



# Waverly Water Update July 2024

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- JANUARY 2024- All wells were requested to be slowed to 80%, except well # 5 which was left at 100% since it does not have a Variable Frequency drive. After about a month we increased the speeds of the wells to the current speeds due to the smaller GPM wells doing the majority of the pumping compared to our larger capacity wells.
- - Feb 2024 Well # 5 was serviced from January 22 to Feb 7 and then valved down to run at 94% to keep the well from pumping too close to the top of the pump bowls and kept at 3 feet above that level while pumping.
- - Well # 6 was serviced next from Feb 7 to March 27, cleaning of the screen improved pumping capacity.
- - Well # 11 was serviced from March 20 to March 30, screen was in excellent condition so no change due to service.
- -Well # 9 was serviced from April 4 to May 4 , cleaning of screen improved pumping capacity.
- -Well 4 was serviced from May 10 to June 27, Cleaning of the screen appears to have increased capacity, however the static levels have raised in the Wabaunsee aquifer so it may be a reflection of the static level increase, we will see.
- South Wellfield Dakota Aquifer as you will see later does not change dramatically in static levels due to rain events and has stayed steady for the last 20 years.
- The Wabaunsee Aquifer wells # 4 and 5 see a more instant reaction to rain events since they are in the valley and closer to continuous running water in rivers.

- Well #8 was serviced in 2020 and will be planned to service by 2027
- Well # 10 is planned to be serviced as soon as October 2024
- Well # 7 has been drilled and awaiting finished construction deadline of July 30, 2024, however engineer has sent email hinting that an extension may need to be approved, so I expect it will not arrive until sometime in August which will increase capacity around another 350 GPM, or up to 500,000 gallons per day if ran 24 hours.
- Test samples, Parameter 13 testing have been done on area domestic wells in the study areas identified by Olsson Engineering with more planned to be drawn from pivot irrigation wells later this summer to acquire additional water quality data within the region around Waverly.
- Test wells identified by the Olsson studies have been proposed to be funded in the 24/25 budget year and once the data from those test wells are completed, then moving forward with addition capacity of production wells can be decided on where, how many, budgeting, engineering, land and ROW access, and construction of additional wells or wellfields can take place.
- The 2023 drought was in comparison to the 1936 drought and is not typical climatological for this region. Waverly was not the only city to see static levels drop in 2023 as region wide static levels dropped as was not unique only to Waverly.
- Currently we are 4.96 inches above in precipitation compared to the same time last year
- Jan – July 2023 14.48 inches      Jan –July so far 19.44 inches

## Water use

<b>All wells monthly total</b>	<b>12,849,314</b>	<b>11,939,898</b>	<b>13,268,481</b>	<b>18,093,805</b>	<b>30,387,370</b>	<b>34,230,812</b>	
	2023	January	February	March	April	May	June
<b>Daily average</b>		414,494	426,425	428,016	603,127	980,238	1,141,027
<b>All wells monthly total</b>	<b>12,952,242</b>	<b>12,542,549</b>	<b>13,994,744</b>	<b>17,522,752</b>	<b>17,958,629</b>	<b>20,386,191</b>	
	2024	January	February	March	April	May	June
<b>Daily average</b>		417,814	447,948	451,443	584,092	579,311	679,540

2024 we have used 25.4 million gallons less than the same time of 2023.

**2024 Water Pumping and Static levels**

as of July 8

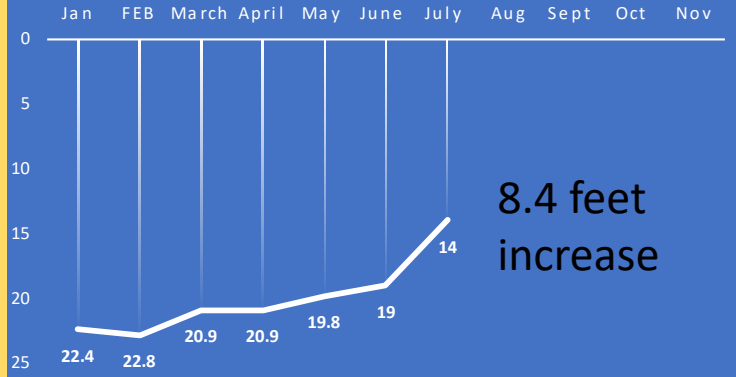
**Pumping Levels distance from shutoff points ( based on the lowest level it reached during the month)**

Well	Speed	Jan	FEB	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
4	100%	4.7	5.9	6.8	7.2	5.5	5.5	11					
5	94%	1.1	1.5	3	3	3	3.2	6.2					
6	83%	0.8	12.7	10	9.4	9.1	9.4	10.3					
8	100%	9.2	9.2	9.1	8.8	6.3	8.2	6.8					
9	85%	4.1	6.5	7.1	7.1	11.4	14.9	16					
10	100%	19.7	18.3	18.1	18.2	19.8	17.4	20.1					
11	85%	22.2	11.5	11.5	11.3	11.4	10.7	11.6					
<b>Precip. Inches</b>	<b>19.44</b>	0.95	0.51	1.09	3.42	4.78	3.28	5.41					

**Static Levels- Water distance from ground level ( based on the lowest level it reached during the month)**

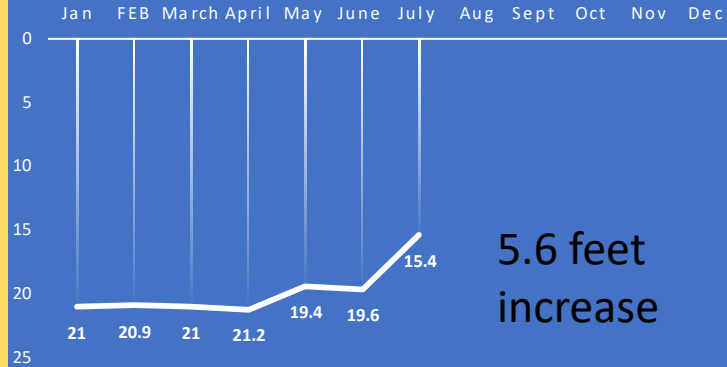
Well		Jan	FEB	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
4		22.4	22.8	20.9	20.9	19.8	19	14					
5		21	20.9	21	21.2	19.4	19.6	15.4					
6		80	79.9	79.7	81.1	81.2	81.8	81.1					
8		73.8	74.3	73.3	73.8	73.9	74.4	74.1					
9		104.8	104.7	102	102	102.8	103.7	102.9					
10		85	85.9	85.9	86.2	86.9	87.8	86.2					
11		98	101.5	98.1	99.3	99.1	99.6	98.9					
<b>Precip. Inches</b>	<b>19.44</b>	0.95	0.51	1.09	3.42	4.78	3.28	5.41					

### WELL #4 STATIC LEVELS 2024



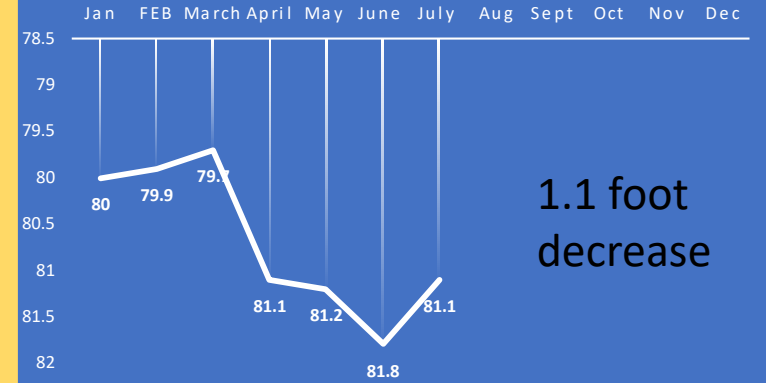
8.4 feet increase

### WELL #5 STATIC LEVELS 2024



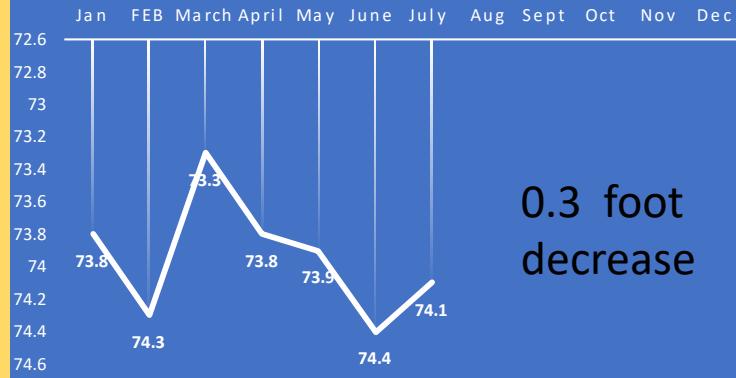
5.6 feet increase

### WELL #6 STATIC LEVELS 2024



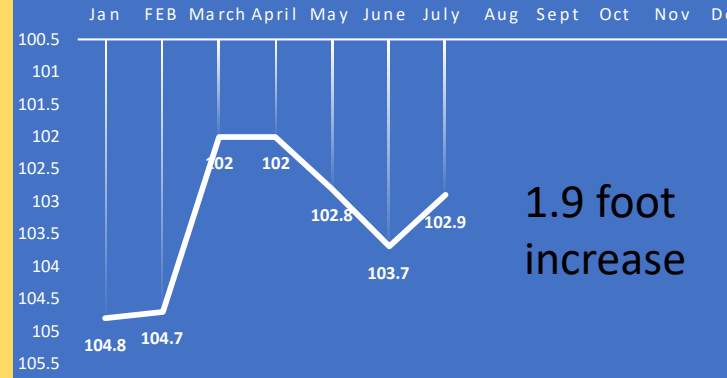
1.1 foot decrease

### WELL #8 STATIC LEVELS 2024



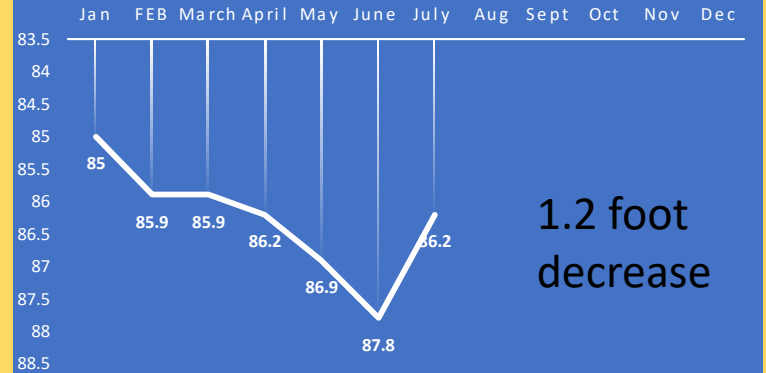
0.3 foot decrease

### WELL #9 STATIC LEVELS 2024



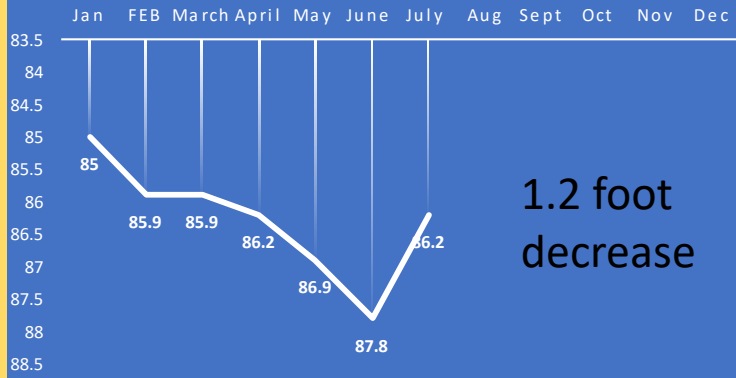
1.9 foot increase

### WELL #10 STATIC LEVELS 2024



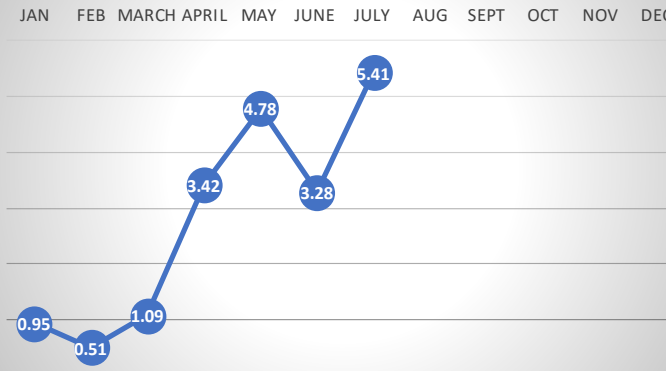
1.2 foot decrease

### WELL #11 STATIC LEVELS 2024

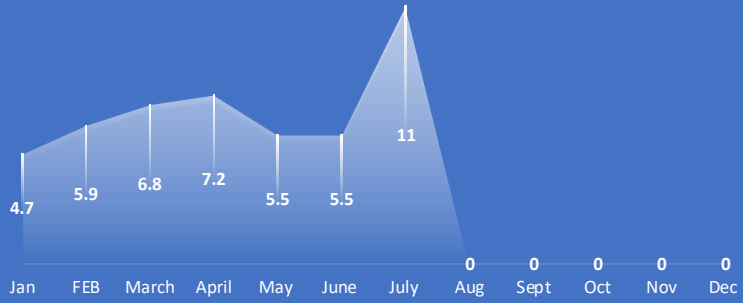


1.2 foot decrease

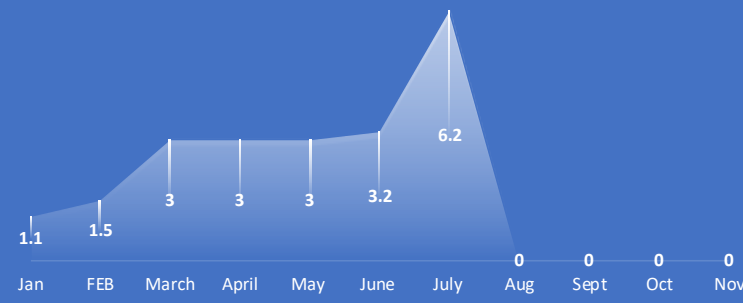
### Precipitation 2024



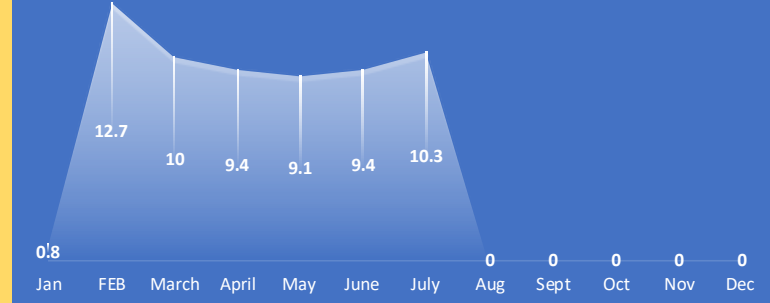
WELL # 4 PUMPING LEVEL TO STUTOFF



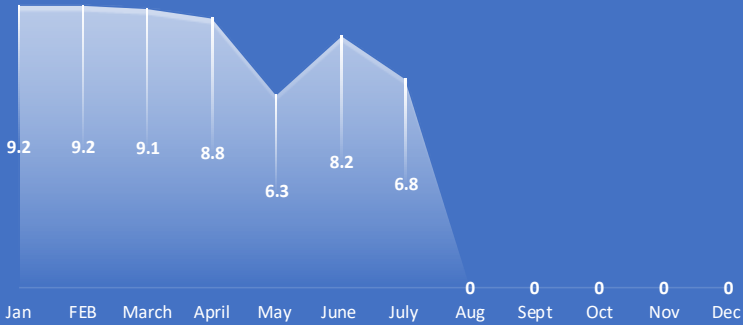
WELL # 5 PUMPING LEVEL TO SHUTOFF



WELL # 6 PUMPING LEVEL TO SHUTOFF



WELL # 8 PUMPING LEVEL TO SHUTOFF



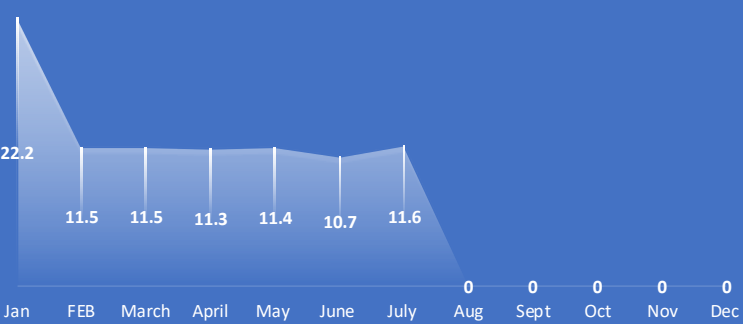
WELL # 9 PUMPING LEVEL TO SHUTOFF



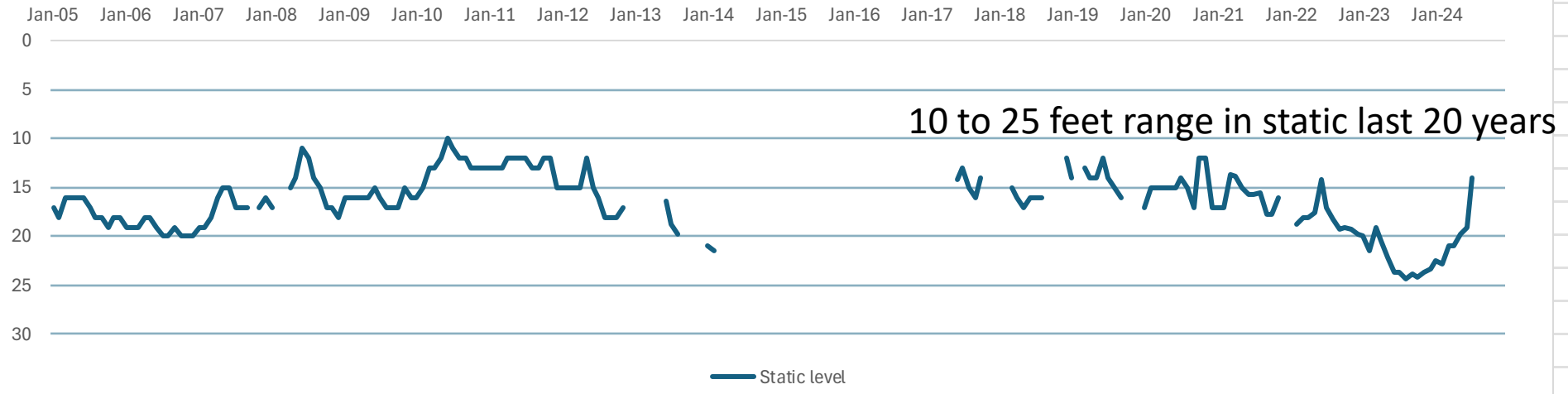
WELL #10 PUMPING LEVEL TO SHUTOFF



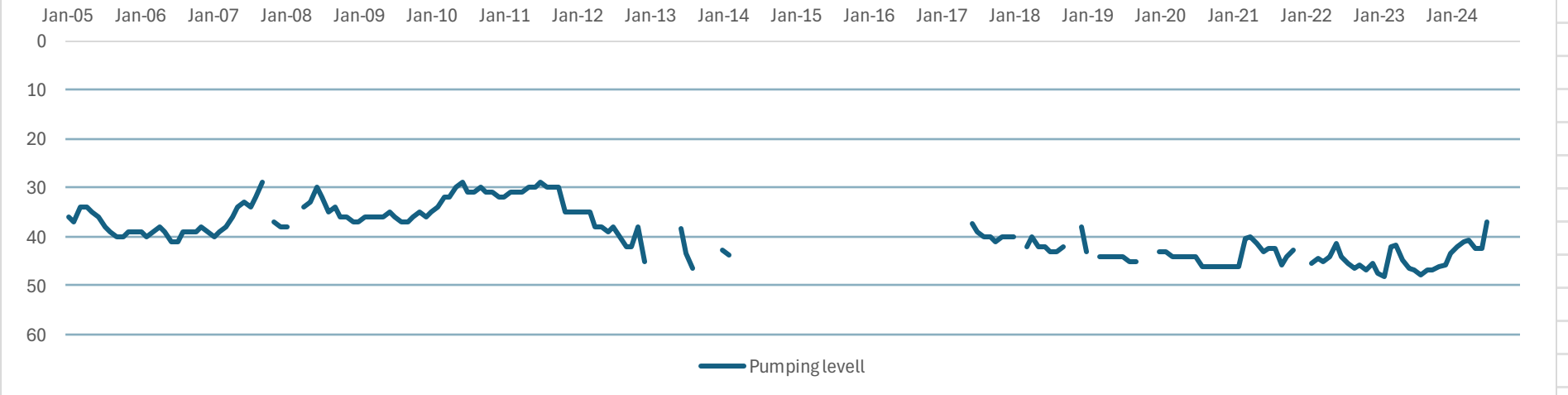
WELL # 11 PUMPING LEVEL TO SHUTOFF



### Well # 4 Static level

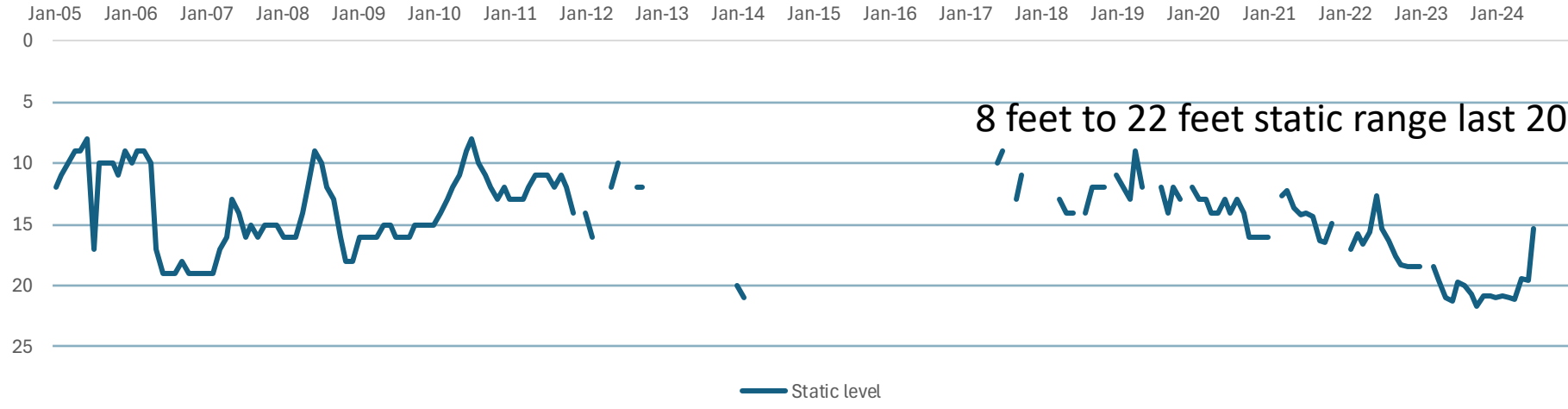


### Well # 4 Pumping level

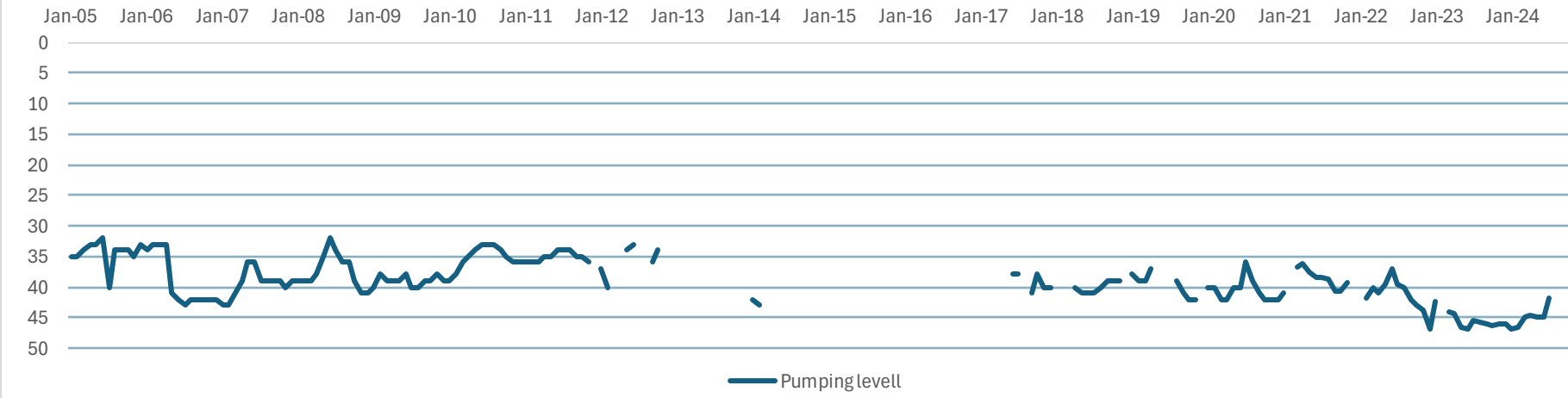




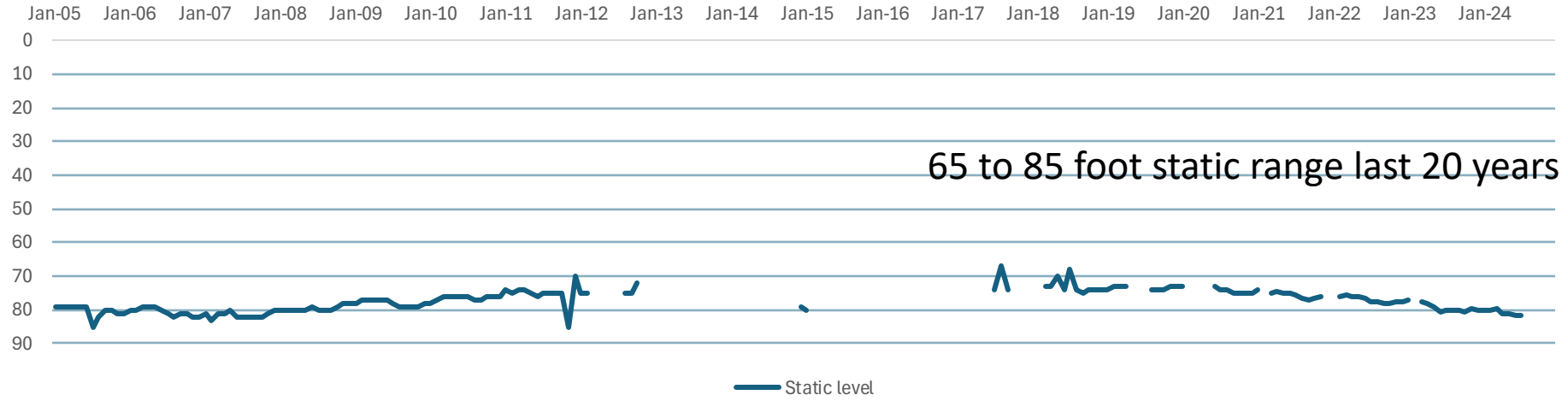
### Well # 5 Static level



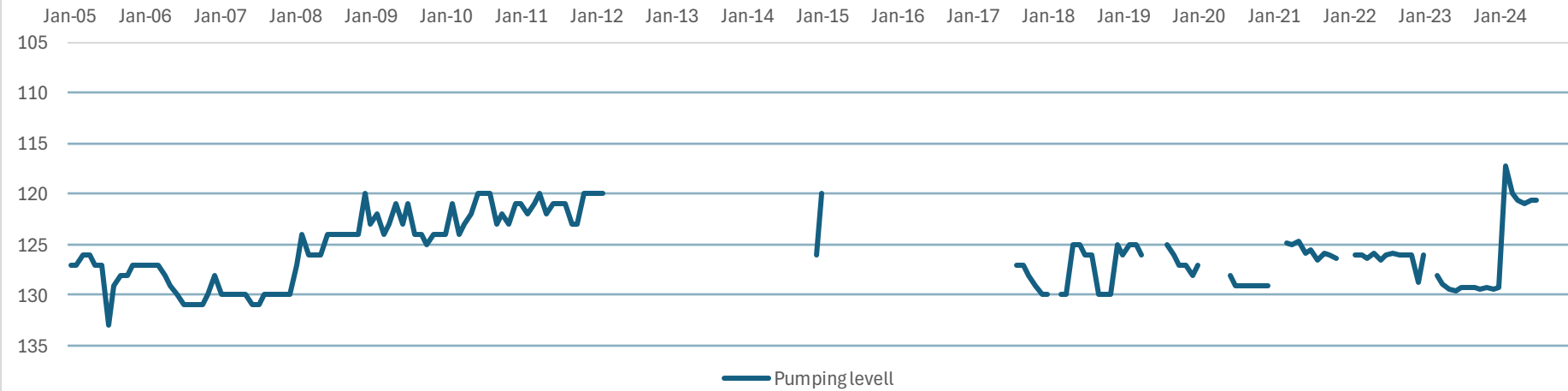
### Well # 5 Pumping level



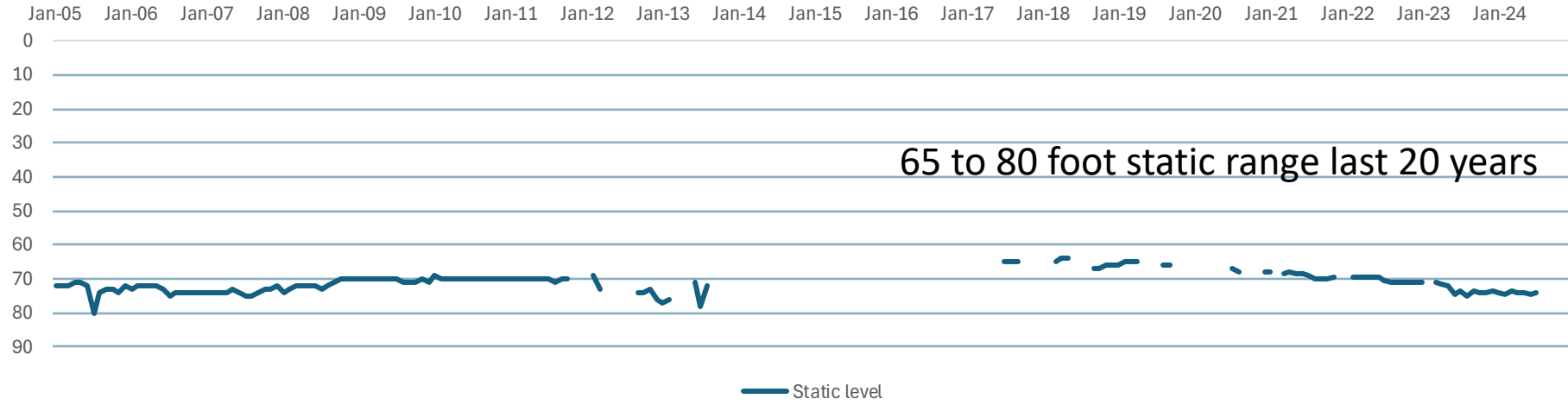
### Well # 6 Static level



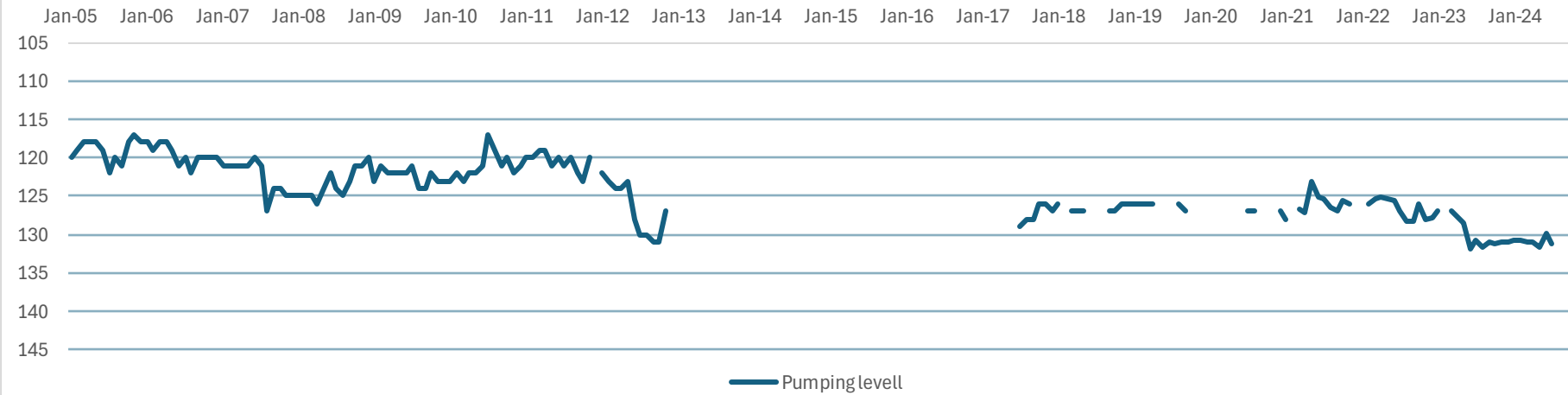
### Well # 6 Pumping level



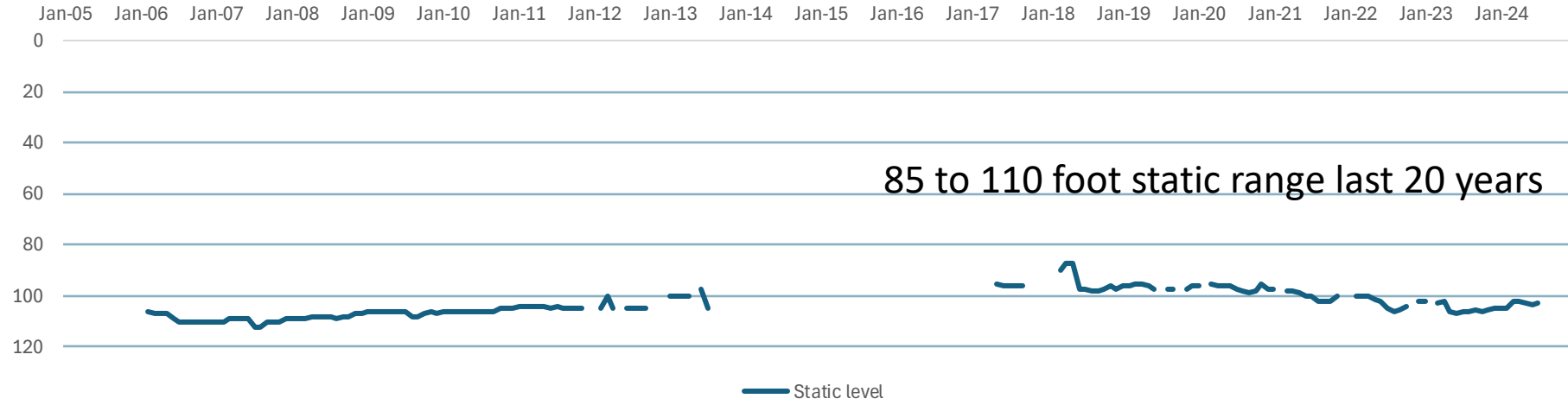
### Well # 8 Static level



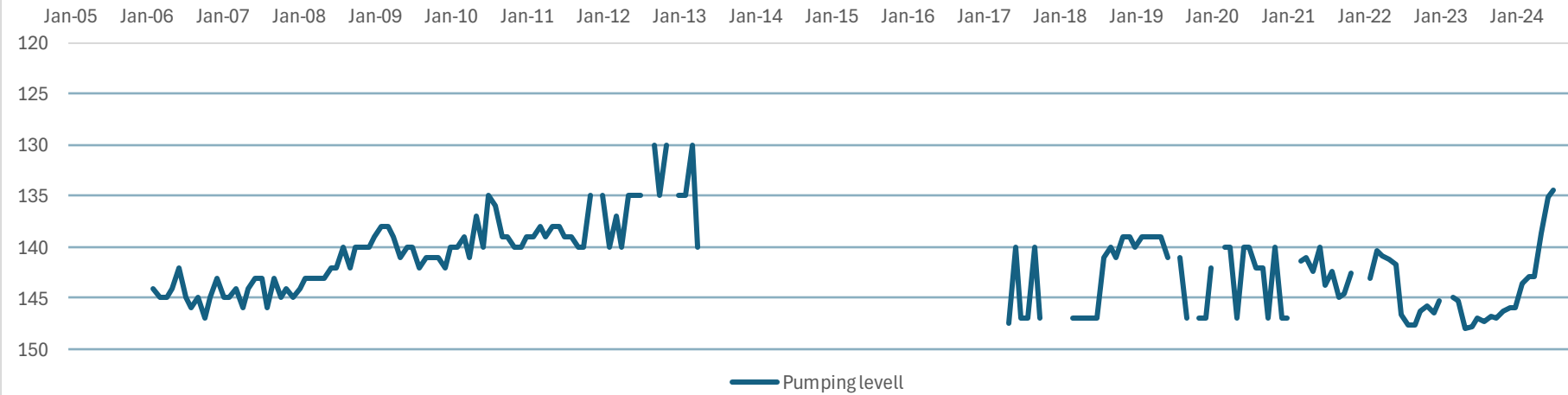
### Well # 8 Pumping level



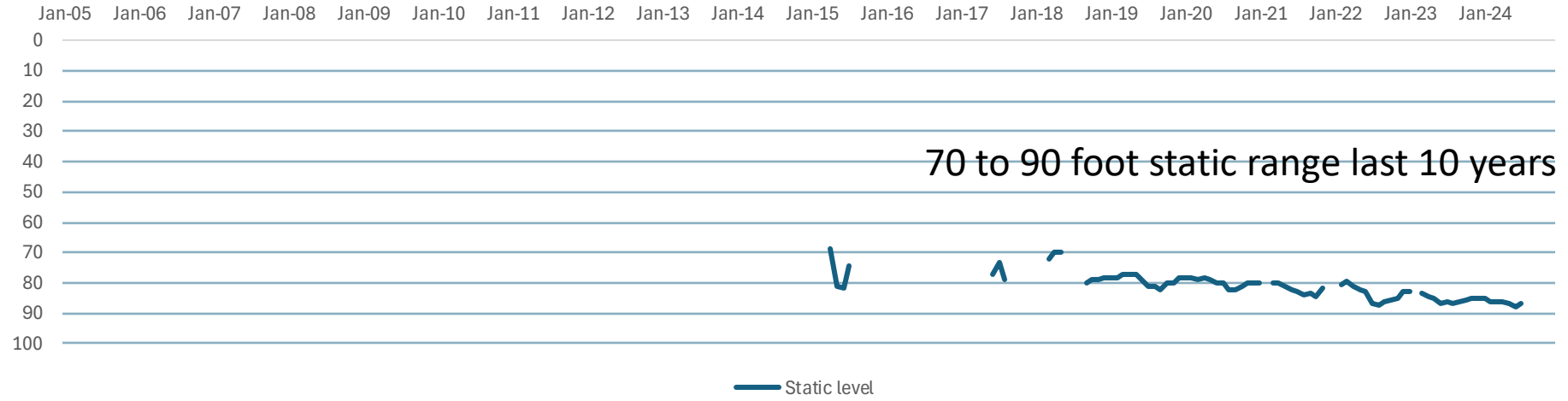
### Well # 9 Static level



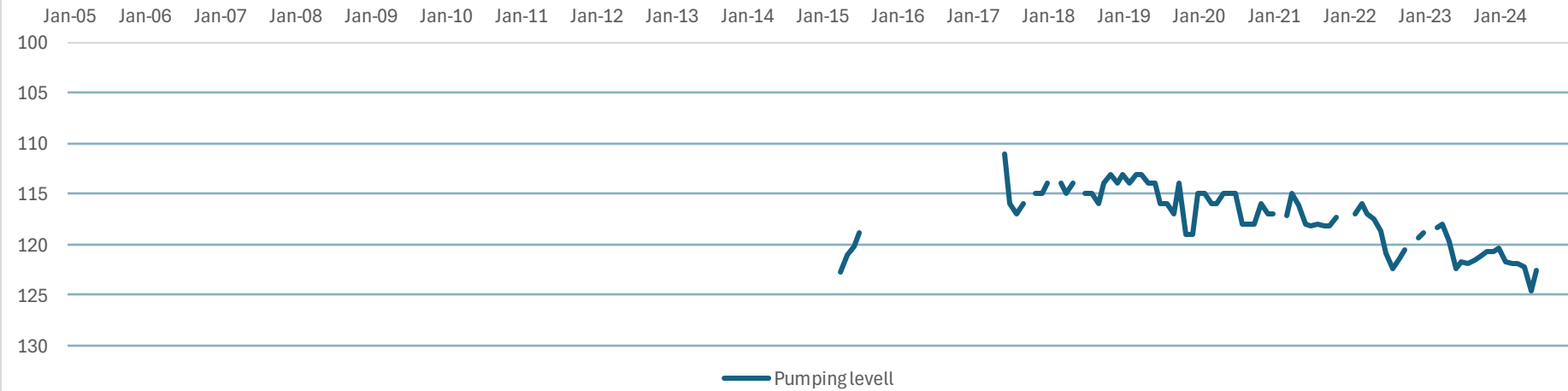
### Well # 9 Pumping level



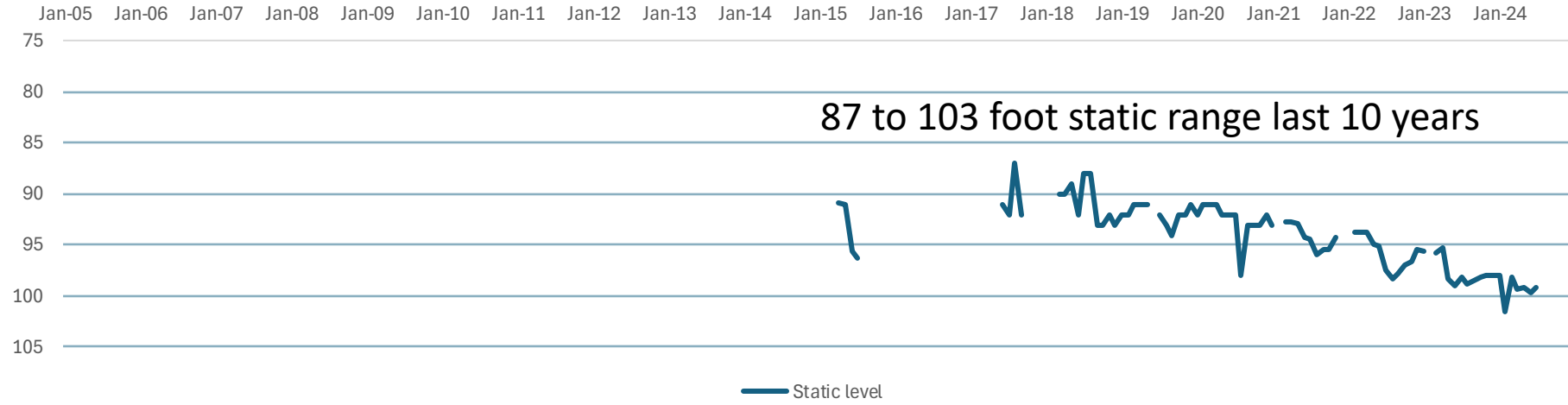
### Well # 10 Static level



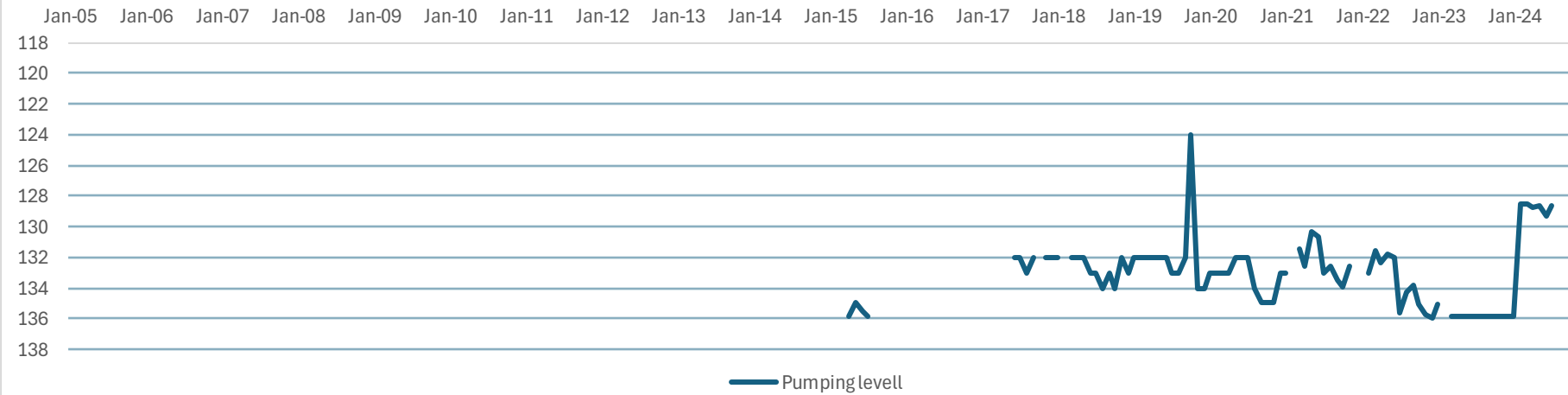
### Well # 10 Pumping level



### Well # 11 Static level



### Well # 11 Pumping level



**WELL VOLUME OF WATER AVAILABLE IN GALLONS**

$V = \pi r^2 h * S_y$  Colby Osborn formula from Olssons

Where:

$V$  is the volume of the cylinder, adjusted for specific yield

$\pi$  is the mathematical constant pi

$r$  is the radius of the cylinder,

$hh$  is the height of the cylinder.

$S_y$  is specific yield

$V = 3.14159 * (2640 \text{ ft})^2 * 30 \text{ ft} * 0.15$

$V = 98530398.7 \text{ ft}^3$  or **737,058,567 gallons.**

**Well # 4**

**33** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	290,801
100	1,163,205
200	4,652,820
500	29,080,128
1000	116,320,511
2640 1/2 mile	810,707,436

**Well # 5**

**32.6** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	287,276
100	1,149,106
200	4,596,423
500	28,727,641
1000	114,910,566
2640 1/2 mile	800,880,679

**Well # 6**

**48.9** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	430,915
100	1,723,658
200	6,894,634
500	43,091,462
1000	172,365,849
2640 1/2 mile	1,201,321,019

**Well # 7**

**0** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	0
100	0
200	0
500	0
1000	0
2640 1/2 mile	0

**Well # 8**

**64** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	563,978
100	2,255,913
200	9,023,652
500	56,397,824
1000	225,591,295
2640 1/2 mile	1,572,281,088

**Well # 9**

**47.6** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	419,459
100	1,677,835
200	6,711,341
500	41,945,881
1000	167,783,525
2640 1/2 mile	1,169,384,059

**Well # 10**

**55.8** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	491,719
100	1,966,874
200	7,867,496
500	49,171,853
1000	196,687,410
2640 1/2 mile	1,370,832,573

**Well # 11**

**41.4** feet of water from static to maximum pumping level

Radius from well in feet	Gallons available
50	364,823
100	1,459,294
200	5,837,175
500	36,482,342
1000	145,929,369
2640 1/2 mile	1,017,069,329

**Total Water available from all wells**

radius	Gallons available
50	2,848,971
100	11,395,885
200	45,583,541
500	284,897,131
1000	1,139,588,525
2640	7,942,476,182