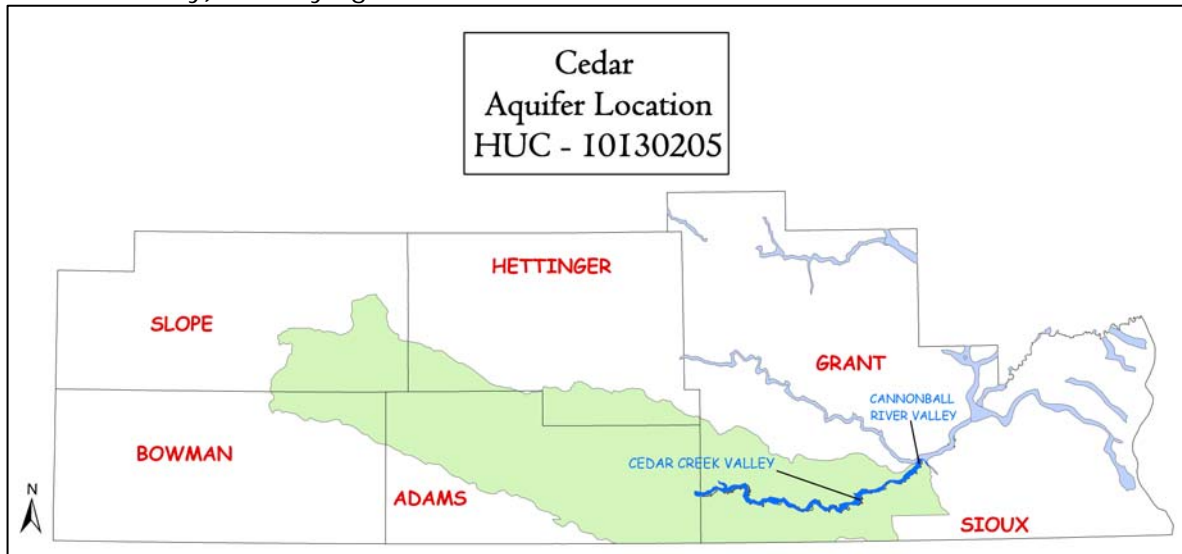
### Resource Concerns - Continued

#### Soil (continued)

- Through NRCS programs, many farmers and ranchers have applied conservation practices to reduce the effects of both wind and water erosion. From 1982 to 1997, the average wind erosion rate reduced from 4.6 tons/acre/year to 3.5 tons/acre/year on all cultivated cropland. The average water erosion rate on cultivated cropland reduced from 2.3 tons/acre/year to 1.6 tons/acre/year.
- Controlling erosion affects the amount of soil, pesticides, fertilizer, and other organic material that move into the basin's waters.
- Sandy soils and steep soils still require conservation practices to control excessive soil erosion.
- Soil health, especially compaction on silty and clayey soils and organic matter on sandy soils.
- Soil condition, from contaminants such as salts coming from saline and alkaline soils.
- Soil erosion and low organic matter remain resource concerns along with mass movement of soil from stream bank failure and hillside slumping.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed.

#### Water

- **Aquifers**<sup>15</sup> - There are two glacial drift aquifers (Cannonball River Valley and Cedar Creek Valley) underlying the Cedar River sub-basin.



- **Wellhead Protection Areas**<sup>16</sup> – There are no protection areas located in the sub-basin.
- Three of the stream sections on the 303(d) listed in hydrologic unit code 10130205 is listed for total fecal coliform. Four other were for sedimentation/siltation. Two were for both total fecal coliform and sedimentation/siltation. One for biological indicators.
- Cedar Creek and its tributaries have water quality impacts from sedimentation and siltation.

### **Resource Concerns - Continued**

#### **Water (continued)**

- Conservation practices that can be used to address water quality issues include grazing management, erosion control, nutrient and ag waste management, no-till, and riparian buffers.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Inadequate quantity and quality water supplies for livestock.
- Impaired hydrologic function on pasture and rangeland due to low plant vigor, low plant density, and invasive plants.
- Water conservation and water quality (potential for nutrient runoff and leaching) are issues on cropland.
- Animal waste is providing excessive nutrients and organics in surface water.
- Agricultural wastes, sediment, and nutrients are primary water quality pollutants impairing the watershed streams and lakes.

#### **Air**

- Visibility is reduced from blowing snow during winter months and smoke from prairie fires during summer months.
- Poor air quality when prairie fires exist.
- Increased wind speeds due to tree/shelterbelt removal.

#### **Plants**

- Major concerns are controlling invasive plants and maintaining good pasture condition.
- Noxious weeds and/or invasive plants reduce productivity for livestock and wildlife.
- Direct seeding of corn and soybeans has been successful in some locations.
- Conventional tillage systems are still utilized, especially with small grains.
- Season long grazing on or near water courses are of a concern.
- Fires breaks are needed to help manage prairie fires.
- Native species are not being replanted when land comes out of crop production.

#### **Animals**

- Animals that are threatened and endangered can be seen in the following table of threatened and endangered species.

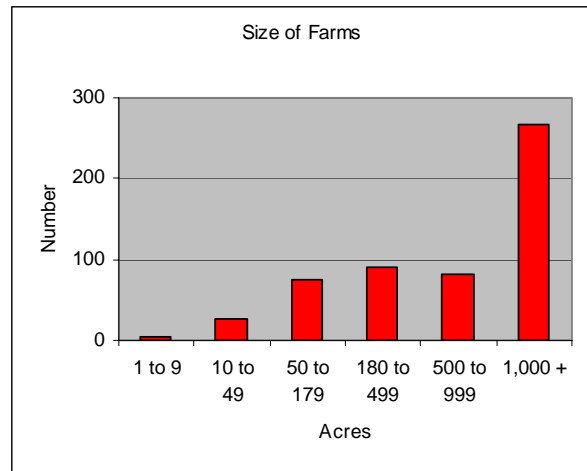
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	Black-footed Ferret Gray Wolf	Black-tailed Prairie Dog
Birds	Piping Plover	Whooping Crane Interior Least Tern	None
Fish	None	None	None
Invertebrates	None	None	None
Plants	None	None	None
Critical Habitat – Piping Plover			

### **Census and Social Data**<sup>17</sup>

**Number of Farms: 550**

**Number of Operators:**

- Average Age: 55
- Full-Time Operators: 71%
- Part-Time Operators: 29%



### **Limited Resource and Beginning Farmer**

Approximately six percent of the operators are minority producers. Limited Resource Farmers are estimated at 11 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> USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- <sup>4</sup> USDI-US Geologic Services, ND GAP analysis data, 2005.
- <sup>5</sup> USDA-NRCS, Natural Resources Planning Staff, 30 meter Relief Data GIS data layer, 2002.
- <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, 2006.
- <sup>12</sup> USDA-NRCS, Natural Resources Planning Staff, Ecological Sites GIS data layer, 2006.
- <sup>13</sup> USDA-NRCS National Range and Pasture Handbook, 1997.
- <sup>14</sup> Interpreting Indicators of Rangeland Health, Version 4, 2005. Bureau of Land Management Technical Reference 1734-6.
- <sup>15</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- <sup>16</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
- <sup>17</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.)