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Effects of the 2000-2005 Drought on Groundwater Levels in Nebraska

Although the relationship between drought, agriculture, and groundwater use in the southern Great Plains has well-publicized effects, droughts are more persistent in the central and northern Great Plains. Recent decreases in rainfall and the accompanying rise in irrigation-well registrations (nearly 19,000) since 1999 demonstrate an increased vulnerability to drought in Nebraska and, by inference, in the surrounding northern Great Plains as well. The period from December, 2001 to July, 2002 was the driest such period in 108 years of weather recording in Nebraska. Furthermore, precipitation at some stations in Nebraska fell to as little as 72% of the 30-year mean during the five-year period from 2000 to 2005, rendering groundwater recharge to minimal levels over large areas. During the same period, ground-water levels in wells in Nebraska declined by more than 25 feet (7.6 m) in the most heavily impacted areas. These heavily-impacted areas had also experienced previous groundwater-level declines, in some cases exceeding 50 ft (15 m), as a result of comparatively consistent and intense pumping, whereas groundwater levels elsewhere showed only modest changes. Therefore, aquifers in intensely groundwater-irrigated regions are particularly vulnerable to long-term drought conditions. Drought mitigation efforts should consider the combined effects of reduced recharge, local geohydrology, and increased groundwater withdrawals when assessing drought vulnerability.

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