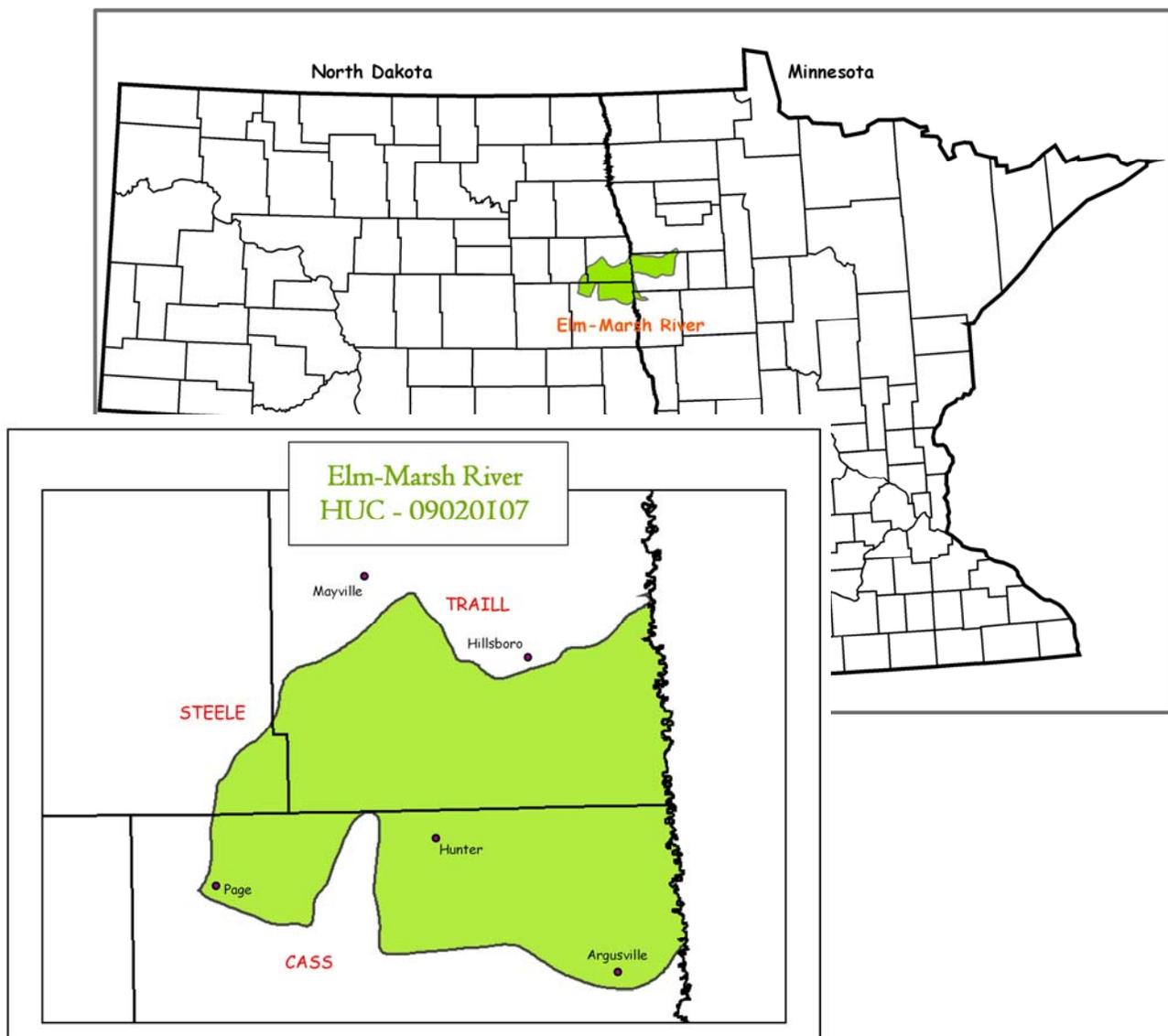


### Introduction

The Elm-Marsh 8-Digit Hydrologic Unit Code (HUC) (09020107) sub-basin includes land in two states (Minnesota and North Dakota). There are approximately 724,000 acres in the entire sub-basin. This sub-basin is located in Souris-Red-Rainy River Region - Red River Sub-Region.

This report addresses the portion located within the State of North Dakota. Elm-Marsh is approximately 487,900 acres covering parts of three counties (Cass, Steele, and Traill) in North Dakota. Of the 487,900 acres, Cass County contains 50%, Traill 47%, and Steele 3%. There are approximately 380 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.



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

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### Introduction (cont.)

This sub-basin encompasses commodities ranging from soybeans, wheat, corn, sugarbeets, and dry edible beans to beef cattle, swine, poultry, and bees.

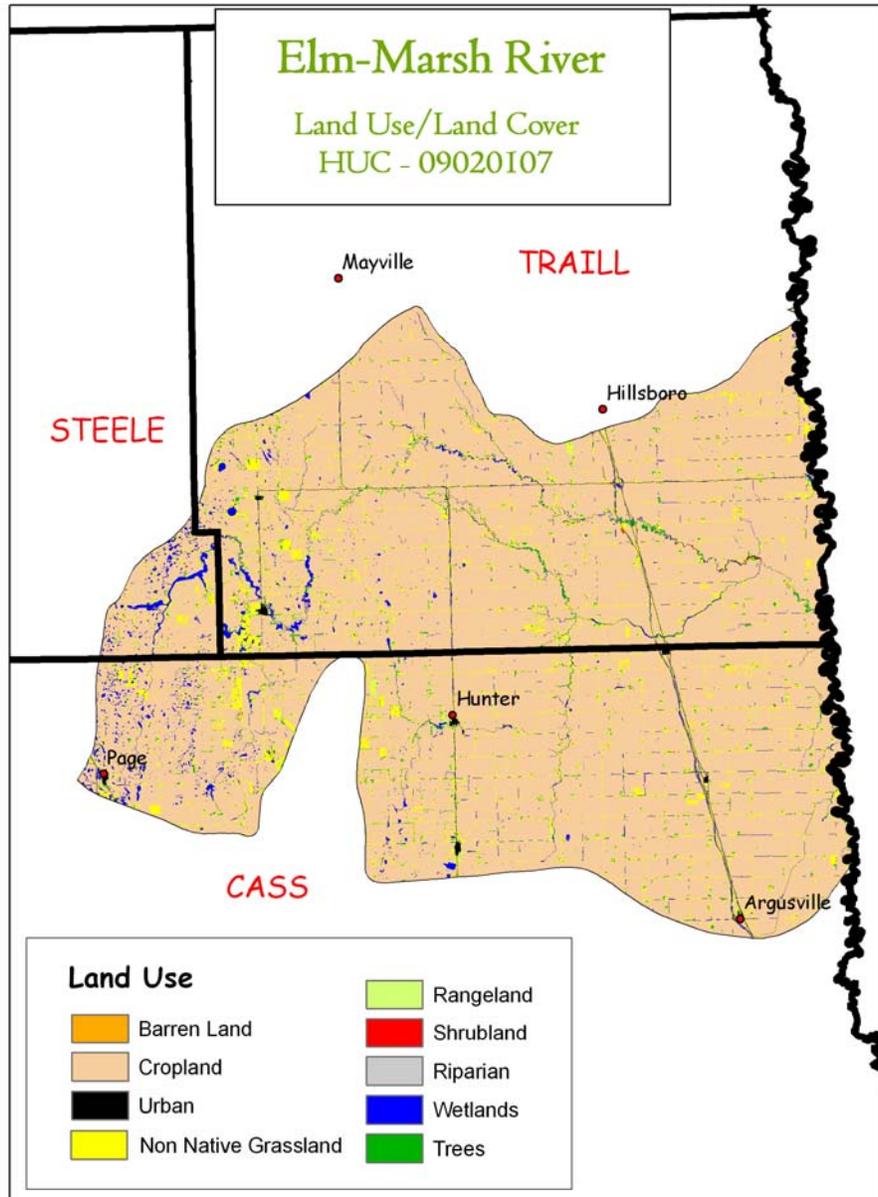
Conservation assistance is provided by three Natural Resources Conservation Service (NRCS) service centers and one Resource Conservation & Development office.

### 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	0	0%
Cropland	444,400	91%
Conservation Reserve Program (CRP) Land <sup>2a</sup>	500	*
Tame Grass/Hayland	0	0%
Pasture	5,300	1%
Rangeland	1,000	*
Urban/Farmstead/ Transportation Land	16,600	3%
Water/Wetlands	6,200	*
Federal Lands	500	*
Other Lands **	18,300	4%
<b>North Dakota HUC Totals</b> <sup>b</sup>	<b>487,900</b>	<b>100%</b>
<p>* Less than one percent of total acres. See below for special considerations.  ** Other land includes farmsteads, windbreaks, marshland, etc.  a: Estimate from Farm Service Agency records and includes CRP/CREP.  b: Totals may not add due to rounding and small unknown acreages.</p>		
<b>Irrigated Land</b> ( <i>Farm Services Agency</i> ) <sup>3</sup>	6,580	1.3%

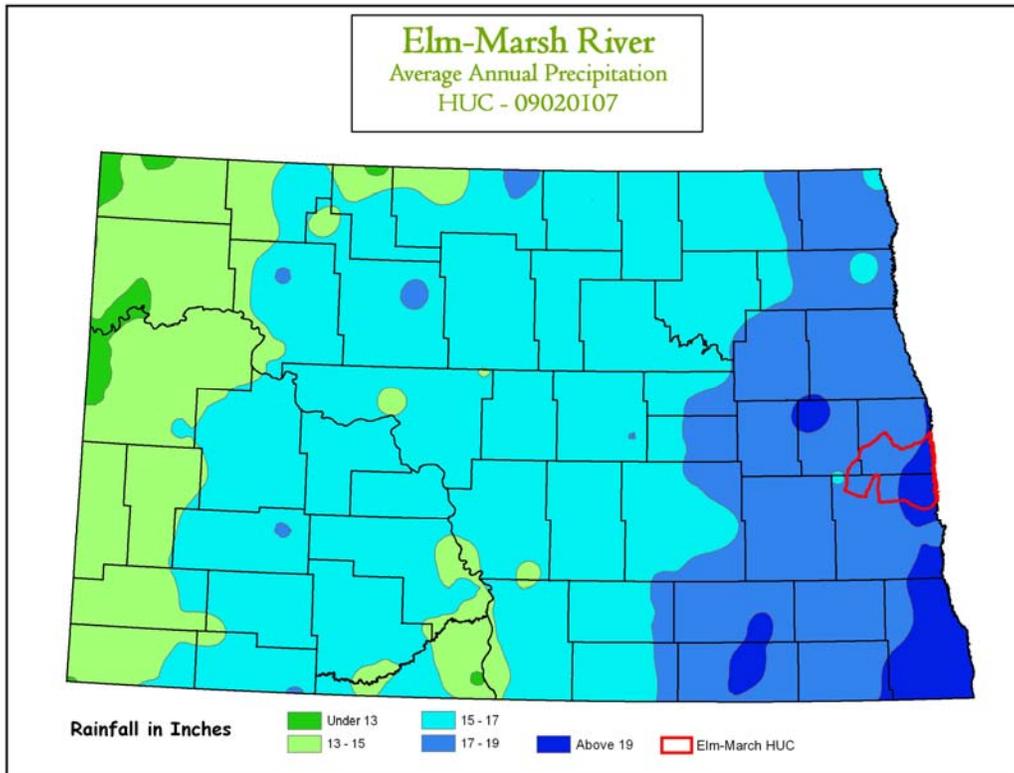
**Physical Description – Continued**



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

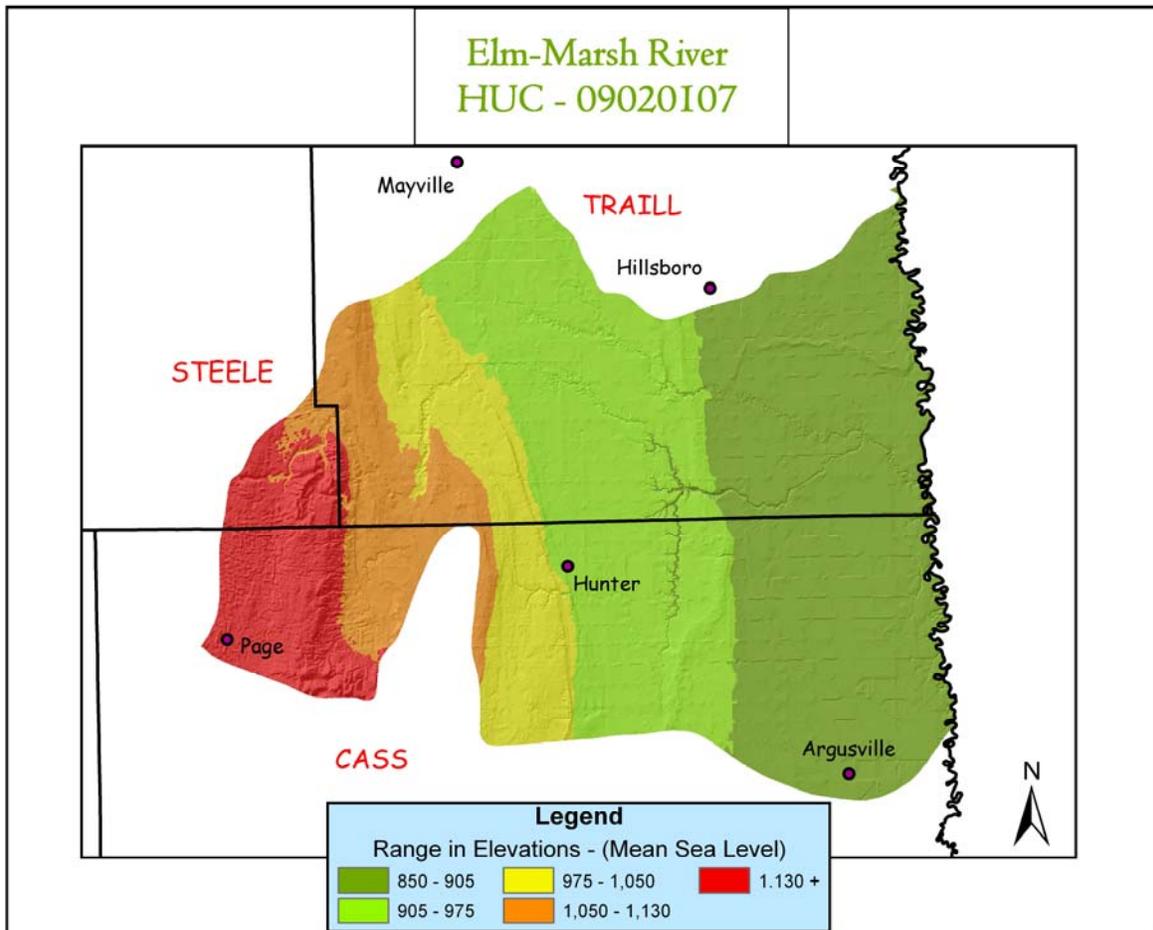
### Physical Description – Continued

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)



### 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>5</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>6</sup>	Elm-Marsh Sub-basin <sup>7</sup>	Elm-Marsh as percent of North Dakota	Impaired Water Quality (303d) <sup>8</sup>	Percent Impaired* Elm-Marsh
<b>Water Quality Data</b>	Total – Major Water bodies						
	Rivers/Streams	Miles	56,687	520	0.9%	143	27.5%
	Lakes/Reservoirs	Acres	434,658	294	0.1%	None - ID	0%

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

### **Animal Feeding Facilities – North Dakota Department of Health Permit<sup>9</sup>**

Animal Type	Dairy	Beef	Swine	Other	Total
Number of Animal Feeding Operations	2	5	5	1	13
Number of Animals	260	4450	598	2	5310
<b>Number of State Permitted Operations</b>					8

### **Livestock Numbers (rounded to nearest 100)<sup>10</sup>**

	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
Elm-Marsh	5,000	3,000	100	1,900	1,900
Elm-Marsh as a percent of North Dakota	0.3%	0.3%	0.3%	1.4%	1.7%

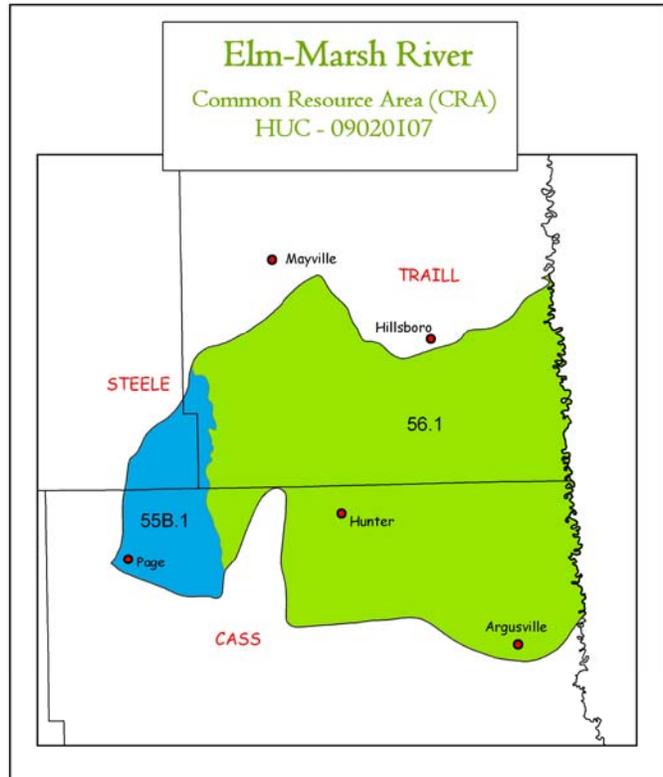
### Physical Description – Continued

Common Resource Areas (CRA's) 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. CRA's are subsets of Major Land Resource Areas. The following map<sup>11</sup> shows the CRA's for Elm-Marsh sub-basin with the descriptions below.

#### **55B.1 – Central Black Glaciated Drift**

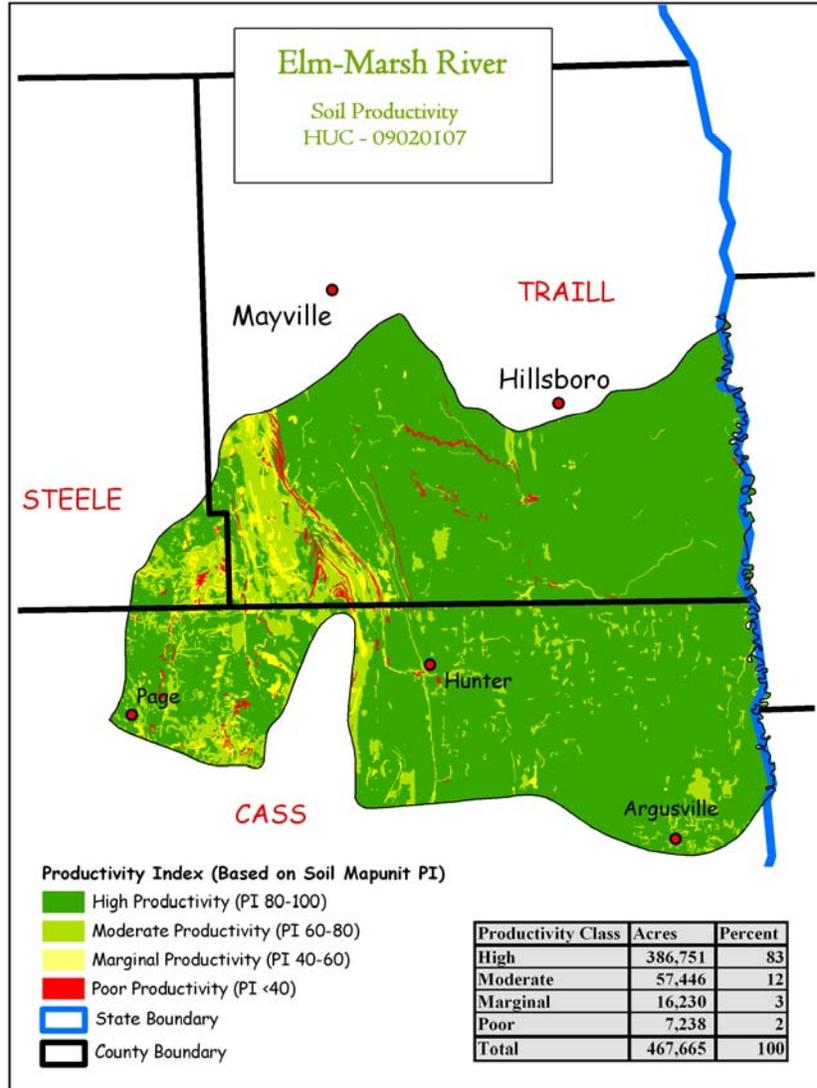
**Plain:** The Central Black Glaciated Drift Plains are a gently rolling to undulating landscape with a thick layer of glacial till. Temporary and seasonal wetlands are numerous throughout the area. These soils are very fertile, but agricultural success is subject to annual climatic fluctuations. Most 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.



### Soil Productivity<sup>12</sup>

The Elm-Marsh sub-basin has two distinct soil productivity regions. Western region (about 16% of the sub-basin) consists of many soils of marginal to moderate productivity, while the remaining region consists of highly productive Red River Valley soils.



### 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 following table shows the different projects, plans, studies, and assessments and their status that have been conducted within the sub-basin.

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		NRCS Watershed Plans, Studies & Assessments	
Name	Status	Name	Status
Elm River	Complete	None	N/A
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 0	Streams – 5	None	N/A
EPA 319 Watershed Projects			
Name		Status	
Red River Basin Riparian Project		Ongoing	

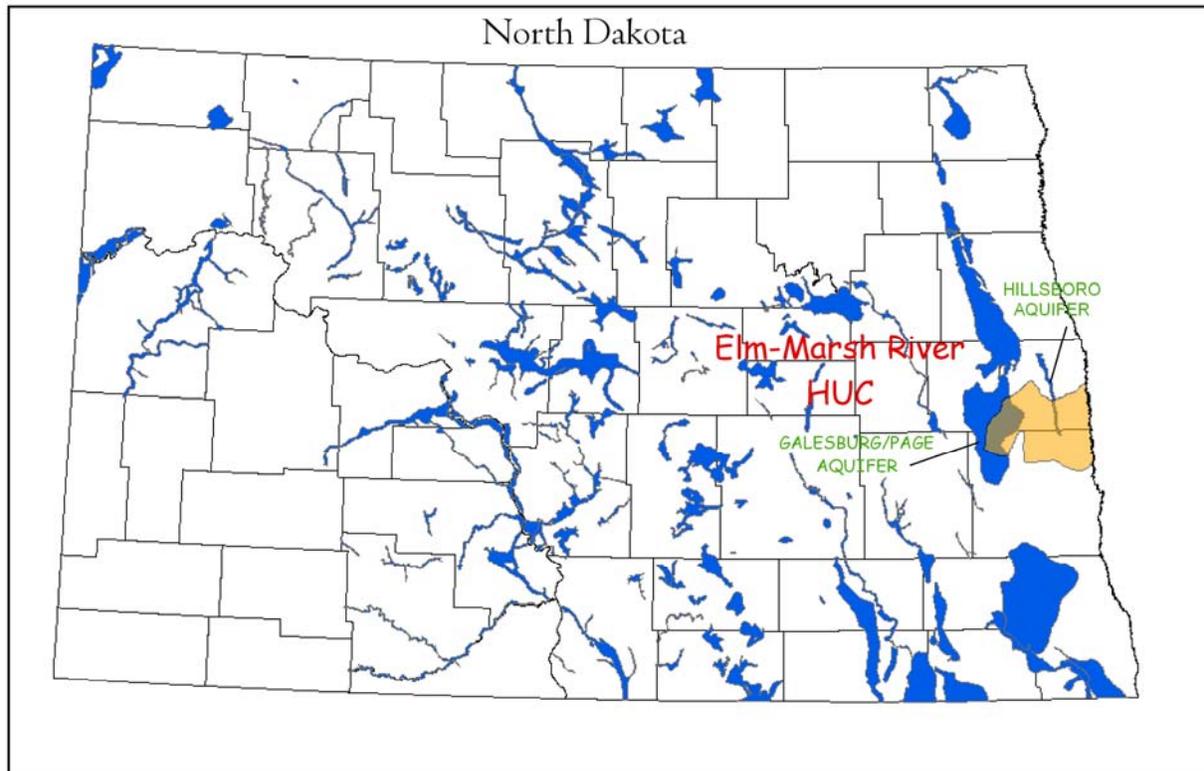
### **Soil**

- NRI estimates indicate 331,000 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. As a result, the wind erosion rates on cultivated cropland dropped 40 percent from 13.1 to 7.9 tons/acre/year from 1987 to 1997.
- Sandy soils and irrigated 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 erosion and low organic matter remain resource concerns.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed.

### Resource Concerns - Continued

#### Water

- **Aquifers**<sup>13</sup> - There are three glacial drift aquifers (Galesburg/Page, Hillsboro, and West Fargo) located below the Elm-Marsh sub-basin. The Galesburg/Page and Hillsboro aquifers are the source of water for the Traill County Rural Water Users, and the cities of Hillsboro, Galesburg and Page.



- **Wellhead Protection Areas**<sup>14</sup> – there are three protection areas located in the sub-basin. They are designated to protect the municipal water supply for the cities of Hillsboro, Galesburg, and Page.
- Two of the stream sections on the 303(d) listed in hydrologic unit code 09020107 is listed for methyl-mercury. The other three were for sedimentation/siltation and biological indicators.
- Conservation practices that can be used to address these water quality issues include grazing management, erosion control, nutrient and ag waste management, and riparian buffers.
- The Elm River has water quality impacts from sedimentation and siltation.
- Impairments to biological indicators are present in 3 of 5 impaired stream segments.
- There are three shallow aquifers (Galesburg/Page, Hillsboro, and West Fargo) that are considered sensitive to nitrate and pesticide leaching.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Spring flooding occurs nearly every year effecting transportation infrastructure and crop seeding dates.

### Resource Concerns - Continued

#### Water (cont.)

- Summer flooding does occasionally occur and impacts crop production.
- Water conservation and water quality (potential for pesticide contamination) are issues on irrigated cropland.

#### Air

- Objectionable odors are noticeable from the northeast where a sugar beet processing facility is located in the adjoining watershed.
- Visibility is reduced during winter months from blowing snow.
- Increased wind speeds due to tree/shelterbelt removal.

#### Plants

- Major concerns are with controlling invasive weeds and maintaining good pasture condition.
- Direct seeding of corn and soybeans has been successful in some locations.
- Conventional tillage systems are still utilized, especially with potatoes, dry beans, and sugar beets.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- Season long grazing on or near water courses are of a concern.
- The private, non-industrial forestland is associated with small woodlots or rural home sites 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.

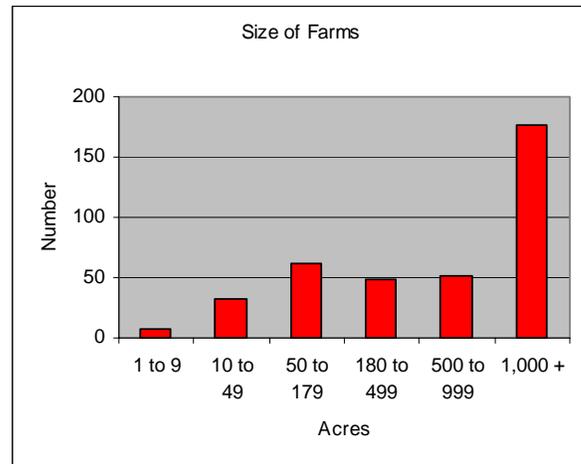
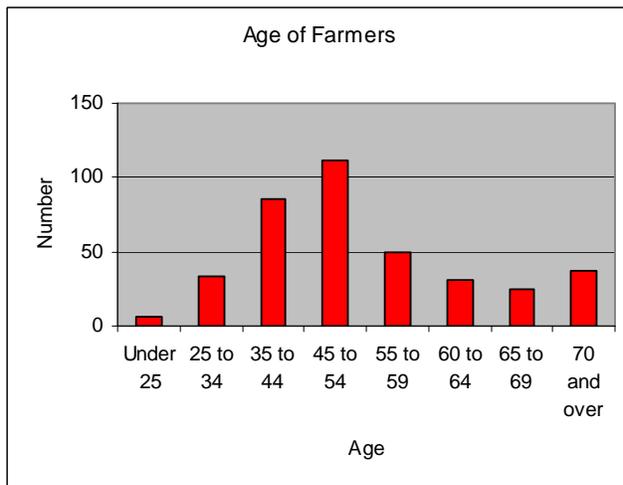
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	Gray Wolf	None
Birds	Bald Eagle	None	None
Fish	None	None	None
Invertebrates	None	None	None
Plants	None	None	None
Critical Habitat – None			

### Census and Social Data<sup>15</sup>

**Number of Farms: 380**

**Number of Operators:**

- Average Age: 51
- Full-Time Operators: 77%
- Part-Time Operators: 23%



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

**MODERATE**

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

Four percent of the operators are minority producers. Limited Resource Farmers are also estimated at just less than 4%. 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, National Hydrography GIS layers, June 2006.
- <sup>8</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>9</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Animal Feeding Operations Program data, 2006.
- <sup>10</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>11</sup> USDA-NRCS, Natural Resources Planning Staff, Common Resource Area GIS data layer, 2004.
- <sup>12</sup> USDA-NRCS, Natural Resources Planning Staff, Soils Productivity GIS data layer, 2006.
- <sup>13</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- <sup>14</sup> ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
- <sup>15</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)