

University of Nebraska-Lincoln Statewide Groundwater-Level Monitoring Program

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Mission Statement

The University of Nebraska-Lincoln Statewide Groundwater-Level Monitoring Program collects, evaluates and manages water-level data from monitoring agencies in Nebraska and disseminates spatial-temporal water level data in multiple platforms that enable responsible management of Nebraska's ground water resources. We are committed to high quality, unbiased scholarly research and service. The Program's data and products form a statewide information database and infrastructure that can be used by other governmental agencies, the private sector, the public, and the global community.

Introduction

In 1930, the Conservation and Survey Division of the University of Nebraska-Lincoln and the U.S. Geological Survey began a cooperative water-level measurement program to observe and document, on a continuing basis, the changes in groundwater levels throughout Nebraska. The Conservation and Survey Division continues this program today with the cooperation of 26 federal, state, and local agencies. More than 5,600 observation wells are measured on at least an annual basis. Products include maps depicting groundwater-level changes from year to year and maps depicting changes from predevelopment to current year. Other products include maps and reports depicting groundwater-level changes during the recent drought. Maps are available in hard copy or electronic formats at <http://csd.unl.edu/>. The maps are also available as geographic information system (GIS) coverages.

Cooperating Agencies

Natural Resources Districts
US Geological Survey
Central Nebraska Public Power and Irrigation District
US Bureau of Reclamation

Program Director

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Latest Groundwater Change Maps

The latest groundwater change maps depicting changes in groundwater levels in Nebraska from predevelopment to spring of 2006 and from spring 2000 to spring 2006 are included in this booklet. The estimated predevelopment water level is the approximate average water level at a well site prior to any development that significantly affects water levels. All available water-level data collected prior to or during the early stages of groundwater development are used to estimate predevelopment water levels. Initial groundwater development in Nebraska was not uniform. For example, large areas of groundwater irrigation began in the Platte River valley in the 1930s and 1940s.

Groundwater irrigation did not begin in earnest in southwest Nebraska until the 1960s. The median predevelopment date for Nebraska is about 1952.

Predevelopment to Spring 2006

The largest groundwater-level declines from predevelopment to spring 2006 occurred in southwest Nebraska and in the panhandle (figure 1). Declines in portions of Chase, Dundy and Box Butte Counties exceed 50 feet. Groundwater levels in portions of Perkins and Cheyenne County have declined more than 40 feet.

A large portion of south central Nebraska has also experienced groundwater declines. Groundwater levels in parts of Adams, Buffalo, Butler, Clay, Custer, Dawson, Fillmore, Hall, Hamilton, Merrick, Polk, Seward, and York Counties have declined more than 20 feet. Parts of other counties experiencing declines greater than 20 feet include Hayes, Hitchcock, Frontier, Lincoln, and Red Willow in the southwest; Banner, Kimball, Morrill, and Sheridan in the panhandle; and Holt in the north central.

The areas of groundwater declines in Nebraska all occur in areas of intense groundwater irrigation (figure 2). Groundwater extraction has exceeded recharge in these areas.

Groundwater-level rises from predevelopment all occurred in areas of surface irrigation systems. Rises exceeded more than 50 feet in portions of Gosper and Phelps Counties. Rises of more than 30 feet occurred in portions of Howard, Kearney, Keith, Lincoln, Scotts Bluff, Sherman, and Valley Counties.

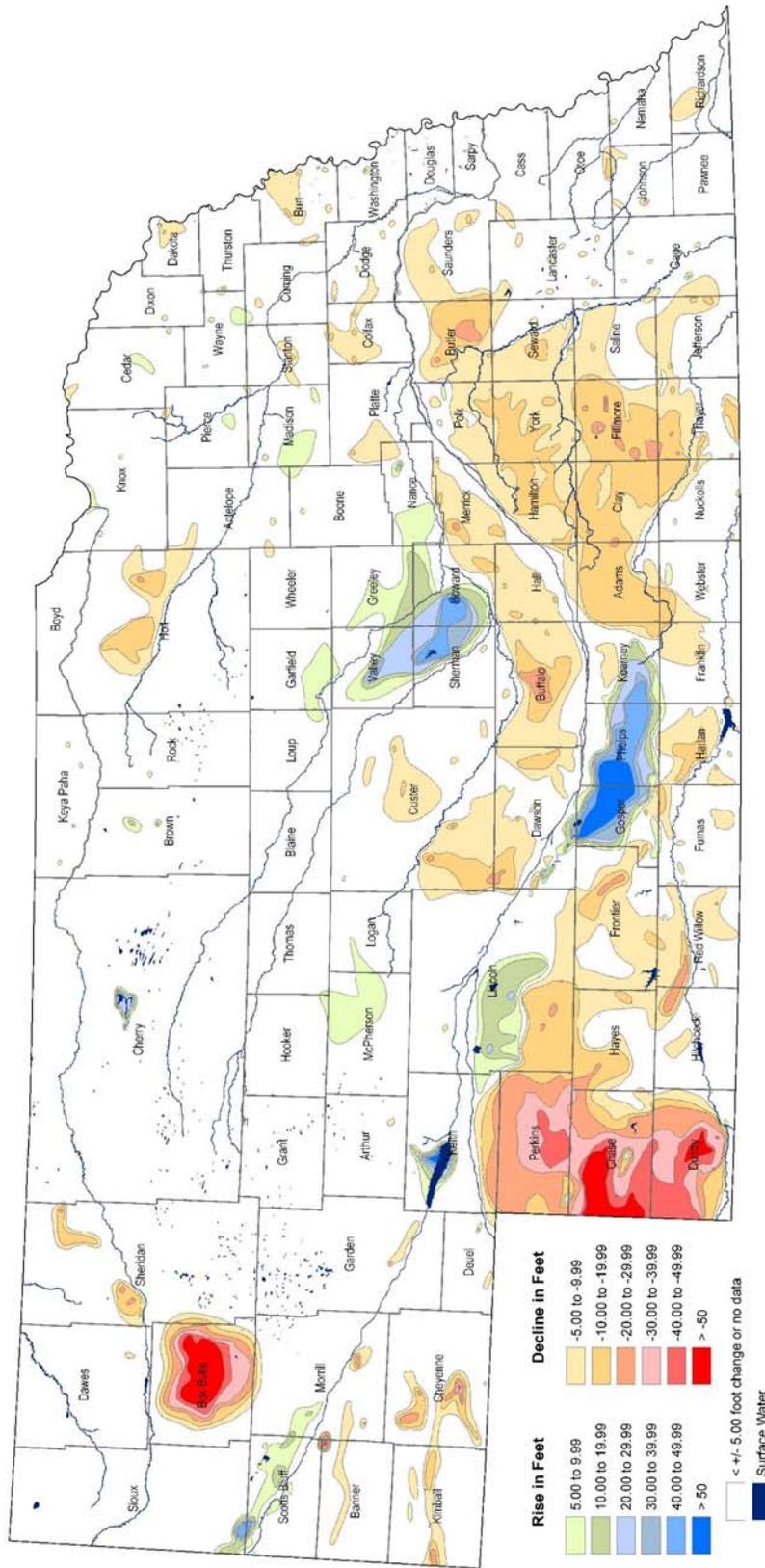
Spring 2000 to Spring 2006

Large parts of Nebraska have experienced drought conditions since the beginning of 2000 (figure 3). Since 2000, declines greater than 25 feet occurred in parts of Butler, Cheyenne, Clay, and Dundy Counties. The area immediately adjacent to Lake McConaughy in Keith County also experienced a decline greater than 25 feet. Counties that experienced declines greater than 15 feet include Box Butte in the panhandle; Chase, Lincoln, and Perkins in the southwest; and Buffalo, Dawson, Hall, Hamilton, Merrick, Polk, Seward, and York in the south central; and Platte and Colfax in the east. Declines were most severe in groundwater-irrigated regions.

A sharp increase in irrigation well installation coincided with below normal precipitation, indicating an attempt to offset the agroeconomic effects of the drought. The number of registered irrigation wells in Nebraska increased 23% from January 2000 to January 2006.

The Sand Hills region experienced no declines or modest declines of less than 5 feet. Large areas of Antelope, Holt, Rock, and Valley Counties experienced rises up to 5 feet. Until the summer of 2006 the northeast corner of Nebraska avoided the recent drought, with some parts receiving above average precipitation. Normal or near normal precipitation as well as the absence of groundwater irrigation may explain the rises in Antelope, Holt, and Rock Counties. The portion of Valley County with a groundwater rise is associated with a surface irrigation system.

Groundwater-level Changes in Nebraska - Predevelopment to Spring 2006



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Figure 1. Groundwater-level changes in Nebraska, predevelopment to spring 2006.

Density of Registered Irrigation Wells in Nebraska August 2005

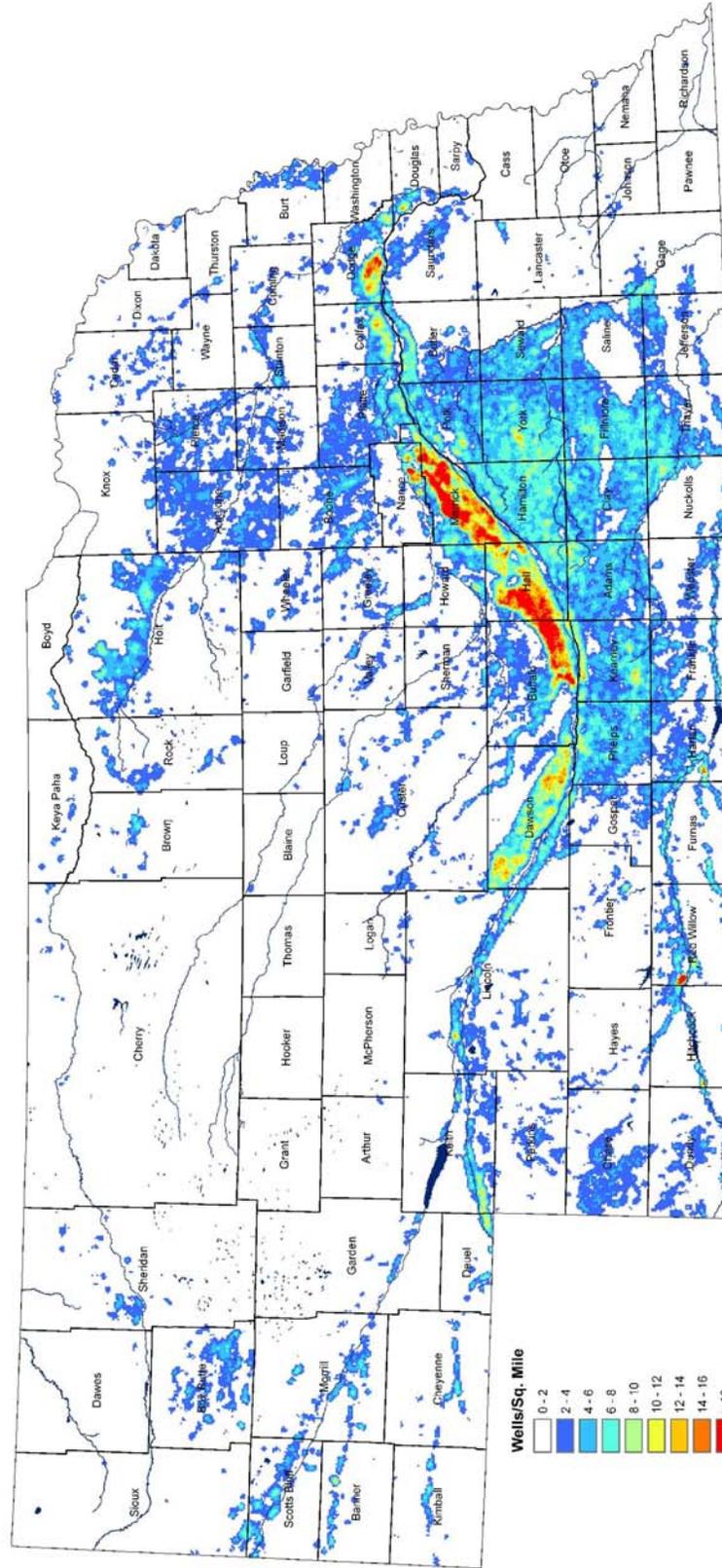
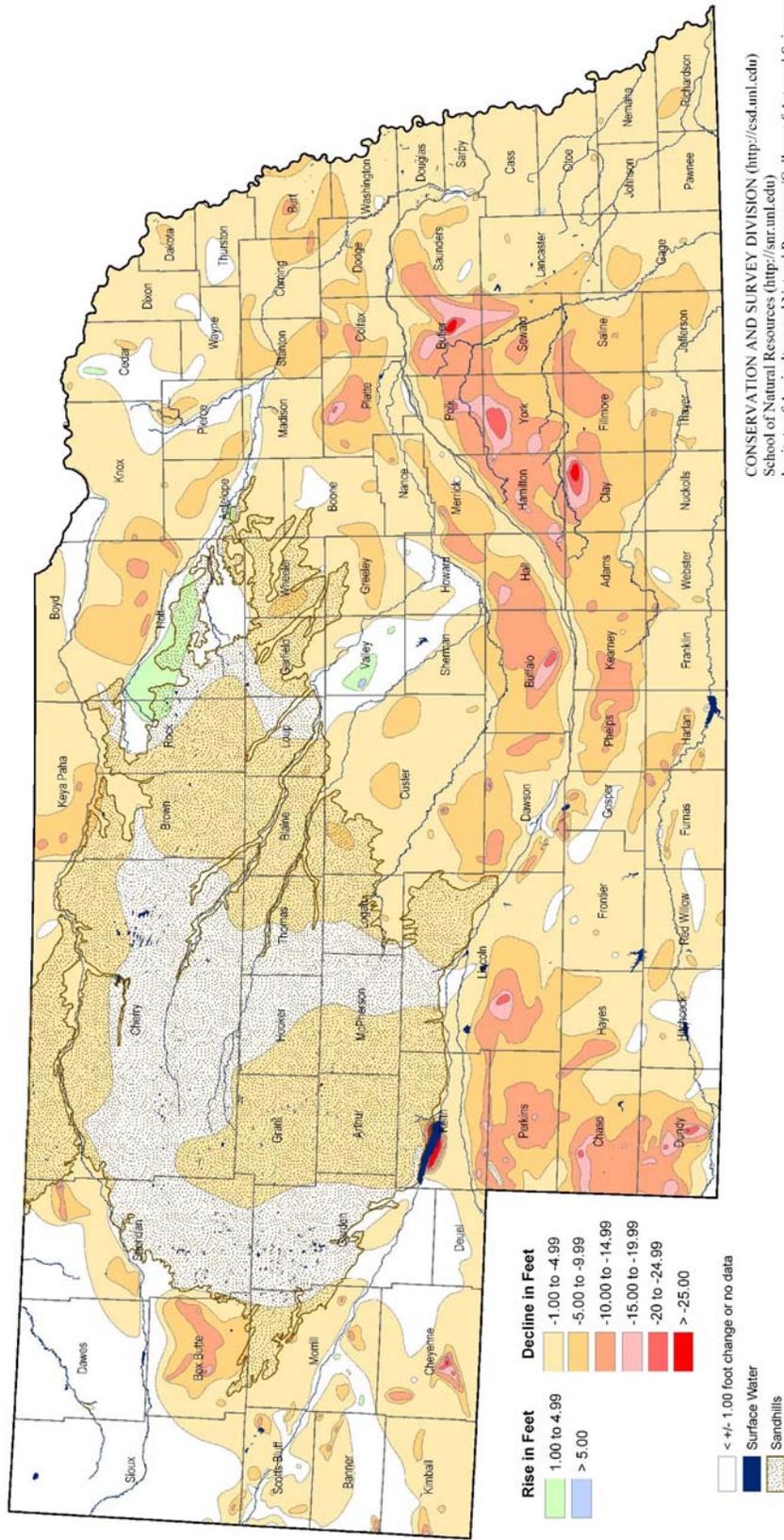


Figure 2. Density of registered irrigation wells in Nebraska, August 2005.

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Groundwater-level Changes in Nebraska - Spring 2000 to Spring 2006



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Figure 3. Groundwater-level changes in Nebraska, spring 2000 to spring 2006.