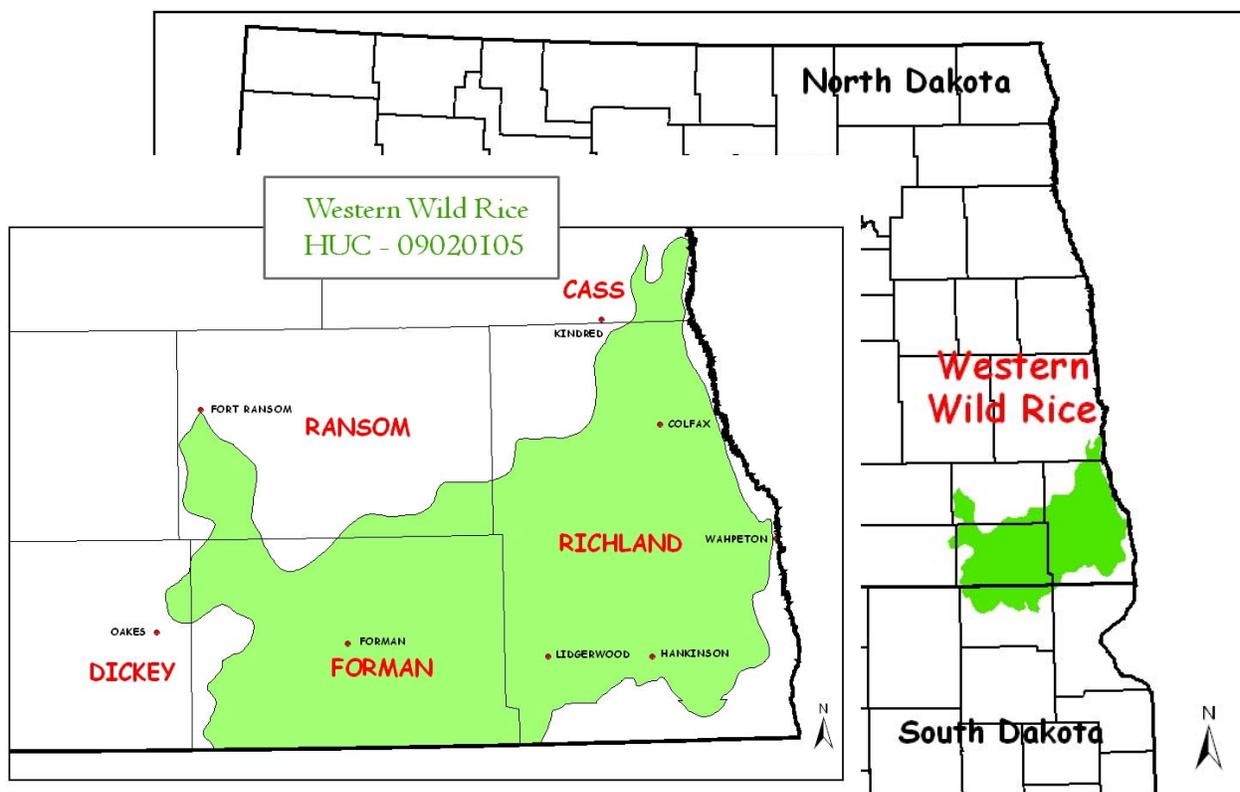


Introduction

The Western Wild Rice 8-Digit Hydrologic Unit Code (HUC) (09020105) sub-basin includes land in North Dakota and South Dakota. There are approximately 1,475,000 acres in the entire sub-basin. This sub-basin is located in Souris-Red-Rainy River Region, Red River Sub-Region.

This report addresses only the portion located within North Dakota. The Western Wild Rice is approximately 1,301,000 acres covering parts of five counties (Cass, Dickey, Ransom, Richland, and Sargent) in North Dakota. Of the 1,301,000 acres, Dickey County contains 1%, Cass 3%, Ransom 6%, Richland 51%, and Sargent 39%. There are approximately 1,128 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 sugar beets, corn, soybeans, and multiple small grain crops to beef and dairy cattle, swine, and turkeys.

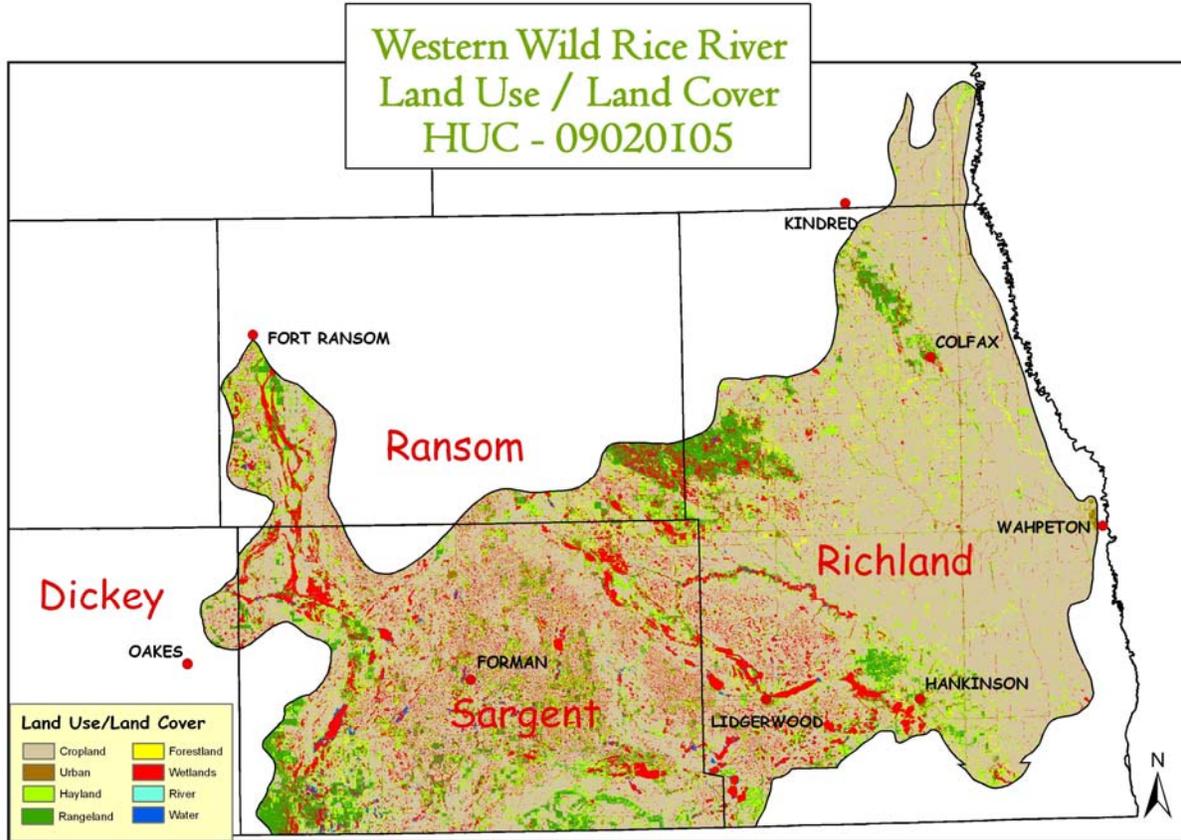
Conservation assistance is provided by five Natural Resources Conservation Service (NRCS) service centers, one soil survey office, and two Resource Conservation & Development Councils.

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>) ¹	Acres	Percent of HUC
Forestland	1,400	1% *
Cropland	972,700	75
Conservation Reserve Program (CRP) Land ^{2a}	62,100	5%
Tame Grass/Hayland	23,700	2%
Pastureland	56,300	4%
Rangeland	100,800	8%
Urban/Farmstead/ Transportation Land	41,900	3%
Water/Wetlands	10,700	1% *
Federal Lands	25,300	2%
Other Lands * *	6,100	1% *
North Dakota HUC Totals ^b	1,301,000	100% *
<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 include CRP/CREP. b: Totals may not add due to rounding and small unknown acreages.</p>		
Irrigated Land (<i>Farm Security Agency</i>) ³	8,560	<1%

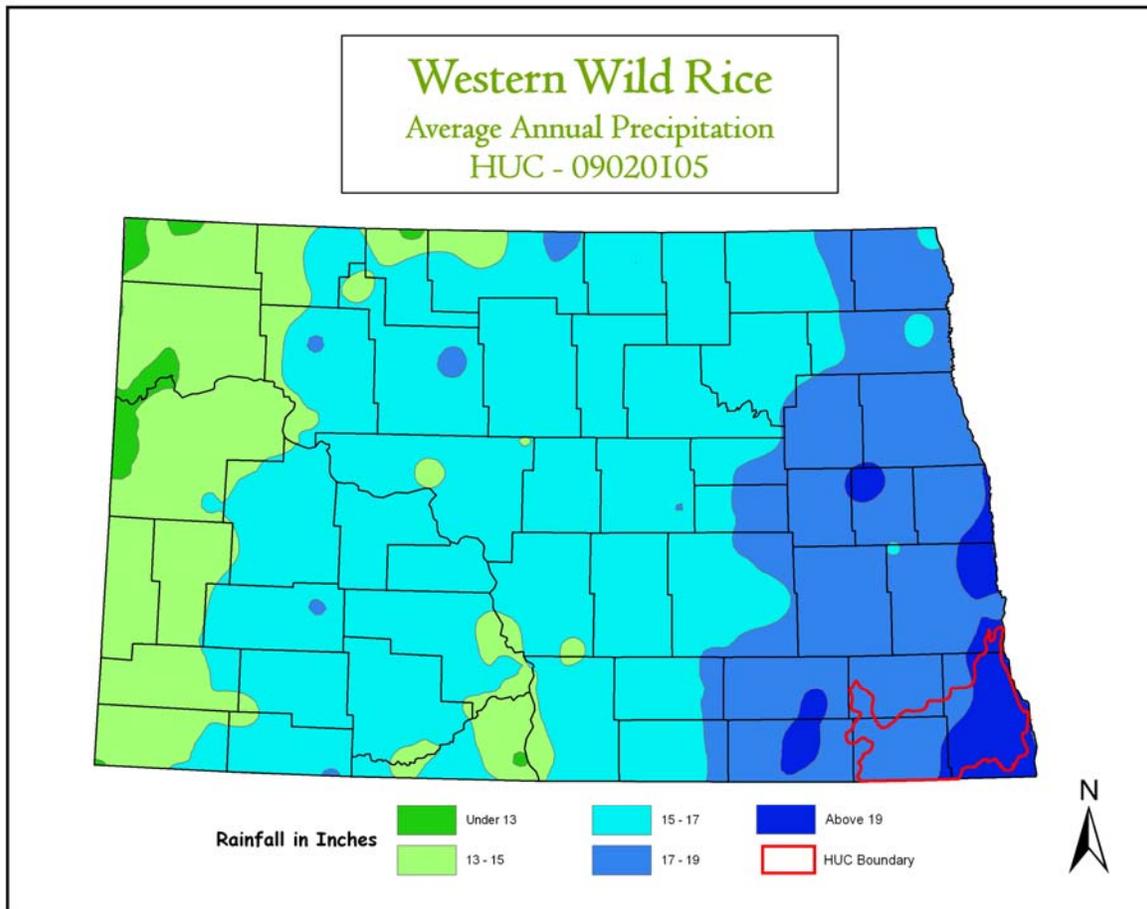
Physical Description – Continued



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

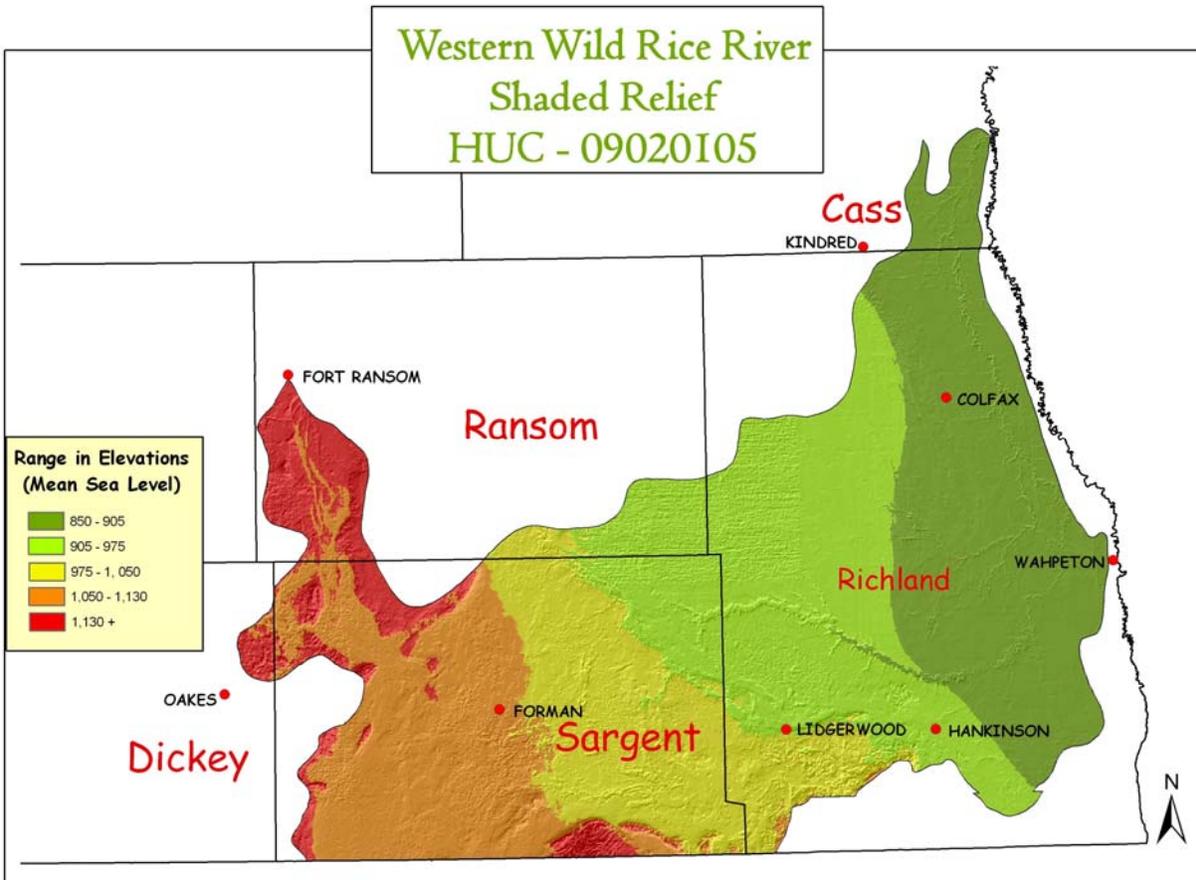
Physical Description – Continued

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 sub-basin is part of the Souris-Red-Rainy River Region, Red River Sub-Region. All drainage patterns flow to the east ending up in the Red River which flows north into Canada. The following map shows the relief for the sub-basin.⁵



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	Western Wild Rice Sub-basin ⁶	Western Wild Rice as percent of North Dakota	Impaired Water Quality (303d) ⁷	Percent Impaired* Western Wild Rice
Water Quality Data	Total – Major Water bodies						
	Rivers/Streams	Miles	56,687 ⁸	880	1.6%	459	52%
	Lakes/Reservoirs	Acres	434,658 ⁹	3,700	0.9%	298	8%

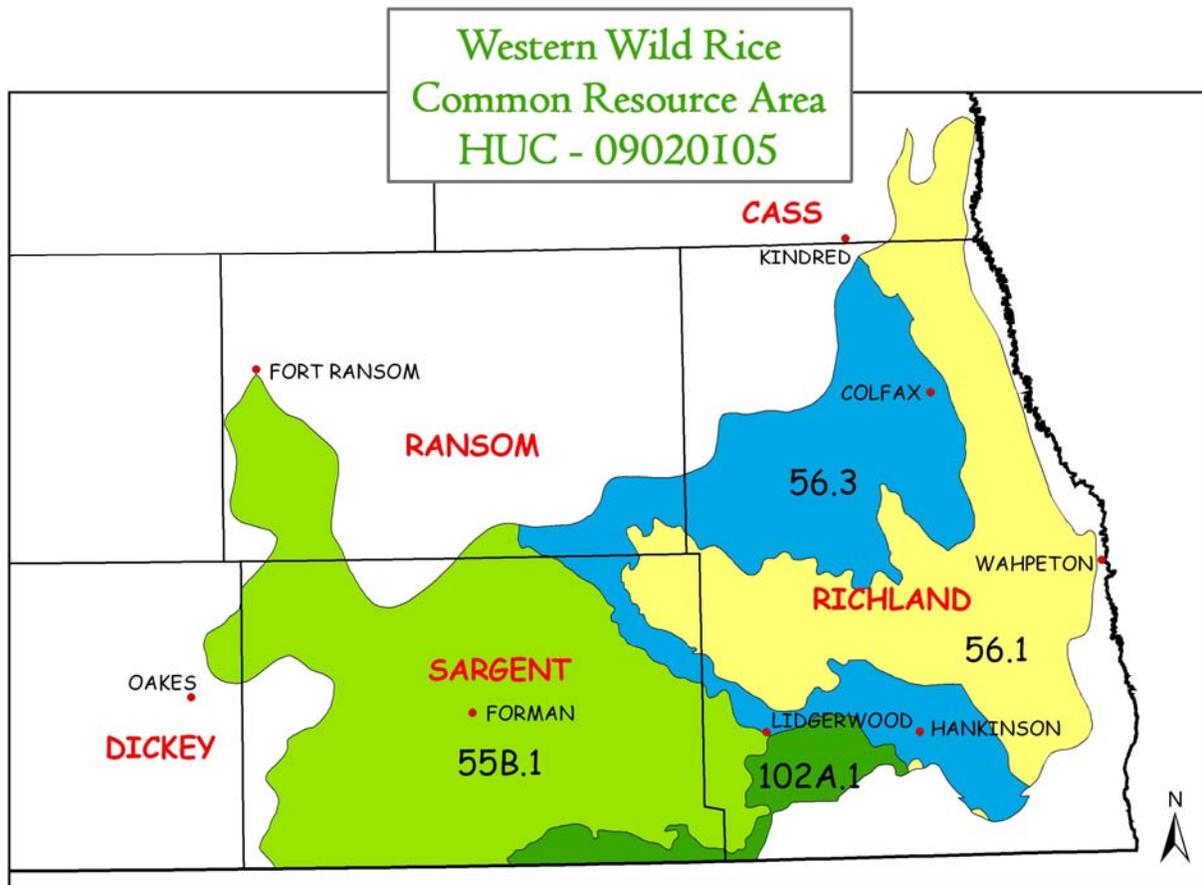
**Percent of Total Miles and acres in HUC*

Animal Feeding Facilities – North Dakota Department of Health Permit¹⁰					
Animal Type	Dairy	Beef	Swine	Other	Total
Number of Animal Feeding Operations	10	18	27	8	63
Number of Animals	3,850	6,790	4,380	--	15,020
Number of State Permitted Operations					42

Livestock Numbers (rounded to nearest 100)¹¹					
	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
Western Wild Rice	50,200	25,700	1,000	15,900	5,800
Western Wild Rice as a percent of North Dakota	2.7%	2.6%	2.9%	11.5%	5.1%

Physical Description – Continued

Common Resource Areas (CRA) 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 map¹² shows the CRA's for Western Wild Rice sub-basin with the CRA 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.

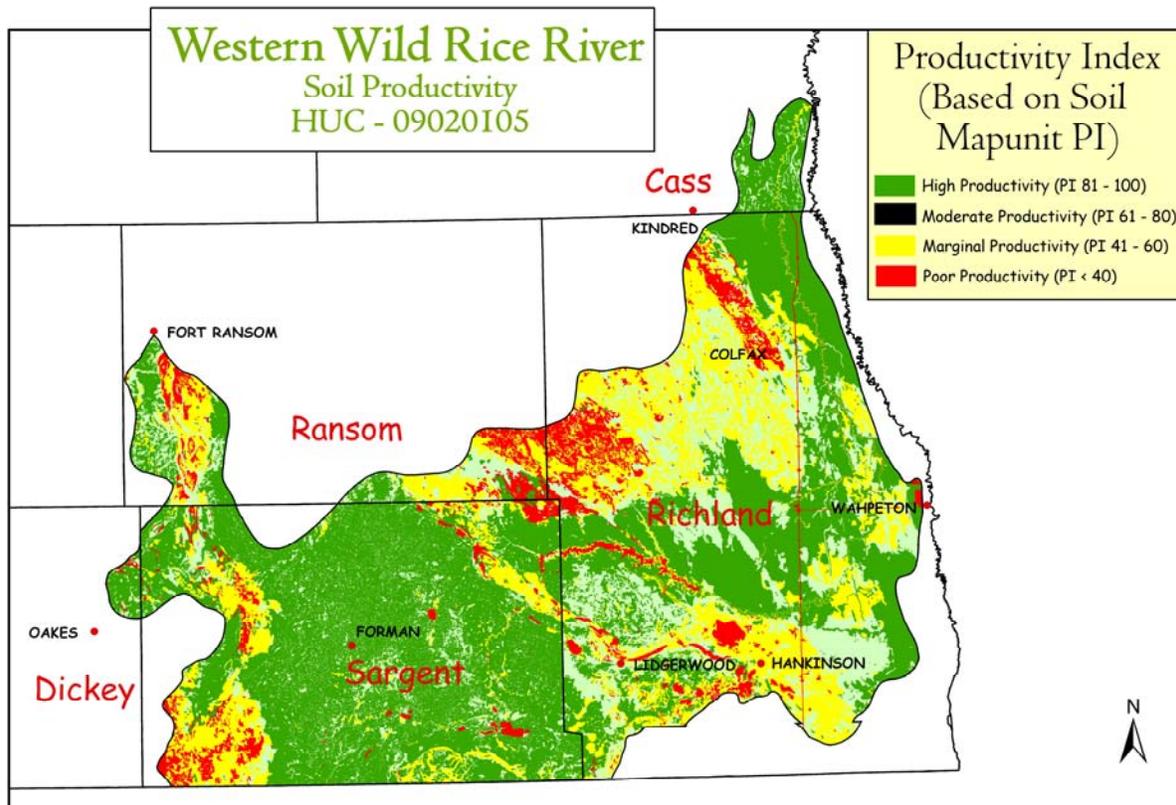
Physical Description – Continued

56.3 - Sheyenne Delta of the Red River Valley: The Sheyenne Delta landscape ranges from strongly rolling sand dunes in the northeastern edge, to nearly level high water table sandy soils of the south. A risk of wind erosion exists throughout this area. The area is used for range and cropland. A portion of the Sheyenne delta is in the Sheyenne National Grassland.

102A.1 - Rolling Till Prairie: Gently sloping to steep, loamy glacial till soils with scattered sandy outwash soils and silty alluvial flood plains soils. This area is part of the Prairie Pothole Region of the upper Midwest. Predominantly cropped to corn and soybeans with increasing hayland and pasture and small grains in the western part. Resource concerns are water and wind erosion, nutrient management, and water quality.

Soil Productivity ¹³

The Western Wild Rice sub-basin has a wide variety of soil productivities. The Sheyenne Delta has coarser soils with productivity indexes ranging from moderate to poor. The fine textured lake sediments of Glacial Lake Agassiz and adjacent glacial till plain have moderate to high productivity.



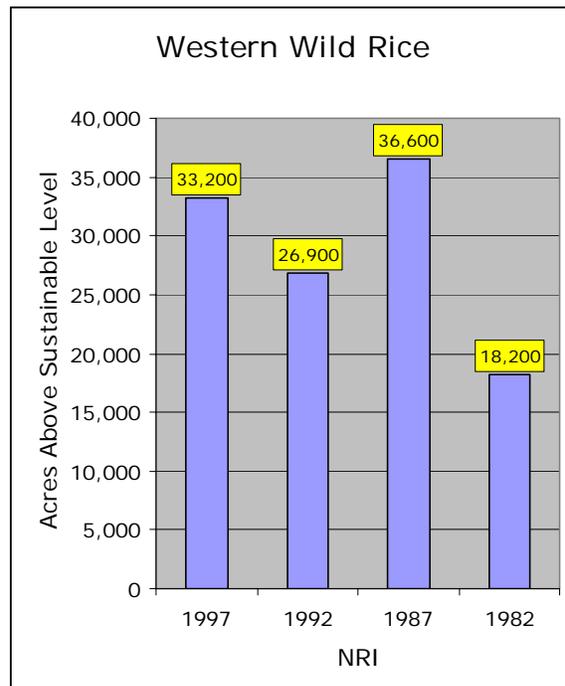
Common Land Unit

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 acres of land above sustainable levels for soil erosion have demonstrated wide fluctuations in acreage from 1982 to 1997. One possible reason for this may be the extensive irrigation for potato production in this sub-basin.
- ❖ NRI estimates indicate 2,800 acres of the sub-basin agricultural lands still has water erosion rates above a sustainable level in 1997.
- ❖ NRI estimates show 30,400 acres of the sub-basin agricultural lands still has 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 by water. As a result, water erosion rates on cultivated cropland were 1.0 tons/acre/year in 1997. Wind erosion rates were also 1.0 tons/acre/year.
- ❖ NRI estimates indicate 54,800 acres of Highly Erodible Land (HEL) in 1997 compared to 51,800 acres in 1987. This is nearly a 6% increase in HEL being farmed.
- ❖ Sixty nine percent of all 303(d) listed stream, lake, and reservoir acres are listed for Total Fecal Coliform. Impairments from sediment and siltation were listed on 6 of the 13 identified Total Maximum Daily Load (TMDL) water bodies. Stream reaches listed for sediment are affected by erosion on croplands and from stream banks. Season-long grazing systems and lack of riparian buffers in cropland fields contribute to the stream bank erosion.
- ❖ Conservation practices that can be used to address these water quality issues include erosion control, nutrient and pest management, grazing management, agricultural waste management/utilization, and riparian buffers



Resource Concerns (cont.)

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

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		NRCS Watershed Plans, Studies & Assessments	
Name	Status	Name	Status
Colfax Watershed Wild Rice 'B' Wild Rice Creek	Planning Completed Deauthorized Completed	None	N/A
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs – 2	Streams – 11	Western Wild Rice River WRAS Wild Rice Assessment – Richland County Conservation Cropping Systems Project (CCSP)	Ongoing Ongoing Ongoing
EPA 319 Watershed Projects			
Name		Status	
Red River Basin Riparian Project Sheyenne River - Barnes County 319 Cass Co. -319 (Rush & Maple River, Brewer Lake)		Ongoing Ongoing Ongoing	

SOIL

- Sandy soils and irrigated soils still require conservation practices to control excessive soil erosion.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed to reduce soil erosion.
- Soil health, especially compaction on heavier or fine textures soils and organic matter on sandy soils are two resource concerns.
- Soil erosion and low organic matter remain resource concerns.

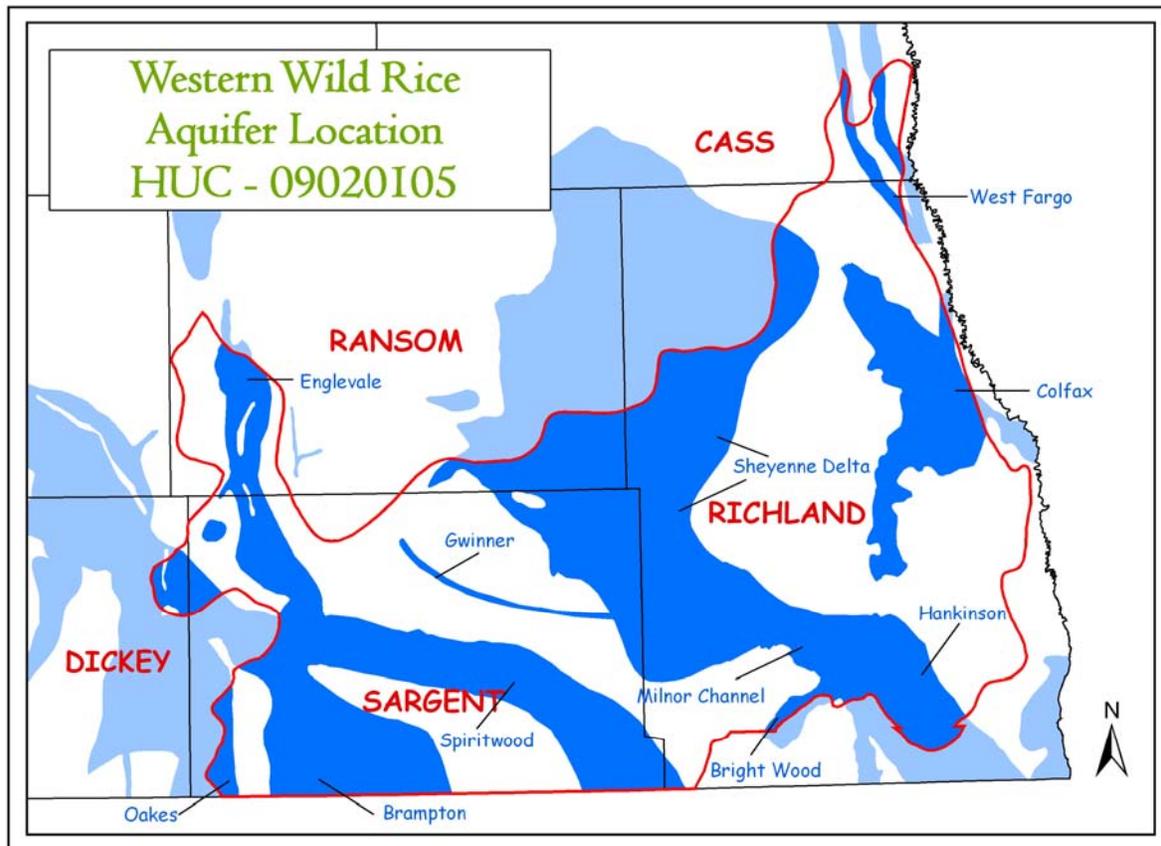
WATER

- Total fecal coliform, sediment and nutrients are primary water quality pollutants impairing the watershed streams and lakes.
- The Wild Rice River has a large number of livestock operations on or near the river, impacting water quality from nutrient loading and total fecal coliform.
- There are three shallow aquifers that are considered sensitive to nitrate and pesticide loading.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Flooding is a major concern that impacts crop production.
- Draining, filling, and loss of wetlands continue to be a concern.
- Season long grazing on or near riparian or shoreline zones is contributing to fecal coliform in the water.
- Water conservation and water quality (potential for pesticide and nutrient contamination) are issues on irrigated cropland.
- Flooding causes scour erosion and damages to roads and bridges.
- Urban related runoff/storm water entering into the water causes a concern for nitrates.

Resource Concerns (cont.)

WATER (cont.)

- **Aquifers¹⁴** - There are eleven glacial drift aquifers located below the Western Wild Rice sub-basin. Nine of them are identified as “shallow” aquifers (Englevale, Oakes, Brampton, Milnor Channel, Bright Wood, Hankinson, Colfax, Sheyenne Delta, and West Fargo) and two as “deep” aquifers (Spiritwood and Gwinner). These aquifers are the source of water for multiple municipal and rural water users associations in southeastern North Dakota.



- **Wellhead Protection Areas¹⁵** – As of January 2003 there were 13 protection areas located in the sub-basin. They are designated to protect the municipal water.
- 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.

AIR

- Factory/industrial plant pollution is becoming a concern in urban areas.

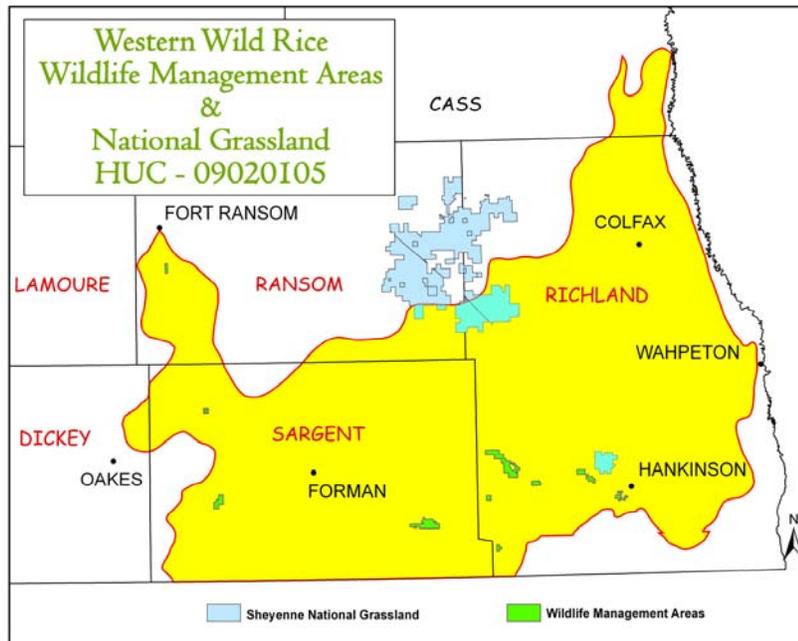
Resource Concerns (cont.)

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 and sugar beets.
- 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 which are not actively managed for timber production.
- Western Prairie Fringed Orchid is listed as a Threatened Species (see table in Animals section below)

ANIMALS

- ND Game and Fish has just over 5,800 acres of Wildlife Management Areas (see adjacent map) which are open to hunting and fishing.
- Part of the Sheyenne National Grasslands (US Forest Service) is located within the HUC.
- US Fish and Wildlife Service's Tewauckon National Wildlife Refuge (8,363 acres) is located in the HUC.



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

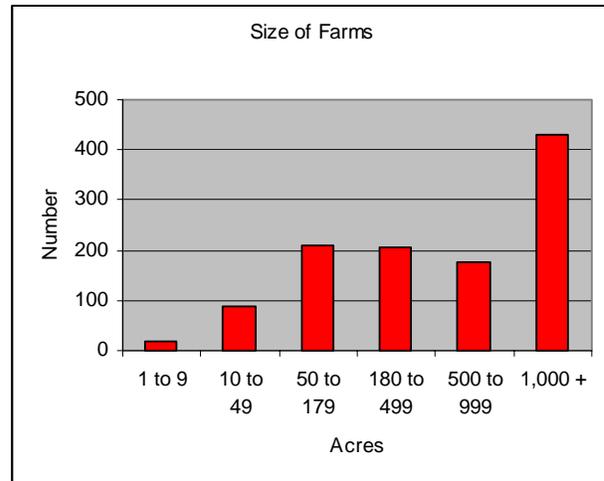
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	Gray Wolf	None
Birds	Bald Eagle	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	Dakota Skipper
Plants	Western Prairie Fringed Orchid	None	None
Critical Habitat – None			

Census and Social Data¹⁶

Number of Farms: 1,128

Number of Operators:

- Average Age: 52
- Full-Time Operators: 77%
- Part-Time Operators: 23%



Estimated Level of Willingness and Ability to Participate in Conservation:

MODERATE

Limited Resource and Beginning Farmer

Three percent of the operators are minority producers. Limited Resource Farmers are estimated at just over 3 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

- ¹ USDA-NRCS, NRI data.
- ² USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- ³ USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- ⁴ USDI-US Geologic Services, ND GAP analysis data, 2005.
- ⁵ USDA-NRCS, Natural Resources Planning Staff, 30 meter Relief Data GIS data layer, 2002.
- ⁶ ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
- ⁷ 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.
- ⁸ ND Department of Transportation, GIS Layers, 2006
- ⁹ ND Game and Fish Department, GIS Layers, 2006
- ¹⁰ ND Department of Health, Environmental Health Section, Water Quality Division, Animal Feeding Operations Program data, 2006.
- ¹¹ 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)
- ¹² USDA-NRCS, Natural Resources Planning Staff, Common Resource Area GIS data layer, 2004.
- ¹³ USDA-NRCS, Natural Resources Planning Staff, Soils Productivity GIS data layer, 2005.
- ¹⁴ ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- ¹⁵ ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
- ¹⁶ 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)