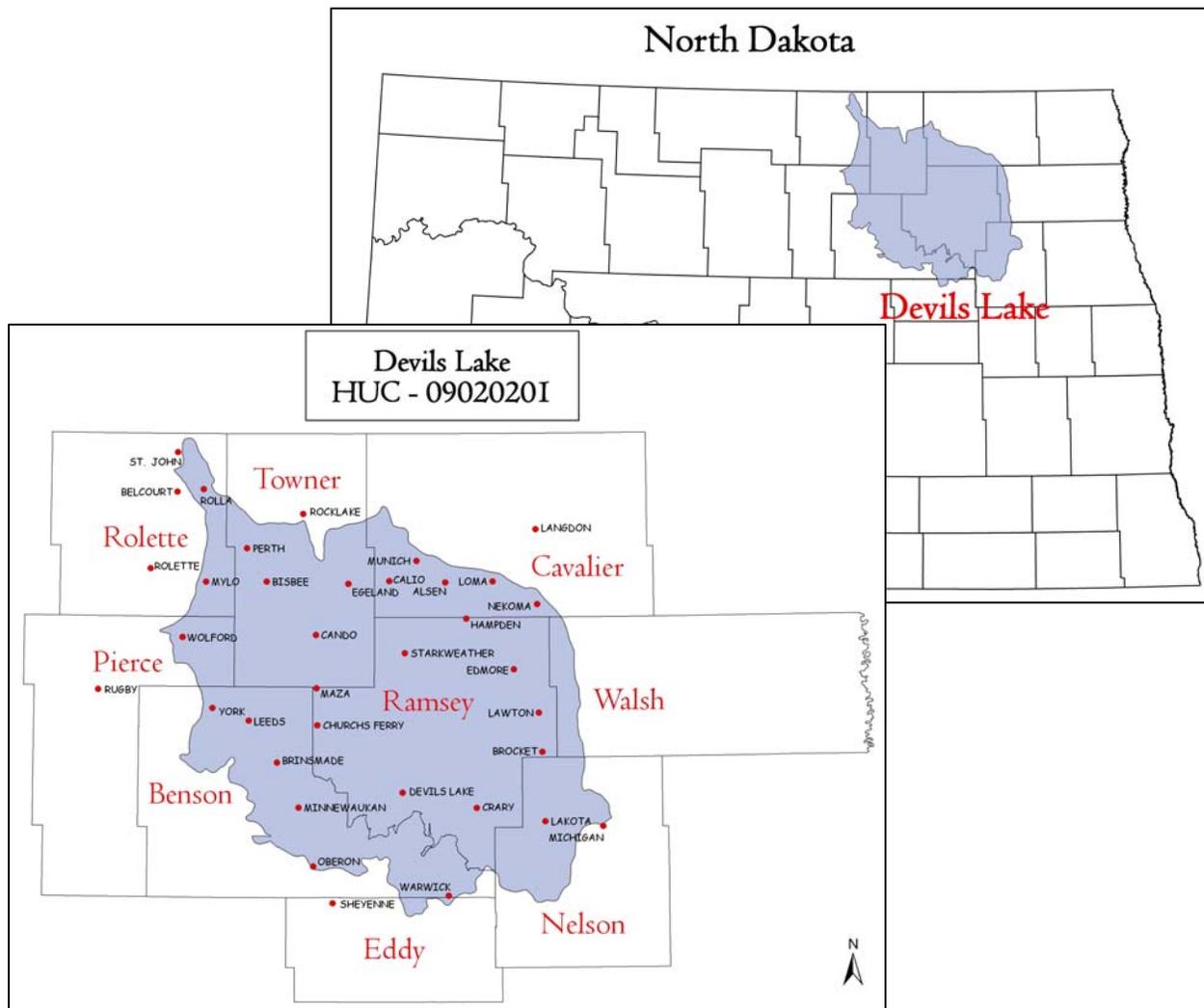


### Introduction

The Devils Lake 8-Digit Hydrologic Unit Code (HUC) (09020201) sub-basin is approximately 2,327,000 acres covering parts of 9 counties (Benson, Cavalier, Eddy, Nelson, Pierce, Ramsey, Rolette, Towner, and Walsh) in the Souris-Red-Rainy River Region – Red River Sub-Region. Of the 2,327,000 acres, Ramsey County contains 36%, Benson 20%, Towner 18%, Cavalier 8%, Nelson 8%, Rolette 3%, Walsh 3%, Pierce 3%, and Eddy 1%. There are approximately 1,600 farms in the sub-basin.

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

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



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

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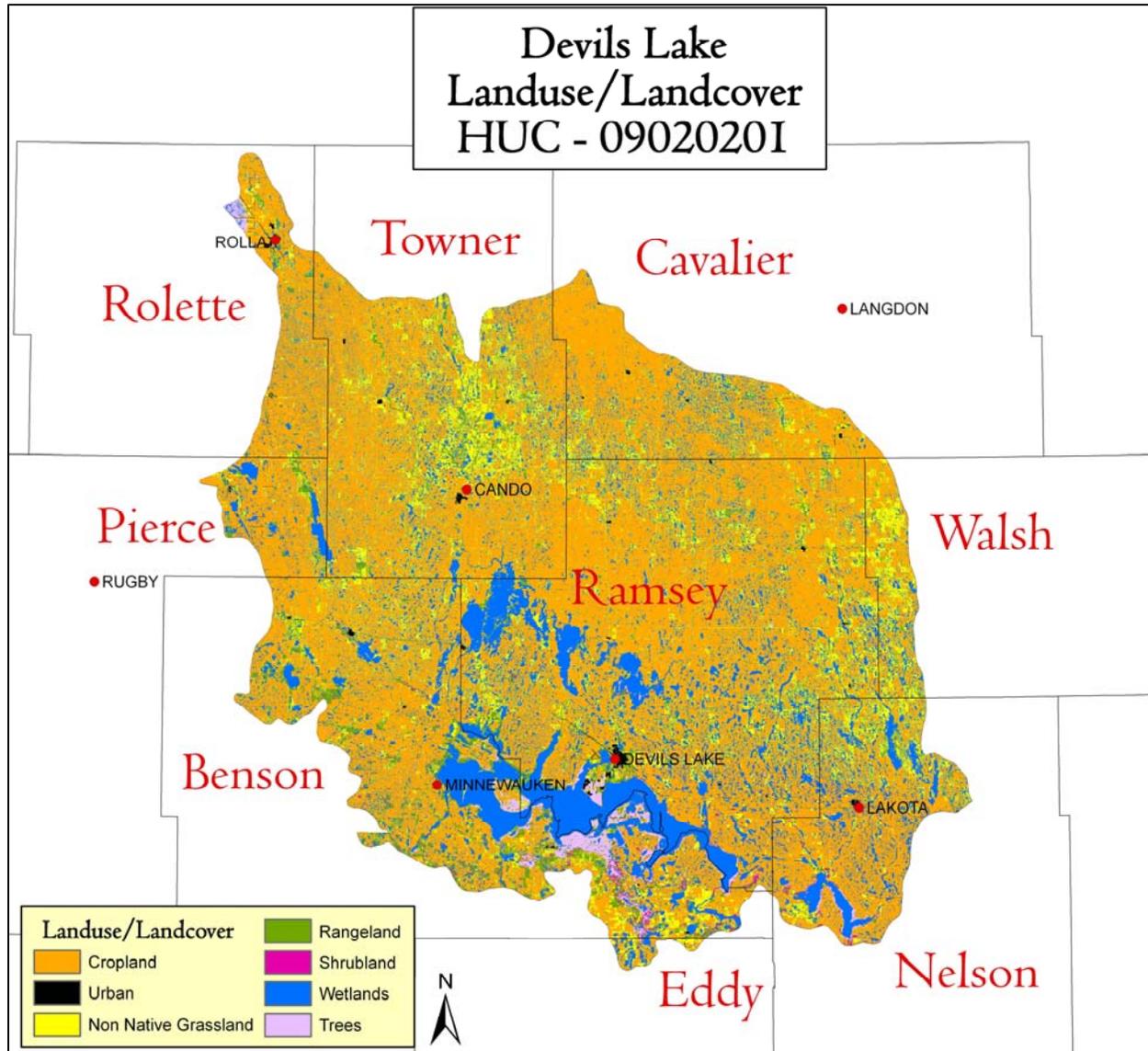
### Physical Description

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

<b>Land Use/ Land Cover (National Resources Inventory [NRI])<sup>1</sup></b>	<b>Acres</b>	<b>Percent of HUC</b>
Forestland	21,300	1%
Cropland	1,698,400	73%
Conservation Reserve Program (CRP) Land <sup>2 a</sup>	85,900	4%
Tame Grass/Hayland	41,300	2%
Pastureland	40,100	2%
Rangeland	141,000	6%
Urban/Farmstead/ Transportation Land	137,900	5%
Water/Wetlands	128,100	6%
Federal Lands	33,000	1%
<b>North Dakota HUC Totals <sup>b</sup></b>	<b>487,900</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> (Farm Services Agency) <sup>3</sup>	4,010	<1%

### Physical Description – Continued

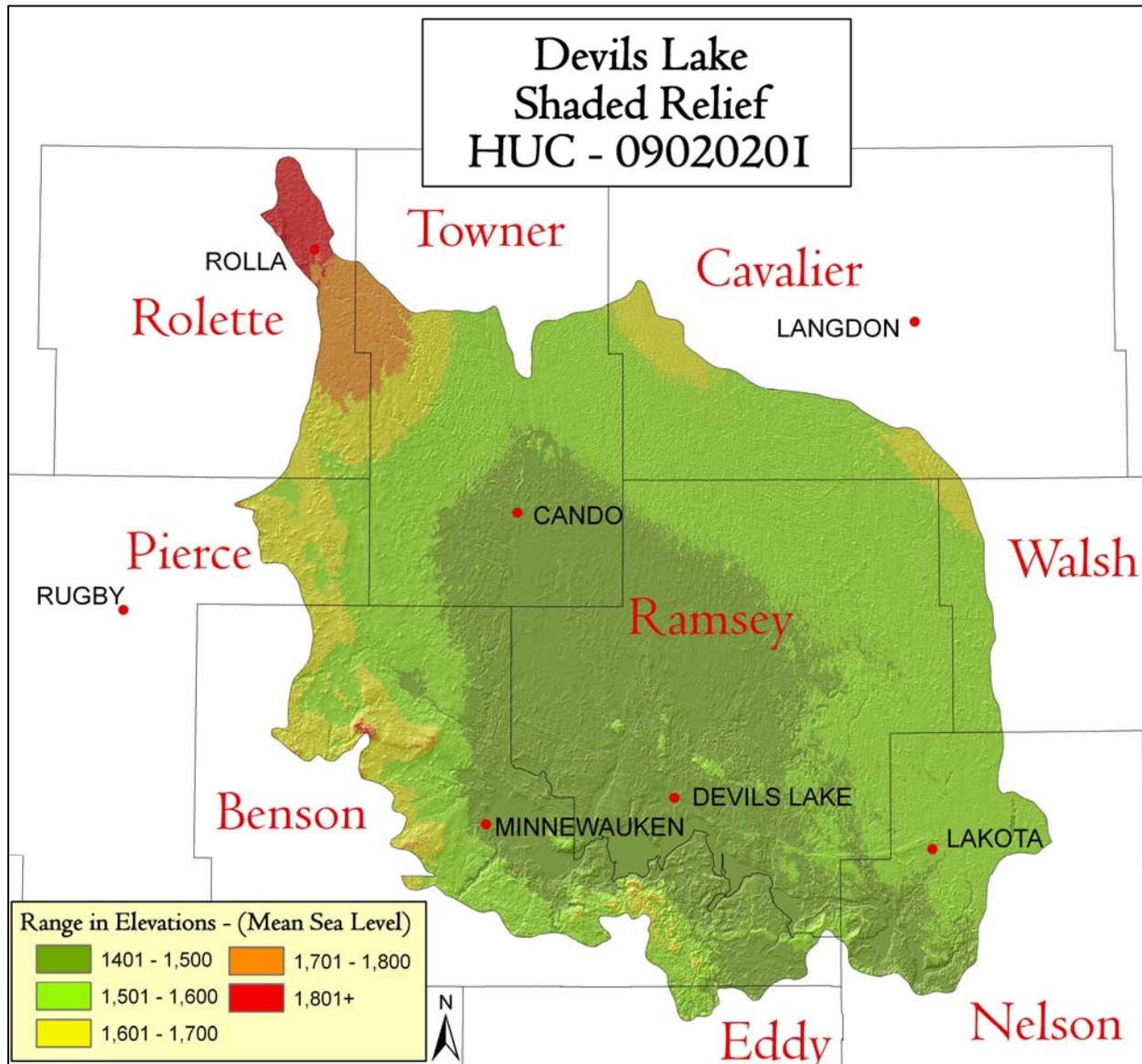
#### Land Use/Land Cover Map



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

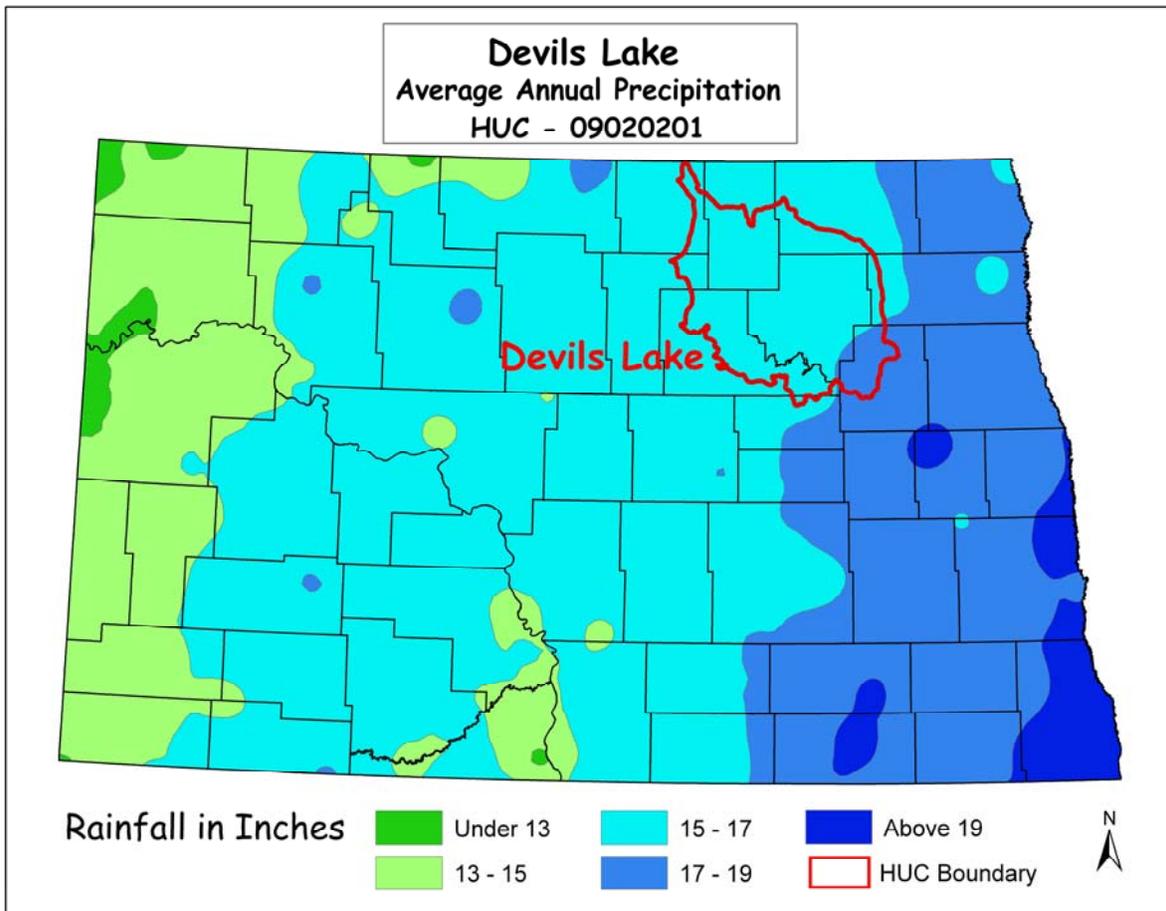
### Physical Description – Continued

The sub-basin is part of the Souris-Red-Rainy River Region - Red River Sub-Region. The Devils Lake Basin is a closed basin with multiple small intermittent streams discharging into Devils Lake and Stump Lake. The Mauvais, Big, Edmore, and Starkweather Coulees are the major tributaries. These streams flow from the north side of the basin into Devils Lake. Devils Lake is the second largest closed basin lake in the United States, behind the Great Salt Lake. The following map shows the relief for the sub-basin.<sup>5</sup>



### Physical Description – Continued

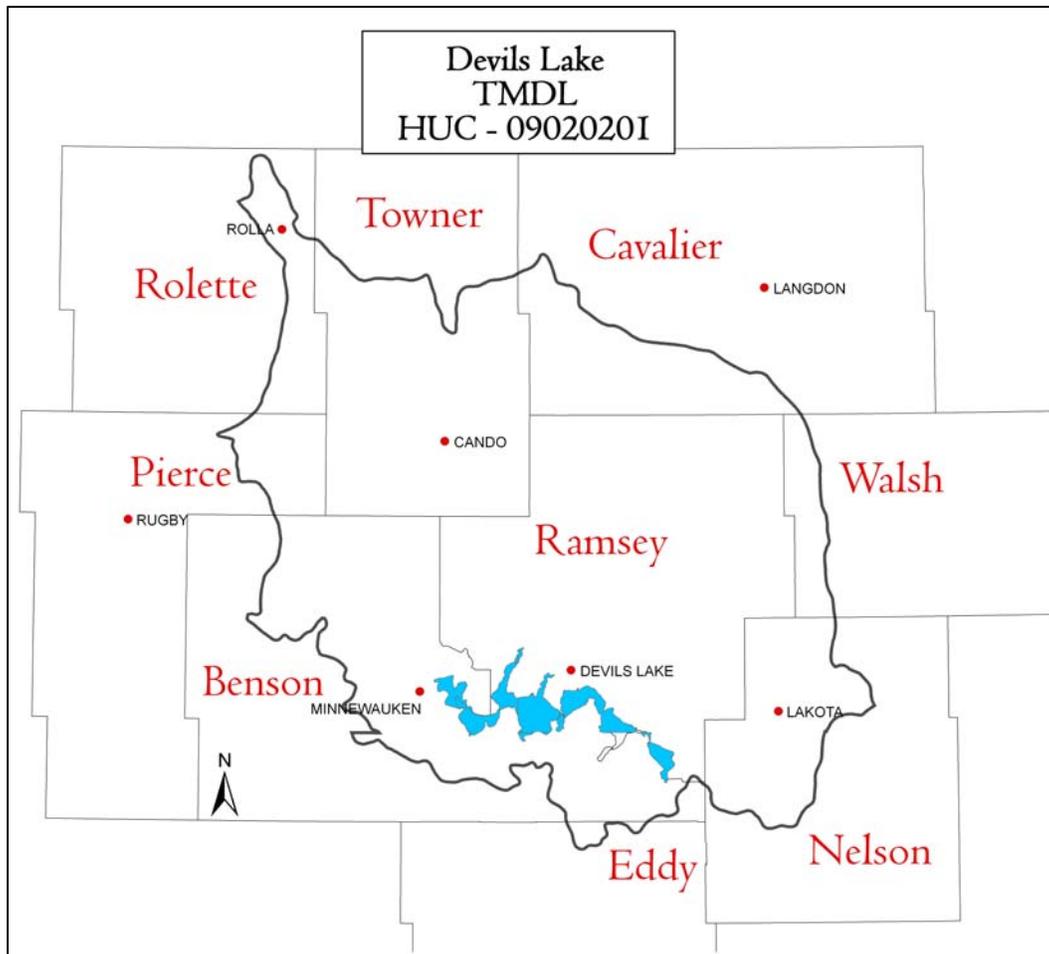
The following map is a plot of 1961-1990 annual average precipitation contours from National Oceanic and Atmospheric Administration (NOAA) Cooperative Stations and (where appropriate) USDA-NRCS Snowpack Telemetry (SNOTEL) Stations. Christopher Daly used the PRISM (Parameter-elevation Regressions on Independent 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 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. A map showing the Total Maximum Daily Load (TMDL) waters within the watershed follows the table. TMDL is the amount of a particular pollutant that a particular stream, lake, estuary, or other waterbody can "handle" without violating State water quality standards.

		Units	Devils Lake Sub-basin <sup>6</sup>	Devils Lake Impaired Water Quality (303d) <sup>7</sup>	Percent Impaired* Devils Lake
<b>Water Quality Data</b> <i>*Percent of Total Miles and acres in HUC</i>	Total – Major Water bodies				
	Rivers/Streams	Miles	1,597	0	0
	Lakes/Reservoirs	Acres	125,000	125,000	100



### 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.

Animal Feeding Facilities – North Dakota Department of Health Permit <sup>8</sup>					
Animal Type	Dairy	Beef	Swine	Other	Total
Number of Animal Feeding Operations	2	11	4	1	18
Number of Animals	825	3,348	42,570	800	47,543
Number of State Permitted Operations					14

Livestock Numbers (rounded to nearest 100) <sup>9</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
Devils Lake	39,300	22,800	400	3,800	2,700
Devils Lake as a percent of North Dakota	2.1%	2.3%	1.2%	2.7%	2.4%

### Physical Description – Continued

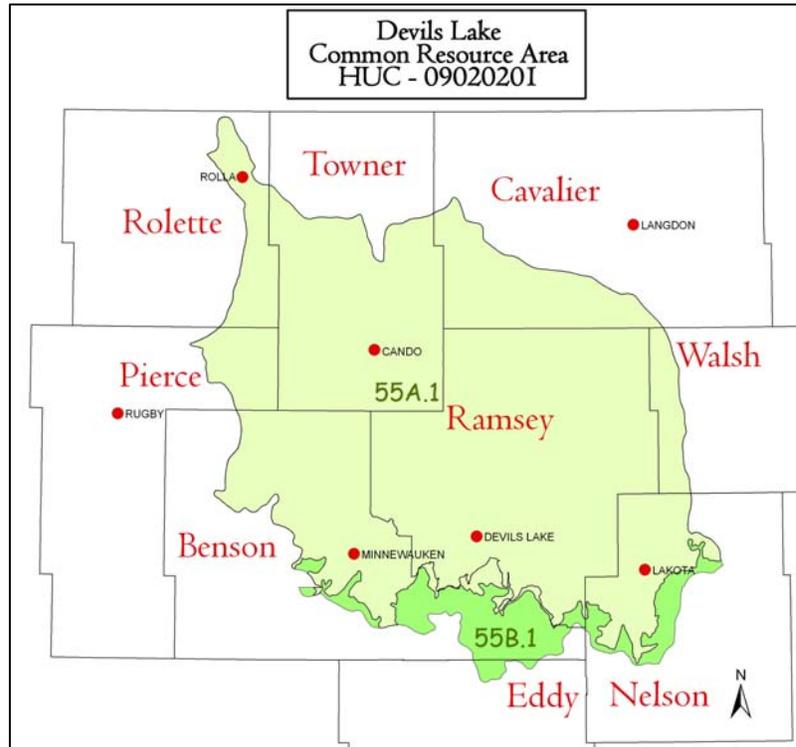
Common Resource Areas (CRAs) are geographical areas where resource concerns, problems, or treatments are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information were used to determine the geographic boundaries. CRAs are subsets of Major Land Resource Areas (MLRAs). The following map<sup>10</sup> shows the CRAs for the Devils Lake sub-basin with the descriptions below.

#### **55A.1 – Northern Black**

**Glaciated Drift Plain:** The Northern Black Glaciated Drift Plain is a nearly level to undulating landscape composed of glacial till and lacustrine sediments. Temporary and seasonal wetlands are numerous throughout the area. A very short growing season and the coldest January temperatures in the Northern Plains limit agriculture.

#### **55B.1 – Central Black**

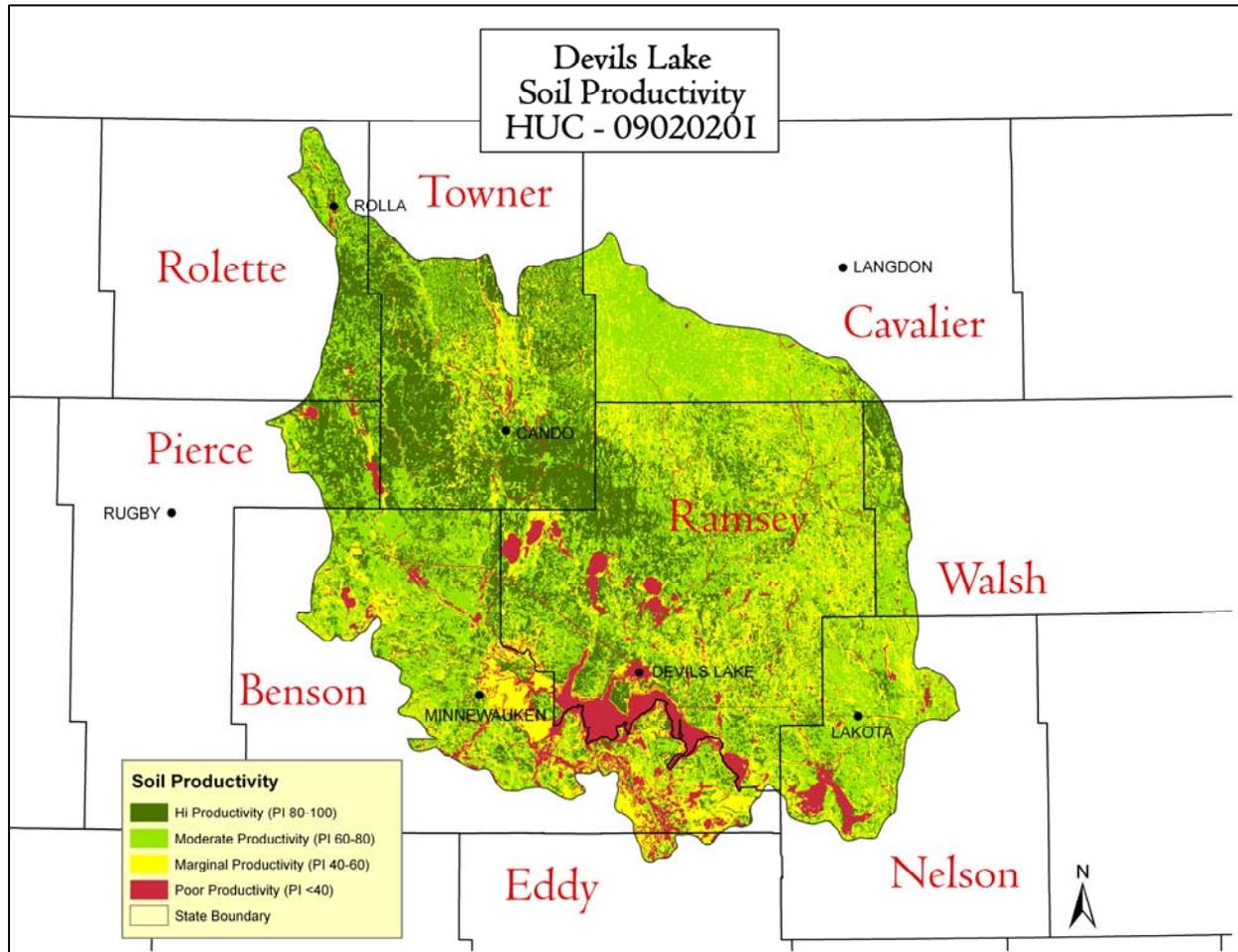
**Glaciated Drift Plain:** The Central Black Glaciated Drift Plains are a gently rolling to undulating landscape with a thick layer of glacial till. Temporary and seasonal wetlands are numerous throughout the area. These soils are very fertile, but agricultural success is subject to annual climatic fluctuations. 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 extreme south central portion of the Devils Lake sub-basin has soils with marginal to poor productivity indexes (PI) because of gravelly or sandy soils. The remainder of the area is dominated by soils with marginal to high PIs.

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



### Common Land Unit

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

### Resource Concerns

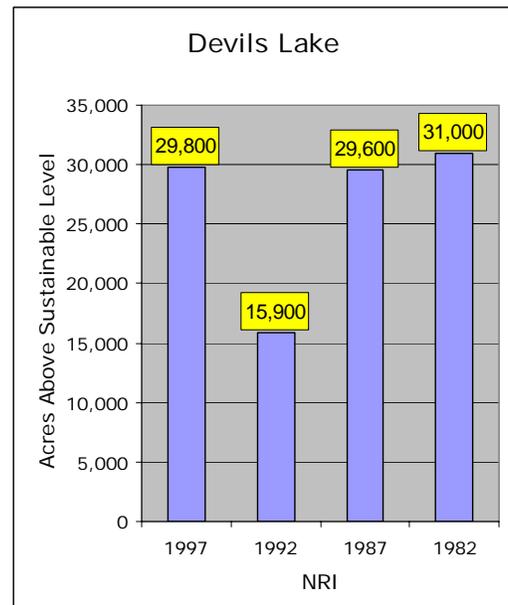
One of the goals of NRCS is to look at an area to help quantify the types and amounts of resources that may be of concern. This helps to identify priority areas for the types and amounts of assistance to be given to a particular watershed.

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
None	None	Starkweather Watershed	Inactive
		Edmore Watersheed	Inactive
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 1	Streams - 0	Big Coulee Watershed	Complete
		Devils Lake Watershed Restoration Action Strategy (WRAS)	Ongoing
EPA 319 Watershed Projects			
Name		Status	
Big Coulee Watershed		Complete	

### Soil

- National Resources Inventory (NRI) estimates indicate there was a 6 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed (46,100 to 43,200).
- NRI estimates indicate 25,900 acres of the sub-basin agricultural lands have wind erosion rates above a sustainable level in 1997.
- Through NRCS programs, many farmers and ranchers have applied conservation practices to reduce the effects of wind erosion. From 1982 to 1997, the average wind erosion rate reduced from 7.3 tons/acre/year to 4.2 tons/acre/year on all cultivated cropland. The average water erosion rate reduced from 1.6 tons/acre/year to 1.1 tons/acre/year on cultivated cropland.



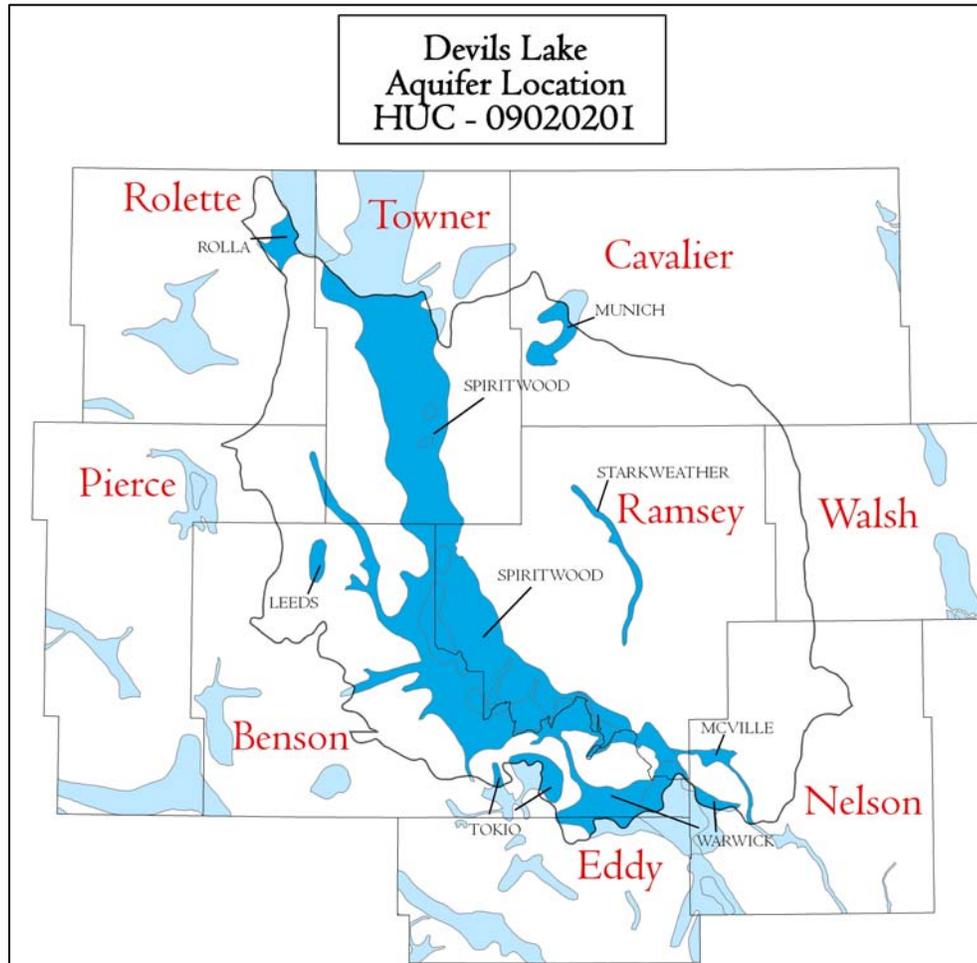
### Resource Concerns – Continued

#### Soil (cont.)

- NRI estimates show that 3,900 acres of the sub-basin agricultural lands have water 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.
- Sandy soils and irrigated soils still require conservation practices to control excessive soil erosion.
- Soil compaction on silty and clayey soils and low organic matter on sandy soils remain resource concerns.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed.

#### Water

- **Aquifers**<sup>12</sup> - There are eight glacial drift aquifers (Munich, Starkweather, Warwick, McVille, Tokio, Leeds, Rolla, and Spiritwood) underlying the Devils Lake sub-basin. These aquifers are the source of water for the cities of Rolla, St. John, Leeds, Cando, Warwick, Tokio, and Devils Lake.



## **Resource Concerns - Continued**

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

- **Wellhead Protection Areas**<sup>13</sup> – there are 16 protection areas located in the sub-basin.
- Devils Lake is listed as a TMDL waterbody due to high levels of nutrients, eutrophication, and methyl-mercury.
- Conservation practices that can be used to address these water quality issues include grazing management, erosion control, conservation tillage systems, nutrient management, ag waste management, and riparian buffers.
- There are two shallow aquifers (Tokio and Warwick) considered highly sensitive to nitrate and pesticide leaching.
- Lack of adequate riparian buffer width and health along intermittent streams is impacting water quality and stream health in the Basin.
- Devils Lake is a closed basin lake. Since the most recent significant drought for the Devils Lake area (late 1980s to early 1990s), Devils Lake has risen from 1,423 feet above mean sea level (msl) in 1992 to a high of 1,449.2 feet msl in 2005. The current lake elevation is 1,447.3 feet msl. At an elevation of about 1,447 feet msl, Devils Lake began overflowing to the east into Stump Lake. Currently, both lakes are at the same elevation. At an elevation of about 1,459 ft msl, the combined lakes would spill over through Tolna Coulee into the Sheyenne River.<sup>14</sup>
- Excessive moisture in the spring can and does hinder spring planting of small grains and row crops.
- Summer flooding does occasionally occur and impacts crop production.

### **Air**

- Objectionable odors are noticeable from the west of Devils Lake where a lagoon facility is located.
- Visibility is reduced during winter months from blowing snow.
- The increase in wind speeds is due to the removal of field windbreaks and trees around farmsteads.

### **Plants**

- Major concerns are controlling invasive weeds and maintaining good pasture condition.
- Approximately 15,000 acres of native forestland occupy the Devils Lake Basin.
- Direct seeding of corn and soybeans has been successful in some locations.
- Conventional tillage systems are still utilized, especially with potatoes and dry beans.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- Season long grazing on or near water courses are a concern.
- The private, non-industrial forestland is associated with small woodlots or rural home sites which are not actively managed for timber production.
- Loss of timber stands and private trees around Devils Lake due to flooding and increasing water levels is a concern.

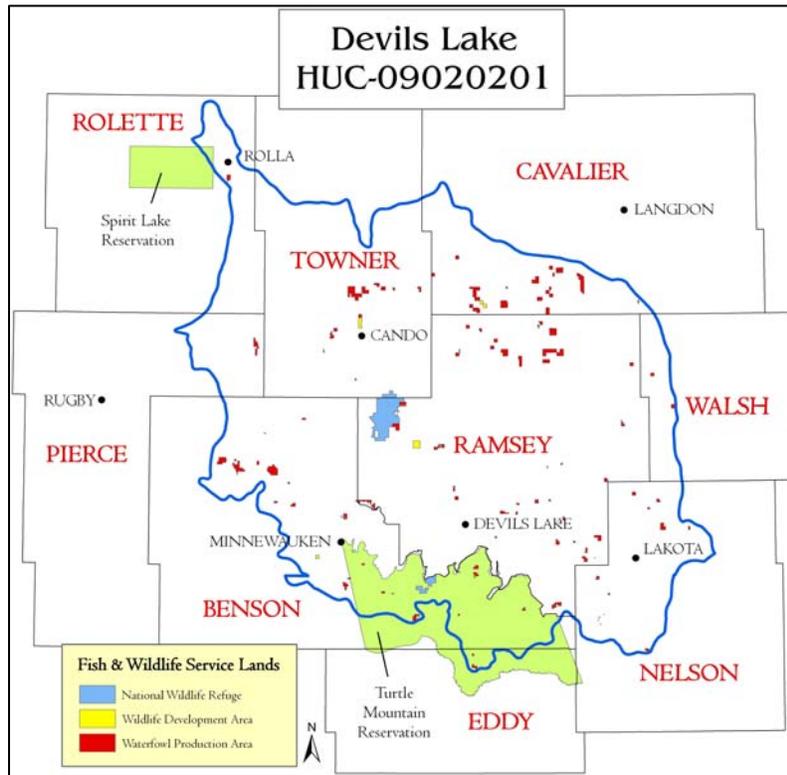
### Resource Concerns - Continued

#### Animals

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

Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	None	None
Birds	Piping Plover	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	Dakota Skipper
Plants	None	None	None
Critical Habitat – Piping Plover			

- The following map shows the US Fish and Wildlife Service (FWS) land and also Reservation Land. The FWS land is separated into the following designations: National Wildlife Refuge, Wildlife Development Area, and Waterfowl Production Areas. The FWS controls nearly 40,000 acres.

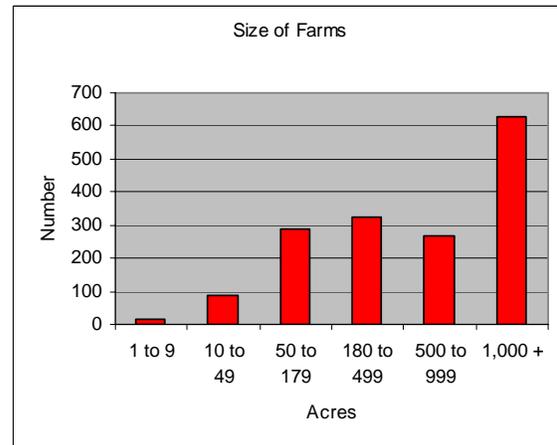
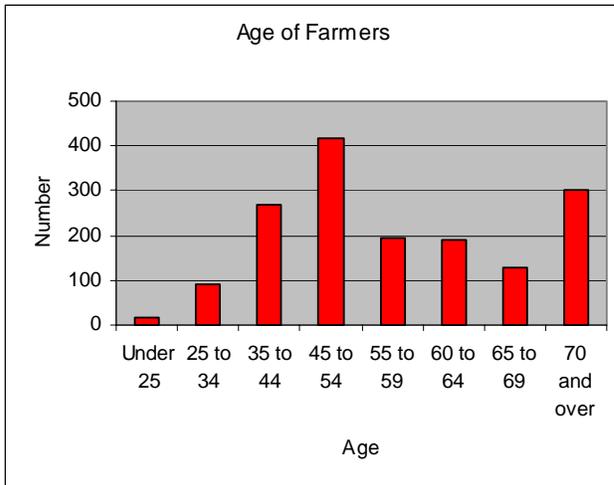


### Census and Social Data<sup>15</sup>

**Number of Farms: 1,600**

**Number of Operators:**

- Average Age: 56
- Full-Time Operators: 73%
- Part-Time Operators: 27%



### Limited Resource and Beginning Farmer

Approximately 6.4 percent of the operators are minority producers. Limited Resource Farmers are also estimated at 4.5 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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# Devils Lake 09020201

## *8-Digit Hydrologic Unit Profile*

September 2007

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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> US Geological Survey, Devils Lake Home Page (<http://nd.water.usgs.gov/devilslake/index.html>), 2007.
- <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.)