Background Information

The Rural Water Authority of Douglas County (the Authority was formed in 2009 to represent the county's rural residents who are reliant on nonrenewable groundwater wells. Douglas County is one of the fastest-growing counties in America; its population has increased an average of about 7% per year since 1980, from about 25,000 to well over 350,000 today.

The Rural Water Authority of Douglas County (the Authority) has been in a partnership with the U.S. Geological Survey (USGS) for the past ten years in a project to monitor water levels in the producing aquifers of residential wells in Douglas County. The work involves a USGS engineer both a) manually measuring water depth, and b) downloading electronic transducer data, from thirty-five household and domestic wells in three different aquifers in Douglas County. This is done at strategic times: winter, when water use is low, and in the fall, after the high use season, thus showing the water levels after the high use period as well as after recovery. The data derived from this work have contributed to the USGS's larger system of monitoring the Denver Basin to evaluate the drawdown of water levels in this nonrenewable source of water. No other entity collects such widespread consistent seasonal data from Douglas County.

The original plan was to gather twenty years' data, which would provide a reasonable timeline to evaluate the condition of the aquifers and possibly estimate a projected lifespan. Until 2020, the Authority has been able to secure grant funds from the Colorado Water Conservation Board to help provide the match that the USGS requires to make this project possible. Given COVID-19 and recent State budget shortfalls, that match will not be forthcoming for at least the coming year, and probably longer.

A majority of the recent growth in Douglas County has relied on aquifer well water from a few large water providers and municipalities. These large providers have realized that this source of water is unsustainable in the long run and have begun to secure more sustainable sources. This transition is expected to take many years. These large water providers are pumping massive amounts of water from the ground, and many rural residents are afraid that their own water-well supply may be threatened. Some well owners have already experienced failing wells. Some of them have tried to drill new wells but come up dry. Hauling water by truck to a property's cistern is currently the only solution to this problem.

Douglas County's individual well owners, permitted only for household and domestic purposes, make up about 20% of the county's population, on about 80% of the county's geographical area. The dispersed nature of these residences requires reliance on groundwater for their domestic water supply, since it is not economically feasible for most of them to connect to any of the large municipal water suppliers' systems. These individual well owners and the small water districts in the county are unique in that they cannot easily secure an alternate supply, so they share a concern for the conservation of the groundwater on which they are dependent.

There is some urgency in our request. The electronic transducers used in the wells must be maintained at least every six months, and their usable lifespan is about 10 years. If funding is not forthcoming, the transducers will have to be pulled from the wells, interrupting the valuable set of data collected to date. A long-term evaluation of the source of this critical natural resource demands valid study, which can be possible only by continuing this program.

The Rural Water Authority needs about $165,000 to continue the well-monitoring project for the next 5 years.

USGS Letter

Water-Level Monitoring in Rural Douglas County, Colorado
Progress Report
To: Rural Water Authority of Douglas County
From: U.S. Geological Survey
Colorado Water Science Center
March 24, 2021

Background

The U.S. Geological Survey (USGS) has worked cooperatively with the Rural Water Authority of Douglas County (RWADC) since 2011 to operate and maintain a groundwater-monitoring network for Denver Basin aquifers in rural areas of Douglas County. Increased groundwater pumping in response to rapid population growth and development has led to declining groundwater levels in Douglas County, where groundwater from the Denver Basin bedrock-aquifer system is a primary water source for both densely populated and rural communities. The four principal Denver Basin bedrock aquifers are, from shallowest to deepest, the Dawson aquifer (divided administratively into "upper" and "lower" Dawson aquifers in Douglas County), the Denver aquifer, the Arapahoe aquifer, and the Laramie-Fox Hills aquifer. The project began in 2011, when target wells were selected, the network was established, and routine groundwater-level data collection was started. The current (2021) network includes 30 wells, with at least two wells screened in each of the major bedrock aquifers of the Denver Basin. Additionally, 14 wells are currently (2021) instrumented with pressure transducers and data loggers, which measure and record hourly water-level measurements (continuous data). Since 2011, groundwater levels have been routinely measured at all network wells. Water levels measured at wells across the network provide an assessment of the groundwater conditions and form the basis of monitoring long-term changes in the hydrologic system. Continued development in Douglas County, as well as observations of declining groundwater levels (Malenda and Penn, 2020) have driven interest in continued monitoring of groundwater levels in Douglas County. The primary objective of the ongoing work is to continue to monitor and assess changes in the hydrologic system by maintaining the now decade-long groundwater-level record through annual winter groundwater-level measurements and download of continuous data and servicing of the network pressure transducers. Presented below is a detailed description of previous agreements and work scopes with the RWADC.

In 2011, RWADC received a Water Supply Reserve Account grant from the Colorado Water Conservation Board (CWCB) in the amount of $113,055, with matching funds of $60,896 provided by the USGS, for a total budget of $173,951 (State Contract C150473). The project with RWADC began in January 2011 in Federal fiscal year (FFY) 2011, with water-level monitoring scheduled to continue through September 2012 (end of FFY 2012), and report completion scheduled for December 2012.

In July 2011, the CWCB approved the allocation of $20,000 from the Severance Tax Grant application process to extend the period of monitoring for the RWADC project. These funds were matched with USGS Cooperative Water Program matching funds ($13,330), which extended bi-monthly and continuous water-level measurements for the entire network through March 2013. The first report, presenting the data collected between June 2011 and June 2013, was published in 2014 (Everett, 2014).

In 2013, RWADC received a second Water Supply Reserve Account grant from the CWCB for $50,000, with matching funds of $16,913 from the USGS, and $745 from the RWADC, for a total budget of $67,658. These funds were used to continue bi-monthly and continuous water-levels measurements for a nine-month period from September 2013 through June 2014. These funds also included costs for the publication of a second report presenting the data collected between July 2013 and June 2014. Also, in 2013, the CWCB provided $19,960, and with matching funds of $6,655 from the USGS, 15 pressure transducers and associated equipment were purchased for dedicated use in the RWADC water-level monitoring network.

In 2014, RWADC received a third Water Supply Reserve Account grant from the CWCB for $13,977, with matching funds of $27,956 from the USGS, and $13,979 from the RWADC, for a total budget of $55,912. These funds were used to maintain the 15 continuous water-levels measurement sites, for the period from July 2014 through October 2016, with three visits per year and manual measurement of water levels in all of the network wells in February of 2015 and 2016. As part of this agreement, a second report was postponed.

In 2017, RWADC received a Severance Tax Grant for $49,750 which was used to extend the monitoring period from October 2016 through June 2018. In addition, the RWADC contributed $10,000, and the USGS contributed $15,000 in matching funds to this effort. Manual water-level measurements were made in all 36 network wells in February 2017 and February 2018 and in all 15 transducer-equipped wells in July 2017, October 2107, and June 2018. The frequency of the manual water-level measurements was reduced from bimonthly to tri-annual site visits and included only the 15 wells with transducers. In addition, manual water-level measurements were made in all 36 wells in February 2017 and 2018. Publication of the second report from the previous agreements, scheduled to include data collected between July 2013 and October 2016, was postponed until 2019 to include the data collected between July 2013 and June 2018. A modification (MOD1) to the joint funding agreement (JFA) between RWADC and the USGS also extended the period of work through September 30, 2019.

Because of the 2019 Federal Government furlough, the second project report planned for 2019 was delayed, and a second modification (MOD2) to the JFA was signed by the RWADC and the USGS. The MOD2 added $37,000 in USGS cooperative matching funds to the agreement, extended the agreement and monitoring period to June 2020, and provided a schedule for the second report. The second Scientific Investigations Report (SIR) was completed and published in August 2020 and includes data collected through June 2019 (Malenda and Penn, 2020).

In January 2020, the RWADC and the USGS submitted a Severance Tax Grant Application to CWCB to fund continued water-level data collection through 2021. However, because to the COVID-19 pandemic and associated state funding restrictions, no Severance Tax Grants were awarded. The remainder of funding was able to support winter manual measurements at all sites in February 2020 and manual measurements, data download, and transducer servicing at all the wells with transducers in June 2020.

In January 2021, another attempt to submit a Severance Tax Grant Application to CWCB was made, but due to on-going funding shortfalls, no 2021 Severance Tax Grants were awarded. In January 2021, the RWADC provided $3,000, and with matching funds of $3,000 from the USGS, winter manual measurements at all sites along with data downloads and servicing of transducers were completed in February 2021. The data

record of annual winter measurements made at the 30 remaining wells in the network began in February 2012 and is now almost a decade-long. Presently (March 2021), there is no available funding for continued water-level measurements, and the network will remain dormant until additional funding is obtained. The USGS and RWADC continue to seek funding for ongoing water-level monitoring in rural Douglas County, and the USGS fully supports the efforts of the RWADC to resume water-level monitoring, offering to provide up to 20 percent of the project funding from USGS Cooperative Matching Funds. The data resulting from this study show clear trends of declining water levels in selected areas and Denver Basin aquifers (Malenda and Penn, 2020), and ***there are no other organizations collecting data sufficient to document these water-level decline.***

References

Everett, R.R., 2014, Groundwater levels in the Denver Basin bedrock aquifers of Douglas County, Colorado, 2011–2013: U.S. Geological Survey Scientific Investigations Report 2014–5172, 45 p., http://dx.doi.org/10.3133/sir20145172.

Malenda, H.F., and Penn, C.A., 2020, Groundwater levels in the Denver Basin bedrock aquifers of Douglas County, Colorado, 2011–19: U.S. Geological Survey Scientific Investigations Report 2020–5076, 44 p., https://doi.org/ 10.3133/ sir20205076.

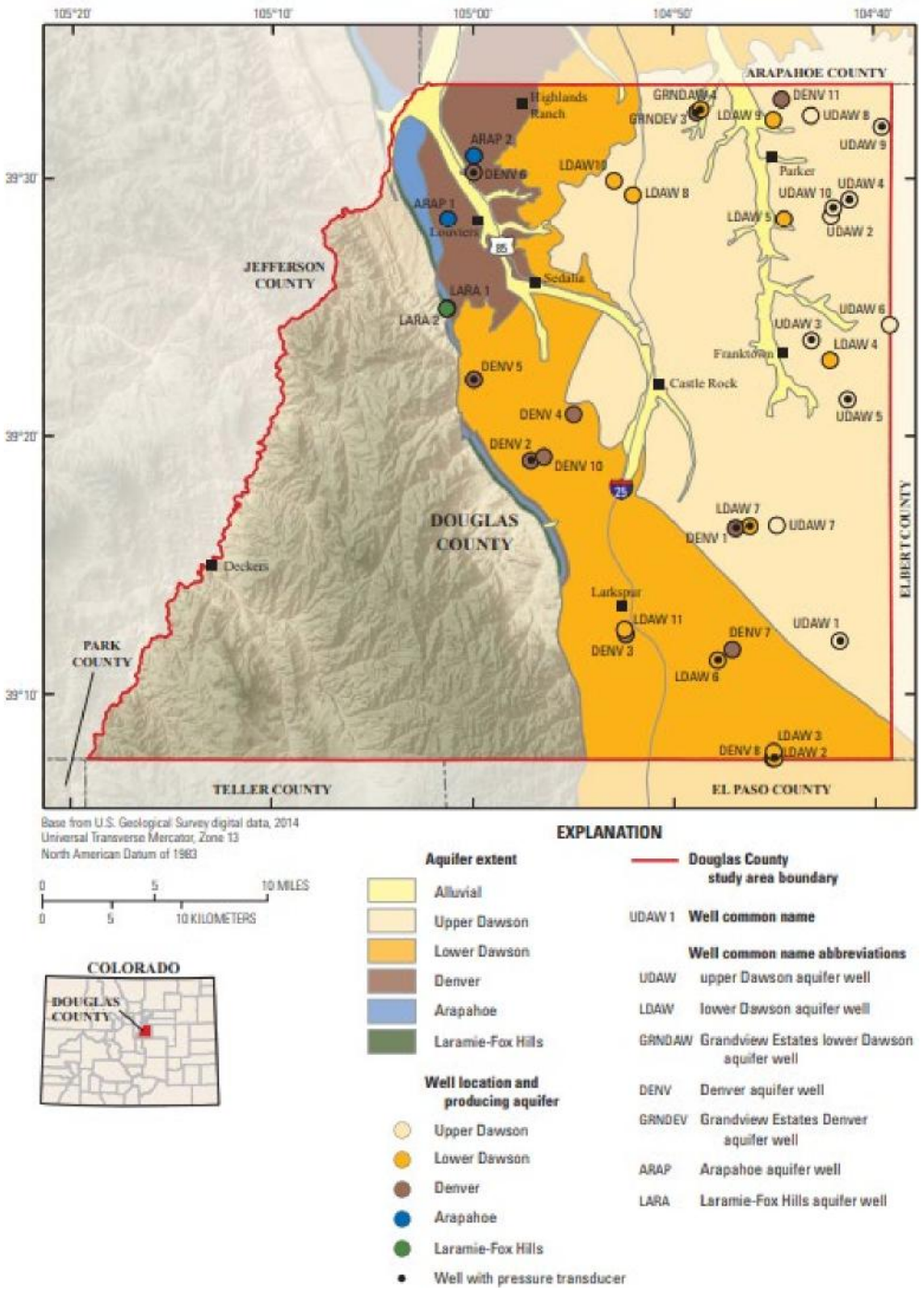

***Figure 1**: Locations of groundwater-level monitoring network wells in producing aquifers in Douglas County, Colorado*

Thank you!