

South Dakota

2021 Ogallala Aquifer Virtual Summit White Paper

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2020 Monitoring Wells Update

The state Department of Environment and Natural Resources (DENR) is now monitoring 1,585 monitoring wells across the state with 76 completed into the Ogallala aquifer. The web page to gain access to observation well data is <https://apps.sd.gov/nr69obswell/default.aspx>.

The Rosebud Sioux Tribe (RST) has 28 observation wells in the Ogallala aquifer (Fig. 1). The depth to water in each well is measured monthly with a manual water level indicator. In addition, nine wells are monitored in real time via satellite data links. The well data presented here are the annual average depths, calculated by averaging the monthly measurements. They (RST) have been monitoring the levels in the wells since 1983.

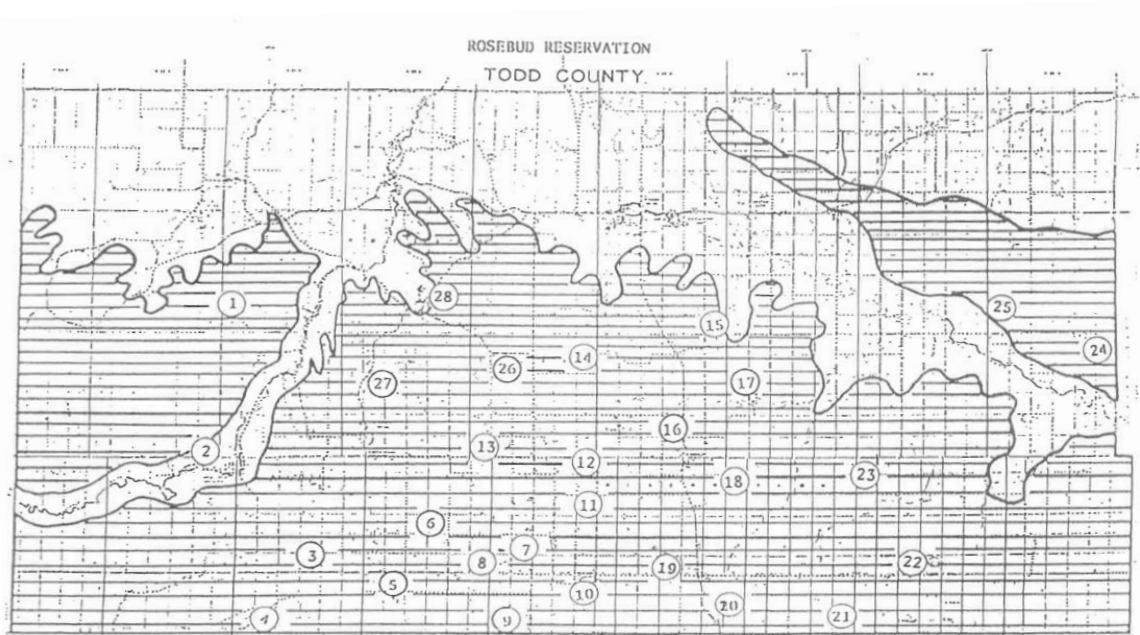


Figure 1. Locations of monitoring wells, Ogallala aquifer, Rosebud Reservation.

Precipitation during the monitoring period was variable (Fig 2). The normal precipitation (1981 to 2010) for the Mission 14S coop station was 21.40 inches. (<https://climate.sdstate.edu/tools/normals/daily.asp>). The average precipitation for the period of record at the Mission 14S coop station, 1985 to 2018, was 21.77 inches. (<https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/cooperative-observer-network-coop>).

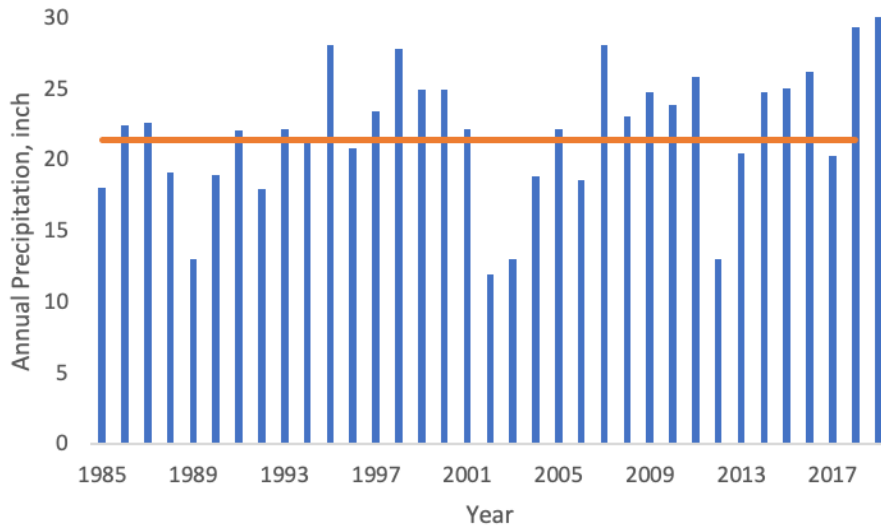


Figure 2. Annual precipitation measured at the Mission 14S coop station, 1985 to 2019. The horizontal line shows the normal precipitation (1981 to 2010) of 21.40 inches (<https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/cooperative-observer-network-coop>).

Water table depths varied from less than 10 feet (Fig. 3) to approximately 150 feet (Fig. 4). Note that the vertical scales vary among the figures. The water table depths vary in response to recharge from precipitation and withdrawals by irrigation wells (more than 80 wells on the reservation) and production wells (nine wells for the Rosebud Rural Water System).

The RST well data showed little movement of water levels during the monitoring period. The maximum change of water table depth was about 20 feet, but water depths at the end of the monitoring period were all within 10 feet of the initial depths. Most wells had maximum depth change of 10 feet or less. Of the 28 wells, only 12 wells ended with water levels lower than their initial elevations. Water levels in three of the wells declined by eight feet or more (one is shown in Fig. 5).

Water tables in 12 wells actually increased during the monitoring period. For example, the water level depth rose from about 150 feet to about 142 feet in well 18 (Fig. 4) and from about 25 feet to about 21 feet in well 23 (Fig. 6).

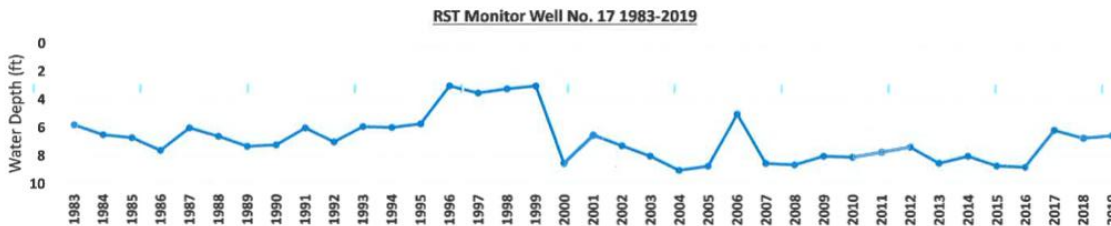


Figure 3. Measured water table depths in monitoring well 17. (Note that the vertical water depth scales are not consistent among Figs. 3 through 6.)

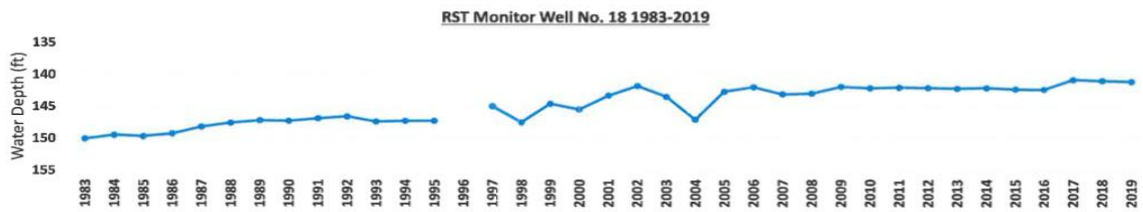


Figure 4. Measured water table depths in monitoring well 18. (Note that the vertical water depth scales are not consistent among Figs. 3 through 6.)

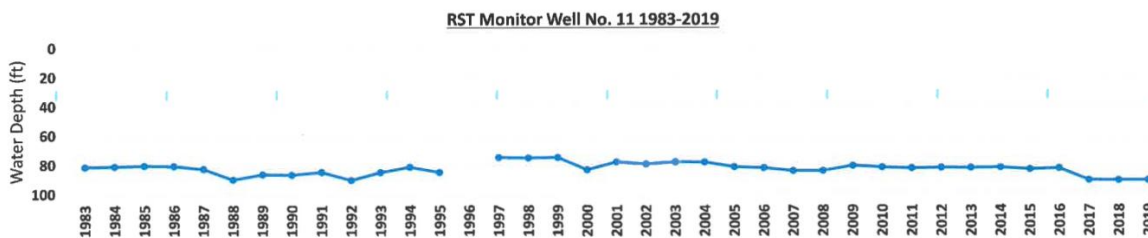


Figure 5. Measured water table depths in monitoring well 11. (Note that the vertical water depth scales are not consistent among Figs. 3 through 6.)

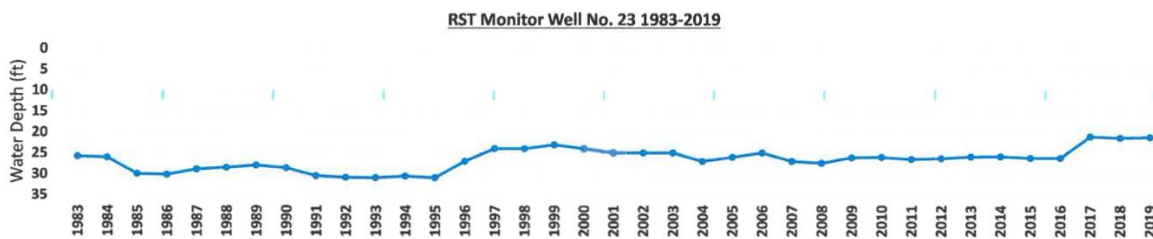


Figure 6. Measured water depths in monitoring well 23. (Note that the vertical water depth scales are not consistent among Figs. 3 through 6.)