Evaluation of Groundwater Level Data from Estancia Basin Monitoring Wells

January 2021

HydroResolutions, LLC

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Prepared for

East Torrance Soil and Water Conservation District

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January 2021 Data Evaluation

As part of the contract between the East Torrance Soil and Water Conservation District (ETSWCD) and HydroResolutions (HR), HR has assembled and evaluated groundwater level data from wells within the Estancia Basin that are being monitored as part of the Estancia Basin Water Planning Committee (EBWPC) hydrogeologic monitoring program. Data were most recently collected on January 21-22, 2021. This included continuous transducer-recorded data from 4 wells and manual water-level measurements from 11 wells. The Bozlan-1 well was inaccessible during the most recent monitoring run.

All of the previously installed transducers were removed during this most recent monitoring run to allow for a required firmware update. There are currently only 4 of the originally purchased 15 transducers that are still operational, and they will be reinstalled in the following wells later in February: Austin-1, E2034-S, E-2298, and Smith-1.

To date, 14 wells have been subject to continuous monitoring for some period of time. The rise-fall effect of seasonal irrigation pumping has been observed in 10 wells (3 manually monitored and 7 continuously monitored) including Magnum Steel, E-6385, E-50-1, E-50-4, E-2034-S, E-2298, Romero Windmill, Smith-1, Shaw Windmill, and Anaya. Wells whose water levels do not appear to be affected by irrigation pumping are located near the basin perimeter. These include Bozlan-1, E-9673, Greene-1, Greene-4, Austin #1, and the Swenka Exploratory well.

Figure 1 shows the EBWPC groundwater monitoring network (blue circles) and additional wells that are monitored by the USGS (orange circles). Figure 2 shows the locations of the EBWPC wells whose water levels are discussed in this report.

Near the northwest boundary of the basin, water levels in E-2298 (Figure 3) did not appear to show any response related to irrigation pumping for the first few years of monitoring, and were previously seen to be linearly increasing. Following the drilling of a replacement well in close proximity to E-2298 during the second half of 2012, the rate of the water level rise increased for about 6 months. Beginning around 2015, the water levels appeared to show a seasonal irrigation pumping signal, and have exhibited a slow downward trend since that time.

Water levels in the Bozlan-1 well (Figure 4) varied about an average level of 6665 ft AMSL from the start of monitoring in 2008 through the first quarter of 2011. Since then, water levels have generally decreased. A clear seasonal variation in water levels due to irrigation pumping is not evident in this well. Water levels decreased about 50 ft at this location between January 2008 and January 2018. However, water levels have increased approximately 50 ft in this well since January 2018. A new transducer was installed in Bozlan-1 on February 13, 2019. As noted above, there was no access to this well during the most recent monitoring run.

Water levels measured at the Hagerman Headquarters well several miles west of Bozlan-1 are shown in Figure 5. Current water level measurements in this well indicate that a sudden 13 ft rise observed in September 2016 may have resulted from a well collapse. No water was detected in the well during the February 2019 visit and the well will no longer be monitored.

South of E-2298 along the western edge of the basin, E-9673 (Figure 6) does not display seasonal water-level changes that would indicate it is affected by irrigation pumping. In May 2011, water was pumped from E-9673 for water-quality analysis. At the end of the water-quality sampling, the water level in E-9673 had decreased from about 6954 ft AMSL to 6812 ft AMSL and subsequently started to recover. The water level was relatively constant through 2012 at a level approximately 10 ft lower than it was prior to water-quality pumping. Between January 2013 and May 2017, the water level at this location increased approximately 35 ft to 6976 ft AMSL. Since May 2017, the water level has gradually decreased to 6950 ft AMSL.

The Anaya well, located approximately 2 miles east of Edgewood (Figure 2), was added to the monitoring network in April 2015. An initial manual water-level reading was taken in this well on April 29, 2015, and a transducer was subsequently installed on July 25, 2015, to begin continuous monitoring (Figure 7). The data to date suggest that water-level seasonal variations due to irrigation pumping in the basin are evident in this well. The water levels start to decrease around February of each year and this decrease ends around August/September of each year.

Magnum Steel (Figure 8) and E-6385 (Bowman) (Figure 9) in the north central part of the basin clearly show the seasonal variations associated with irrigation pumping and both exhibit an overall long-term decline. E-6385 is now under new ownership and will no longer be monitored.

Wells E-50-1 (Schwebach 1) (Figure 10) and E-50-4 (Schwebach 4) (Figure 11) near the center of the basin (Figure 2) show the effect of seasonal irrigation pumping. Water-level changes often exceeded 20 ft between the start and end of the irrigation season when monitoring began in 2009. Long-term water levels in the vicinity of wells E-50-1 and E-50-4 are clearly declining, but the magnitude of the seasonal fluctuations has decreased in E-50-4 over the past four years. The peak recovery water level in E-50-4 during the non-irrigation season has decreased about 35 ft since monitoring began. No water could be detected in E-50-4 during the attempt on February 13, 2019. There is currently no transducer installed in this well.

The apparent static water levels at about 6417 ft AMSL in well E-50-1 resulted when the water level dropped below the level of the transducer in the well. The length of time that the water level was below the transducer steadily increased each year. The peak (maximum recovery) seasonal water levels in E-50-1 decreased to the point where the transducer was barely submerged during the non-irrigation season. A previous collapse in E-50-1 prevented the transducer from being installed at a greater depth, so the transducer was removed from this well on May 1, 2014, after the final data download.

Well E-2034-S displayed an irrigation pumping signal (Figure 12) from the start of monitoring in late 2008 up to the start of 2014. Overall, drawdown during the irrigation season exceeded recovery during

non-irrigation periods, with water levels decreasing approximately 20 ft since the start of monitoring in late 2008. The general character of the E-2034-S water levels changed in early 2014, remaining relatively constant (no apparent irrigation signal) up to January 2016. The water level increased approximately 3 ft in early 2016 and has remained relatively constant since that time.

The Swenka Exploratory well (Figure 13) water levels have been highly variable since the start of monitoring in 2009, but there is no clear indication that they are being affected by irrigation pumping in the basin. The difference between the maximum and minimum water levels observed in this well has been approximately 20 ft. The transducer that had been installed in this well is no longer operational.

Farther south, but still on the west side of the basin, E.B. Romero windmill (Figure 14) shows both short-term windmill pumping cycles as well as the seasonal irrigation pumping cycles. A notable rise in the well's water level started in April 2015 and it is currently at its highest level since the start of monitoring in 2009. There is currently no transducer in this well, but manual monitoring continues.

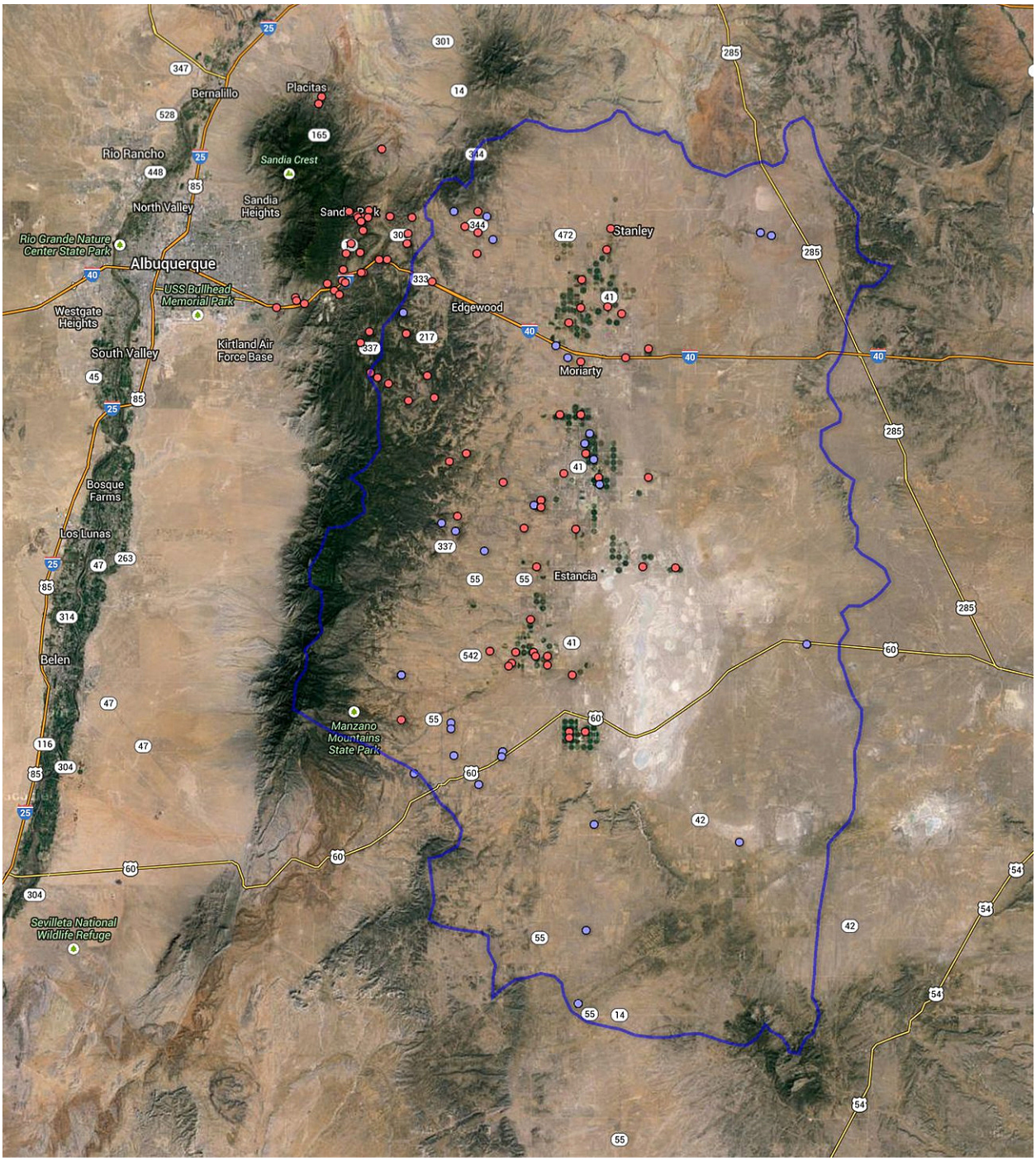
Continuing south along the west side of the basin, Smith-1 (Figure 15) shows the seasonal irrigation pumping cycles and displays a long-term water-level decline. Similar to the water levels in E-50-4, the magnitude of the seasonal fluctuations in Smith-1 has generally decreased since the start of 2014.

Water level readings from the Austin #1 well are shown in Figure 16. The overall water level has been relatively constant, with an observed variability of about +/- 0.25 ft.

Manual water-level measurements in well E-9407 (Figure 17) started in September 2012 and a pressure transducer for continuous monitoring was installed in October 2012. There appeared to be a slight downward trend in water levels at this location, with the water level decreasing about 0.6 ft since the start of monitoring. When the transducer at this well was checked on December 15, 2014, it was determined that some portion of the well had collapsed and the transducer was retrieved from under about 55 ft of mud. Monitoring of this well has been discontinued.

The Shaw WM (Figure 18) water levels show the irrigation pumping signal, but the average water level at this location appears to be relatively constant, with only about 0.2 ft net change over the past 9 years. The magnitude of the seasonal fluctuations decreased at this location between January 2014 and January 2016, similar to the responses in E-50-4, E-2034-S, and Smith-1.

Neither Greene-1 (Figure 19) nor Greene-4 (Figure 20) in the southern part of the basin (Figure 2) shows the effects of irrigation pumping. The water levels at Greene-1 appear to display slight trends that persist for several years before changing. The transducer in Greene-1 stopped functioning in November 2018, and has not yet been replaced. As noted previously, monitoring was discontinued in Greene-4 due to its remote location. During the 3 years that Greene-4 was monitored, the total variation in the water level was about 11 ft, but the net change between the first and last data points was effectively zero.



Estancia Basin Topographic Boundary

EBWPC Monitored Wells

USGS Monitored Wells

URL: http://goo.gl/oWmoy7

Figure 1. Groundwater monitoring network showing EBWPC and USGS monitored well locations.

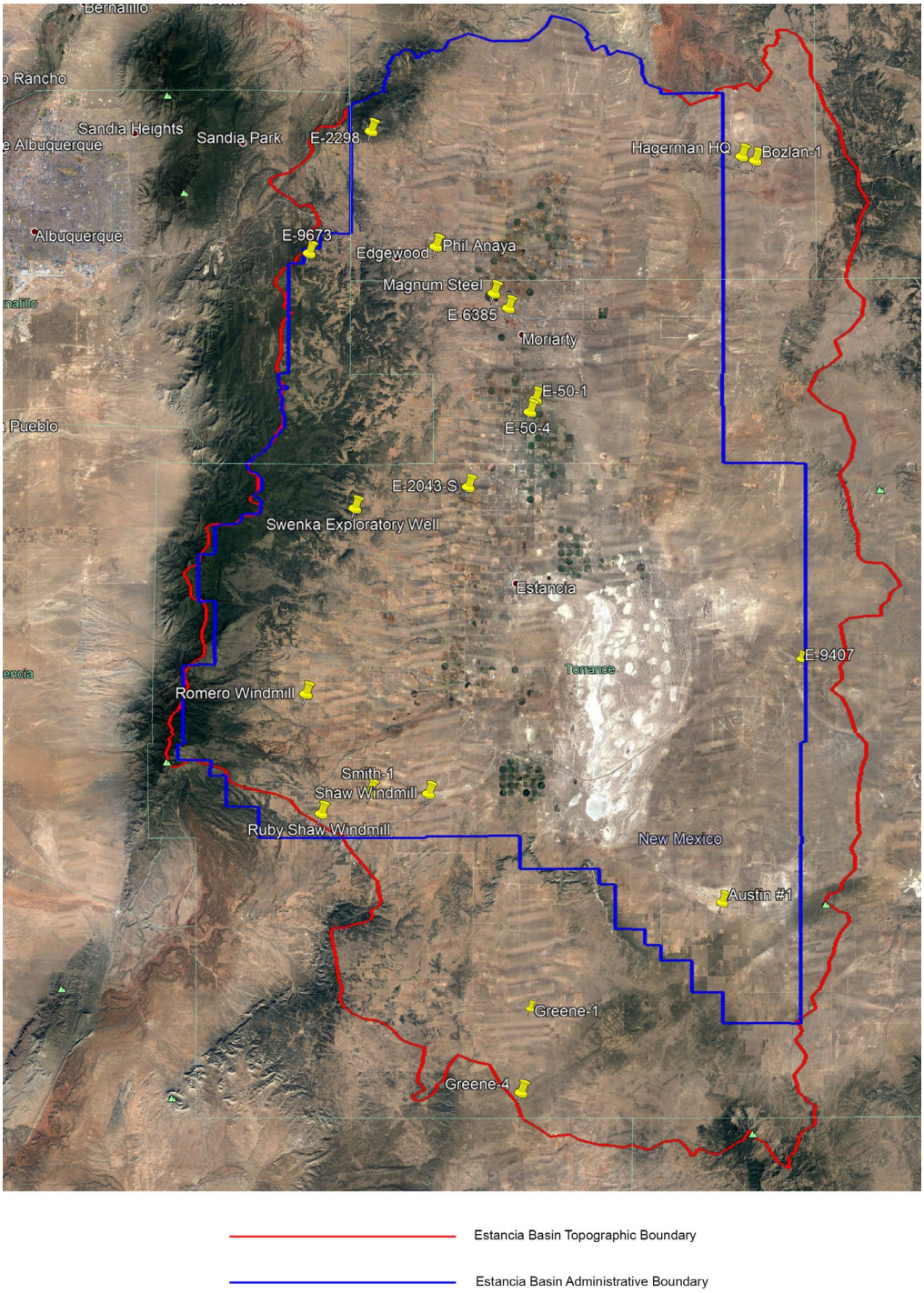


Figure 2. EBWPC groundwater monitoring network showing selected well locations.

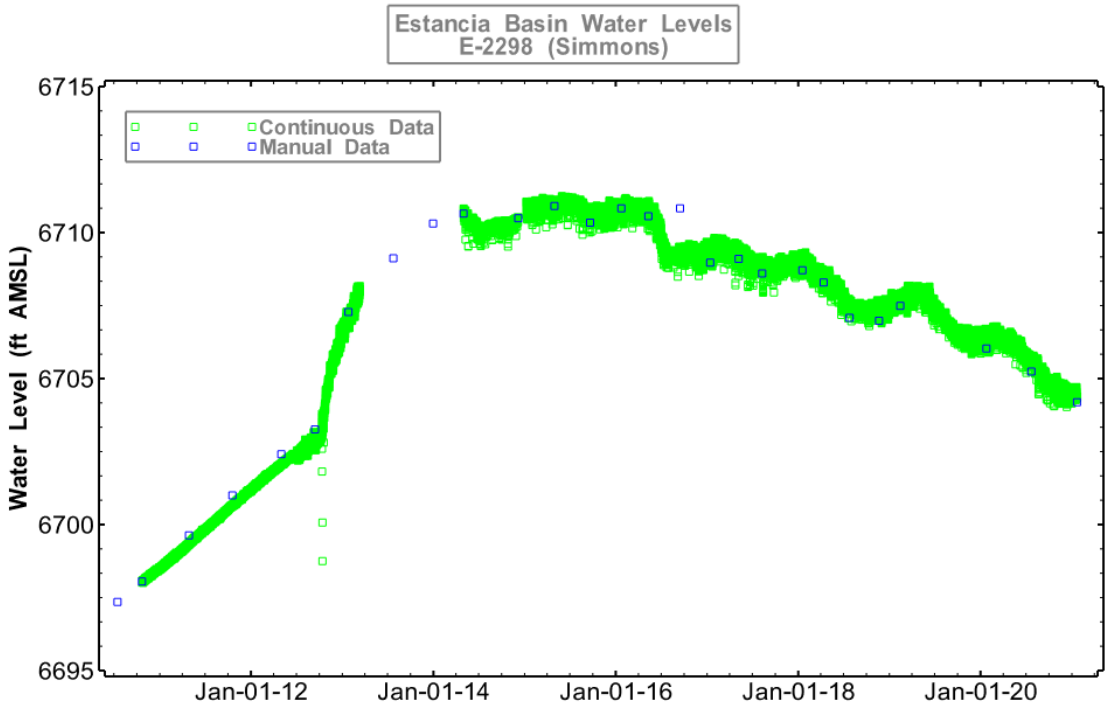


Figure 3. Water levels measured in well E-2298 (Simmons).

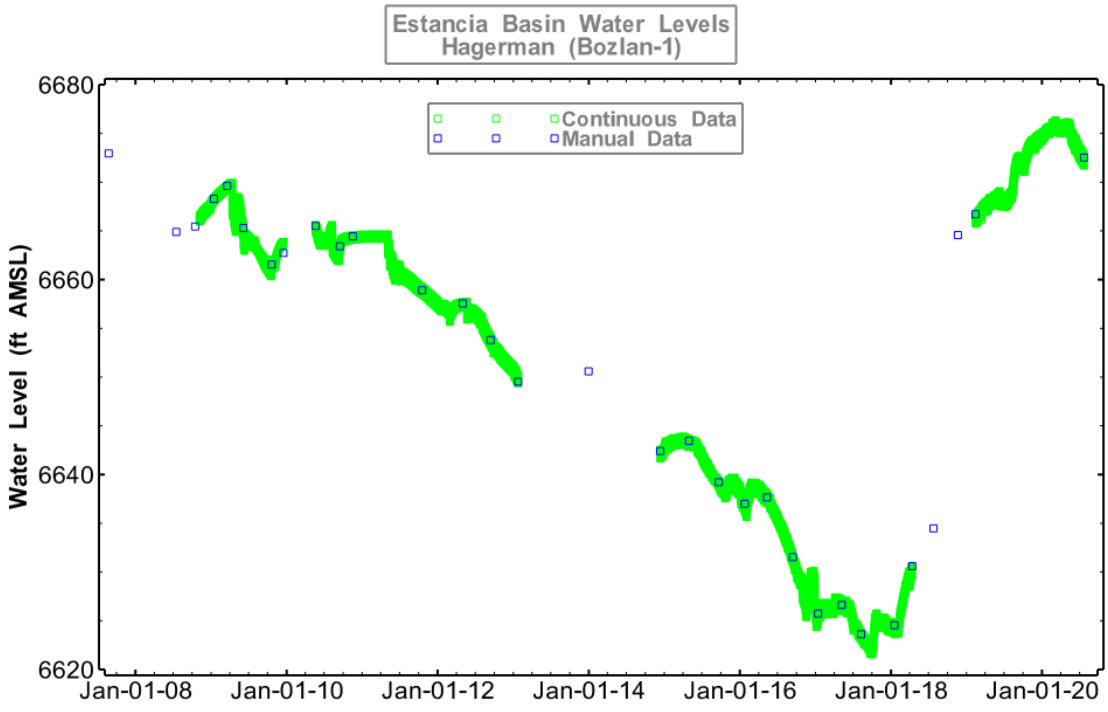


Figure 4. Water levels measured in the Bozlan-1 well.

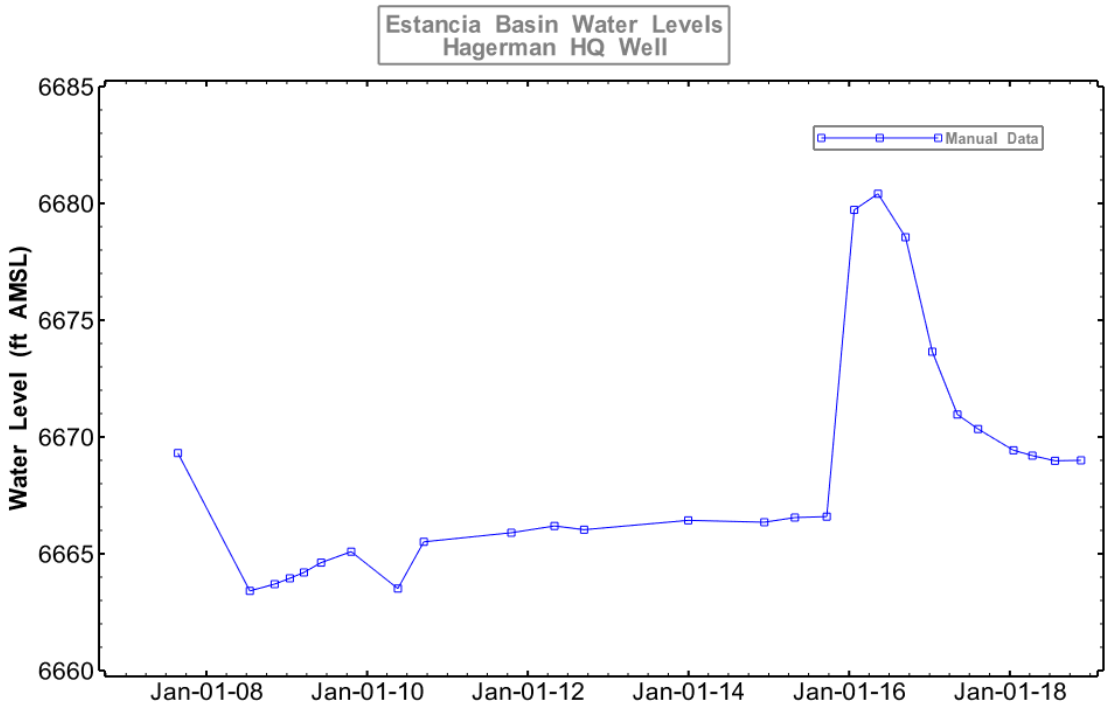


Figure 5. Water levels measured in the Hagerman Headquarters well.

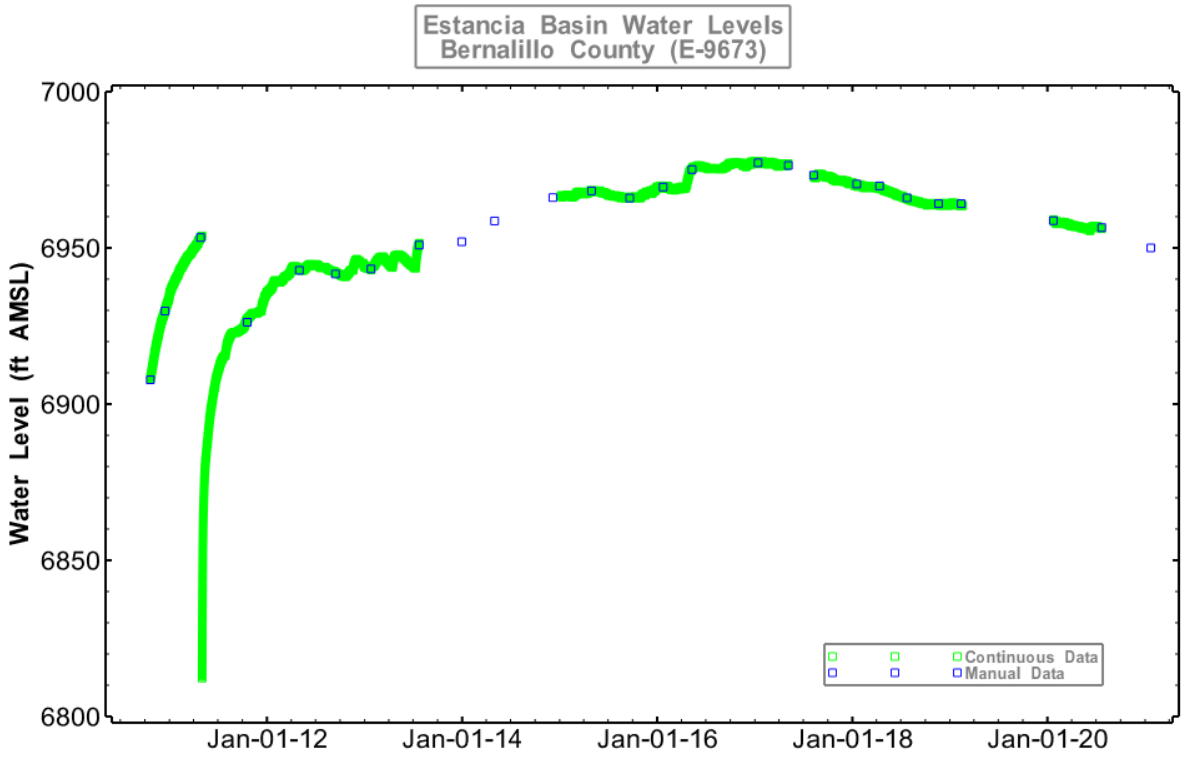


Figure 6. Water levels measured in well E-9673 (Bernalillo County).

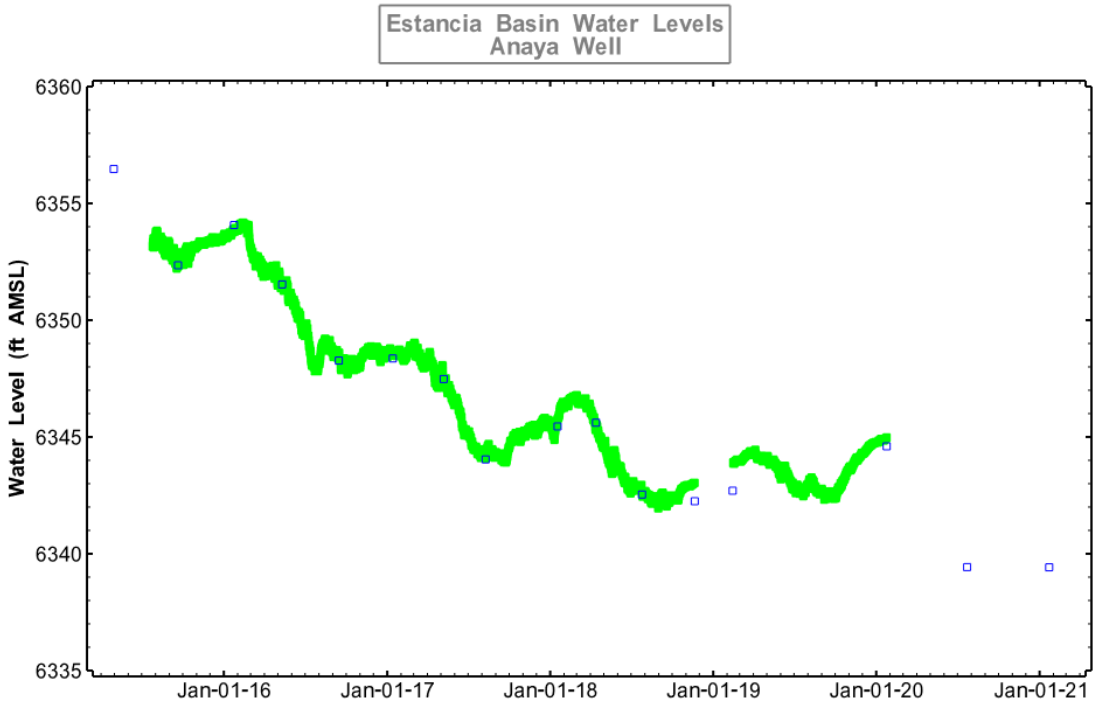


Figure 7. Water levels measured in the Anaya well.

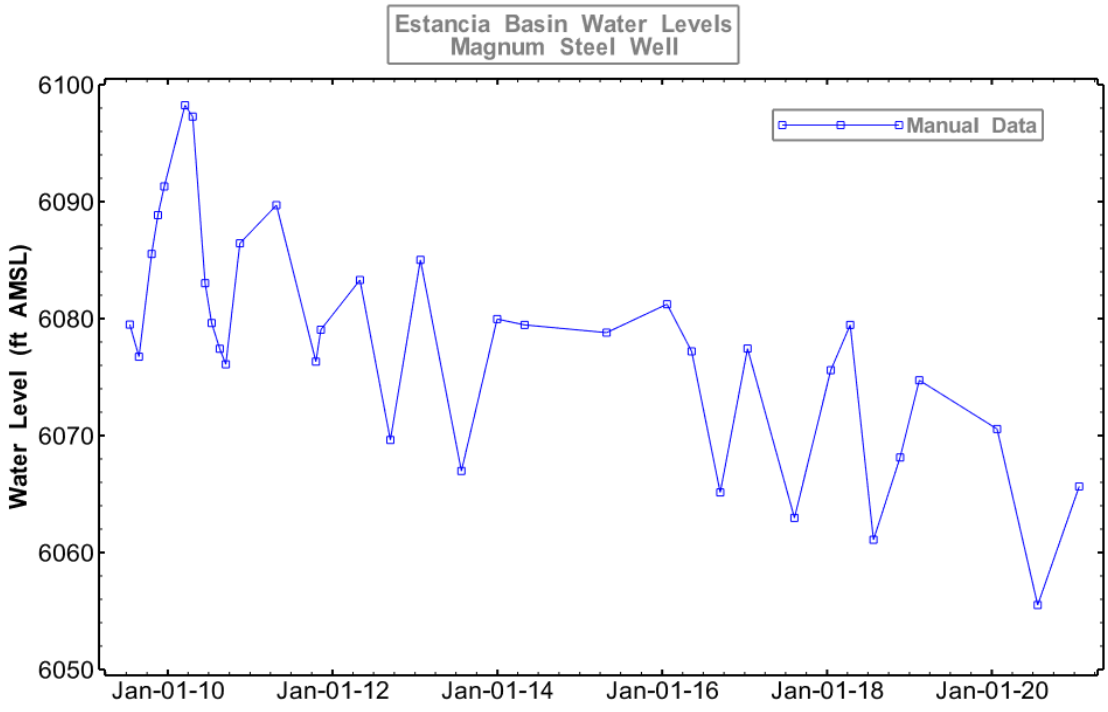


Figure 8. Water levels measured in the Magnum Steel well.

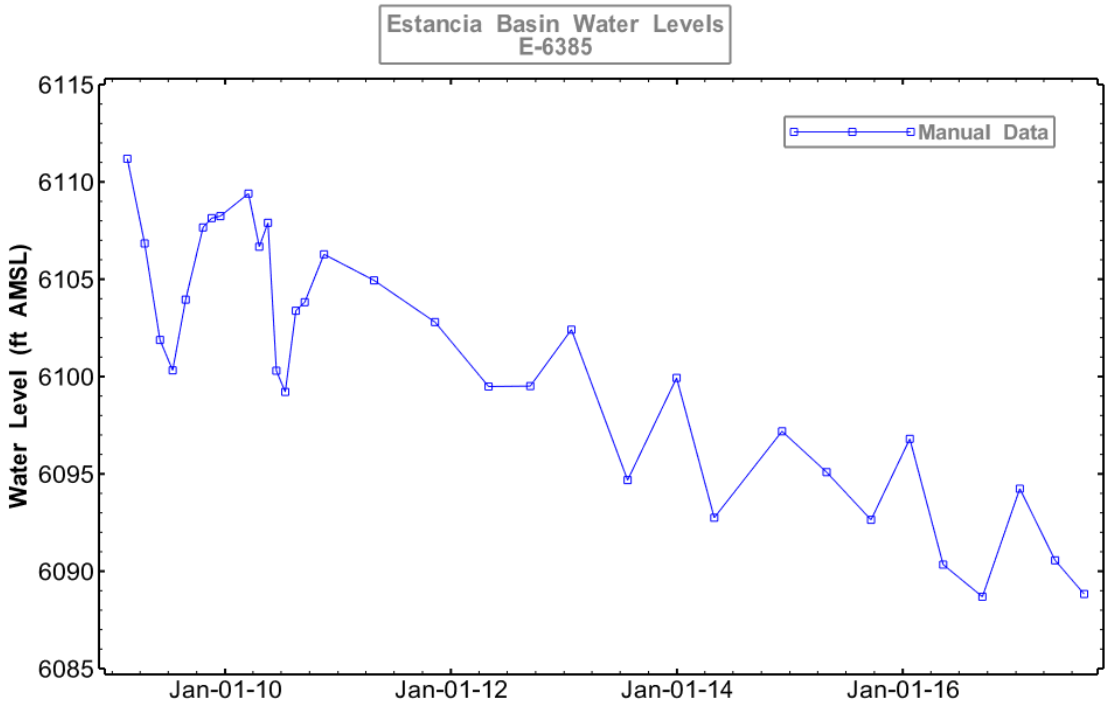


Figure 9. Water levels measured in well E-6385.

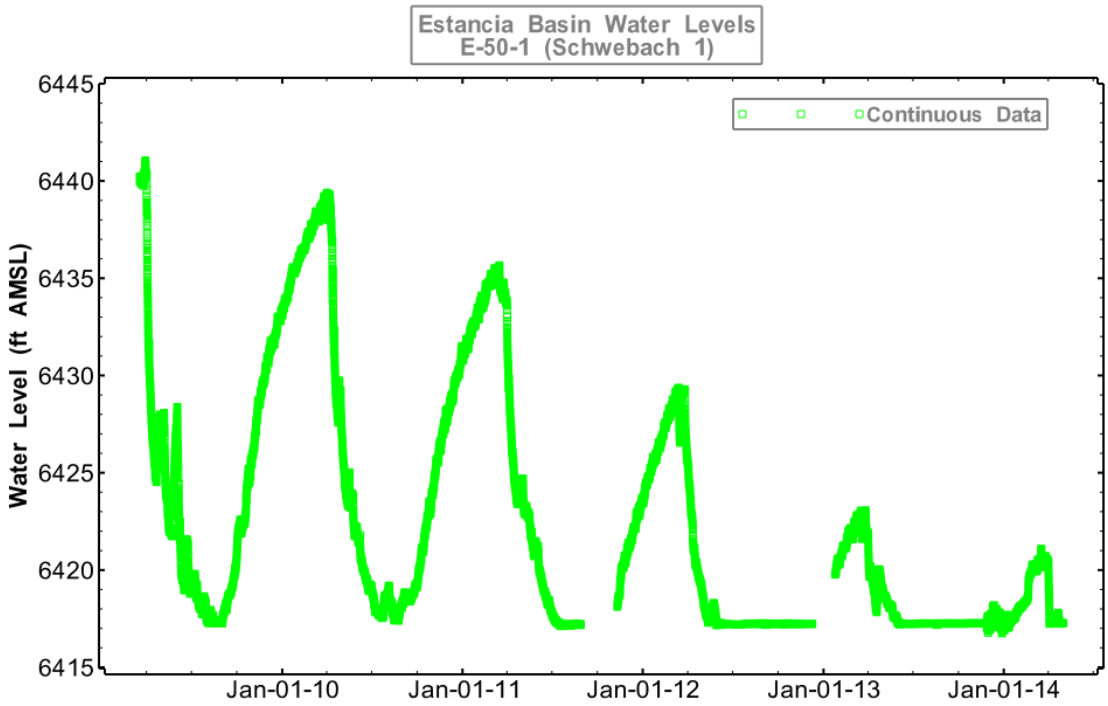


Figure 10. Water levels measured in well E-50-1 (Schwebach 1).

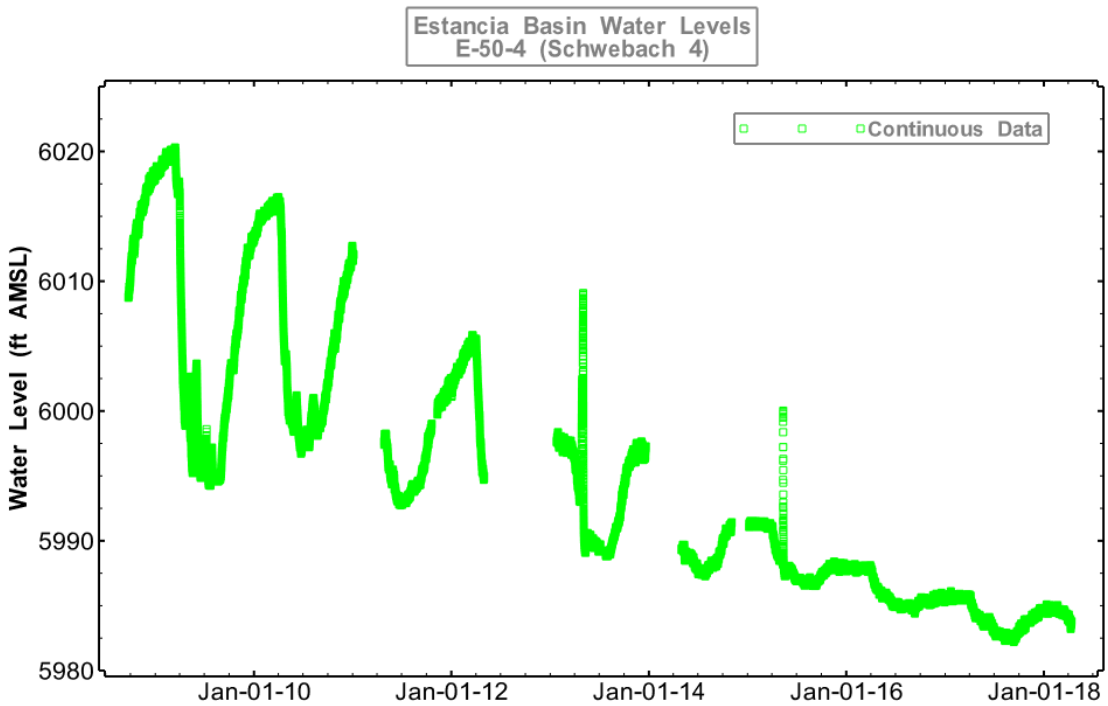


Figure 11. Water levels measured in well E-50-4 (Schwebach 4).

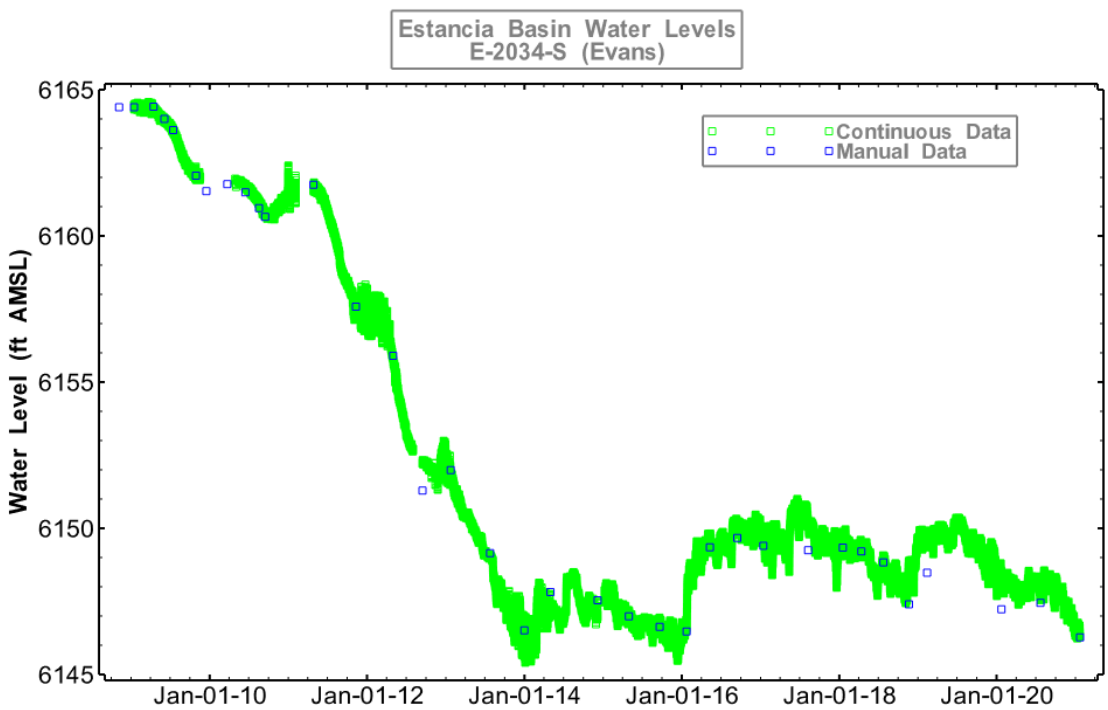


Figure 12. Water levels measured in well E-2034-S (Evans).

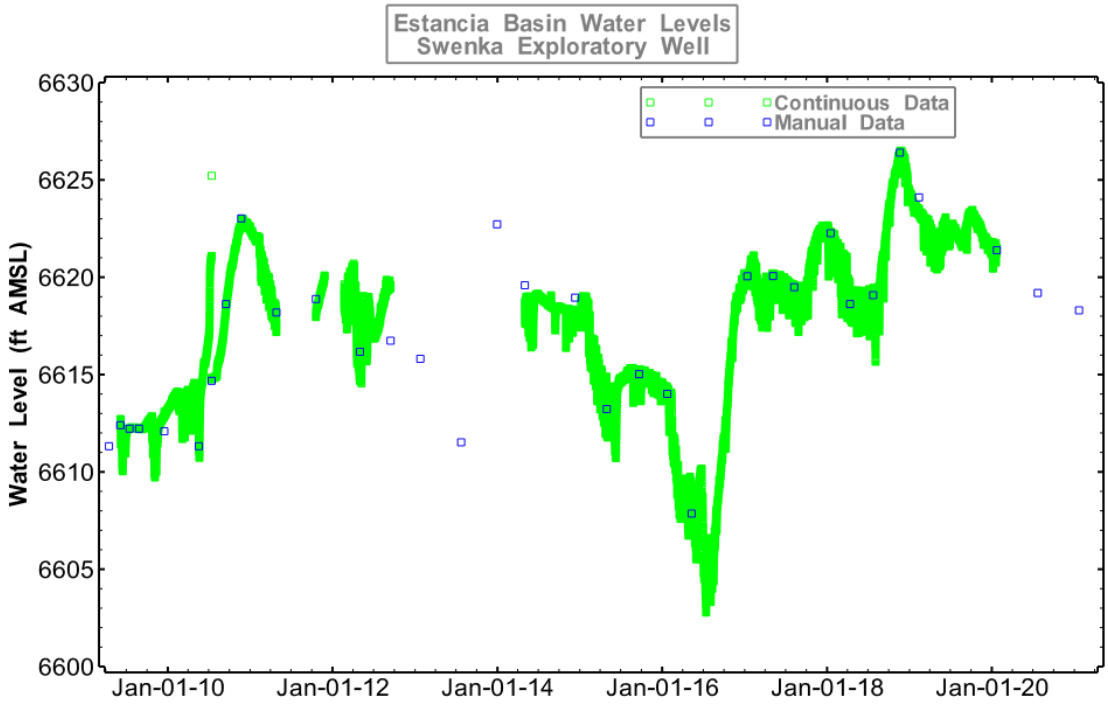


Figure 13. Water levels measured in the Swenka Exploratory well.

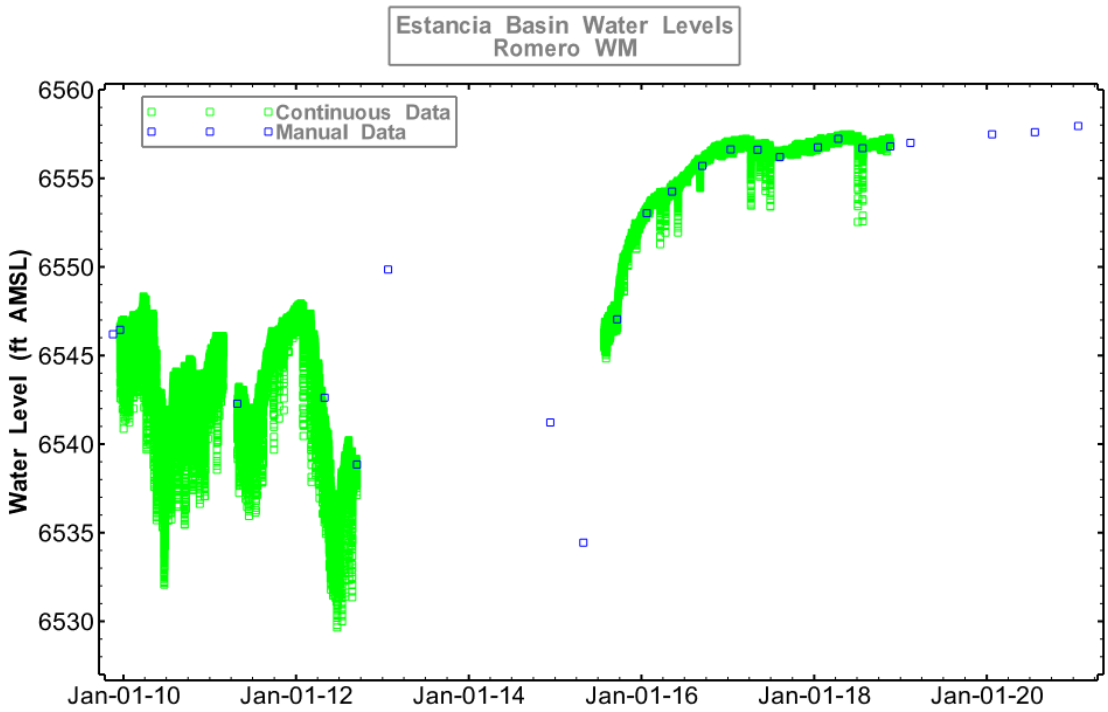


Figure 14. Water levels measured in the E.B. Romero WM well.

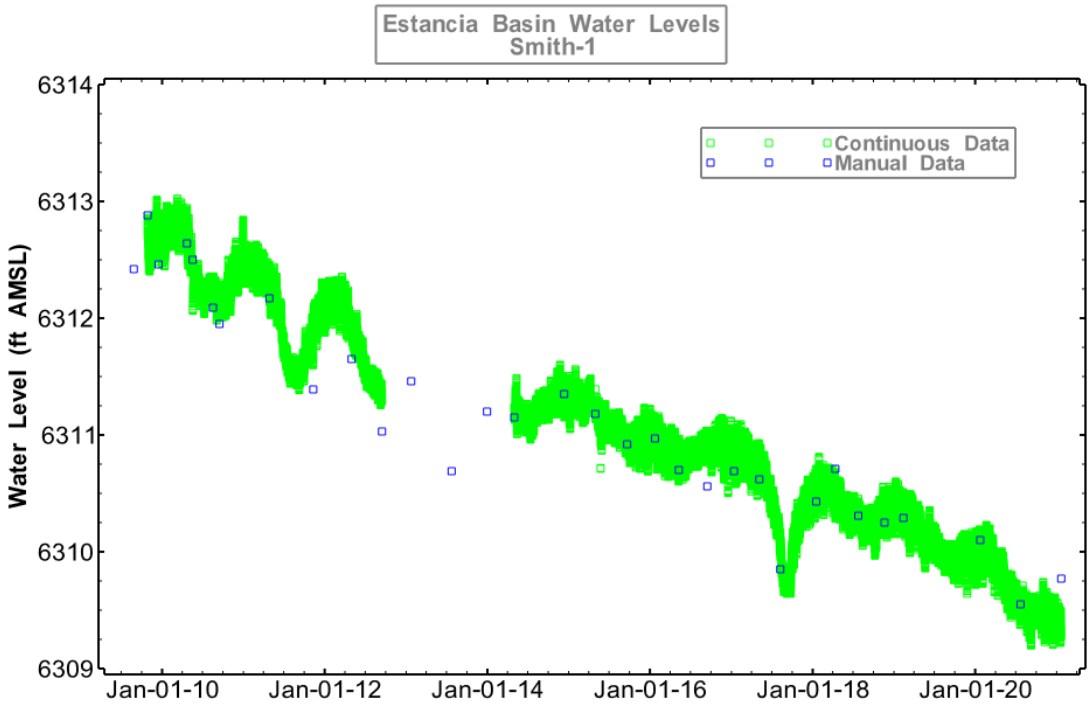


Figure 15. Water levels measured in the Smith-1 well.

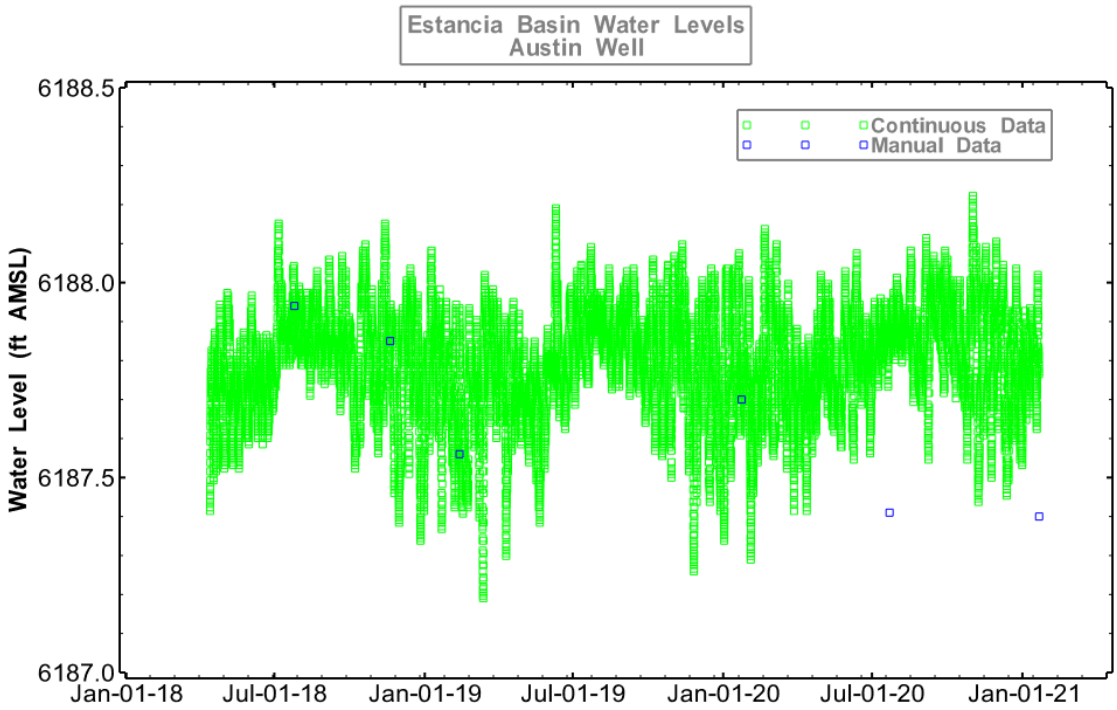


Figure 16. Water levels measured in the Austin #1 well.

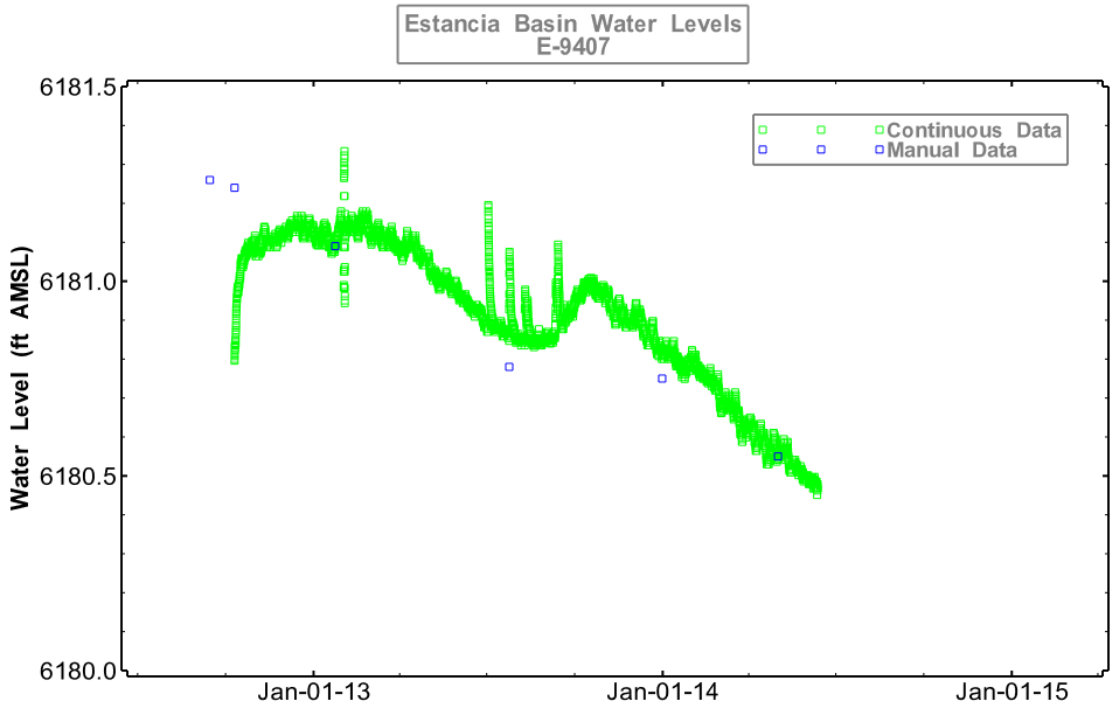


Figure 17. Water levels measured in well E-9407.

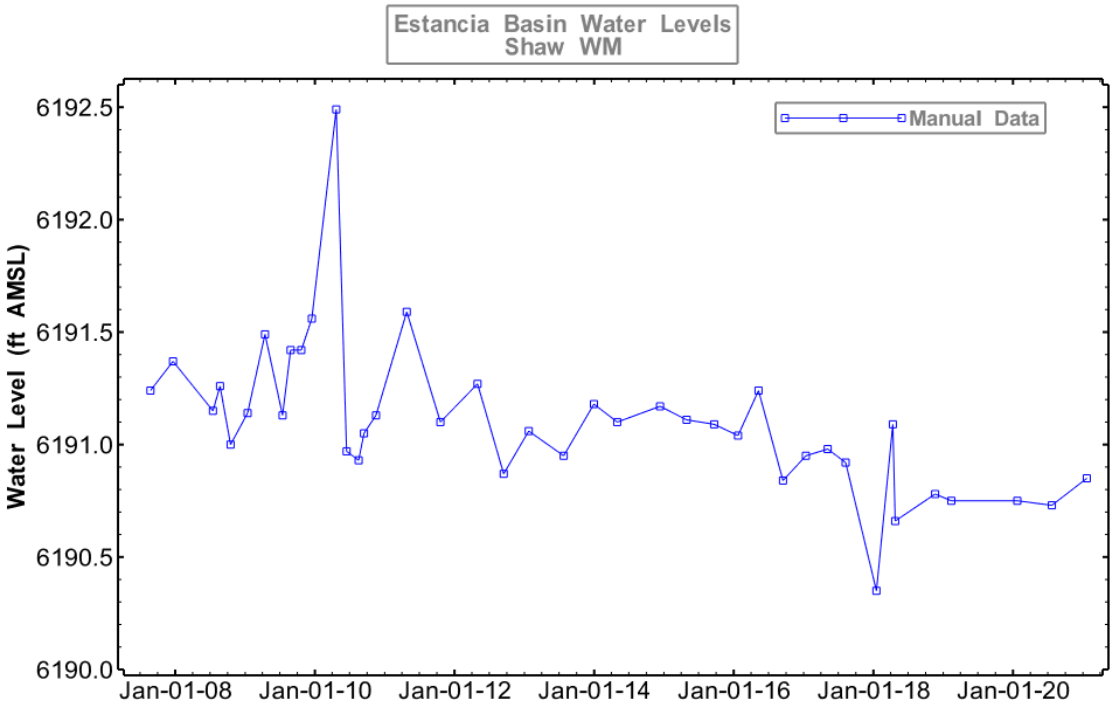


Figure 18. Water levels measured in the Shaw WM well.

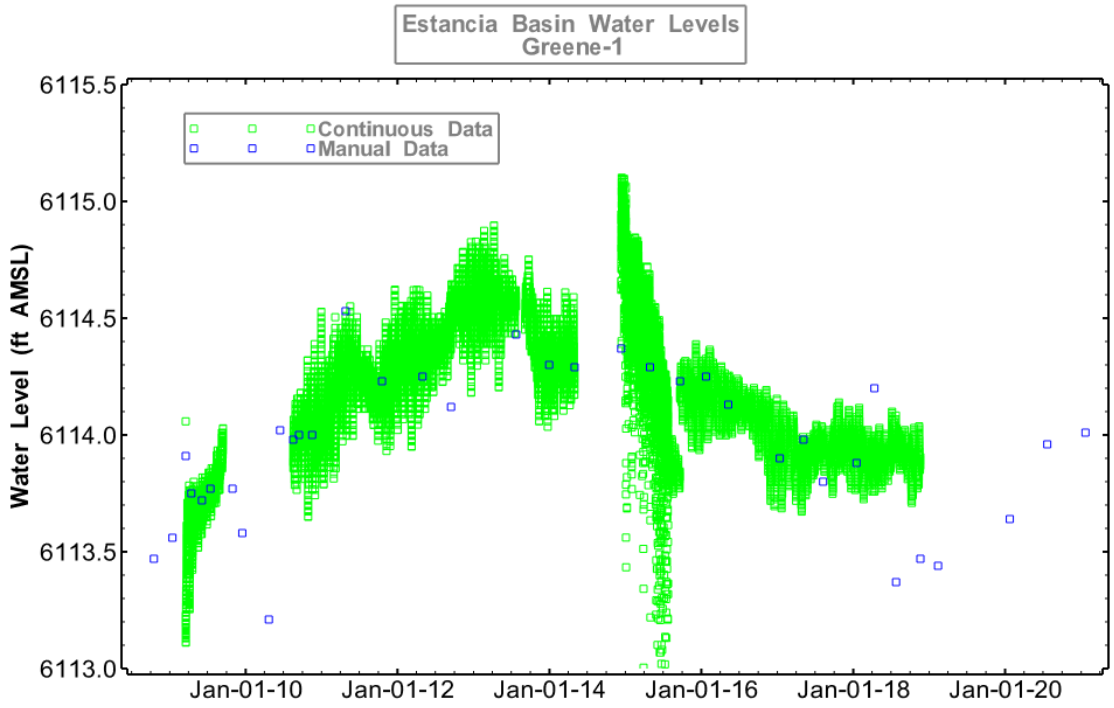


Figure 19. Water levels measured in the Greene-1 well.

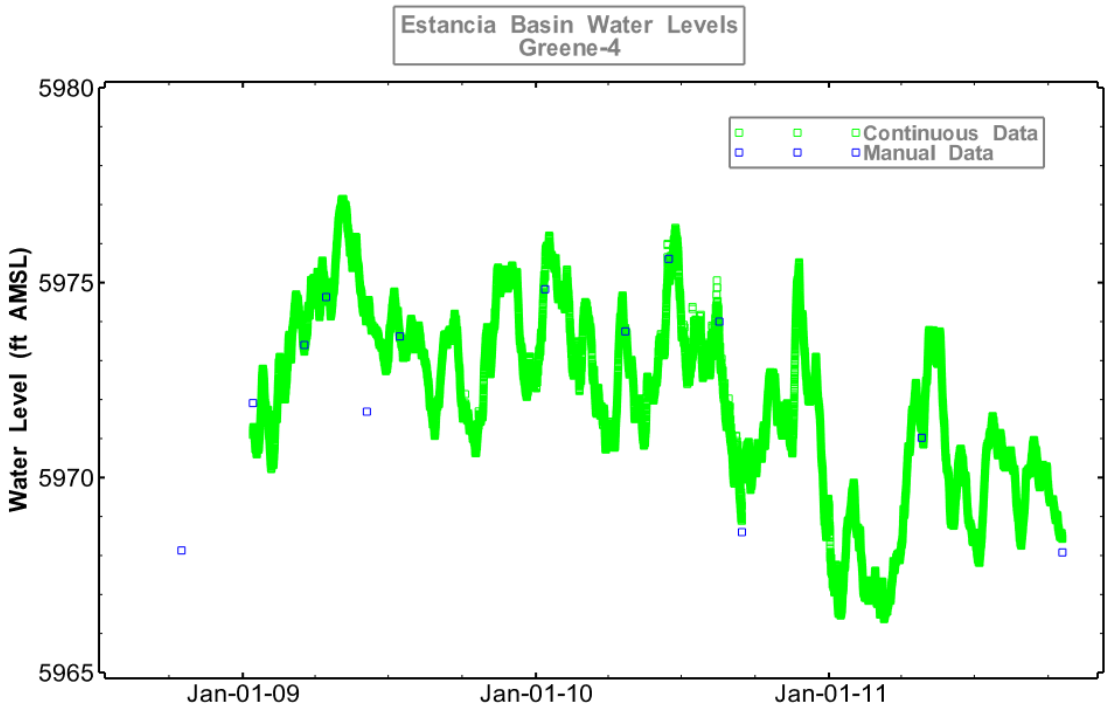


Figure 20. Water levels measured in the Greene-4 well.