2019-2020 ANNUAL ICR AND WELL FIELD REPORT

Prepared for

ICR WATER USERS ASSOCIATION

Prepared

By

Katie Geyer

2019-2020 ANNUAL ICR WELL FIELD REPORT

PURPOSE OF THE REPORT

This report serves as part of an annual series of reports for the Inscription Canyon Ranch (ICR) well field dating back to 2012. It is intended to provide a description of current conditions at the well field including pumpage, water levels, yields of individual wells, and the water demand and use of water by the subdivisions served.

ICR WATER USERS ASSOCIATION

The ICR Water Users Association (ICRWUA) is a private, non-profit water company providing water to the Inscription Canyon Ranch, Whispering Canyons, Preserve at the Ranch, and Talking Rock subdivisions as well as the Talking Rock golf course. The first three subdivisions obtain water from the ICR well field, which consists of two wells and constitutes the ICR groundwater system. The company is regulated by the Arizona Corporation Commission.

In 2020, ICRWUA provided water to 354 residential customers in the Inscription Canyon Ranch, Whispering Canyons, and Preserve at the Ranch subdivisions, an increase of 30 customers since 2019 and 81 customers since 2013 (Table 1). In addition to providing water to residential customers, ICRWUA serves several commercial entities located within the subdivisions and provides water for irrigation of the common areas as well as for home construction purposes within the subdivisions.

Table 1, Residential Customers served December 2012 – June 2020

Subdivision	2013	2014	2015	2016	2017	2018	2019	2020
ICR	291	303	312	314	318	342	342	372

2019-2020 RESIDENTIAL, COMMERCIAL, AND LANDSCAPE DEMAND

The monthly and annual water demands shown in tables 2 and 3 are for all major users served by the ICR well field, excluding construction purposes. The values are derived from monthly billing records that run on a mid-month billing cycle rather than a calendar basis. The billing records date from December 18, 2018 to December 16, 2019 for 2019, and December 17, 2019 to June 15, 2020 for 2020 YTD. Column 2 in tables 2 and 3 shows monthly residential water demand in gallons; column 3 shows the number of residential units served; column 4 shows the number of residential units that had zero water usage for the month; column 5 and 6 show monthly demand for commercial and landscape use in gallons; column 7 shows total residential, commercial, and landscape demand in gallons per day per residence (gpd/r) for each month and for the year.

These values demonstrate significant variation of monthly demand, increasing during the drier, pre-monsoon months in response to increased drip irrigation of residential and common area landscape. The annual average use in gallons per day

per residence in the ICR system, including commercial and landscape demand, increased from 238 gpd/r in 2018 to 249 gpd/r in 2019. Thus far in 2020, the annual average use in gallons per day per residence is 219 gpd/r.

Table 2, 2019 ICR Groundwater System Residential, Landscape, and Commercial Water Demand, in gallons

Month	Residential Demand	Residential Customers	Zero Use Residential Customers	Commercial Demand	Landscape Demand	Total Demand	Average Residential Use (gpd/r)
January	1,316,680	332	15	1,550	1,380	1,319,610	134
February	1,184,820	333	23	570	640	1,186,030	137
March	1,152,810	331	23	1,260	570	1,154,640	121
April	1,739,180	342	17	2,800	4,810	1,746,790	179
May	2,558,150	335	20	5,030	7,370	2,570,550	263
June	2,834,950	334	8	6,430	8,570	2,849,950	291
July	3,755,940	338	9	4,110	8,410	4,044,445	358
August	3,997,840	336	6	1,930	13,820	4,217,195	384
September	4,269,930	339	6	3,500	25,530	4,302,038	420
October	2,974,730	341	9	2,460	28,170	3,140,145	281
November	2,569,830	340	6	1,660	19,150	2,656,246	252
December	1,257,980	340	6	1,130	3,430	1,426,951	119
Total/Avg	29,612,840[1]	337[1]	12[1]	32,430	121,850	30,614,590	245[1]

[1]average annual value.

Table 3, 2020 Year-to-Date (YTD) ICR Groundwater System Residential, Landscape, and Commercial Water Demand, in gallons.

Month	Residential Demand	Residential Customers	Zero Use Residential Customers	Commercial Demand	Landscape Demand	Total Demand	Average Residential Use (gpd/r)
January	1,102,260	342	12	1,220	0	1,345,254	104
February	1,151,090	344	16	1,550	0	1,393,875	115
March	1,212,810	350	16	15,390	0	1,505,895	112
April	1,553,720	352	16	7,110	2,020	1,755,450	147
May	2,955,620	354	16	8,349	29,300	2,969,262	269
June	4,182,130	356	16	2,730	24,730	4,460,837	392
Total/Avg	13,258,630	333[1]	15.3[1]	36,349	56,050	13,422,512	190[1]

[1]average annual value.

THE ICR WELL FIELD

There are two wells, ICR 1 and ICR 2, in the ICR well field, located about 47 feet apart. The wells are within Section 17, Township 16 North, Range 3 West and are situated in the Mint Wash floodplain, about one-half mile west of Williamson Valley Road where the road crosses the wash.

Well 1 is the original well, constructed in 1994 by the developer of the Inscription Canyon Ranch to provide water to the subdivision. Whispering Canyons L.L.C. later constructed well 2, often referred to as Whispering Canyon 1 (WC 1), in 2002 to serve Inscription Canyon Ranch, Whispering Canyon, and Preserve at the Ranch subdivisions.

The wells are owned by Aqua Meadows and are on land owned by Aqua Meadows. ICRWUA has an agreement dated August 1, 1995 that gives the Association the right to operate and use ICR well 1 as a water supply for Inscription Canyon Ranch and Preserve at the Ranch subdivisions for 100 years, subject to renewal every 25 years. This agreement serves to satisfy the Arizona Department of Water Resources 100 Year Water Adequacy Requirement. An amendment to the agreement (Amendment 1), dated July 24, 2001, adds Whispering Canyon subdivision. ICRWUA is responsible for operating and maintaining the two wells and paying all costs associated with the operation and maintenance. Per contract with Aqua Meadows, the Association is permitted to withdraw 164,518,498 gallons per year to service the ICR, WC, and Preserve at the Ranch subdivisions.

The aquifer tapped by the wells is a mixture of unconsolidated sediments consisting of clay, silt, sand, and gravel, locally cemented to form conglomerate. The base of the aquifer is confined by crystalline basement rock, occurring at a depth of about 223 ft at well 1, and about 220 ft at well 2. The pump intake at ICR well 1 is 172 ft below land surface. The depth to pump intake at ICR well 2 is 160 ft below land surface.

The water table elevation naturally fluctuates in response to seasonal patterns of precipitation. At the time ICR well 1 was completed, the regional water table was at a depth of 18 ft below land surface at ICR well 1 and 19 ft below land surface at ICR well 2.

JANUARY 2019 - JUNE 2020 MONTHLY WELL DEMAND

Total pumpage at ICR wells 1 and 2 in 2019 was 32,760,551 gallons. Total pumpage at well 1 for the year was 19,925,100 gallons while total pumpage at well 2 for the year was 12,835,451 gallons (table 4). Total pumpage at ICR wells 1 and 2 for January through June, 2020 was 13,641,408 gallons. Total pumpage at well 1 was 4,178,640 gallons while total pumpage at well 2 was 9,462,768 gallons (table 5). Monthly demand on the well field in 2019 increased from approximately 1,440,000 gallons in March to a high of 4,636,856 gallons in September when pumpage peaked. Demand then steadily decreased, falling to about 1,513,501 gallons in December. Monthly demand on the well field in 2020 increased from approximately 1,358,714 in January to a high of 4,460,323 gallons in June.

Table 4, 2019 ICR Wells 1 and 2 Monthly and Annual Pumpage, in gallons.

Month	Well 1	Well 2	Total
January	1,545,000	0	1,545,000
February	1,451,000	0	1,451,000
March	1,440,000	0	1,440,000
April	588,000	1,261,284	1,849,284
May	0	2,868,030	2,868,030
June	0	3,100,497	3,100,497
July	5,050	4,088,513	4,093,563
August	3,829,709	430,098	4,259,807
September	4,636,856	0	4,636,856
October	3,210,385	0	3,210,385
November	2,785,700	6,928	2,792,628
December	433,400	1,080,101	1,513,501
Total	19,925,100	12,835,451	32,760,551

Table 5, 2020 ICR Wells 1 and 2 Monthly and YTD Total Pumpage, in gallons.

Month	Well 1	Well 2	Total
January	0	1,358,714	1,358,714
February	77,806	1,369,494	1,447,300
March	337,951	1,149,196	1,487,147
April	547,573	1,143,995	1,691,568
May	1,414,660	1,781,696	3,196,356
June	1,800,650	2,659,673	4,460,323
Total	4,178,640	9,462,768	13,641,408

2013-2020 MONTHLY WELL FIELD DEMAND

Table 6 shows the variation in monthly demand at the ICR well field from January 2013 to June 2020. Minimum demand occurs in the winter months, with the lowest generally occurring during the first 3 months of the year. The highest demand occurs in June and July. The difference between maximum and minimum demand for a given year averages about 2.31 million gallons and has been as much as 3.2 million gallons.

The well field's annual demand during this time period has ranged from a low of 25,669,000 gallons in 2015 to a high of 32,457,551 gallons in 2019. These rates correspond to an average daily pumping rate ranging from 49 gallons per minutes to 62 gallons per minutes. The capacity of each ICR well is approximately 375 gpm.

Table 6, Monthly and Annual ICR Well Field Water Demand, Jan 2013- Jun 2020, in gallons.

Month	2013	2014	2015	2016	2017	2018	2019	2020
Jan	1,418,000	1,485,000	1,433,000	1,243,000	1,129,000	1,674,000	1,545,000	1,358,714
Feb	1,006,000	1,408,000	1,238,000	1,379,000	1,087,000	1,528,000	1,451,000	1,447,300
Mar	1,710,000	1,771,000	1,601,000	1,919,000	1,707,000	1,440,000	1,440,000	1,487,147
Apr	2,480,000	2,440,000	2,299,000	2,349,000	2,411,000	2,553,000	1,849,284	1,691,568
May	3,046,000	3,019,000	2,488,000	2,992,000	2,859,000	3,107,000	2,868,030	3,196,356
Jun	3,700,000	3,753,000	3,183,000	3,662,000	3,851,000	4,008,000	3,100,497	4,460,323
Jul	2,985,000	3,270,000	3,013,000	3,872,000	3,475,000	4,500,000	4,093,563	
Aug	2,817,000	2,603,000	2,820,000	3,031,000	2,905,000	3,283,000	4,259,807	
Sep	2,172,000	2,305,000	2,636,000	2,769,000	3,104,000	3,278,000	4,636,856	
Oct	2,034,000	2,642,000	2,161,000	2,369,000	2,896,000	2,629,000	3,175,385	
Nov	1,495,000	1,469,000	1,375,000	1,793,000	2,295,000	2,196,000	2,612,628	
Dec	1,242,000	1,335,000	1,422,000	1,220,000	1,672,000	1,451,670	1,483,501	
Total	26,375,000	27,500,000	25,669,000	28,598,000	29,391,000	31,647,670	32,457,551	13,641,408

MAXIMUM DAILY DEMAND

The maximum average daily demand for 2019 occurred in September, equaling 456 gpd/r. The maximum average daily demand for 2020 YTD occurred in June, equaling 445 gpd/r.

The September pumpage of 4,636,856 gallons exceeds that of all other months during the recorded time period. This demand equates to an average daily demand of approximately 154,562 gallons per day. There were 339 residential units served during this time with an average daily use of 456 gpd/r.

WELL FIELD HOURS OF USE AND YIELD

ICR well 1 was pumped for approximately 864.8 hours during 2019 for an average daily use of about 2.4 hours per day. The maximum use occurred in September when the well was pumped for approximately 201.3 hours for an average daily use of 6.7 hours. ICR well 2 was pumped for approximately 576.6 hours during 2019 for an average daily use of about 1.6 hours per day. The maximum use occurred in June when the well was pumped for approximately 183.7 hours for an average daily use of about 5.9 hours.

ICR well 1 was used for approximately 181.8 hours during 2020 YTD for an average daily use of about 1.0 hours per day. ICR well 2 was used for approximately 421.7 hours during 2020 YTD for an average daily use of about 2.3 hours.

Average annual yield for ICR well 1 was approximately 384 gpm for 2019 and 383 gpm for 2020 YTD. Average annual yield for ICR well 2 was approximately 371 gpm for 2019 and 374 gpm for 2020 YTD. Average annual yields for ICR

well 1 and well 2 over the last 5 years are shown below (table 7). The yields from each well have been relatively stable during this time.

Table 7, 2015-2019 YTD Average Annual ICR Well Field Yields, in gpm.

ICR well	2016	2017	2018	2019	2020 YTD
well 1	374	381	384	384	383
well 2	369	370	371	371	374

WELL FIELD WATER LEVELS

For practical reasons, it is best practice to maintain the pumping water level in the wells at approximately two-thirds of the original thickness of the aquifer at each well. This will maximize production relative to pumping cost and the decline in pumping water level. For both wells, the suggested maximum pumping depth to water should be about 152 feet below land surface.

Another consideration is the requirement to maintain the pumping water level in a well above the pump intakes, located 172 feet below land surface at ICR well 1 and 160 feet below land surface at ICR well 2. Long-term viability of the well requires a pumping level above these depths.

ICR WELL 1

Static (non-pumping) depths to water at ICR well 1 in 2019 did not vary significantly, nor did it vary much between June of 2019 and July of 2020. We only have depth-to-water data recorded for the first 6 months of 2019 with a recorded difference of .7 inches: a high of 39 feet in January and a low of 39.7 feet in June. We only have one recorded depth-to-water datum for 2020: 39 feet in June, an increase of .7 feet from the previous June. The slight difference of .7 feet may be due to a sustained recharge from the abnormally wet winter in 2019. The non-pumping water level of 39 feet below land surface in 2020 compared to an average of 39.4 feet in 2019 results in a difference of .4 feet.

Because of the short hourly use of the well, a pumping water level was recorded only once during 2019 following a 75-minute test at the well on July 18th. The pumping water level was recorded at 119 feet below land surface after pumping for 75 minutes, well above the pump intakes. A pumping water level was not recorded for 2020.

Pumping and non-pumping depths and stable well yields are consistent with continued viability of the well.

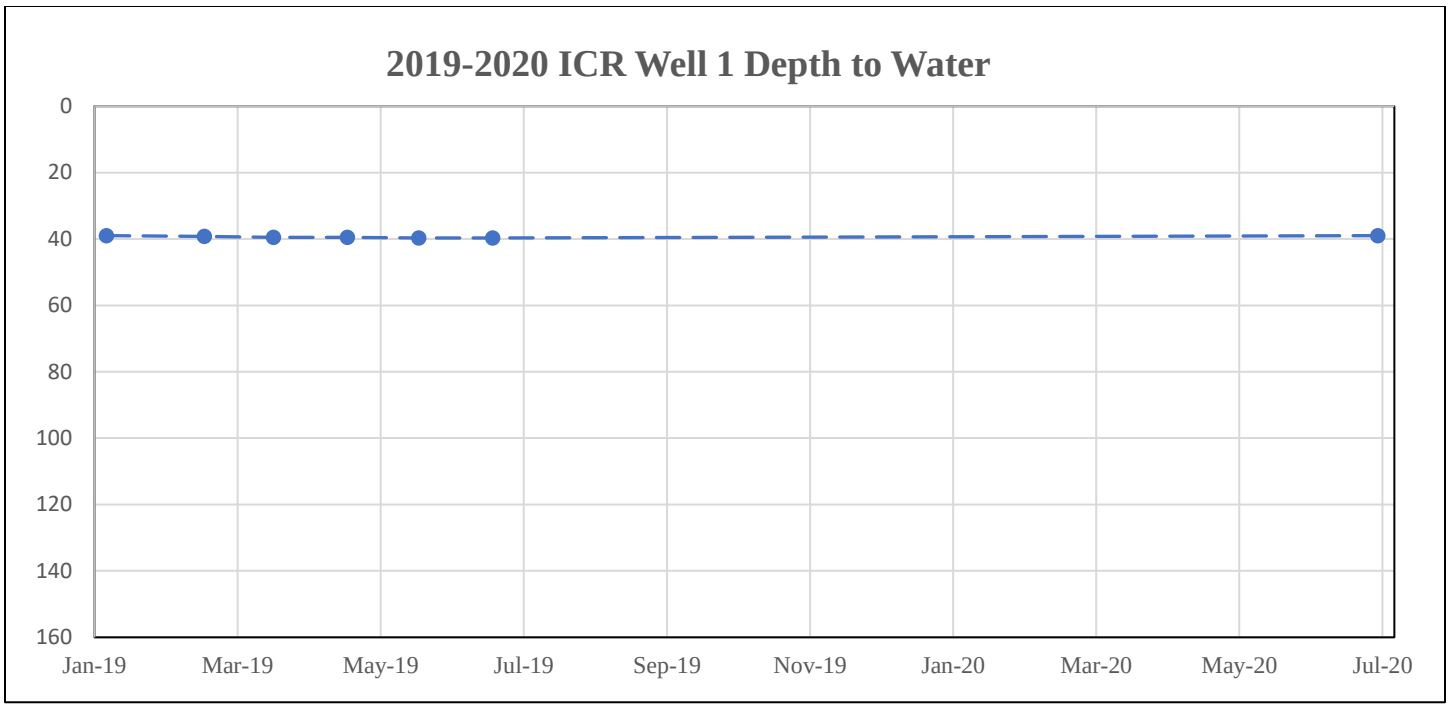

Figure 1: ICR Well 1 depth to water, only two data points available.

ICR WELL 2

Static depths to water at ICR well 2 in 2019 remained stable with a range of 39.4 feet below land surface in January to 40.1 feet below land surface in June. The non-pumping water levels averaged about 39.4 compared to 40.1 feet in 2019, a difference of .7 feet directly comparable to that in well 1.

Static depths to water at ICR well 2 in June 2020 was recorded at 39.4 feet below land surface, a .7 feet increase from the previous June.

A pumping water level was recorded only once during 2020 following a 75-minute test at the well on July 18th. The pumping water level was recorded at 77.8 feet below land surface after pumping for 75 minutes, well above the pump intakes.

Non-pumping depths and stable well yields are consistent with continued viability of the well.

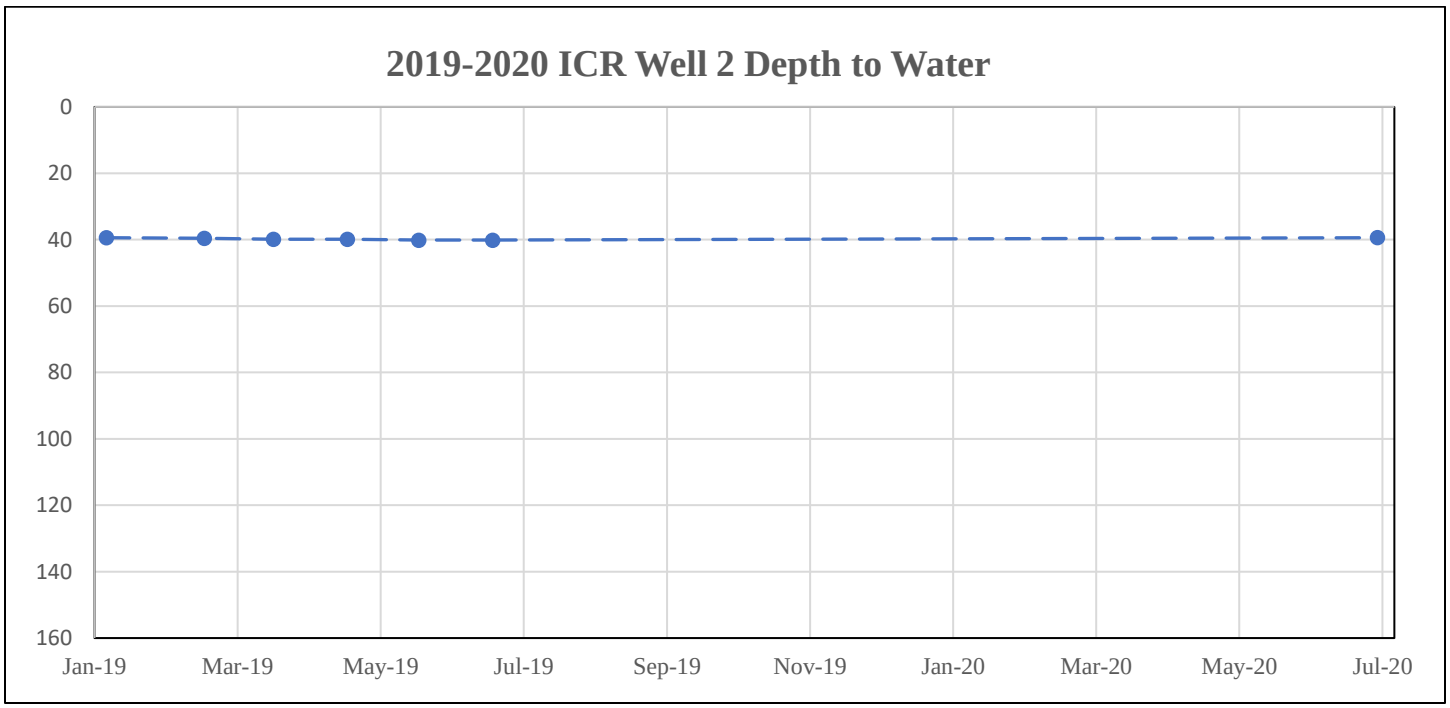

Figure 2: ICR Well 2 depth to water, only two data points available.

SUMMARY

The ICR Water Users Association (ICRWUA) is a private, non-profit water company providing water to the Inscription Canyon Ranch, Whispering Canyons, Preserve at the Ranch, and Talking Rock subdivisions as well as the Talking Rock golf course. The first three subdivisions are serviced by the ICR well field, which is comprised of two wells, ICR well 1 and ICR well 2, located about 47 feet apart.

The 2019 annual demand at the ICR well field was 32,457,551gallons, compared to 31,647,670 gallons in 2018. Average 2019 residential demand per residence, including landscape and commercial use, was 245 gpd/r for the subdivisions served by the ICR well field, compared to 238 gpd/r in 2018. The 2020 YTD average demand was 13,641,408 gallons. Average 2020 YTD residential demand per residence was 190 gpd/r.

The maximum 2019 monthly demand occurred in September, equaling 4,636,856 gallons. The maximum 2020 YTD monthly demand occurred in June, equaling 4,460,323 gallons.

The ICR well field is operated with only one well pumping during a given day, ICR well 1 serving as a back-up well to ICR well 2.

ICR well 1 was used for 864.8 hours during 2019 for an average daily use of about 2.4 hours per day. Maximum use was in September when the well was pumped 201.3 hours for an average daily use of 6.7 hours. Average annual yield from ICR well 1 was approximately 384 gpm. Total production from the well for 2019 was 19,925,100 gallons. ICR well 1

was used for 181.8 hours during 2020 YTD for an average daily use of about 1.0 hours per day. Average YTD yield was approximately 383 gpm. Total production from the well for 2020 YTD was 4,178,640 gallons.

ICR well 2 was used for 576.6 hours during 2019 for an average daily use of about 1.6 hours. Maximum use was in June when the well was pumped for 183.7 hours for an average daily use of about 5.9 hours. Average annual yield from ICR well 2 was approximately 371 gpm. Total production from the well for 2019 was 12,835,451gallons. ICR well 2 was used for 421.7 hours during 2020 YTD for an average daily use of about 2.3 hours per day. Average YTD yield was approximately 374 gpm. Total production from the well for 2020 YTD is 9,462,768 gallons.

Average yields for ICR wells 1 and 2 have been essentially stable over the last 5 years. This, combined with pumping and non-pumping depths to water in both wells, is consistent with the continued viability of the wells.