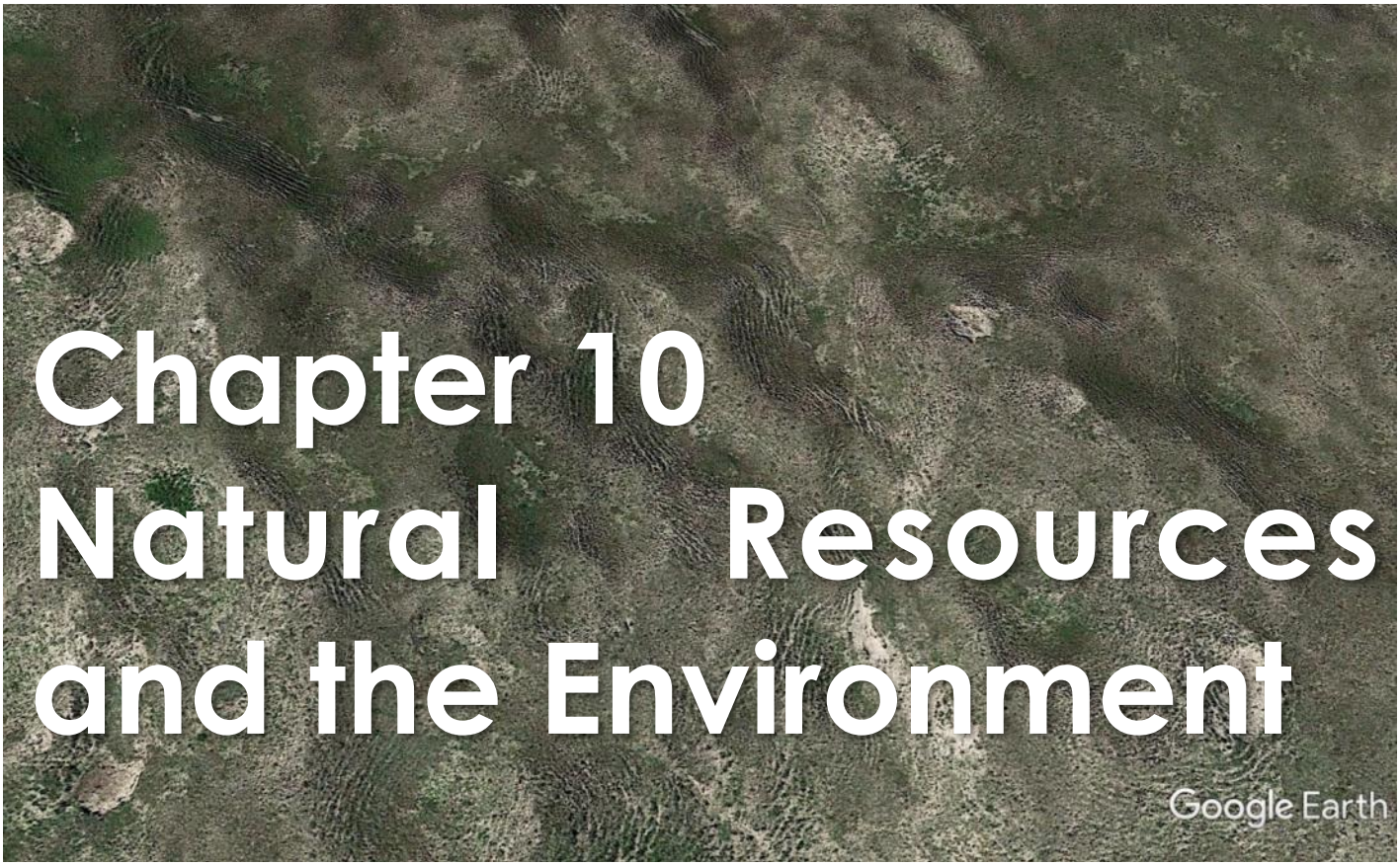


Chapter 10 Natural Resources and the Environment

Introduction

This component of the Cherry County Comprehensive Plan provides a general summary of the environmental and man-made conditions, which are present in the county, and identifies and qualifies the characteristics of each which will directly or indirectly impact future land uses in the county. Much of the information referenced is from the Cherry County Soil Survey conducted by the United States Department of Agriculture – Soil Conservation Service in 2005.

The issues discussed in this chapter include:

- Climate
- Geology
- Relief and Drainage
- Wetlands
- Soil Association
- Prime Farmland
- Soil Limitations

Natural Conditions

Climate

The climate in Cherry County is characterized by cold winters and long, hot summers. Heavy rains occur mainly in spring and early summer when moist air from the Gulf of Mexico interacts with the drier continental air. Snowfall is fairly frequent in winter, but the snow cover is usually not continuous. The annual precipitation normally is adequate for wheat, rye, and range grasses.

In winter, the average temperature is 22.3 degrees F and the average daily minimum temperature is 9.3 degrees. The lowest temperature on record, which occurred at Valentine on December 22, 1989, was -39 degrees. In summer, the average temperature is 71.6 degrees and the average daily maximum temperature is 85.8 degrees. The highest temperature, which occurred at Valentine on July 2, 1990, was 114 degrees.

The average annual precipitation is about 18.24 inches. Of this total, about 12.9 inches, or 71 percent, usually falls in May through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record was 3.76 inches at Valentine on May 29, 1949. Thunderstorms occur on about 46 days each year, and most occur between May and August.

The average seasonal snowfall is 34.1 inches. The greatest snow depth at any one time during the period of record was 22 inches, recorded on December 28, 1987. On the average, 55 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 18.4 inches, recorded on September 28, 1985.

The average relative humidity in midafternoon is about 48 percent. Humidity is higher at night, and the average at dawn is about 77 percent. The sun shines 74 percent of the time possible in summer and 62 percent in winter. The prevailing wind is from

the south during the summer and fall and from the north and west during the rest of the year. Average windspeed is highest, about 10 to 11 miles per hour, from March to May.

Geology and Groundwater

The oldest exposed rocks in Cherry County occur in the eastern Niobrara River Valley and consist of brownish to pinkish, pale orange siltstone and silty sandstone. They have been correlated by some geologists with the Rosebud Formation of South Dakota and by others with the upper part of the Brule Formation. These strata are composed predominantly of volcanically derived grains (glass shards and crystals) and were for the most part deposited by the wind. They are upper Oligocene in age (Swinehart and others, 1985).

Overlying the Brule/Rosebud Formation in a few scattered exposures along the central and western Niobrara River Valley are fine grained, silty sandstones of the Arikaree Group. These sandstones contain a lower percentage of glass shards than the Brule or Rosebud Formation and are upper Oligocene to lower Miocene in age.

Sand, sandstone, and siltstone of the Ogallala Group overlie the Brule/Rosebud Formation and Arikaree rocks along the Niobrara River Valley and elsewhere in the county. The outcroppings of the Ogallala sediments have been subdivided into two formations—the Valentine Formation and the overlying Ash Hollow Formation. Subsurface correlation of these units has been difficult. Both formations were deposited by streams in a complex set of valleys locally cut deep into underlying strata. A widespread calcium-carbonate-cemented unit, the "Cap Rock," occurs at the base of the Ash Hollow Formation. Several discrete beds of volcanic ash occur in the Ash Hollow Formation. The Ogallala Group beneath the Sandhills in the southern half of the county is fairly uniform fine and medium sand and lesser amounts of siltstone and coarse sand and gravel (Swinehart and Diffendal, 1990). The Ogallala Group is famous for its accumulation of fossil vertebrates. It is middle to upper Miocene in age.

A few exposures of Pliocene river-deposited sand and gravel occur in southeastern Cherry County. These have been correlated with the Broadwater Formation of Morrill County. Pleistocene alluvial gravel, sand, and silt are present locally along the Niobrara River Valley. The majority of Cherry County is covered by the fine and medium sand of the Nebraska Sandhills. Recent research indicates that the present dunes were formed during two or more periods of aridity and dune movement in the last 8,000 years (Ahlbrandt and others, 1983). In some interdunes, peat and windblown sand are interbedded to a depth of 25 feet (Loope and others, 1995).

The Ogallala Group of the High Plains Aquifer is the main source of ground water in the county (Cronic and others, 1956). Almost all of the water for public and domestic use and much of the water for livestock is obtained from wells. Very little water can be obtained from the Brule/ Rosebud sediments. The Arikaree Group would constitute a source if it were more extensive. The depth to water in areas of the Sandhills varies according to dune height and is generally less than 50 feet in interdune areas. In the tableland areas of the county, water depths generally range from 100 to 200 feet. The saturated thickness of the High Plains Aquifer is typically 300 to 500 feet in the southern half of the county and 100 to 300 feet in the northern half. Water is generally of good quality throughout the county. Total dissolved solids are typically less than 200 milligrams per liter, but higher concentrations are in the northeastern and northwestern parts of the county. Relatively few center-pivot irrigation systems have been installed.

Physiography, Relief, and Drainage

Cherry County is in the northern High Plains of the Great Plains physiographic province. More than 90 percent of the county is covered by sand dunes and interdunes of the prairie-covered Nebraska Sandhills, which make up about 20,000 square miles (Swinehart, 1990). The Niobrara River Valley, extending from west to east across the northern part of the county, and tablelands in the northeast corner and the extreme west-central parts of the county make up the other major landforms.

The Nebraska Sandhills is by far the largest sand dune area in North America. The sand dunes in Cherry County average about 150 to 250 feet high, 2 to 10 miles long, and one-half mile to 2 miles wide. These large dunes typically have steep south - to southeastern-facing slopes and rolling backslopes. They are separated from each other by nearly level to gently sloping interdunes. Certain areas of the Sandhills have many shallow lakes and interdunal wetlands. Some of the lakes and the interdunes surrounding them are moderately alkaline or strongly alkaline. Many interdunes have small streams, but drainage networks are poorly developed because the sandy soils allow little runoff. The Snake River, Minnechaduza Creek, and all other tributaries of the Niobrara River and the

forks of the Middle Loup River all flow in valleys cut 50 to 200 feet below the level of the interdunes. The North Loup River and its tributaries flow east and southeast. They drain much of the southeastern part of the county, and their valleys are not cut so deeply.

The Niobrara River Valley has been entrenched 150 to 350 feet, and the valley sides are steep and very steep. Sandy alluvial bottom land makes up only a small part of the valley. The valley is steepest in western Cherry County, where a 10-mile region of incised meanders has formed. Remnants of a prominent high terrace underlain by deep, loamy and sandy soils occur along portions of the Niobrara River Valley. Rivers and streams within the county have quite constant flows because they are fed primarily by ground water and receive little runoff. The high tablelands in the northeastern and extreme west central parts of the county are underlain by sandstone and are capped by loamy and sandy soils. These tablelands are among the few areas that contribute significant runoff to streams and rivers.

WETLANDS

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods during the year, including during the growing season. Water saturation (hydrology) largely determines the soil development and the types of plant and animal communities living in and on the soil.

Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions favoring the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils. Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance. Two general categories of wetlands are recognized: coastal or tidal wetlands and inland or non-tidal wetlands.

Inland wetlands spread across the entire county in the form of Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetlands. Inland wetlands include marshes and wet meadows dominated by herbaceous plants, swamps dominated by shrubs, and wooded swamps dominated by trees.

Many of these wetlands are seasonal (dry one or more seasons every year). The quantity of water present and the timing of its presence in part determine the functions of a wetland and its role in the environment. Wetlands can appear dry, at times, for significant parts of the year - such as vernal pools – and still provide habitat for wildlife adapted to breeding exclusively in these areas.

The federal government can regulate some wetlands under the Clean Water Act, depending on how "navigable waters" is defined. The Act gives the federal government the ability to regulate navigable waters, and the definition of this has been expanded and limited several times by courts and administrations, making what qualifies as wetlands as clear as mud.

What is clear, however, is that some of the measures used to protect wetlands, such as the Natural Resource Conservation Agencies wetlands reserve easement program, have significantly devalued the land. The Department of Revenue has found that wetland reserve easements has reduce the property value in some Nebraska counties by 40 percent.

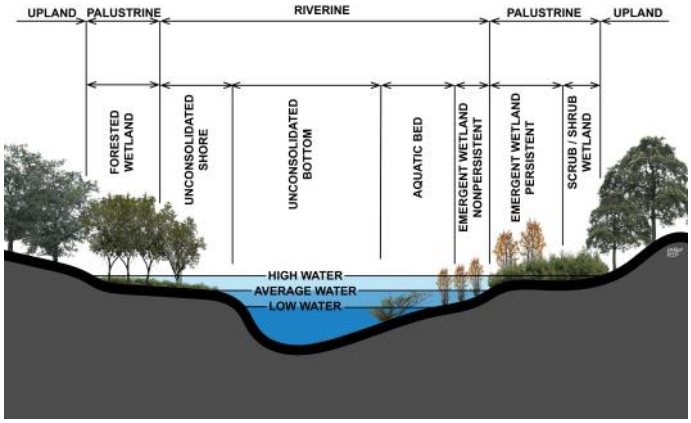
Because wetlands play an important role in the ecology of Cherry County, the county supports continued state oversight of these waters, and opposes federal overreach into the long-term conservation of these resources. Wetlands are home to many species of wildlife, and provide an important service to nearby areas by holding and retaining floodwaters. These waters are then slowly released as surface water, or are used to recharge groundwater supplies. Wetlands also help regulate stream flows during dry periods. The counties policies must be coordinated with all entities attempting to regulate wetlands within the counties jurisdiction to ensure these important functions are properly considered.

The U.S. Fish and Wildlife Service (FWS) tracks the characteristics, extent, and status of the Nation's wetlands and deep-water habitats. This information has been compiled and organized into the National Wetlands Inventory (NWI).

According to this database, Cherry County has the three wetland systems of estuarine, riverine, and lacustrine. The majority of the wetlands in the county occur, mostly along the Niobrara River and as meadow areas (mostly around the Wood Lake are). However, there are smaller wetland pockets scattered throughout Cherry County.

Figures 10.1, 10.2, and 10.3 depict common examples of the riverine, lacustrine, and palustrine wetlands, respectively. Figure 10.4 shows the occurrence of wetlands in Cherry County. These figures were produced by the United States Fish and Wildlife Service, and are taken from their 1979 publication entitled "Classification of Wetlands and Deepwater Habitats of the United States", some enhancement was completed in order to place accents on key areas.

Figure 10.1: Riverine Wetland System



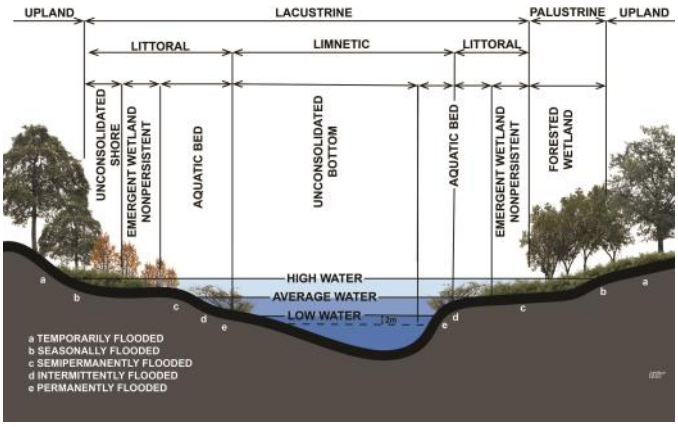
Source: National Wetlands Inventory

Figure 10.1 shows the riverine system includes all wetlands occurring in channels, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.5%. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water. Therefore, water is usually, but not always, flowing in the riverine system.

Springs discharging into a channel are also part of the riverine system. Uplands and palustrine wetlands may occur in the channel, but are not included in the riverine system. Palustrine Moss-Lichen Wetlands, Emergent Wetlands, Scrub-Shrub Wetlands, and Forested Wetlands may occur adjacent to the riverine system, often in a floodplain.

The Lacustrine System includes wetlands with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent moss or lichens with greater than 30% area coverage; and (3) total area exceeds 20 acres. Similar wetland areas totaling less than 20 acres are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 6.6 feet (2 meters) at low water.

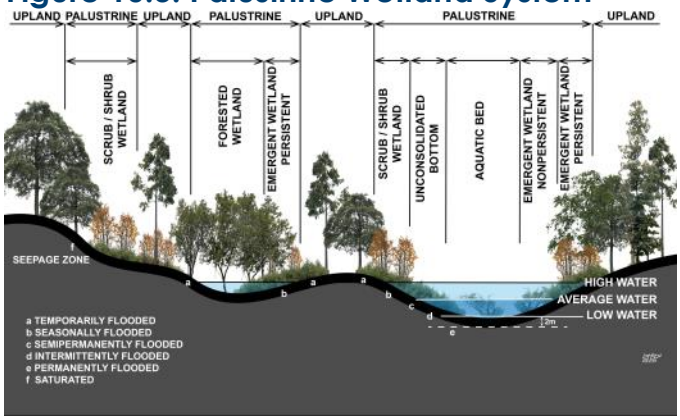
Figure 10.2: Lacustrine Wetland System



Source: National Wetlands Inventory

The Lacustrine System includes permanently flooded lakes and reservoirs (e.g. Lake Superior), intermittent lakes (e.g. playa lakes), and tidal lakes with ocean-derived salinities below 0.5% (e.g. Grand lake, Louisiana). Typically, there are extensive areas of deep water and there is considerable wave action. Islands of Palustrine wetlands may lie within the boundaries of the Lacustrine System.

Figure 10.3: Palustrine Wetland System



Source: National Wetlands Inventory

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than

20 acres; (2) lacking active wave-formed or bedrock shoreline features; (3) water depth in the deepest part of basin less than 6.6 feet (2 meters) at low water; and (4) salinity due to ocean-derived salts less than 0.5%.

The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent, or intermittent water bodies often called ponds. These wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers.

Wetlands play an important role in the ecology of Cherry County. Wetlands are home to many species of wildlife, many of which live only in wetland areas. Wetlands also provide an important service to nearby areas by holding and retaining floodwaters. These waters are then slowly released as surface water, or are used to recharge groundwater supplies. Wetlands also help regulate stream flows during dry periods.

The U.S. Fish and Wildlife Service (FWS) produce information on the characteristics, extent, and status of the Nation's wetlands and deep-water habitats. This information has been compiled and organized into the National Wetlands Inventory (NWI).

Wetlands are categorized in several classifications, each more detailed and specific than the previous. The NWI uses five systems; marine, estuarine, riverine, lacustrine, and palustrine. Within each system, there are subsystems, classes, subclasses, and dominance types to describe different wetland characteristics. The system classification refers to wetlands sharing similar hydrologic, geomorphologic, chemical, or biological factors. The following are definitions and examples of three of the five systems used to describe wetlands. The Marine and Estuarine wetland systems are located in and near the open ocean; therefore, they do not occur in Nebraska. Further information, through NWI, on specific classifications is available.

Cherry County experiences each of these three other wetland systems. The majority of the wetlands in the county occur, mostly along the Niobrara River and as meadow areas (mostly around the Wood Lake are). However, there are smaller wetland pockets scattered throughout Cherry County.

Figures 10.1, 10.2, and 10.3 depict common examples of the riverine, lacustrine, and palustrine wetlands, respectively. Figure 10.4 shows the occurrence of wetlands in Cherry County. These figures were produced by the United States Fish and Wildlife Service, and are taken from their 1979 publication entitled "Classification of Wetlands and Deepwater Habitats of the United States", some enhancement was completed in order to place accents on key areas.

Figure 10.1 shows the riverine system includes all wetlands occurring in channels, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.5%. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water. Therefore, water is usually, but not always, flowing in the riverine system.

Springs discharging into a channel are also part of the riverine system. Uplands and palustrine wetlands may occur in the channel, but are not included in the riverine system. Palustrine Moss-Lichen Wetlands, Emergent Wetlands, Scrub-Shrub Wetlands, and Forested Wetlands may occur adjacent to the riverine system, often in a floodplain.

The Lacustrine System includes all wetlands with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent moss or lichens with greater than 30% area coverage; and (3) total area exceeds 20 acres. Similar wetland areas totaling less than 20 acres are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 6.6 feet (2 meters) at low water.

The Lacustrine System includes permanently flooded lakes and reservoirs (e.g. Lake Superior), intermittent lakes (e.g. playa lakes), and tidal lakes with ocean-derived salinities below 0.5% (e.g. Grand lake, Louisiana). Typically, there are extensive areas of deep water and there is considerable wave action. Islands of Palustrine wetlands may lie within the boundaries of the Lacustrine System.

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The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent, or intermittent water bodies often called ponds. These wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers.

Water Quality, Riparian Areas, and Wetlands and Best Management Practices

Best Management Practices are a practice or combination of practices determined to be the most effective and practicable means of preventing or reducing the amount of pollution generated by non-point sources. In the absence of State of Nebraska or NRD approved BMPs, non-point source activities are to be conducted in a manner that demonstrates a knowledgeable and reasonable effort to minimize resulting adverse water quality impacts. "Knowledgeable" is herein interpreted to mean, based upon the best available science and "reasonable" is interpreted to mean, economically feasible for the agriculture operation(s) involved.

There is a vast diversity of riparian, groundwater and wetland areas in Cherry County, in terms of waterway or impoundment types, climatic factors, up and down stream watershed impacts, condition, trend, potential for improvement, and opportunity for management changes.

NATIONAL WILD AND SCENIC RIVER SYSTEMS

The National Wild and Scenic Rivers Act, 16 U.S.C. §§1271-1287, provides the guidance for identification and designation of individual river segments for study and for recommendation for inclusion in the system in order to provide balance with Dams (development) and to provide unique representation within the national system.

Section 1271 called for protection of "certain selected rivers of the Nation, which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values." Among those "certain selected rivers" there are now in Cherry County some rivers, which have either been included in the system or proposed for inclusion as "outstandingly remarkable" rivers.

The Cherry County Board is satisfied there is no further need for including any other segments of rivers or tributaries within Cherry County in the national system and there are no others which meet the standards set by Section 1271.

Based upon inaction by Congress to further act on the additional areas, the remaining areas, if not already done, should be released from the designated program. Based upon 16 U.S.C. §1283...the section shall not be "construed to abrogate any existing rights, privileges, or contracts affecting Federal lands held by any private party without the consent of said party.

Soil Formation and Classification

Cherry County has over 100 different soil types scattered throughout the county. Some of these soils are similar; however, many are completely different from one another. The 2005 Cherry County Soil Survey identify key aspects of each soil. A summary of these soil qualities is included in Appendix A. [Recommend placing the soil quality detail from this chapter in an appendix. Have deleted this information here for readability.]

Other Factors Impacting Land Uses

The previously discussed uses are typical to counties similar to Cherry County. Earlier in this Chapter, the issue of wetlands was covered in some detail and is very closely associated with surface and groundwater. The following topics are greatly influenced by the type of soil and its location in an area. The following paragraphs will focus on Prime Farmland and Percent of Slope.

Prime Farmland

Prime farmland is directly tied to the specific soils and their composition. The map in Figure 10.** identifies Prime Farmland, Prime Farmland if

CHERRY COUNTY, NEBRASKA

COMPREHENSIVE PLAN

NATIONAL WETLANDS INVENTORY

Legend

- Municipality
- Township/Range
- County Boundary
- US Highway
- State/County Highway
- Local Road

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

MARVIN PLANNING CONSULTANTS
Specializing in Municipal, County and Neighborhood Planning

PROJECTION: NE State Plane (Ft.)
DATUM: NAD 83
DATE: 03.08.2020

0 3.5 7 14 Miles

1" = 7 miles

CHERRY COUNTY, NEBRASKA

COMPREHENSIVE PLAN

SOILS - PRIME FARMLAND

Legend

- Municipality
- Township/Range
- County Boundary
- US Highway
- State/County Highway
- Local Road

Soils - Prime Farmland

- Farmland of Statewide Importance
- Prime Farmland if Irrigated
- Prime Farmland if Drained
- Not prime farmland

Merriman
Cody
Nenzel
Kilgore
Crookston
Valentine
Wood Lake
Thomas
SOUTH DAKOTA
Middle Loup River
Cherry
Brown
Sheridan

MARVIN PLANNING CONSULTANTS
Specializing in Municipal, County and Neighborhood Planning

PROJECTION: NE State Plane (Ft.)
DATUM: NAD 83
DATE: 03.08.2020

N

0 3.5 7 14 Miles

1 " = 7 miles

Drained, Farmland of Statewide Importance, and Not Prime Farmland.

According to the USDA, Prime farmland

> *"...is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It must also be available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding."*

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland soils if the limitations or hazards are overcome by drainage, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland can be obtained at the local office of the Soil Conservation Service.

Cherry County contains approximately 3,845,903 acres of land within the county borders. The Prime Farmland found in the county is in two forms: Farmland of Statewide Importance and Prime Farmland, if drained.

Figure 10.** shows the locations of the Prime Farmland within Cherry County. However, the amount of these two classifications are very limited. Farmland of Statewide Importance makes up a total of 20,725.4 acres or 0.54% of the total county; while Prime, if drained had 47,307.7 acres or 1.23% of the entire county. All together, Prime Farmland makes up only 1.77% of Cherry County.

Soils determined to be prime farmland need to be protected throughout the rural areas of Nebraska. These soils are typically the best crop producing lands.

Percent of Slope

The slope of an area is critical to the ability of the area to be used for agricultural purposes to constructing homes and septic systems. Typically the steeper the slope the more difficult these issues become. However, lands with little to no slope can also create problems regarding the inability of water to drain away from a site.

TABLE 10.1: DEFINTION OF SOIL SLOPES

Classes Simple Slopes	Complex Slopes	Slope Gradient Limits	
		Lower Percent	Upper Percent
Nearly level	Nearly level	0	3
Gently sloping	Undulating	1	8
Strongly sloping	Rolling	4	16
Moderately sloping	Hilly	10	30
Steep	Steep	20	60
Very steep	Very steep	>45	

Figure A10.13 (Appendices) shows the percent slope for Cherry County. Based upon the map, Cherry County has steep slopes in limited locations of the county throughout the entire county; however, some of the steepest are in the northeast along the Niobrara River.

Based upon Table 10.* slope is a factor in several soils/locations in the county. In a number of situations, any soil conditions based upon slope could likely be engineered to become more compatible. However, it is important to involve an engineer, geologist, or soil scientist in the issue in order to make the correct modifications throughout the county.

Permeability

Permeability is defined in the Cherry County Soil Survey as..."The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through saturated soils." Permeability is rated as:

Very slow	less than 0.06 inches
Slow	0.06 to 0.20 inches
Moderately slow	0.2 to 0.6 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Table 10.2 indicates the various permeability rates for each soil and at what depth the rating was taken. The Table indicates those considered to moderately rapid or higher in red. There are a number of soils in Cherry County with a permeability of twenty inches per hour or more.

There are a number of specific uses not compatible for soils rated as Moderately rapid or higher. Soils rated at these levels will move contaminated materials much faster through the profile and into the regional water tables and aquifers. These uses will typically include anything dealing with animal or human sanitary waste systems.

Permeability, as with other soil factors, can be overcome with the proper engineering and construction techniques. Caution is a must when dealing with these conditions since the potential for contaminating an aquifer that feeds an entire area with water is a risk.

WATER IMPACT ON CHERRY COUNTY

Water, along with the soils are the two most restricting environmental conditions faced by Cherry County. Damaging either one of these two elements will impact the residents of the county for years to come. As with the soil descriptions and conditions, it is important to discuss the water factors impacting Cherry County during the present and coming planning period. Water in this section will apply to two topics, surface water and ground water.

Surface water applies to any water running across a surface and eventually runs into a minor drainage area, eventually ending up in a major waterway such as the Niobrara River. However, a certain portion of surface water can and is absorbed by the soil in order to support plant life including corn, soybeans, and grass lawns.

Cherry County lies in two distinct watersheds, these are defined and drainage areas controlled by the respective Natural Resource District. The two districts covering Cherry County are the Middle Niobrara Natural Resource District and the Upper Loup Natural Resource District. The Middle Niobrara is based in Valentine, Nebraska, while the Upper Loup is in Thedford, Nebraska.

TABLE 10.2: PERMEABILITY/SHRINK-SWELL BY SOIL TYPE

Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
4201	Almeria	0-7 7-79	2-6 6-20	Low Low
4203	Almeria	0-3 3-6 6-60	.6-6 .6-6 6-20	- Low Low
4205	Almeria	0-10 10-12 12-24 24-79	6-20 6-20 6-20 6-20	Low Low Low Low
9001	Anselmo	0-11 11-44 44-79	2-6 2-6 6-20	Low Low Low
9004	Anselmo	0-11 11-44 44-79	2-6 2-6 6-20	Low Low Low
9006	Anselmo	0-11 11-44 44-79	2-6 2-6 6-20	Low Low Low
9012	Anselmo	0-11 11-36 36-79	6-20 2-6 6-20	Low Low Low
9013	Anselmo	0-11 11-36 36-79	6-20 2-6 6-20	Low Low Low
9019	Anselmo Longpine	0-6 6-12 12-34 34-60 0-4 4-12 12-60	.6-6 2-6 2-6 6-20 2-6 2-6 1.42-14.17	Low Low Low Low Low Low -
4221	Bolent	0-4 4-60	2-6 6-20	Low Low
4224	Bolent	0-5 5-60	6-20 6-20	Low Low
4226	Bolent Almeria	0-5 5-25 25-79 0-2 2-4 4-79	6-20 6-20 6-20 6-20 .6-2 6-20	Low Low Low Low Low Low
4228	Bolent Calamus	0-4 4-60 0-9 9-38 38-60	6-20 6-20 6-20 6-20 6-20	Low Low Low Low Low
5121	Busher	0-16 16-45 45-60	2-6 2-6 1.42-14.17	Low Low -
5141	Busher Tassel	0-18 18-42 42-60 0-4 4-15 15-60	2-6 2-6 1.42-14.17 2-6 2-6 .2-2	Low Low - Low Low -
4231	Calamus	0-4 4-30 30-60	6-20 6-20 6-20	Low Low Low
4233	Calamus	0-9 9-38 38-60	6-20 6-20 6-20	Low Low Low
4237	Calamus Bolent	0-4 4-39 39-79 0-7 7-25 25-79	6-20 6-20 6-20 6-20 6-20 6-20	Low Low Low Low Low Low

Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
4455	Crowther	0-11 11-26 26-79	.6-2 .6-2 6-20	Moderate High Low
4456	Crowther	0-3 3-24 24-36 36-79	6-20 .6-2 .6-2 6-20	Low Moderate Moderate Low
4462	Cullison	0-8 8-24 24-79	.6-2 .6-2 .6-2	Moderate Moderate Moderate
4463	Cullison	0-2 2-27 27-79	6-20 .6-6 .6-6	Low Moderate Moderate
4467	Cutcomb	0-52 52-79	6-20 6-20	Low Low
4470	Doughboy	0-19 19-38 38-79	2-20 .6-6 .6-6	Low Low Low
4471	Doughboy	0-14 14-37	6-20 .6-6	Low Low
4476	Duda Fishberry	0-8 8-36 36-79 0-5 5-12 12-79	2-20 2-20 1.42-14.17 6-20 6-20 1.42-14.17	Low Low - Low Low -
4485	Dunday	0-18 18-25 25-79	6-20 6-20 6-20	Low Low Low
4490	Dunday	0-18 18-25	6-20 6-20	Low Low
4521	Els	0-6 6-35	6-20 6-20	Low Low
4536	Els Hoffland	0-9 9-37 37-79 0-1 1-9 9-79	6-20 6-20 6-20 6-20 2-20 6-20	Low Low Low - Low Low
4540	Els Selia	0-5 5-40 40-60 0-6 6-14 14-60	6-20 6-20 6-20 6-20 .06-.2 6-20	Low Low Low Low Low Low
4545	Els Ipage	0-6 6-35 35-79 0-4 4-15 15-38	6-20 6-20 6-20 6-20 6-20 6-20	Low Low Low Low Low Low
4553	Elsmere	0-14 14-23	6-20 6-20	Low Low
4556	Elsmere	0-8 8-14 14-79	6-20 6-20 6-20	Low Low Low
4561	Elsmere Loup	0-14 14-23 23-79 0-10 10-15 15-79	6-20 6-20 6-20 2-20 6-20 6-20	Low Low Low Low Low Low
4563	Els Tryon	0-6 6-16 16-79 0-7 7-25 25-79	6-20 6-20 6-20 6-20 6-20 6-20	Low Low Low Low Low Low
3351	Fishberry	0-4 4-15 15-60	2-6 6-20 1.42-14.17	Low Low -

TABLE 10.2: PERMEABILITY/SHRINK-SWELL BY SOIL TYPE

Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
3352	Fishberry	0-5	2-6	Low
		5-12	6-20	Low
		12-60	1.42-14.17	-
	Duda	0-4	2-20	Low
		4-24	2-20	Low
		24-60	1.42-20	-
3353	Fishberry	0-5	2-6	Low
		5-12	6-20	Low
		12-60	1.42-14.17	-
	Rock	0-60	.01-.15	-
9903	Fluvaquents	0-2	6-20	Low
		2-79	20-100	Low
4576	Gannett	0-10	.6-2	Moderate
		10-22	2-6	Low
		22-79	6-20	Low
4579	Gannett	0-2	6-20	Low
		2-10	.6-6	Moderate
		10-32	2-20	Low
		32-79	6-20	Low
4590	Gus	0-1	.6-2	-
		1-6	.6-2	Moderate
		6-28	.6-2	Moderate
		28-60	.6-2	Moderate
4591	Gus	0-2	6-20	-
		2-5	.6-6	Moderate
		5-36	.6-6	Moderate
		36-79	.6-6	High
3167	Hennings	0-7	.6-6	Low
		7-27	.6-2	Moderate
		27-36	.6-6	Low
		36-55	2-20	Low
		55-60	1.42-14.17	-
4596	Hennings	0-7	.6-6	Low
		7-27	.6-2	Moderate
		27-36	.6-6	Low
		36-55	2-20	Low
		55-60	1.42-14.17	-
4597	Hennings	0-7	.6-6	Low
		7-27	.6-2	Moderate
		27-36	.6-6	Low
		36-55	2-20	Low
		55-60	1.42-14.17	-
4598	Hennings	0-8	.6-6	Low
		8-22	.6-2	Moderate
		22-26	.6-6	Low
		26-42	2-20	Low
		42-60	1.42-14.17	-
	Anselmo	0-10	.6-6	Low
		10-18	2-6	Low
		18-26	2-6	Low
		26-60	6-20	Low
4635	Hoffland	0-1	6-20	-
		1-9	2-20	Low
		9-79	6-20	Low
4636	Hoffland	0-1	6-20	-
		1-9	2-20	Low
		9-79	6-20	Low
3170	Holt	0-7	2-6	Low
		7-17	.6-2	Low
		17-22	.6-2	Low
		22-42	.2-2	-
3172	Holt	0-7	2-6	Low
		7-17	.6-2	Low
		17-22	.6-2	Low
		22-42	.2-2	-
	Longpine	0-6	2-6	Low
		6-16	2-6	Low
		16-36	.2-2	-
4641	Ipage	0-4	6-20	Low
		4-15	6-20	Low
		15-38	6-20	Low
		38-79	6-20	Low
4643	Ipage	0-4	6-20	Low
		4-40	6-20	Low
		40-79	6-20	Low
4646	Ipage	0-5	6-20	Low
		5-11	6-20	Low
		11-22	6-20	Low
		22-79	6-20	Low
4655	Ipage	0-4	6-20	Low
		4-15	6-20	Low
		15-38	6-20	Low
		38-79	6-20	Low
	Tryon	0-7	6-20	Low
		7-25	6-20	Low
		25-79	6-20	Low
3180	Jensen	0-6	2-6	Low
		6-35	.6-2	Moderate
		35-60	20-100	Low
5188	Keya	0-22	.6-2	Low
		22-42	.6-2	Moderate
		42-79	.6-2	Low
4370	Libory	0-18	6-20	Low
		18-57	2-20	Low
		57-79	2-20	Low
1661	Lodgepole	0-6	.6-2	Low
		6-41	.06-.2	High
		41-60	.6-2	Low
4662	Loup	0-10	2-20	Low
		10-15	6-20	Low
		15-79	6-20	Low
4670	Loup	0-3	6-20	-
		3-14	2-20	Low
		14-79	6-20	Low
4691	Marlake	0-2	6-20	-
		2-9	2-20	Low
		9-16	6-20	Low
		16-79	6-20	Low
4700	McKelvie	0-6	6-20	Low
		6-10	6-20	Low
		10-79	6-20	Low
4701	McKelvie	0-6	6-20	Low
		6-10	6-20	Low
		10-79	6-20	Low
4702	McKelvie	0-6	6-20	Low
		6-10	6-20	Low
		10-79	6-20	Low
4703	McKelvie	0-6	6-20	Low
		6-10	6-20	Low
		10-79	6-20	Low
	Fishberry	0-5	6-20	Low
		5-15	6-20	Low
		15-79	0-.06	-
4704	McKelvie	0-6	6-20	Low
		6-36	6-20	Low
		36-79	6-20	Low
	Fishberry-Rock	0-5	6-20	Low
		5-15	6-20	Low
		15-79	0-.06	-
		0-79	0	-
4705	McKelvie-Rock	0-6	6-20	Low
		6-36	6-20	Low
		36-79	6-20	Low
		0-79	0	-
4707	McKelvie	0-6	6-20	Low
		6-36	6-20	Low
		36-60	6-20	Low
	Ustorthents	0-11	6-20	Low
		11-60	2-6	Low
3249	Meadin	0-5	2-6	Low
		5-14	6-20	Low
		14-60	20-100	Low
3251	Meadin	0-6	2-6	Low
		6-11	6-20	Low

TABLE 10.2: PERMEABILITY/SHRINK-SWELL BY SOIL TYPE

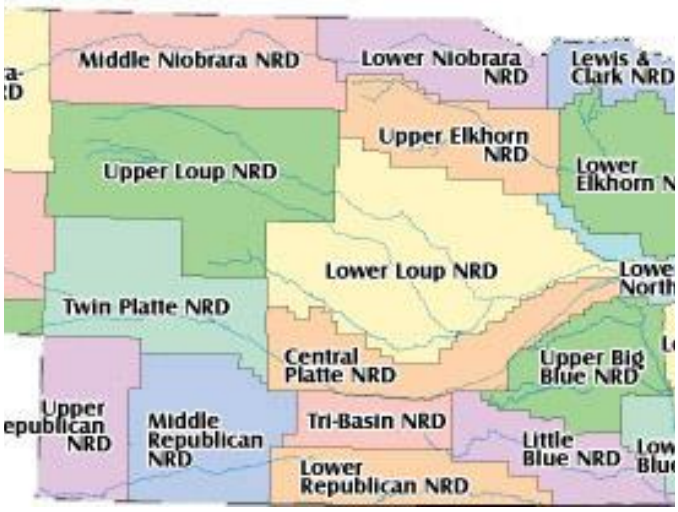
Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
4390	Natick	0-5	6-20	Low
		5-11	6-20	Low
		11-22	6-20	Low
		22-79	6-20	Low
4712	Nenzel	0-18	6-20	Low
		18-33	6-20	Low
		33-79	6-20	Low
4711	Nenzel	0-14	6-20	Low
		14-21	6-20	Low
		21-30	6-20	Low
		30-79	6-20	Low
4243	Ord	0-14	.6-2	Low
		14-34	2-6	Low
		34-60	6-20	Low
4713	Orpha	0-5	6-20	Low
		5-44	6-20	Low
		44-60	6-20	Low
4717	Orpha	0-8	6-20	Low
		8-14	6-20	Low
		14-60	6-20	Low
	Niobrara	0-6	6-20	Low
		6-13	6-20	Low
		13-60	1.42-14.17	-
4718	Orpha	0-6	6-20	Low
		6-26	6-20	Low
		26-60	6-20	Low
	Rock	0-60	.01-.15	-
4720	Pivot	0-5	6-20	Low
		5-11	6-20	Low
		11-28	6-20	Low
		28-60	20-100	Low
4730	Sandrose	0-10	6-20	Low
		10-32	6-20	Low
		32-48	.6-2	Moderate
		48-60	.6-6	Low
4733	Sandrose	0-16	6-20	Low
		16-30	6-20	Low
		30-48	.6-2	Moderate
		48-60	.6-6	Low
	Hennings	0-17	6-20	Low
		17-29	.6-2	Moderate
		29-35	.6-6	Low
		35-55	2-20	Low
		55-60	1.42-14.17	-
4734	Sandrose	0-16	6-20	Low
		16-30	6-20	Low
		30-48	.6-2	Moderate
		48-60	.6-6	Low
	Hennings	0-17	6-20	Low
		17-29	.6-2	Moderate
		29-35	.6-6	Low
		35-55	2-20	Low
		55-60	1.42-14.17	-
4735	Sandrose	0-16	6-20	Low
		16-30	6-20	Low
		30-48	.6-2	Moderate
		48-60	.6-6	Low
	Hennings	0-17	6-20	Low
		17-29	.6-2	Low
		29-35	.6-6	Moderate
		35-55	2-20	Low
		55-60	1.42	Low
			14.17	-
1809	Satanta	0-13	2-6	Low
		13-46	.6-2	Low
		46-79	2-6	Low
8929	Simeon	0-5	6-20	Low
		5-79	6-20	Low
8939	Simeon	0-5	6-20	Low
		5-79	6-20	Low
	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
8941	Simeon	0-5	6-20	Low
		5-79	6-20	Low
	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
4740	Tryon	0-7	6-20	Low
		7-25	6-20	Low
		25-79	6-20	Low
4743	Tryon	0-4	2-6	Low
		4-79	6-20	Low

Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
5266	Tuthill	0-8	.6-6	Low
		8-23	.6-2	Moderate
		23-50	6-20	Low
		50-60	6-20	Low
5267	Tuthill	0-8	.6-6	Low
		8-23	.6-2	Moderate
		23-50	6-20	Low
		50-60	6-20	Low
4781	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
4791	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
4800	Valentine	0-4	6-20	Low
		4-20	6-20	Low
		20-79	6-20	Low
4810	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
4807	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
4814	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
4818	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
4450	Valentine	0-79	6-20	Low
		0-4	6-20	Low
		4-20	6-20	Low
		20-79	6-20	Low
4851	Valentine	0-4	6-20	Low
		4-20	6-20	Low
		20-79	6-20	Low
	Birdwood	0-6	.6-6	Low
		6-36	2-20	Low
		36-79	2-20	Low
4856	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
	Duda	0-8	2-20	Low
		8-36	2-20	Low
		36-79	1.42-14.17	Low
4870	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
	Duda	0-8	2-20	Low
		8-36	2-20	Low
		36-79	1.42-14.17	-
4875	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
	Dunday	0-18	6-20	Low
		18-25	6-20	Low
		25-79	6-20	Low
4861	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
	Els	0-6	6-20	Low
		6-35	6-20	Low
		35-79	6-20	Low
4867	Valentine	0-5	6-20	Low
		5-12	6-20	Low
		12-79	6-20	Low
	Libory	0-18	6-20	Low
		18-57	.6-6	Low
		57-79	.6-6	Low
4771	Valentine	0-7	6-20	Low
		7-14	6-20	Low
		14-79	6-20	Low
	Mullen	0-19	6-20	Low
		19-37	6-20	Low
		37-58	.6-6	Low
		58-79	.6-6	Low

Table 10.2: Permeability/Shrink-Swell by Soil Type Cont.

Soil Symbol/Soil Name		Depth (inches)	Permeability (inches/hour)	Shrink-Swell potential
4872	Valentine	0-6	6-20	Low
		6-60	6-20	Low
	Sandrose	0-11	6-20	Low
		11-22	6-20	Low
		22-41	.6-2	Moderate
		41-60	.6-6	Low
4889	Valentine	0-5	6-20	Low
		5-12	6-20	Low
	Tryon	12-79	6-20	Low
		0-7	6-20	Low
		7-79	6-20	Low
5281	Vetal	0-7	2-6	Low
		7-23	2-6	Low
		23-48	2-6	Low
		48-79	6-20	Low
5288	Vetal	0-25	6-20	Low
		25-42	2-6	Low
		42-79	6-20	Low
4894	Wildhorse	0-6	6-20	Low
		6-11	6-20	Low
		11-22	6-20	Low
		22-79	6-20	Low

Figure 10.3: Natural Resource Districts



Groundwater/Water Table Elevations

Groundwater refers to water found beneath the surface and includes smaller pockets of water as well as aquifers. This water source is where the residents of Cherry County both city and rural, get their potable water for everyday living as well as the irrigation water for crops. The ability to find water meeting these specific needs is critical to the placement of certain

Irrigated and Intensive agriculture, including row crops, are critical to the economic base of the County and are important to the economic stability of the County. The Nebraska legislature has recognized that importance in Nebraska statute, §23-114.04 [statutory reference corrected from original document].

Irrigation wells in Cherry County are very limited for two reasons: the typical depth to water and the type of soils are not conducive to crops like corn, soybeans, etc. The main location for irrigation wells in Cherry County are in the northern areas near the Niobrara River.

Domestic and Livestock supplies

Typically domestic and most livestock water supplies are obtained through the use of small diameter wells. Most of these wells are drilled only a few feet below the top of the water table, are low production wells, and equipped with electric powered jet or submersible pumps. The water yield of this type of well is usually no more than five gallons of water per minute.

Public Water Supplies

The public water supply is one of the most critical uses of groundwater resources. These supplies are used by the municipalities supplying water to its residents. In Cherry County, all of the incorporated communities have a publicly owned water supply system.

The State of Nebraska places a great deal of value on these systems across the state. The value is so high that a Wellhead Protection Program is available to municipalities through Nebraska Department of Environment and Energy. This program allows the municipalities, after a series of prescribed steps are completed, to designate special areas around their wells and well fields in order to protect the quality and quantity of the water within the underlying aquifers. Development of a community wellhead protection plan can help communities receive financial assistance to protect and secure the source of drinking water for the community.

Water Rights

General Rights

Nebraska water resources play a major role in the state's heritage and economy. Beginning with the state constitution, Nebraska surface waters have been governed by the Appropriative First-in-Time, First-in-Right Rule which allows diversion of water from the surface waters of the state based upon the date the water right was obtained. (Source: water.unl.edu/article/agricultural-irrigation/regulations-policies)

Correlative Water Rights for Groundwater

Correlative Rights govern the use of Nebraska ground waters. Correlative Rights allow land owners to drill wells and extract groundwater from an underlying aquifer for beneficial purposes subject to management by the public. In 1957 the Unicameral passed legislation requiring the registration of all irrigation wells.

To execute this right, land owners now must first obtain a permit to drill a well from their local Natural Resources District. If approved, the well permit allows the land owner to drill a well and extract as much groundwater as needed as long as the use is deemed beneficial. When the well development is completed the well permit is registered with the NDNR which places the information in a statewide data base. (Source: water.unl.edu/article/agricultural-irrigation/regulations-policies)

All rules and regulations governing the use of groundwater and surface water are found listed in, "State of Nebraska, Department of Natural Resources, Ground Water, Chapter 42, Article 2 and Article 6". These chapters and articles establish the nature of water rights as rights of reality, define the process by which such rights are acquired, protect such vested rights and establish the Nebraska Department of Water Resources as the control agency regarding surface and ground water.

Wellhead Protection

A Wellhead Protection Area is a delineated area indicating where a water source is located, as well as the area of travel for a specific well or well field. A wellhead protection area is important from the aspect that correctly implemented, the area will aid in protecting the water supply of a domestic well providing potable water to a community.

In Nebraska, the goal of the Nebraska Department of Environment and Energy Wellhead Protection Program "...is to protect the land and groundwater surrounding public drinking water supply wells from Contamination". Within the NDEE's program there are five steps to developing a wellhead protection area, which are:

1. Delineation
2. Contamination Source Inventory
3. Contaminant Source Management
4. Emergency, Contingency, and Long-term Planning
5. Public Education

The mapping process includes the use of computer modeling and other data. From this the NDEE can generate a map indicating the wellhead Protection Area. However, delineating an area is not sufficient for protecting the groundwater around a public supply well, the governmental entity must adopt an ordinance in order to enforce the area and the regulations used to protect this water supply. Another way to officially regulate a wellhead protection area is for the community to create an interlocal agreement with the County to regulate these areas as part of the county comprehensive plan and zoning regulations.

Hydric Soils

Hydric soils are formed under conditions of saturation, flooding, or ponding. The process has to occur long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils along with hydrophytic vegetation and wetland hydrology are used to define wetlands. (USDA/NRCS, Fall 1996)

Figure 10.4 indicates where the hydric soils are located in Cherry County. The soils are classified as the following:

- All Hydric; or
- Not Hydric

The majority of the soils in Cherry County are considered Not Hydric. Overall, a small amount of soils are considered as 100% Hydric or All Hydric.

Floodways and Floodplains

Flooding is the temporary covering of the soil surface by flowing water from any source, such as streams and rivers overflowing their banks, runoff from adjacent or surrounding slopes, or a combination of different sources. During a flooding event there are a number of components that make up the flooded area. These areas include:

Floodway which is the channel of a watercourse and those portions of the adjoining floodplains which are required to carry and discharge the 100-year flood with no significant increase in the base flood elevation.

Floodplain which is the low land near a watercourse which has been or may be covered by water from flood of 100-year frequency, as established by engineering practices of the U.S. Army Corps of Engineers. It shall also mean that a flood of this magnitude may have a 1 percent chance of occurring in any given year.

CHERRY COUNTY, NEBRASKA

COMPREHENSIVE PLAN

SOILS - HYDRIC SOILS

Legend

- Municipality
- Township/Range
- County Boundary
- US Highway
- State/County Highway
- Local Road

Hydric Soils Rating

- Not Rated / Not Hydric
- Hydric

N

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PROJECTION: NE State Plane (Ft.)
DATUM: NAD 83
DATE: 03.08.2020

0 3.5 7 14 Miles

1 " = 7 miles

CHERRY COUNTY, NEBRASKA

COMPREHENSIVE PLAN

WELLHEAD PROJECTION AREAS

Legend

- Municipality
- Wellhead Protection Area
- Township/Range
- County Boundary
- US Highway
- State/County Highway
- Local Road

Merriman
Cody
Nenzel
Kilgore
Crookston
Valentine
Wood Lake

SOUTH DAKOTA
NEBRASKA
Cherry
Sheridan
Brown
Thomas

MARVIN PLANNING CONSULTANTS
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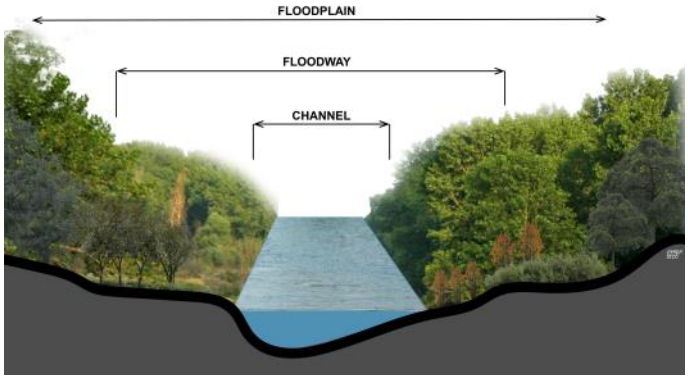
PROJECTION: NE State Plane (Ft.)
DATUM: NAD 83
DATE: 07.06.2020

0 3.5 7 14 Miles

1 " = 7 miles

Floodway Fringe which is that portion of a floodplain that is inundated by floodwaters but is not within a defined floodway. Floodway fringes serve as temporary storage for floodwaters.

FIGURE 10.5: FLOODING DIAGRAM



The floodplain also includes the floodway and the flood fringe, which are areas covered by the flood, but which do not experience a strong current.

The floodplain area of greatest significance in terms of state and federal regulation is the 100 year floodplain. This area is defined by the ground elevation in relation to the water elevation experienced during a 100 year flood event. The 100 year floodplain is calculated to be the elevation level of flood water expected to be equaled or exceeded every 100 years on average. In other and more accurate words, the 100 year flood is a 1% flood, meaning it defines a flood that has a 1% chance of being equaled or exceeded in any single year.

Preserving the floodplain and floodway are critical to limiting the level of property damage that can occur as well as the level of damage to life of the occupants of the area. Land when not flooded seems to be harmless, but it is those rare times that threaten life and property that need to be controlled.

All this said, the county of Cherry County as a whole is not mapped for floodplains and floodway. However, Valentine and Cody are in the flood program.

In recent years there have been numerous flooding occurrences in Nebraska and the Midwest. These events have included the Platte River, the Niobrara River (downstream from Cherry County, the Missouri River, and the Mississippi River, as well as their tributaries. Each of these events have caused significant damage to life and property. In order to protect an individuals property there are specific rules and guidelines that need to be followed. Most guidelines are developed for 100 year flooding events. The times the guidelines have not worked are typically referred to a 500 year event for lack of a better term. However, in some cases, due to mother nature and increases in development runoff, the area needed to handle the floodway and floodplain (100 year event) have increased due to the amount and speed of the water reaching the streams and rivers.

NATURAL RESOURCES/ENVIRONMENT GOALS AND POLICIES

Natural Resource Goal 1

To maintain or improve the primary landscape soil, vegetation and watershed resources in a manner that perpetuates and sustains a diversity of uses while fully supporting the custom, culture, economic stability and viability of Cherry County and our individual citizens.

Natural Resource Policies and Strategies

NR-1.1 Non-agricultural developments should maintain a vegetative cover on the land sufficient to prevent wind and water erosion.

NR-1.2 Non-agricultural developments should protect wetlands and flood-prone areas.

NR-1-3 "Good neighbor" standards should be developed for land use changes and set forth in the County zoning regulations as information required in a zoning permit application.

Water

Water Goal 1

Meet the requirements for water quality contained in the State of Nebraska water quality plan to the extent they can be met while complying with Nebraska constitutional and statutory law as to vested water rights and control of in-stream flow, and to maintain or improve riparian areas and aquatic habitat that represents a range of variability for functioning condition.

Water Policies and Strategies

W-1.1 Encourage the use of Best Management Practices (BMP's) for those waters which have been specifically identified and documented as not meeting beneficial use. BMPs include but are not limited to: Prescribed grazing systems, off site water development, red cedar control, livestock salting plans, establishment of riparian

pastures, herding.

W-1.2 Develop and utilize standardized forms and procedures for all monitoring data related to riparian and aquatic, habitat, condition and trend.

W-1-3 Develop BMPs for riparian, groundwater and wetland management based on the best available science, balancing the needs of current and future agriculture operation(s). The custom, culture, and economic stability of the County and private property rights and private property interests including investment backed expectations will be protected in the application of all riparian, groundwater and wetland management plans.

W-1-4 All riparian, ground water and wetland management decisions are best resolved on a site-specific basis.

W-1.5 Develop management plans for multiple recreation uses in high erosion hazard watersheds, or watersheds where accelerated erosion is occurring, which assure that planning documents and/or other agreements which alter multiple recreation use are formulated through coordination with Cherry County.

W-1.6 Develop and implement a management plan for wildlife to minimize surface disturbance erosion adversely affecting riparian areas.

W-1.7 Complete annual reviews and provide documentation and data to Nebraska Department of Natural Resources (NDNR) regarding in-stream flow impact on fish and wildlife habitat, aquatic life, recreation, aesthetic beauty and water quality.

W-1.8 Provide for the development and maintenance of water systems.

Water (surface water and groundwater)

Water Goal 2

Protect both the surface water and groundwater that runs through and is under the county.

Water Policies and Strategies

W-2.1 Encourage the private conservation of sensitive areas such as wetlands, wooded areas, waterways (streams, ponds, lakes, rivers, etc.).

W-2.2 Protect all water supplies and aquifers from development activities that may affect the quality of water; development must demonstrate a positive or, at least, a neutral impact on groundwater.

W-2.3 Continue participation in the FEMA National Flood Insurance Program to prevent flood- caused loss of life and property.

W-2.4 Land use development within the floodplains of the county should be avoided.

W-2.5 Cherry County encourages soil and water conservation efforts to aid in erosion, sediment, and run-off control where possible.

W-2.6 Cherry County encourages protection of riparian vegetation from damage that may result from development.

W-2.7 Cherry County will plan for and positively urge better development of water supply consistent with the statutory and constitutional standards and will work to protect established water rights in accordance with such standards.

W-2-8 Cherry County opposes the expansion of the federal regulation of wetlands beyond the traditional understanding of navigable waters, which means waters that provide a channel for commerce and transportation of people and goods.

W-2-9 Any rivers within Cherry County considered "outstandly remarkable areas" under The National Wild and Scenic Rivers Act, 16 U.S.C. §§1271-1287, that have not already been designated, should be released from consideration.

W-2-10 Productive watersheds must be maintained within the county as essential factors to the preservation of irrigated agriculture.