

# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

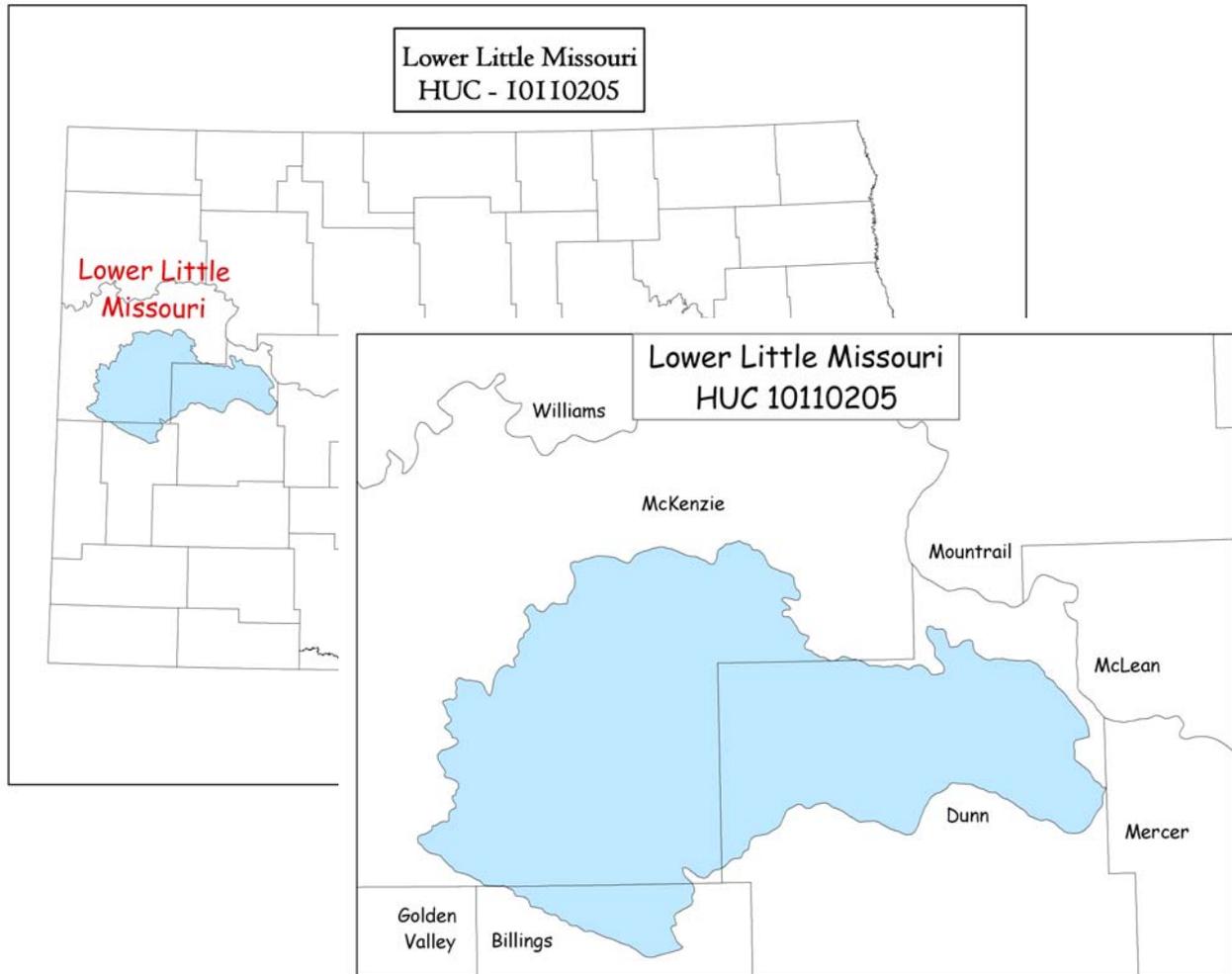
September 2008

### **Introduction**

The Lower Little Missouri River 8-Digit Hydrologic Unit Code (HUC) (10110205) sub-basin is approximately 1,187,500 acres covering parts of three counties (McKenzie, Dunn, and Billings) in the Missouri Region, Missouri-Little Missouri Sub Region. Of the 1,187,500 acres, McKenzie County contains 59%, Dunn 36%, and Billings 5%.

This sub-basin encompasses commodities ranging from, wheat, corn, barley and canola, to beef cattle, swine, sheep, and bees.

Conservation assistance is provided by three Natural Resources Conservation Service (NRCS) Service Centers and two Resource Conservation & Development Offices.



*Produced by  
the Natural  
Resources  
Planning Staff  
Bismarck, ND*

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (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 to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **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	31,600	3%
Cropland	151,100	13%
Conservation Reserve Program (CRP) Land <sup>2</sup> <a href="#">a</a>	15,300	1%
Tame Grass/Hayland	65,600	6%
Pastureland	13,500	1%
Rangeland	493,500	42%
Urban/Farmstead/ Transportation Land	75,900	6%
Water/Wetlands	29,800	2%
Federal Lands	311,600	26%
<b>North Dakota HUC Totals <sup>b</sup></b>	<b>1,187,500</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>	8,638	<1%

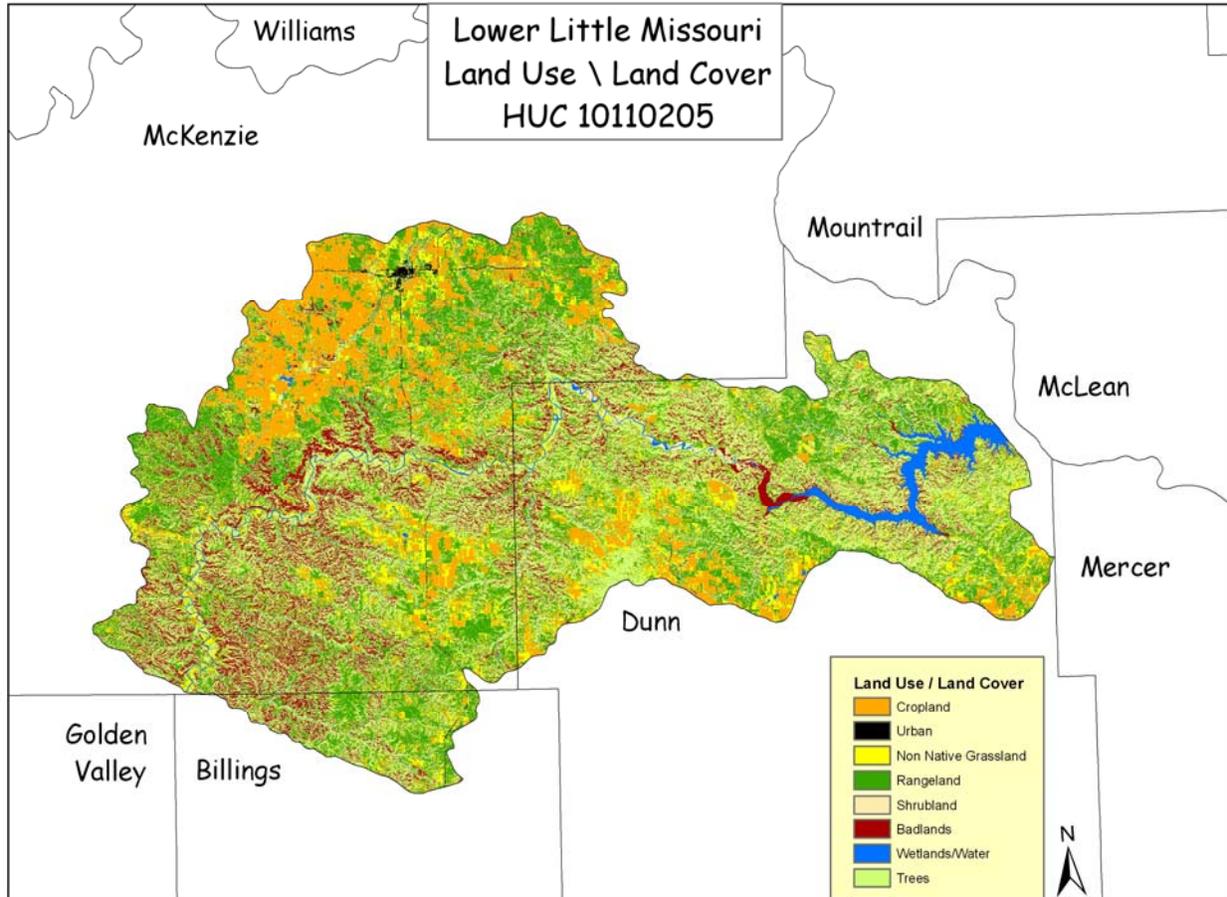
# Lower Little Missouri River 10110205

## 8-Digit Hydrologic Unit Profile

September 2008

### 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>

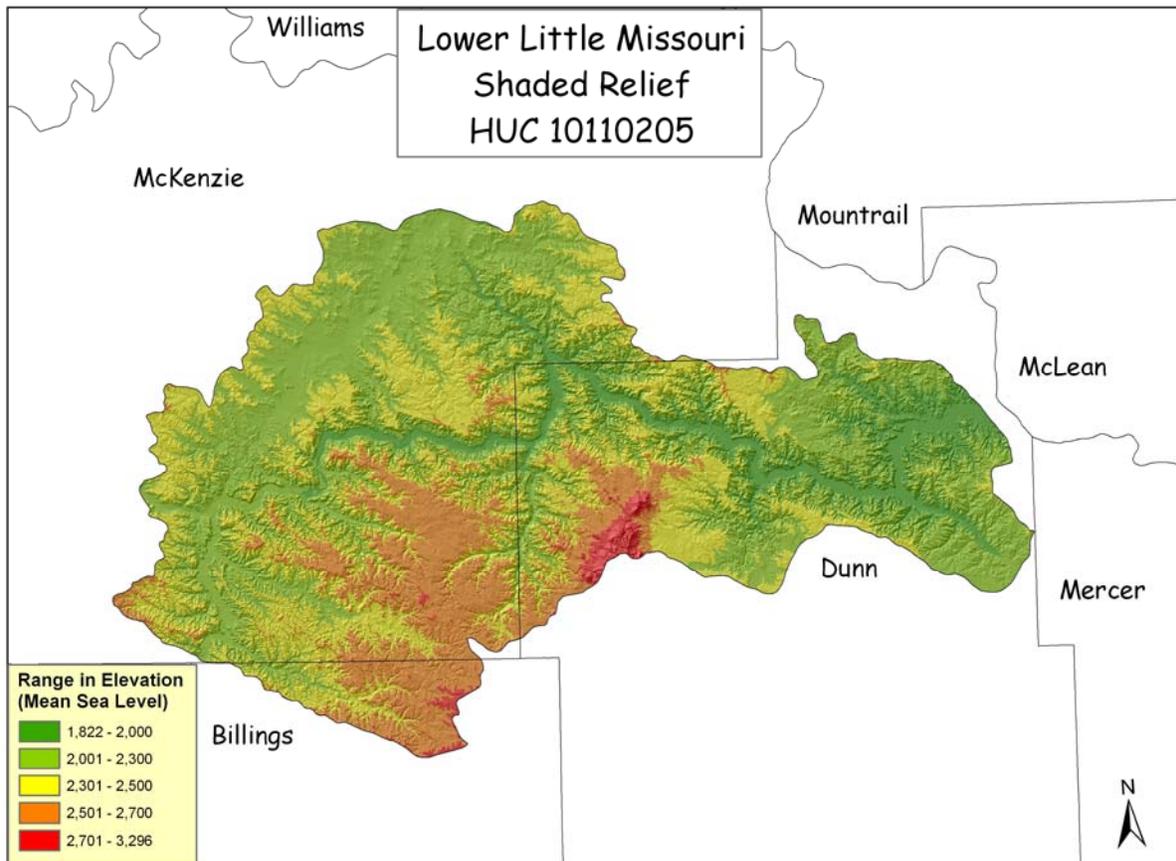
# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **Physical Description – Continued**

The sub-basin is part of the Missouri Region, Missouri-Little Missouri Sub-Region and Little Missouri Basin. All drainage patterns flow into the Little Missouri River, which flows into Lake Sakakawea. The following map shows the relief for the sub-basin.<sup>5</sup>



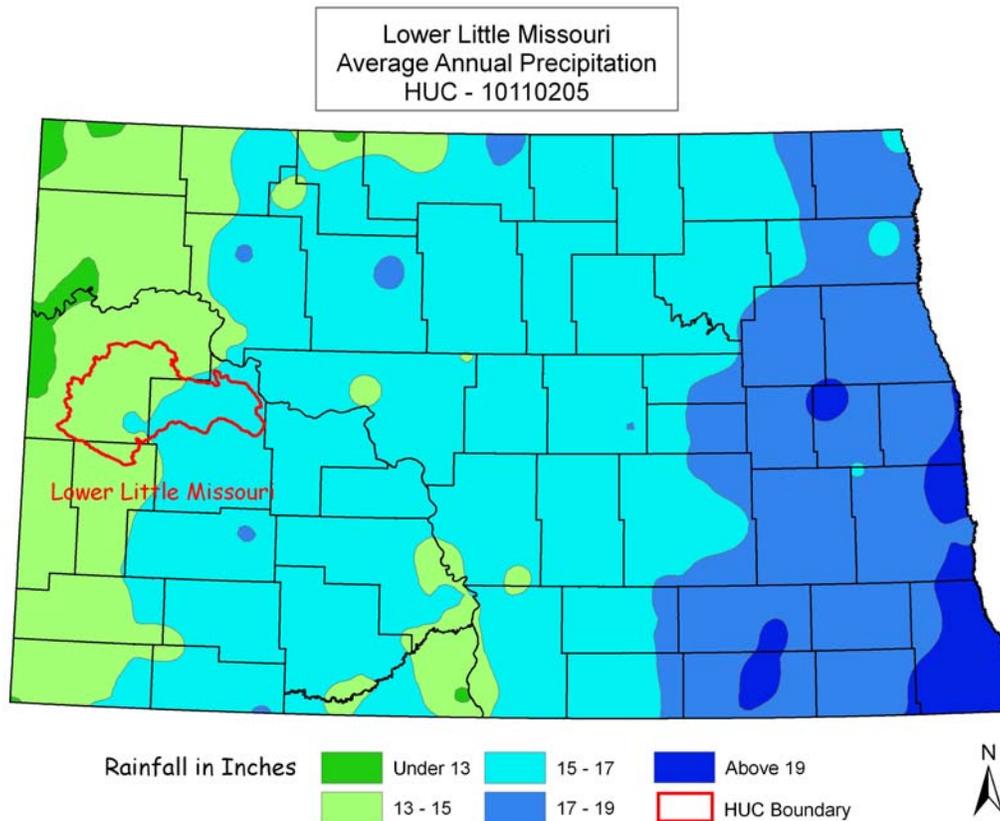
# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **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 Little Missouri River 10110205

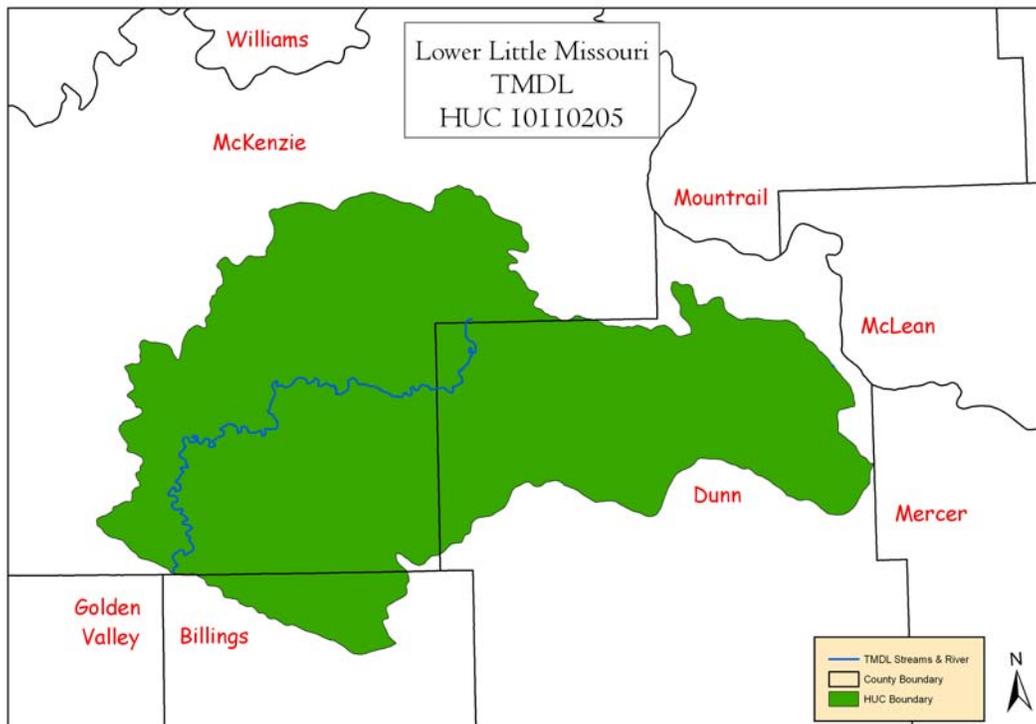
## *8-Digit Hydrologic Unit Profile*

September 2008

### 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	Lower Little Missouri River Sub-basin <sup>6</sup>	Lower Little River Impaired Water Quality (303d) <sup>7</sup>	Percent Impaired* Lower Little Missouri River
<b>Water Quality Data</b> <i>*Percent of Total Miles and acres in HUC</i>	Total – Major Water Bodies				
	Rivers/Streams	Miles	2,493.54	82.7	3.3
	Lakes/Reservoirs	Acres	0	0	0





# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **Physical Description – Continued**

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	7	0	1	8
Number of Animals	0	2,800	0	16	2,816
Number of State Permitted Operations					5

<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 Little Missouri River	56,500	29,300	400	3,600	2,200
Lower Little Missouri River as a percent of North Dakota	3.0%	3.0%	1.2%	2.6%	1.9%

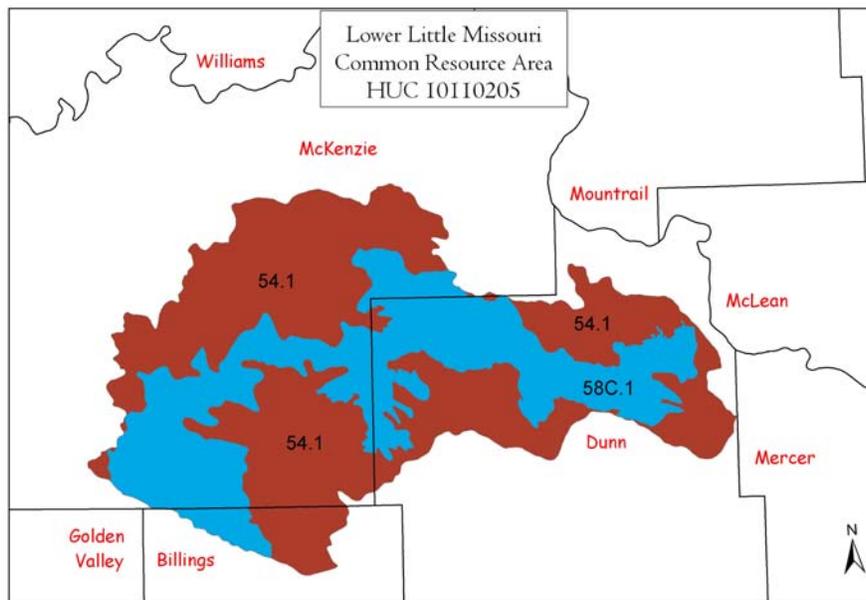
# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **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 Little Missouri 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.

**58C.1 - Northern Rolling High Plains, Northeastern Part:** These strongly dissected plains consist mainly of badlands and steep to very steep soils. Soils formed in shale, siltstone, sandstone, or locally thick alluvium. Most vegetated areas are grazed by livestock. Rocky Mountain Juniper, Aspen, and Ponderosa Pine occur on north slopes. Mean annual precipitation is 14 to 16 in. Mean annual air temperature is 39°F to 43°F. Average frost-free period is 110 to 120 days.

# Lower Little Missouri River 10110205

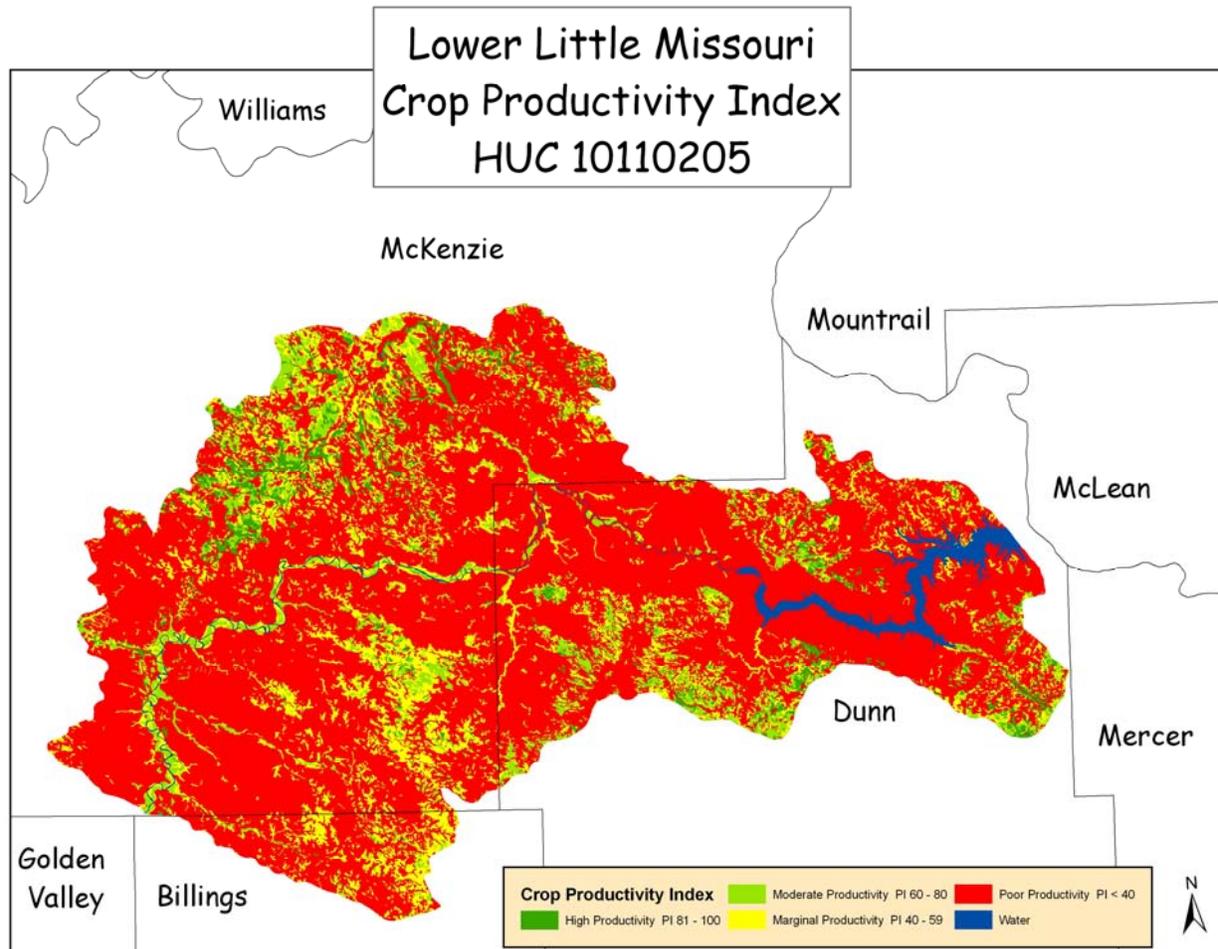
## 8-Digit Hydrologic Unit Profile

September 2008

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

The vast majority of soils in this sub-basin have a poor productivity index (PI). Steepness and undesirable chemical and physical properties of the soil are the causes of these poor PIs. Many of these soils are mapped in combination with badland type landscapes. There are small and relatively few areas in the northwest and southeast parts of this sub-basin that contain soils with a marginal to high PI.

The term "Productivity Index" used in this document reflects soil properties and the inherent production capacity of the soil to produce spring wheat.





# Lower Little Missouri River 10110205

## 8-Digit Hydrologic Unit Profile

September 2008

### Common Land Unit

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

### Resource Concerns

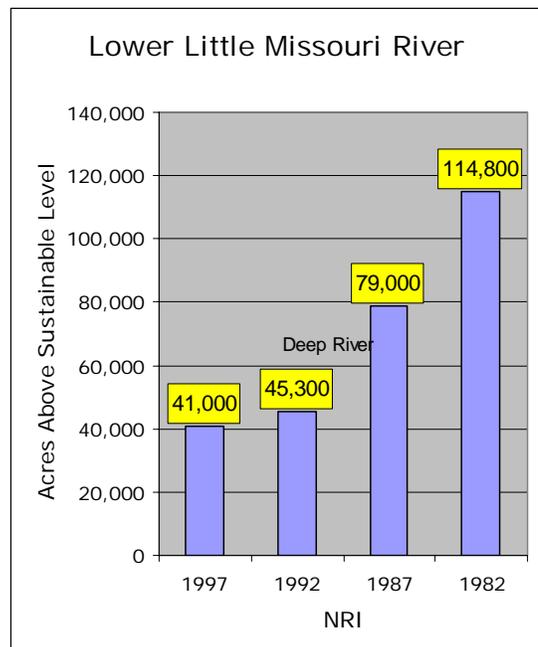
One of the goals of NRCS is to help quantify the types and amounts of resources that may be of concern in an area. This helps identify priority areas for the types and amounts of assistance given to a particular watershed.

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
None	NA	West Missouri River Basin Study	Complete
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 0	Streams - 2	None	NA
EPA 319 Watershed Projects			
Name		Status	
None		NA	

### Soil

- NRI estimates indicate that there was a 16 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed (86,700 to 72,900).
- The cultivated cropland acreage experiencing erosion rates above sustainable levels decreased to 41,000 acres in 1997, as compared to 114,800 acres in 1982.
- 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 4.4 tons/acre/year to 2.8 tons/acre/year on all cultivated cropland. The average water erosion rate reduced from 3.6 tons/acre/year to 2.5 tons/acre/year on cultivated cropland.



# Lower Little Missouri River 10110205

## 8-Digit Hydrologic Unit Profile

September 2008

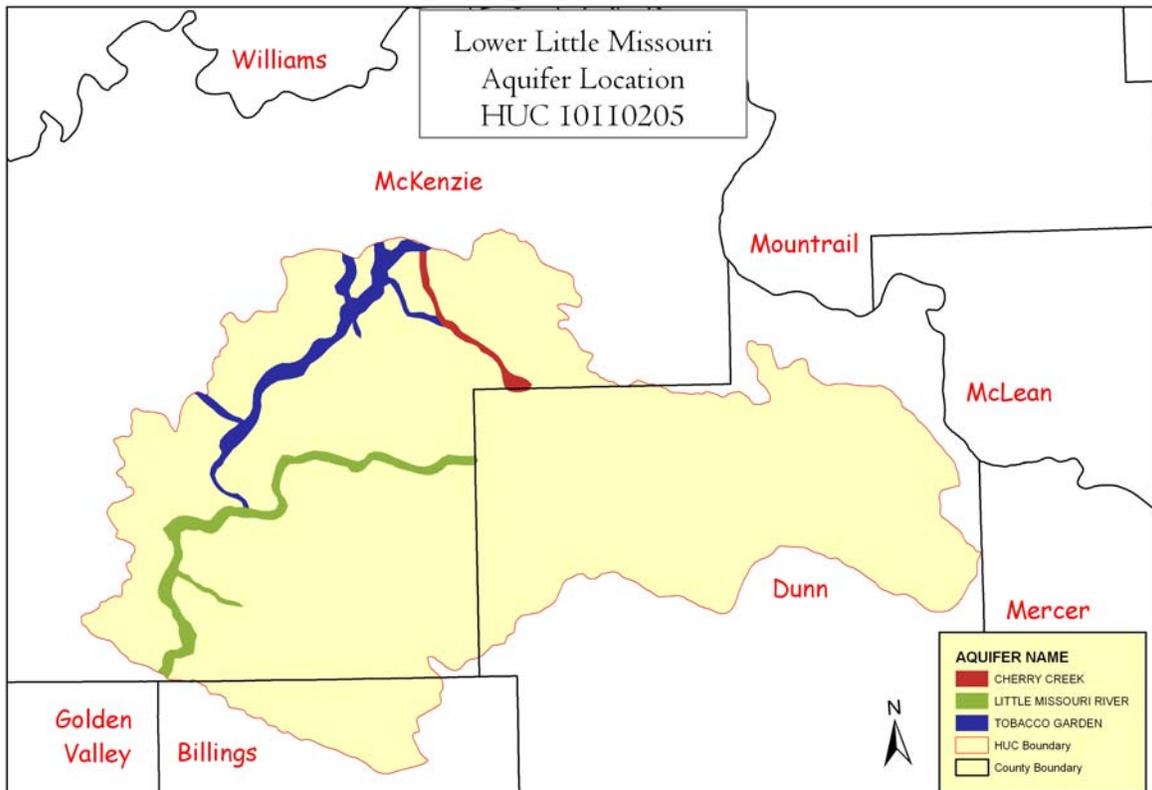
### Resource Concerns – Continued

#### Soil (cont)

- Conservation practices that can be used to address these soil quality issues include grazing management, erosion control, nutrient and Ag waste management, and riparian buffers.
- Sandy soils and soils on steep slopes still require conservation practices to control excessive soil erosion.
- Soil health, especially compaction on silty and clayey soils and organic matter on sandy soils are a concern.
- Soil erosion and low organic matter remain resource concerns.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed.

#### Water

- **Aquifers**<sup>12</sup> - There are three glacial drift aquifers (Little Missouri River, Cherry Creek, and Tobacco Garden,) underlying the Lower Little Missouri River sub-basin.



# Lower Little Missouri River 10110205

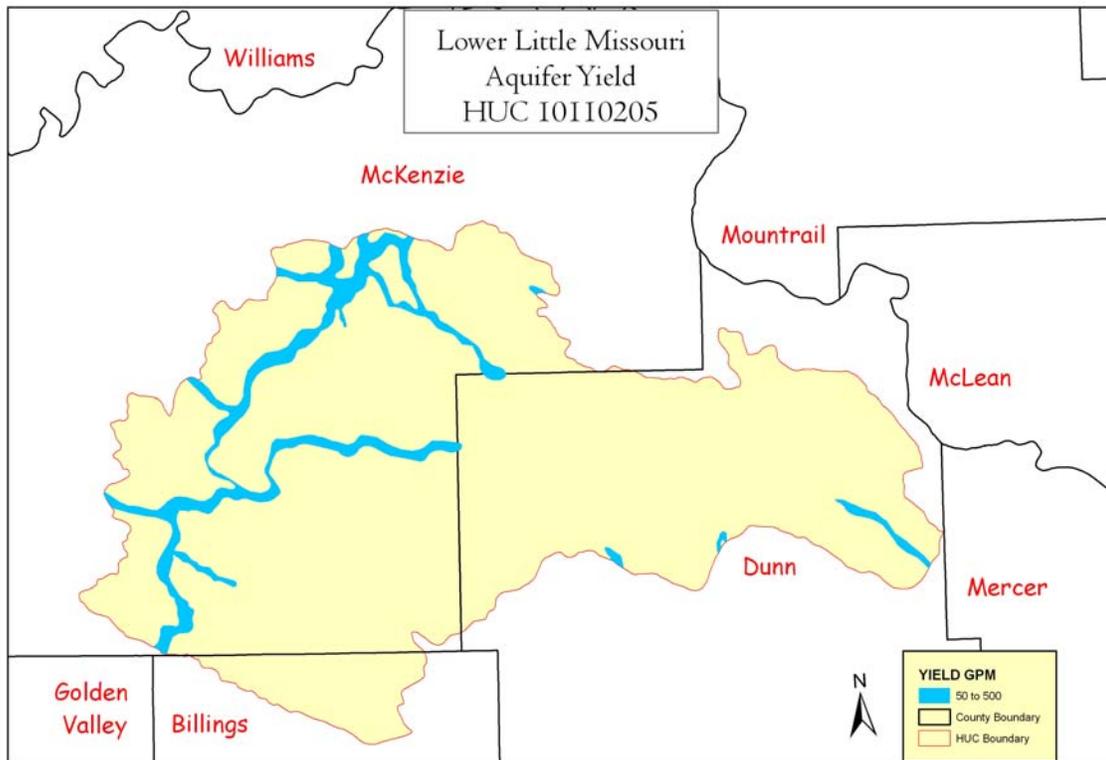
## *8-Digit Hydrologic Unit Profile*

September 2008

### Resource Concerns – Continued

#### Water (cont.)

- **Wellhead Protection Areas**<sup>13</sup> – Thirteen protection areas are located in the sub-basin. Two in Dunn County and eleven in McKenzie County.
- **Aquifers–Surficial** – The map below is a summary of the major glacial-drift aquifers and their potential Gallon Per Minute (GPM) yield as described in the county ground water reports. These aquifers are considered to have the greatest potential for yielding significant quantities of water for municipal, industrial, and agricultural purposes.



- Season long grazing on or near water courses are of a major concern.
- The Lower Little Missouri River has water quality impacts from fecal coliform.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Water conservation and water quality (insufficient water flows and poor range management) are issues on rangeland.

#### Air

- Visibility is reduced during winter months from blowing snow.
- Increased blowing snow due to reduced residue left on fields after harvest.
- Increased wind speeds due to tree/shelterbelt removal.
- Objectionable odors coming from oil wells and feedlots are of a concern.



# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

### **Resource Concerns – Continued**

#### **Plants**

- Major concerns are with controlling invasive weeds and maintaining good pasture condition.
- Direct seeding of corn and small grains has been successful in some locations.
- Conventional tillage systems are still utilized, especially with dry beans, small grains, sunflowers and canola.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- The private, non-industrial forestland is associated with small woodlots or rural home sites and the wooded riparian areas which are not actively managed for timber 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	None
Birds	Piping Plover	Whooping Crane Interior Least Tern	None
Fish	None	Pallid Sturgeon	None
Invertebrates	None	None	Dakota Skipper
Plants	None	None	None
Critical Habitat – Piping Plover			

# Lower Little Missouri River 10110205

## 8-Digit Hydrologic Unit Profile

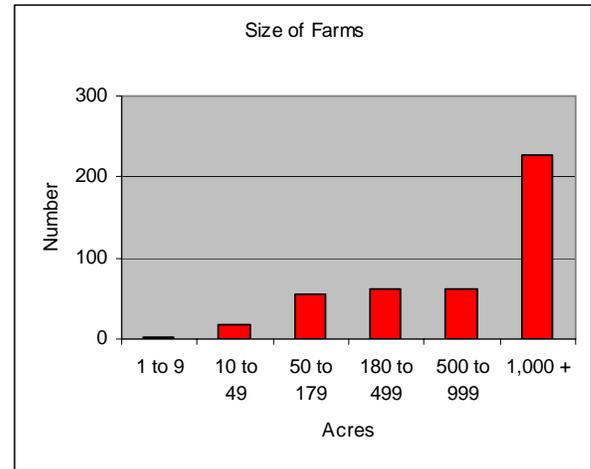
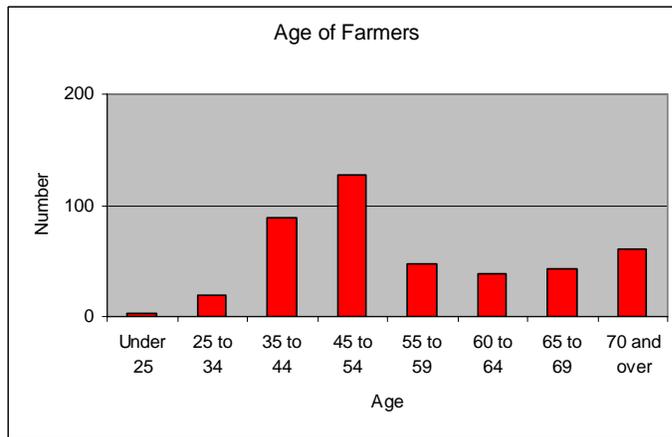
September 2008

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

**Number of Farms: 428**

**Number of Operators:**

- Average Age: 54
- Full-Time Operators: 75%
- Part-Time Operators: 25%



### Limited Resource and Beginning Farmer

Approximately 10 percent of the operators are minority producers. Limited Resource Farmers are also estimated at 2 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.

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



# Lower Little Missouri River 10110205

## *8-Digit Hydrologic Unit Profile*

September 2008

---

### **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, 2008.
- <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> 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.)