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## Ground Water

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## **Ground Water**

R.F. Diffendal, Jr., research geologist, Conservation and Survey Division, University of Nebraska, helped prepare this section.

The Brule Formation, which underlies all of Cheyenne County, generally yields only small amounts of water to wells. Large initial yields often followed by rapid declines during pumping may come from wells in fractured parts of the Brule Formation. Wells along the eroded valley sides and on the floors of the valley of Lodgepole Creek and Sidney Draw may be supplied by water from this aquifer.

The Ash Hollow Formation (Ogallala Group) underlies the tablelands and the sides of valleys along Lodgepole Creek and Sidney Draw and also underlies

the valley floor of Lodgepole Creek west of Point of Rocks. Records of test drilling and drilling for irrigation wells indicate that the formation varies from 0 to more than 500 feet in thickness in the county and is thickest in the northern half of the county.

The Ash Hollow Formation is completely saturated below the water table. The saturated thickness where the formation occurs is known to be from less than 35 to more than 290 feet from one part of the county to another. Potential yields to wells vary from little or no yield to more than 1,000 gallons per minute, depending on the thickness of the formation and the kinds of sediments and rocks encountered.

Unconsolidated silts, sands, and pebbles of Quaternary age (younger than 2.8 million years old) are important sources of ground water in the valleys.

Municipal supplies for some farms, ranches, villages, and towns along Lodgepole Creek come from these units at least in part.

Municipalities in the county obtain their water from one or more of these three geologic units. Sidney obtains most or all of its water from fractured zones in the Brule Formation. Potter, Gurley, and Dalton obtain water from the Ash Hollow Formation. Lodgepole's water supply comes from Quaternary alluvium.

New wells drilled for irrigation and municipal and industrial supplies are recorded annually. In 1983 the cumulative total of registered irrigation wells in the county was 444, of which 222 used center-pivot systems for water distribution. Most of these wells are in the northern half of the county and along Lodgepole and Cottonwood Creeks and along Sidney Draw. A cumulative total of 31 municipal wells and 13 industrial wells had been drilled in Cheyenne County through 1983.

The supply of ground water is adequate for the needs of most domestic and livestock users in the county. Reliable supplies are most difficult to obtain from areas where the Brule Formation is near the surface. The depth to water varies greatly across the county. The water table occurs at less than 10 feet beneath the surface in areas on the floor of Lodgepole Creek, while it is more than 300 feet beneath the surface of the tablelands at many places.

Water quality throughout the county is generally good. The water ranges from hard to very hard but otherwise is low in mineralization.

Contamination of water supplies is a potential problem. Chemicals introduced during agricultural activities, human and animal wastes that have been improperly disposed, leaking fuel storage tanks, and commercial and household chemicals that have been carelessly discarded are possible sources of

contamination. Water supplies should be checked periodically to determine if a problem is developing, particularly in areas where the sources just mentioned are present.