There are reasons for cautious optimism as groundwater levels over much of the eastern two-thirds of Nebraska rebounded slightly, due mainly to above-average precipitation in 2008 and 2009, according to a report recently released by the University of Nebraska-Lincoln.

“The long-term trend over much of the state is that groundwater levels have continued to decline from the period of predevelopment of irrigation to the present, but over the past year we have recorded widespread increases of one to five feet,” said Jesse Korus, a groundwater geologist in UNL’s School of Natural Resources. “A return to anywhere from average to well above-average precipitation in all but the western tip of the Panhandle is the main reason for these increases.”

The information is contained in the first comprehensive statewide groundwater level monitoring report UNL has published in 10 years. The 38-page report tracks changes in Nebraska groundwater levels from spring 2008 to spring 2009, over the past 10 years, from predevelopment of irrigation to spring 2009, as well as average daily streamflows in 2008 and other related information. Groundwater level change statistics for each of Nebraska’s 93 counties are recorded.

Korus co-authored the report with UNL geoscientist Mark Burbach, who long has published annual change-level maps for UNL’s Conservation and Survey Division.

“We have been publishing the change-level maps every year, but this is the first time a comprehensive annual and long-term narrative report on the overall state of Nebraska’s groundwater has been published since 1999, which summarized water level changes in 1996,” Burbach said.

The most recent data collected by the two groundwater researchers clearly note some good news across much of the state.

From 2008 to 2009, groundwater level increases of more than a foot occurred in a broad area of north central, northeast, south central and southeast Nebraska.

“Rises of greater than five feet occurred in large portions of Clay, Fillmore and York counties in the southeast, Buffalo County in the central and Platte County in the northeast,” Korus said, noting “There are several smaller areas with greater than five-foot rises in this region as well.”

Even some portions of western Nebraska, long plagued by severe drought, saw some relief, with small, scattered groundwater level increases in Red Willow, Frontier, Chase and Perkins counties in the southwest and Scotts Bluff, Morrill and Sheridan counties in the Panhandle.

Precipitation is the main reason.

Much of central Nebraska experienced greater than 130% of the 30-year average precipitation in 2008. In areas such as Buffalo, Dawson and Gosper counties, precipitation was as high as 180% of average. Even in typically rain-starved western Nebraska, some counties recorded precipitation of as high as 120% of average, while none were lower than 70% of average.

“The more abundant moisture likely resulted in reduced pumping for irrigation, and in areas of shallow water table and permeable soils it directly recharged the aquifer,” Korus said.

Despite the relatively good news, some parts of the state did see continuing groundwater level declines. In portions of Keith, Perkins, Dundy and Chase counties in southwest Nebraska, declines ranged from one to more than eight feet. Annual declines also were recorded in Box Butte, Sheridan and Cheyenne counties in the Panhandle, averaging one to five feet.

Groundwater levels also remain below spring 2000 levels over most of the state due to widespread drought conditions from 2000 to 2007. Large areas of groundwater level decline since predevelopment of irrigation remain present in the south central, southwest and Panhandle, Korus explained.

Predevelopment water levels are estimated, but generally occurred before the 1930s, 1940s or early to mid-1950s, depending on when intensive groundwater irrigation began.

From 2008 to 2009 large areas of the western Sandhills and the southwest showed little to no change in groundwater levels.

“These areas received near normal precipitation and are also areas of relatively low irrigation well density,” Korus said.

Average daily streamflow across the state somewhat mirrored increases in groundwater levels.

“Flows were well above the long-term average over much of the state due to above-average precipitation, but both streamflow and precipitation were below to near average in western parts of the state,” Korus said.

The groundwater level change maps can be downloaded free at the School of Natural Resources Web site at http://snr.unl.edu/data/water/groundwatermaps.asp. Maps from previous years are archived there, too, dating to 1954.

Data for the maps, graphs and reports are based on recorded measurements from more than 6,000 observation wells taken by 27 organizations, including each of Nebraska’s 23 Natural Resources Districts, U.S. Geological Survey, Central Nebraska Public Power and Irrigation District, U.S. Bureau of Reclamation, and UNL’s Conservation and Survey Division.

Groundwater level change maps rely on well readings recorded as close to April 1 as possible, before the start of the irrigation season.