

# Elm 10160004

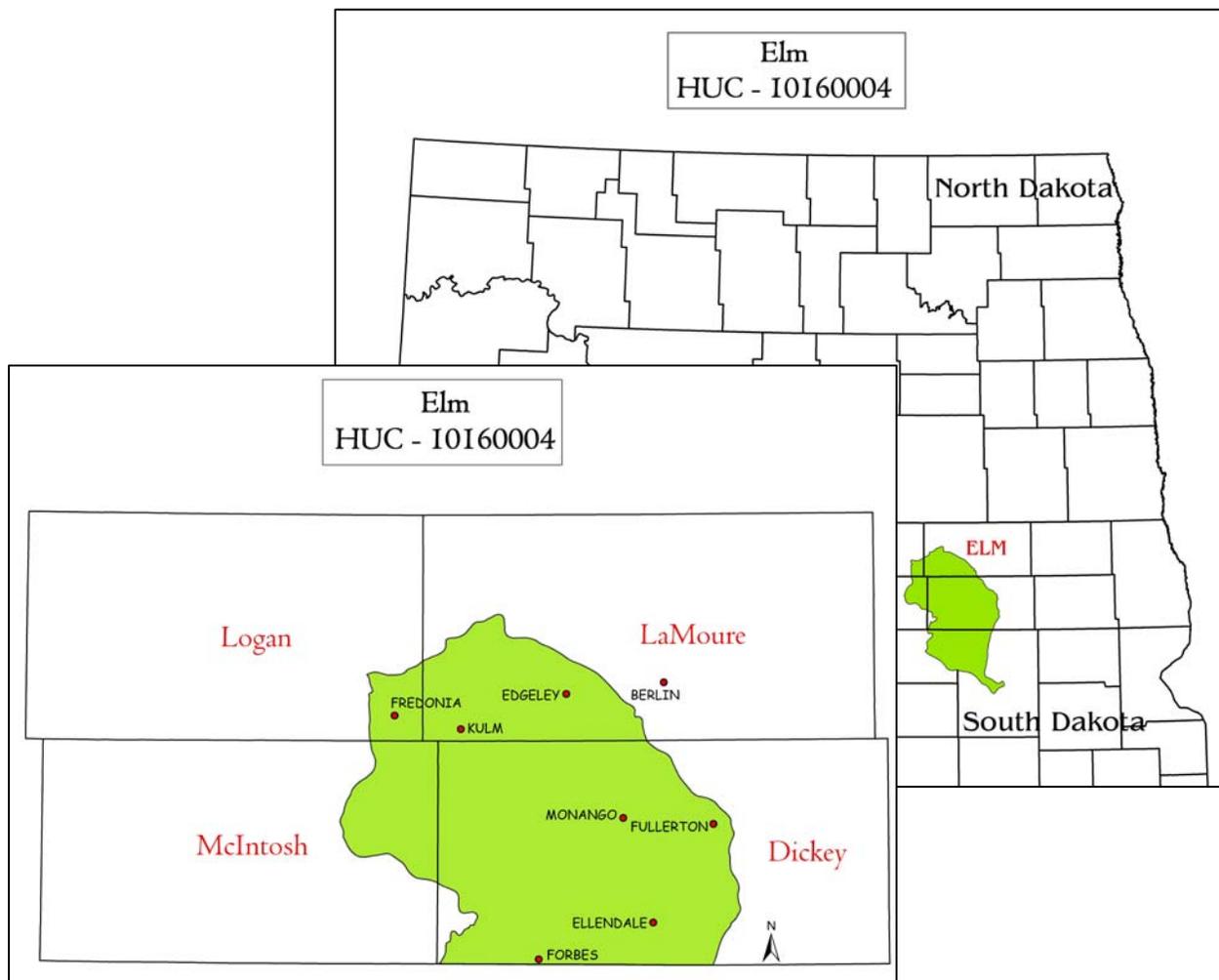
## 8-Digit Hydrologic Unit Profile

July 2007

### Introduction

The Elm 8-Digit Hydrologic Unit Code (HUC) (10160004) sub-basin includes land in North Dakota and South Dakota. There are approximately 999,800 acres in the entire sub-basin. This sub-basin is located in Missouri Region, James Sub-Region.

This report addresses only the portion located within North Dakota. The Elm River is approximately 680,900 acres covering parts of 4 counties (Dickey, LaMoure, McIntosh, and Logan) in North Dakota. Of the 680,900 acres, Dickey County contains 64%, LaMoure 22%, McIntosh 11%, and Logan 3%. There are approximately 520 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.



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the Natural  
Resources  
Planning Staff  
Bismarck, ND*

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### Introduction – Continued

This sub-basin encompasses commodities ranging from corn, soybeans, wheat, barley, alfalfa, and sunflowers to beef cattle, dairy cattle, swine, poultry, and bees.

Conservation assistance is provided by four Natural Resources Conservation Service (NRCS) Service Centers and one Resource Conservation & Development Office.

### Physical Description

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

Land Use / Land Cover ( <i>National Resources Inventory [NRI]</i> ) <sup>1</sup>	Acres	Percent of HUC
Forestland	0	*
Cropland	350,100	51%
Conservation Reserve Program (CRP) Land <sup>2 a</sup>	64,600	9%
Tame Grass/Hayland	45,200	7%
Pastureland	51,100	8%
Rangeland	121,100	18%
Urban/Farmstead/Transportation Land	35,700	4%
Water/Wetlands	4,800	1%
Federal Lands	8,300	1%
<b>North Dakota HUC Totals <sup>b</sup></b>	<b>680,900</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</i> ) <sup>3</sup>	<b>27,800</b>	<b>1.5%</b>

# Elm

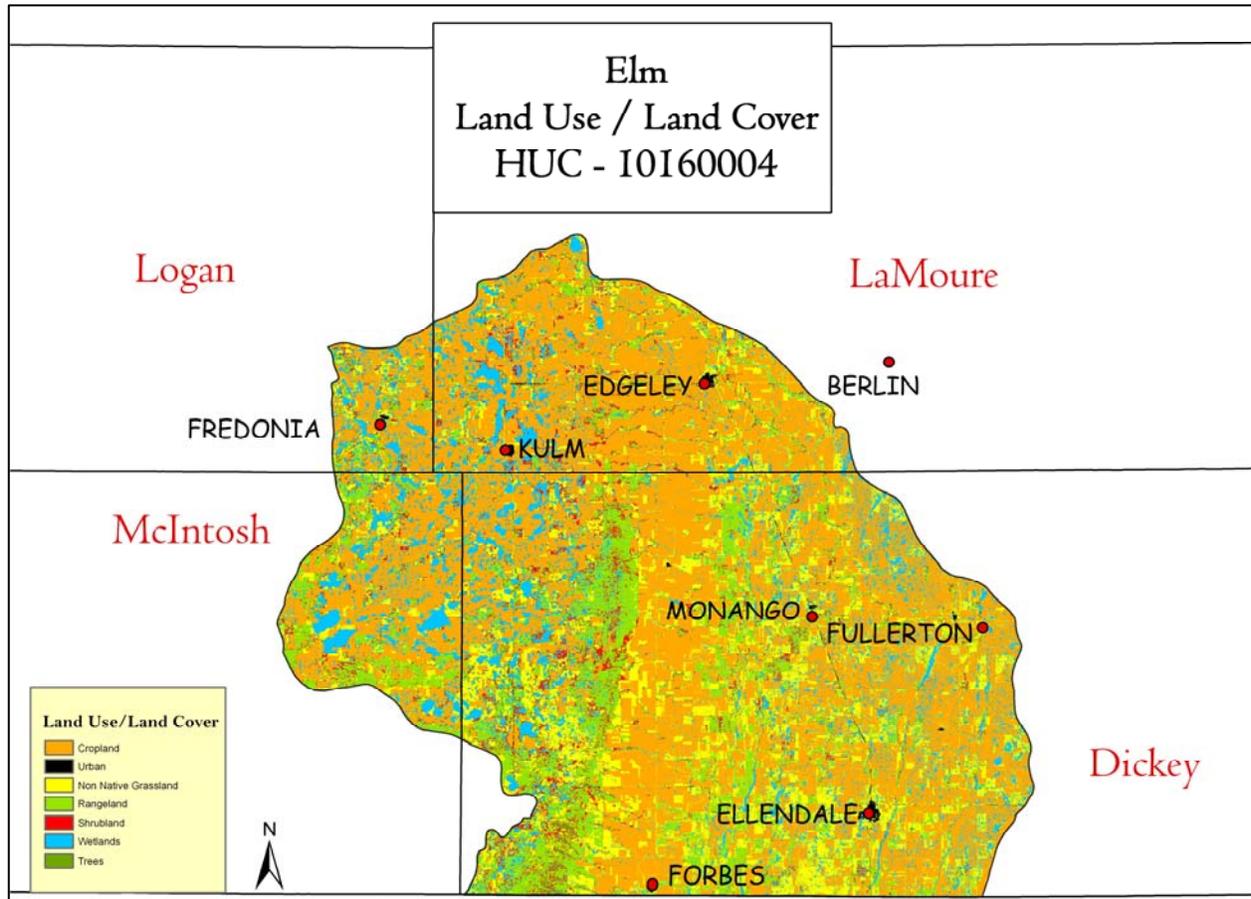
## 10160004

### *8-Digit Hydrologic Unit Profile*

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### Physical Description – Continued

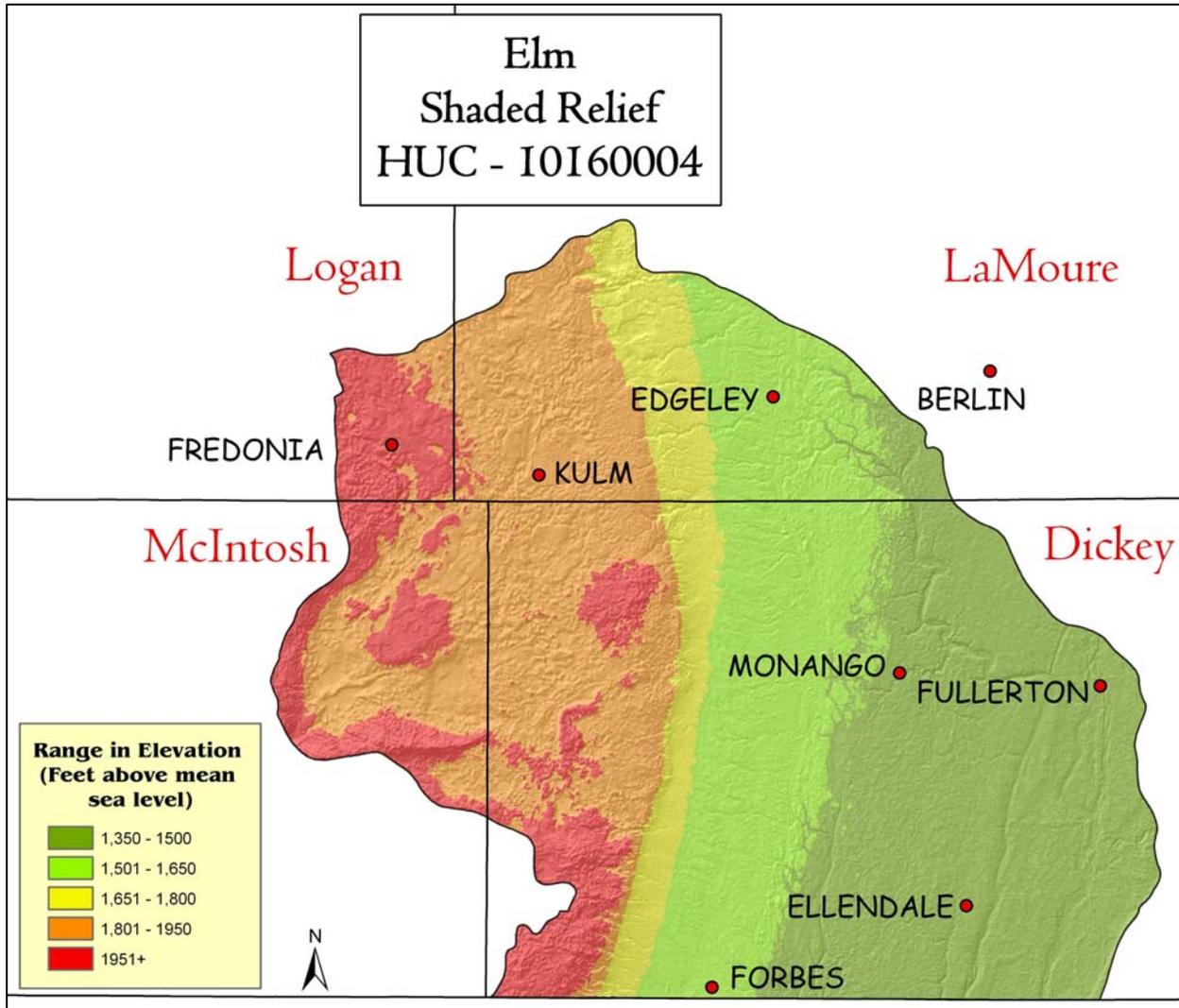
#### Land Use/Land Cover Map



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

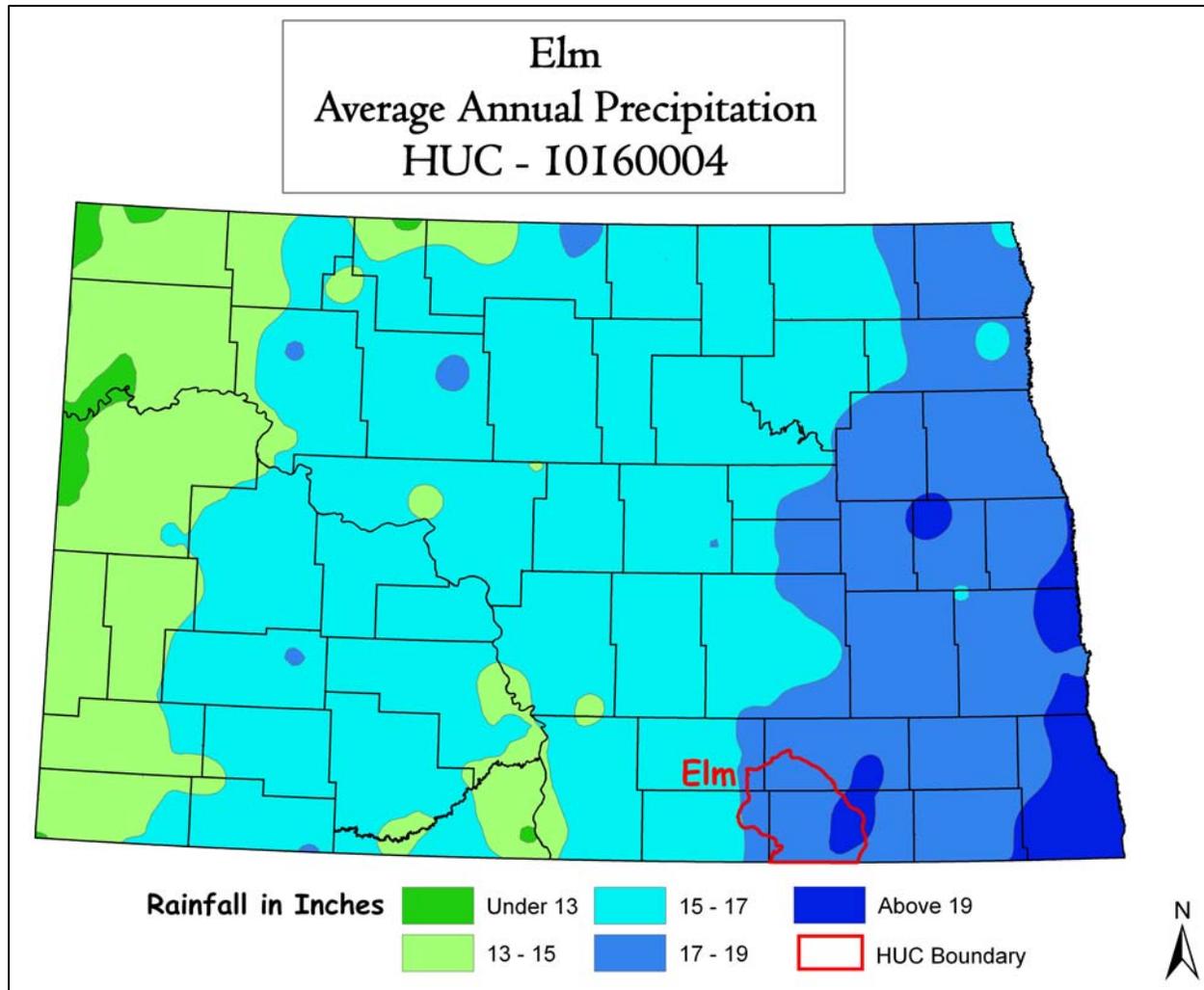
### **Physical Description – Continued**

The sub-basin is part of the Missouri River Region - James River Sub-Region. The drainage patterns flow to the south ending at the James River, near Yankton, SD. 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 (Parameter-elevation Regressions on Independent Slopes Model) 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**

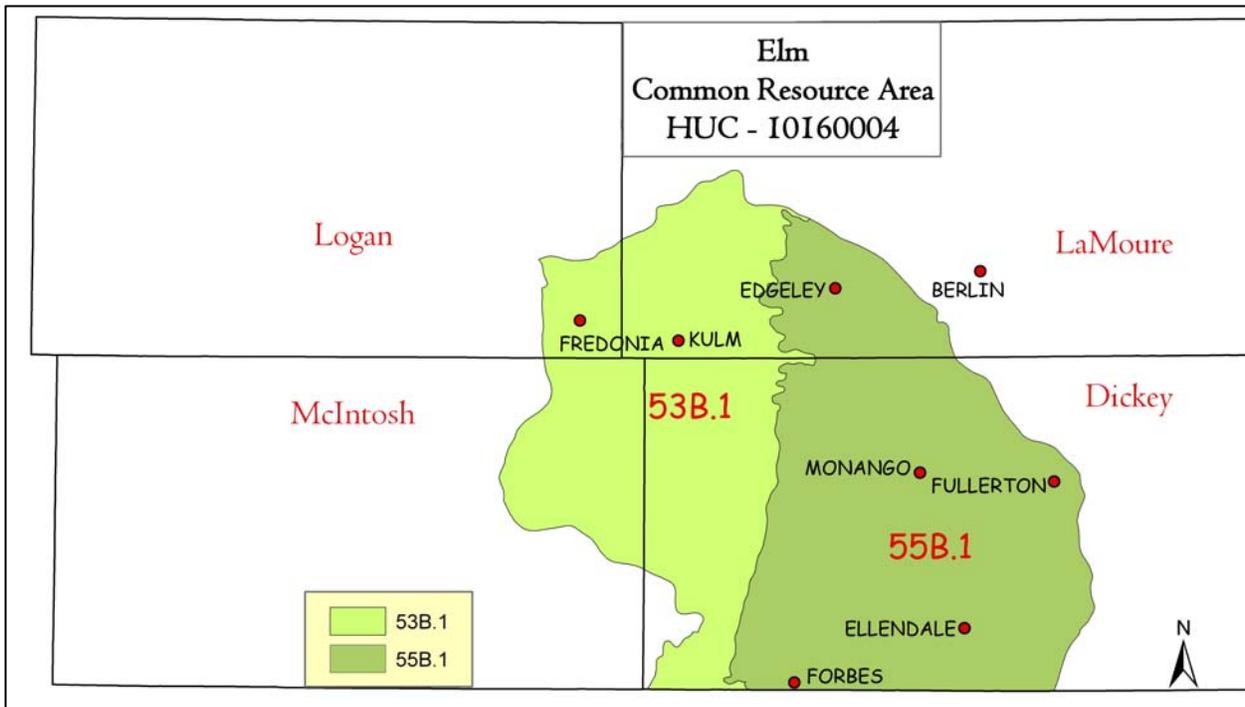
The following two tables show feeding operations, permitted operations, and livestock numbers. The first table lists the number of animal feeding operations and animals as tracked by the North Dakota Department of Health. The second table shows livestock numbers for all cattle, beef cows, dairy cows, 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>					
<b>Animal Type</b>	<b>Dairy</b>	<b>Beef</b>	<b>Swine</b>	<b>Other</b>	<b>Total</b>
<b>Number of Animal Feeding Operations</b>	18	69	22	7	116
<b>Number of Animals</b>	1,246	22,860	13,200	125	37,431
<b>No. of State Permitted Operations</b>					64

<b>Livestock Numbers (rounded to nearest 100)<sup>9</sup></b>					
	<b>Cattle and Calves</b>	<b>Beef Cows</b>	<b>Dairy Cows</b>	<b>Hogs and Pigs</b>	<b>Sheep and Lambs</b>
North Dakota	1,873,200	982,300	34,500	138,800	114,000
Elm River	45,500	20,700	800	4,800	2,900
Elm River as a percent of North Dakota	2.5%	2.1%	2.3%	3.5%	2.5%

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

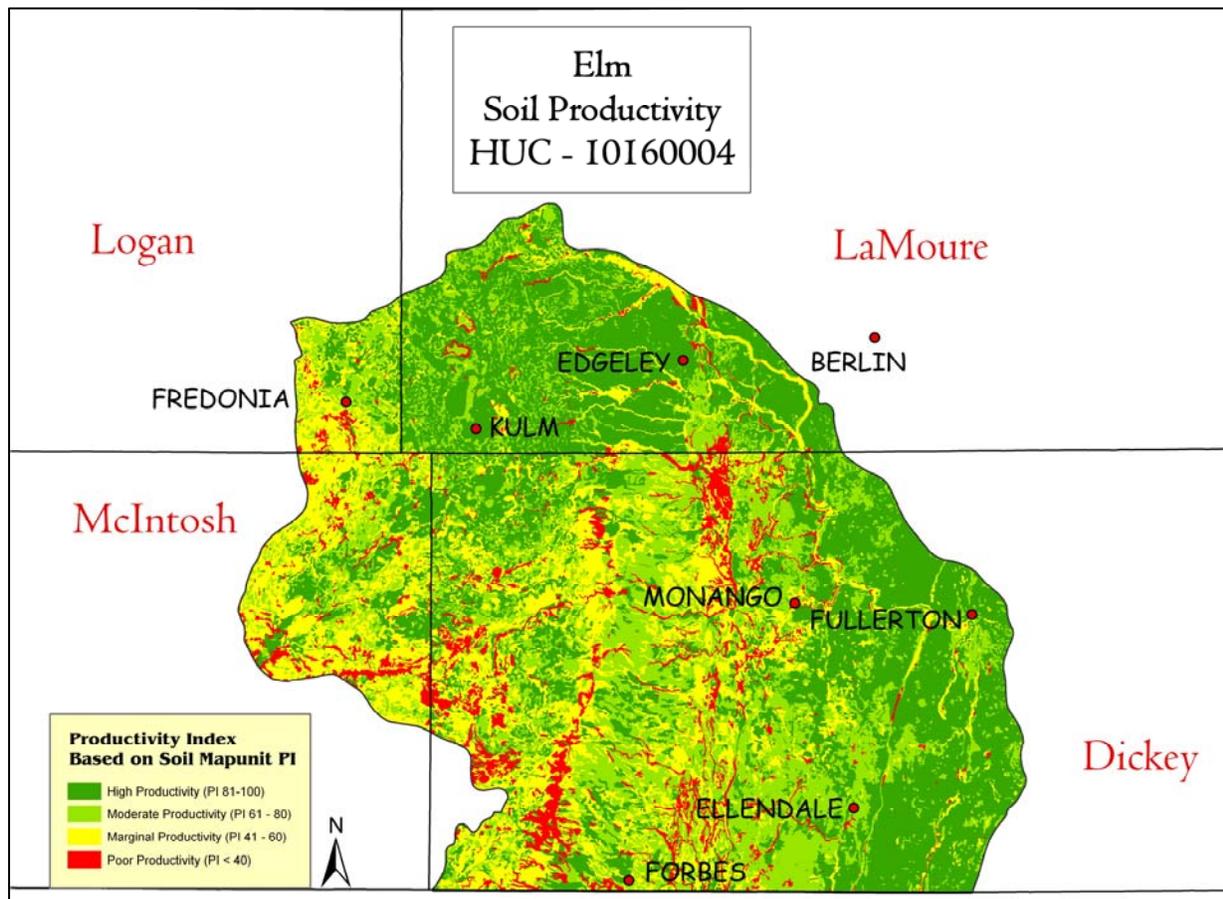


**53B.1 The Central Dark Brown Glaciated Plains:** The Central Dark Brown Glaciated Plains are nearly level to rolling with steeper areas along rivers. Land use is a mosaic of cropland and rangeland. Soil textures are dominantly loamy in glacial till, sandy in outwash areas, and clayey in lacustrine areas. Most soils are moderately deep or deep, well drained or moderately well drained, and have a frigid temperature regime.

**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 <sup>11</sup>

The Elm sub-basin has two distinct landforms that closely coincide with two soil productivity regions. Marginally and poorly productive soils are associated with the strongly sloping Missouri Coteau soils and the adjacent parallel areas east of the coteau. These adjacent areas receive additional ground water high in sodium and other salts. Highly and moderately productive soils are prevalent over much of the remaining area.





# Elm 10160004

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### **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.

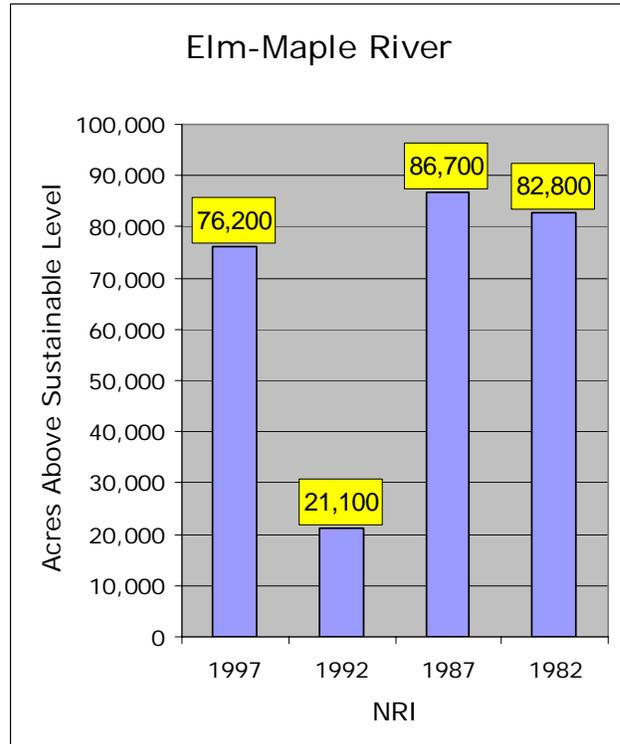
The following table shows the different projects, plans, studies, and assessments conducted within the sub-basin.

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		NRCS Watershed Plans, Studies & Assessments	
Name	Status	Name	Status
Maple River, West Branch	Withdrawn	Maple River SVAP	Complete 1999
		Elm River Stream Assessment	Withdrawn 2001
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 1	Streams - 12	Maple Creek Watershed	Complete
		Pheasant Lake Watershed	Complete
EPA 319 Watershed Projects			
Name		Status	
Maple Creek Watershed		Ongoing	
Pheasant Lake Watershed		Ongoing	

### Resource Concerns - Continued

#### Soil

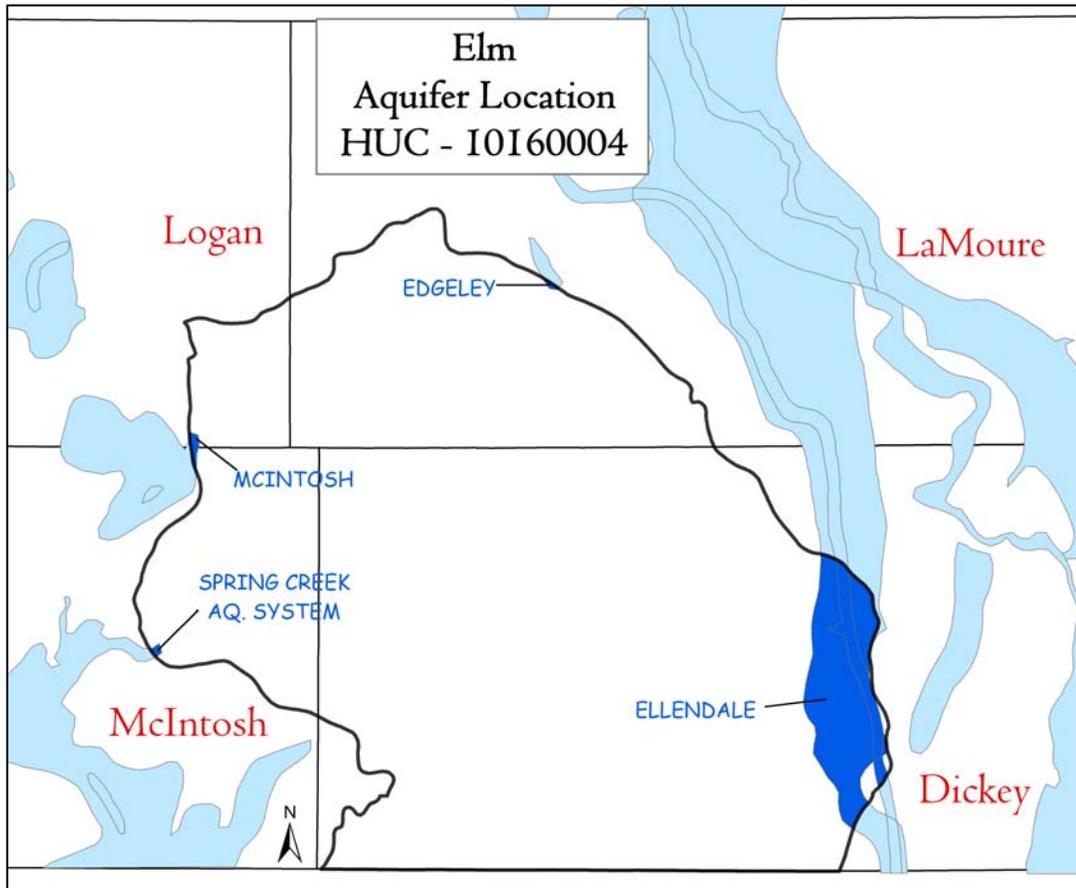
- The cultivated cropland acreage experiencing erosion rates above sustainable levels decreased to 72,900 acres in 1997, as compared to 77,500 acres in 1987.
- NRI estimates indicate that there was a 45 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed.
- Through NRCS programs many farmers and ranchers have applied conservation practices to reduce the effects of wind & water erosion. From 1982 to 1997, the average erosion rates reduced from 2.9 t/ac/yr (WIND) & 1.6 t/ac/yr (WATER) to 2.6 t/ac/yr & 1.3 t/ac/yr---respectively on all cultivated cropland.
- 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.
- 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.
- Grassed waterways are still needed to help reduce ephemeral gully erosion.
- Sediment accumulation is reducing storage capacities in the lakes.
- Cropping systems are needed to help reduce salinity and alkalinity on some soils.
- Stream bank failure and slumping are resource concerns along watercourses leading into the Elm and Maple Rivers.



### Resource Concerns - Continued

#### Water

- **Aquifers**<sup>12</sup> - There are four glacial drift aquifers (Edgeley, Ellendale, McIntosh, and Spring Creek Aquifer System) underlying the Elm sub-basin. These shallow aquifers are considered to be sensitive to nitrate and pesticide leaching.



- **Wellhead Protection Areas**<sup>13</sup> – there are no protection areas located in the sub-basin.
- Five stream sections on the 303(d) list in hydrologic unit code 10160004 are listed for having both excessive total fecal coliforms and sedimentation/siltation. One is listed for excessive total fecal coliform, and six stream sections were listed for sedimentation/siltation,
- Conservation practices that can be used to address these water quality issues include grazing management, conservation tillage, nutrient and ag waste management, and riparian buffers.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.

## **Resource Concerns - Continued**

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

- Summer flooding does occasionally occur and impacts crop production along the Elm and Maple and their tributaries.
- Water conservation and water quality (potential for pesticide contamination) are issues on irrigated cropland.
- Leaching of nitrogen into the groundwater is a concern on high water table soils.
- Sheet and rill erosion due to improper residue management, poor crop rotations, overgrazing, and excess tillage is a concern.
- Urban and ag runoff are a concern for excessive nutrients and organics in surface water.
- Excessive runoff due to tilling is becoming a major concern.
- Water use and conservation are concerns for irrigated cropland.
- Water erosion is a severe hazard on gently sloping and steeper soils. The hazard is greatest when the soil is bare during crop establishment.

### **Air**

- Visibility is reduced during winter months from blowing snow.
- Increased wind speeds due to tree/shelterbelt removal.
- Soil blowing is a severe hazard on the coarse textured and moderately textured soils.
- Nearly all soils can be damaged by soil blowing if they are bare.

### **Plants**

- Major concerns are 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, corn, sunflowers and dry beans.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- Native species not being replaced after land disturbances have taken place is a major concern.
- Season long grazing on or near water courses is a concern for riparian health.

**Resource Concerns - Continued**

**Animals**

- Lack of tall grasses is a concern for the limited number of prairie chickens and pheasants.
- Animals that are threatened and endangered can be seen in the following table of threatened and endangered species.

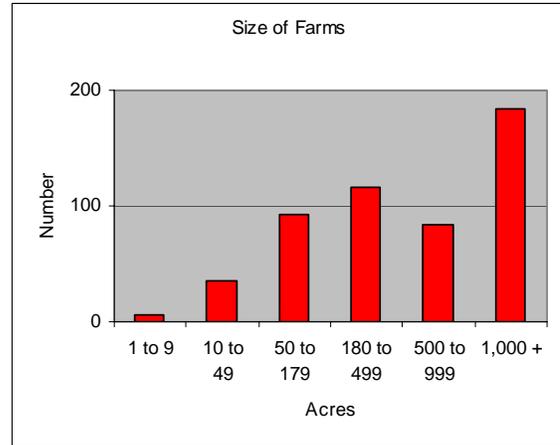
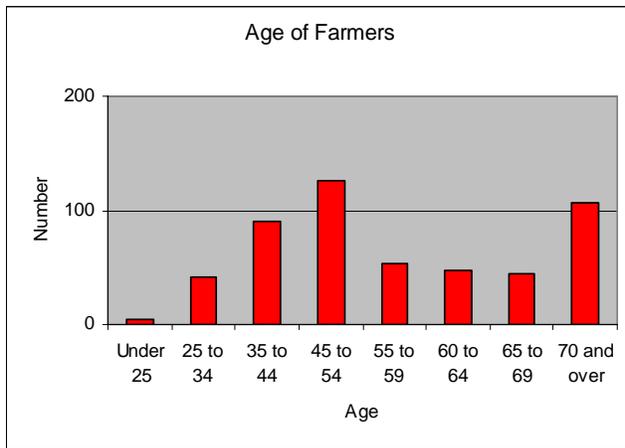
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	Gray Wolf	None
Birds	Bald Eagle Piping Plover	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	None
Plants	None	None	None
Critical Habitat – Piping Plover			

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

**Number of Farms: 520**

**Number of Operators:**

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



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

Approximately 4.9 percent of the operators are minority producers. Limited Resource Farmers are estimated at less than 6.2 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.

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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> 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)