



SOUTH DAKOTA

BACKGROUND

The South Dakota Department of Agriculture and Natural Resources (DANR) is now monitoring 1616 monitoring wells across the state with 76 of those wells completed into the Ogallala aquifer (<https://apps.sd.gov/nr69obswell/default.aspx>).

There are 28 monitoring wells in the Ogallala aquifer on the Rosebud Reservation, monitored by the Rosebud Sioux Tribe (RST) (Fig. 1). The depth to water in each well is measured monthly with a manual water level indicator. The well data presented here are the annual average depths, calculated by averaging the monthly measurements. In response to climate change and drought, Rosebud Sioux Tribe has installed satellite communications to monitor water table depths in real time for 15 monitoring wells.

Precipitation is variable (Fig 2). The normal precipitation (1991 to 2020) for the Mission 14S coop station was 22.50 inch. This is an increase of 0.80 inch when compared to the 1981–2010 normal of 21.70 inch. The average precipitation

for the period of record at the Mission 14S coop station, 1985 to 2023, was 22.07 inch. The maximum was 34.06 inch in 2023 and the minimum was 11.99 inch in 2002. Three of the four most recent years have had below-normal annual precipitation by 3.7 inch or more. Conversely, three of the last six years have had much greater than normal (between 4.9 inch and 11.5 inch greater than normal) precipitation, illustrating the large variability.

Additional weather data are available from the Rosebud mesonet station, sponsored by the RST Water Resources office. Those data are available via the SDState Mesonet (climate.sdstate.edu).

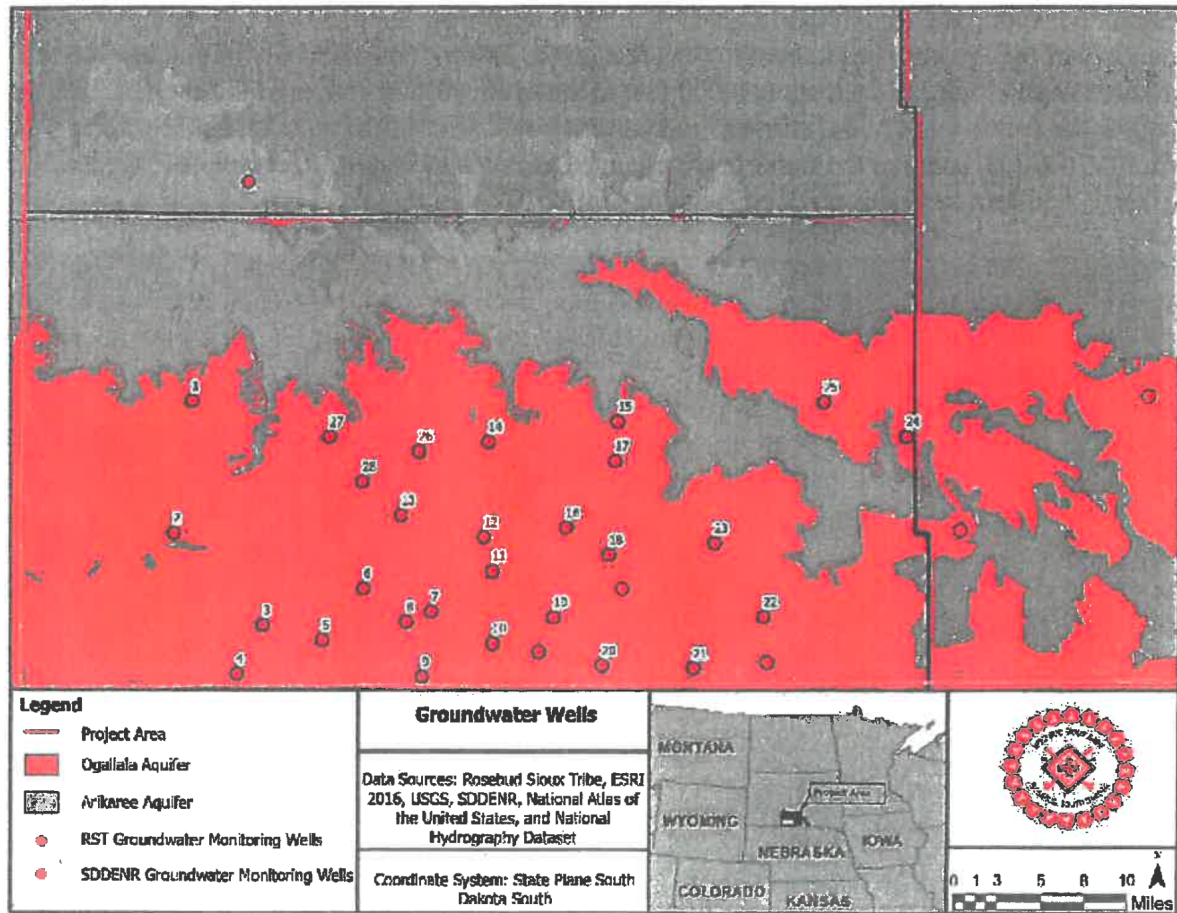


Figure 1. Locations of monitoring wells and the Ogallala aquifer on the Rosebud Reservation.

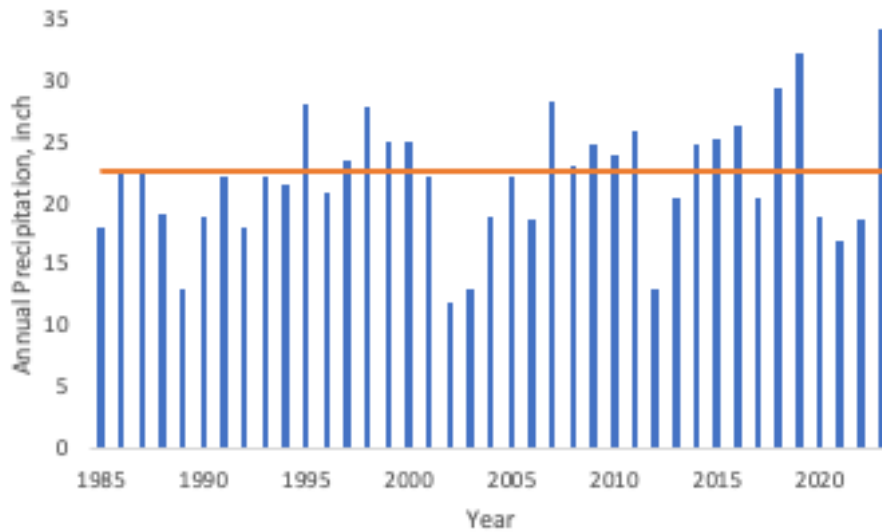


Figure 2. Annual precipitation measured at the Mission 14S coop station, 1985 to 2023. The horizontal line shows the normal annual precipitation (1991 to 2020) of 22.50 inch.

2024 Monitoring Wells Update

Depths to the water table have changed slightly since the 2020 update (Fig. 3). Depth to the water table rose by 0.1 ft for well 2 during the update period (2020 to 2023). The remainder of the wells shown in Fig 3 showed modest water table declines of 2.9 ft or less. Of the wells shown in Fig. 3, five shallow wells actually had water table increases from 2022 to 2023, reflecting the increased precipitation during 2023.

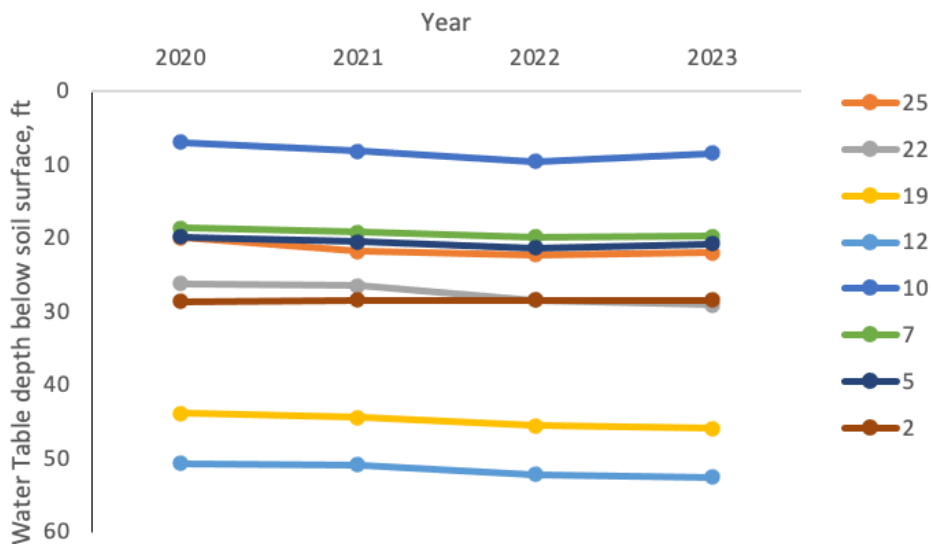


Figure 3. Water table depths for eight representative RST monitoring wells. The legend shows the monitoring well number.

For a longer-term perspective, depths to the water table are shown for two wells for the 1985 to 2019 monitoring period (Figs 4 and 5). Note that the vertical scales differ between the two figures.

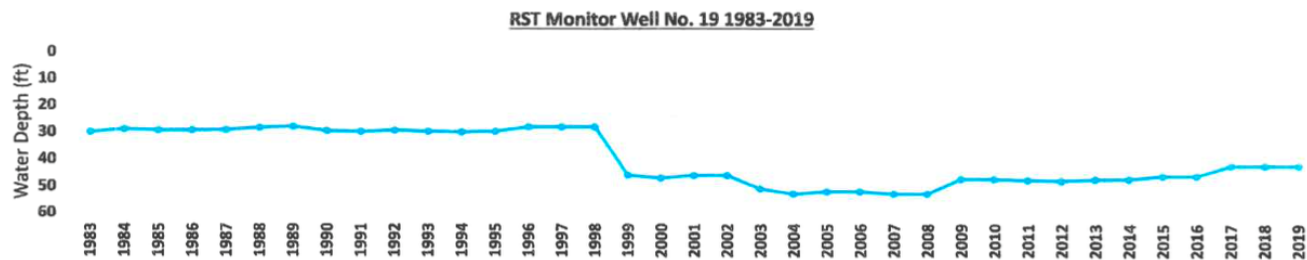


Figure 4. Measured water table depths in RST monitoring well 19. Note that the vertical water depth scales are not consistent for Figs 4 and 5.

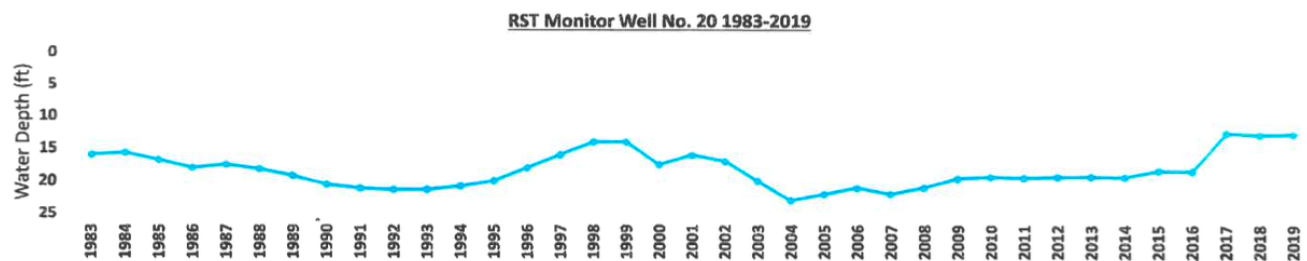


Figure 5. Measured water table depths in RST monitoring well 20. Note that the vertical water depth scales are not consistent for Figs 4 and 5.

Nine production wells provide domestic and municipal water from the Ogallala aquifer to the population of the reservation. It is estimated that more than 11 billion gallons of water are pumped from the aquifer each year for domestic, municipal, irrigation, and other uses. The pumping levels of one of the RST production wells has decreased by about 15 feet. It is being carefully monitored.

Data from gauging stations on the Little White River and Keyapaha River show that both rivers increase in flow from contributions by the aquifer as they flow through the reservation.

In conclusion, the Rosebud Sioux Tribe and State of South Dakota have a well-planned and well-managed Water Resources Program to manage the Ogallala aquifer in South Dakota.