# Red River GCD

# Well Spacing Evaluation

November 20, 2025

Mark Nickels and James Beach P.G.

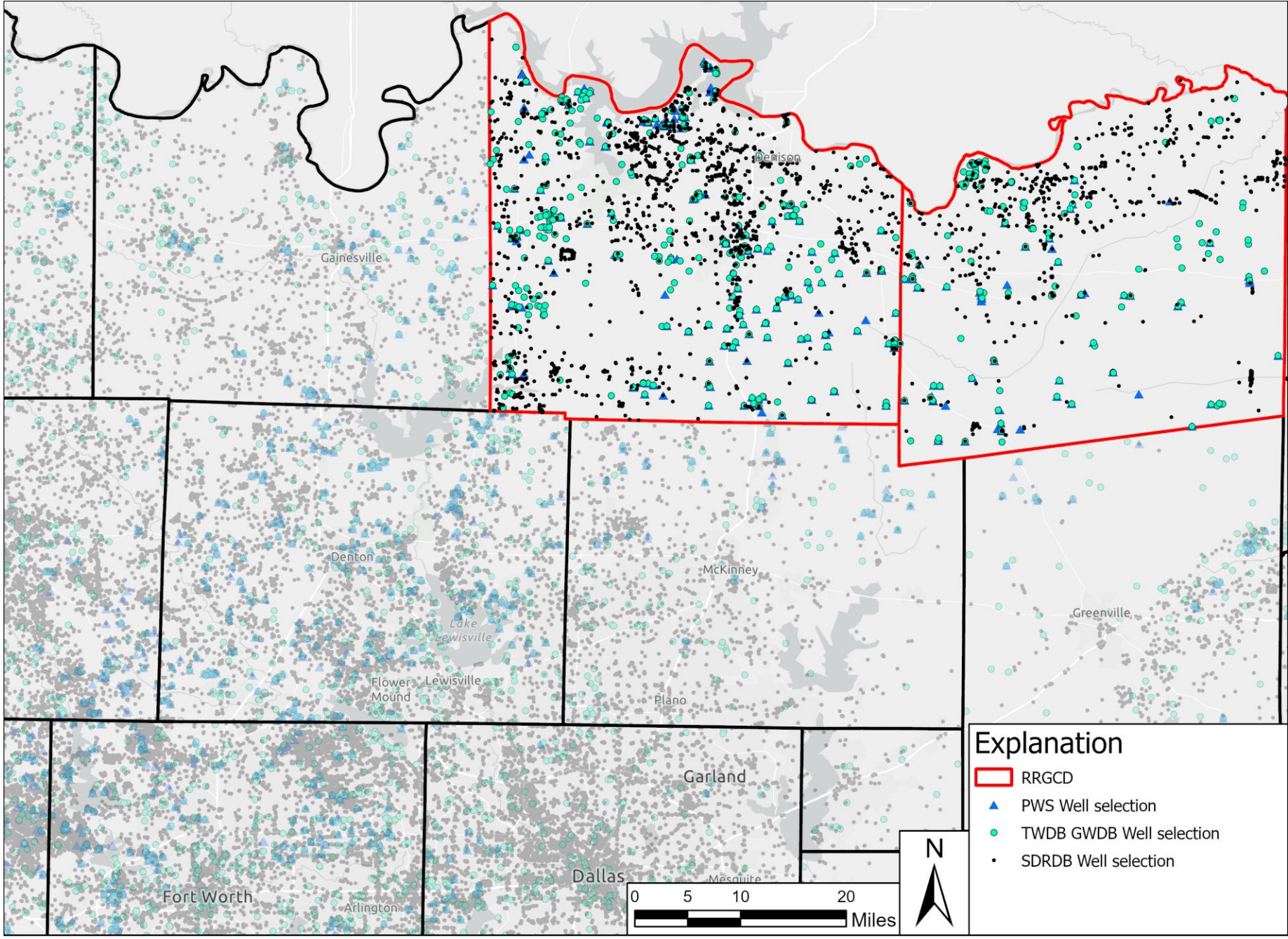
# Purpose of Well Spacing Regulations

- Historically, well spacing rules limit a pumping well's impact on other wells
- Well spacing rules are allowed as a management tool under Chapter 36
- Policy decision to increase spacing to limit overall production
- **Policy Decision**

The main point of the slide…

# Wells in RRGCD

There are a lot of wells in RRGCD, and there will be more coming...

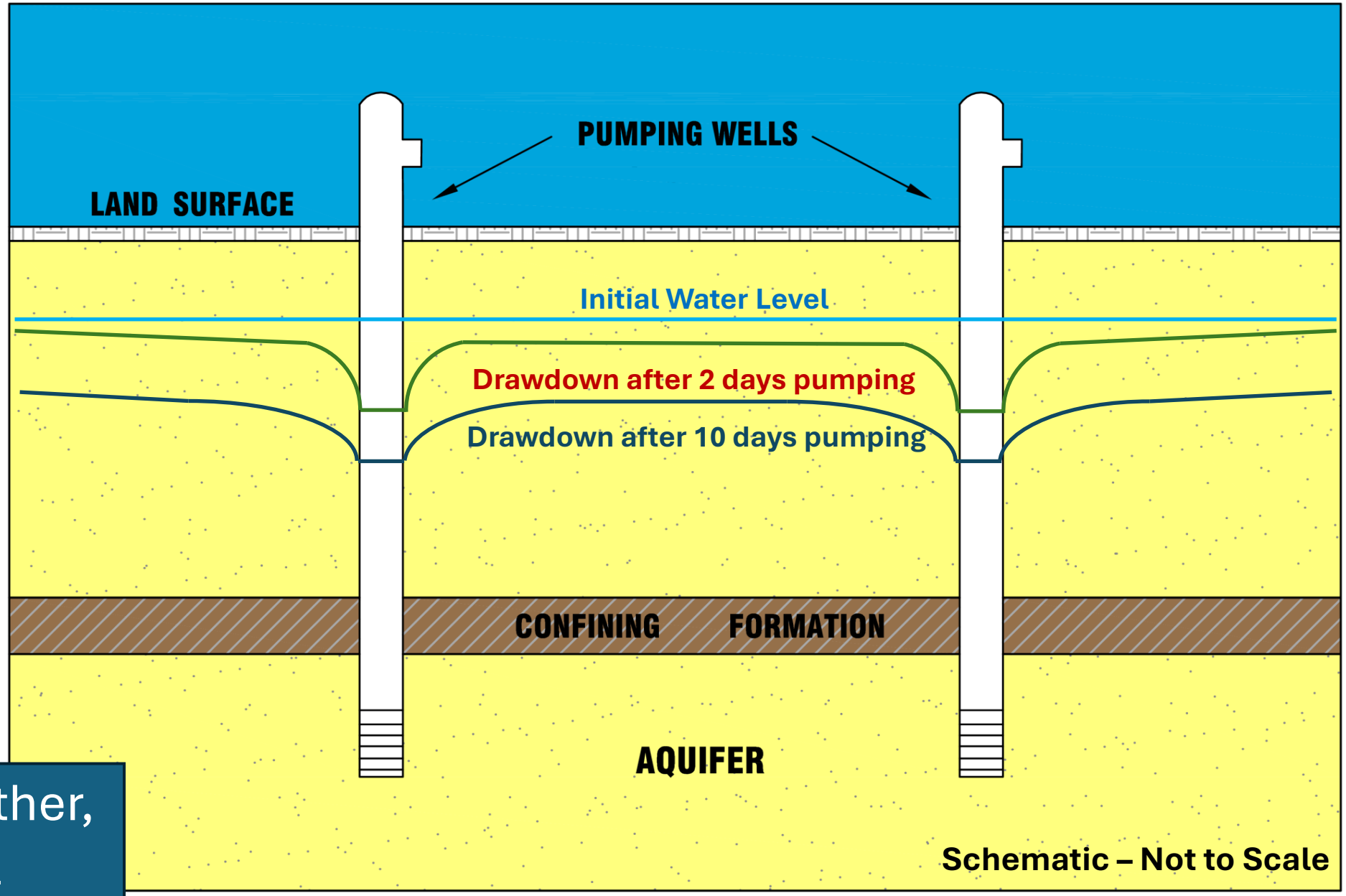


# Well Spacing Rule Update

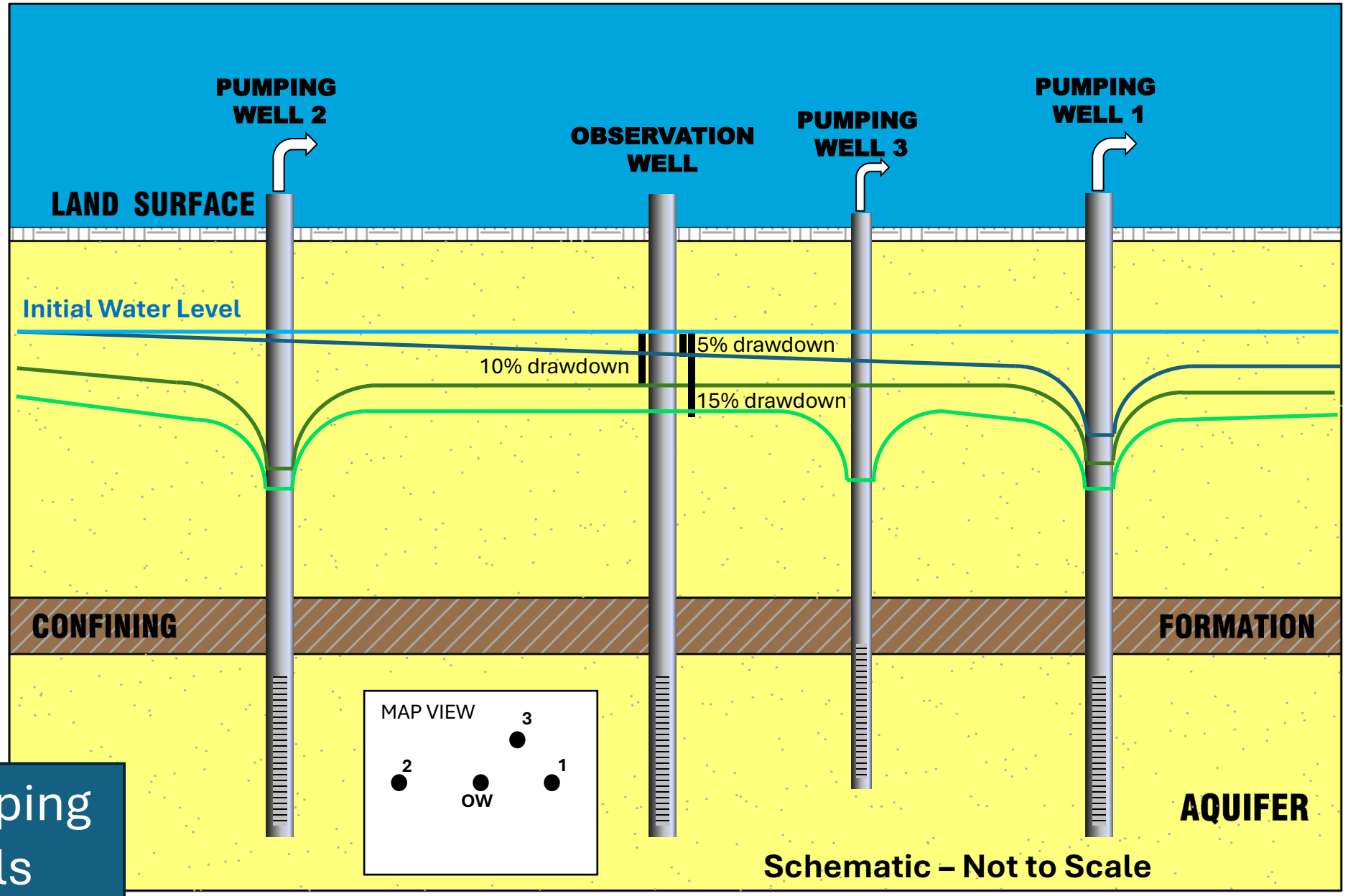
| Minimum Spacing Requirements for All New Wells in the District<br>*Applies to all aquifers* | | |
|---|---|---|
| **Maximum Capacity of Well** | **Spacing from Property Line** | **Spacing from Existing Wells Completed in the Same Aquifer (in feet)** |
| 17.36 gpm or less | 50 feet | 100 feet |
| Greater than 17.36 gpm | 50 feet | 889 feet + [2.5 x (gpm of proposed well)] |

## Updated Well Spacing Rules

We are considering refining the current well spacing rules using a similar method, but with a greater volume of data.



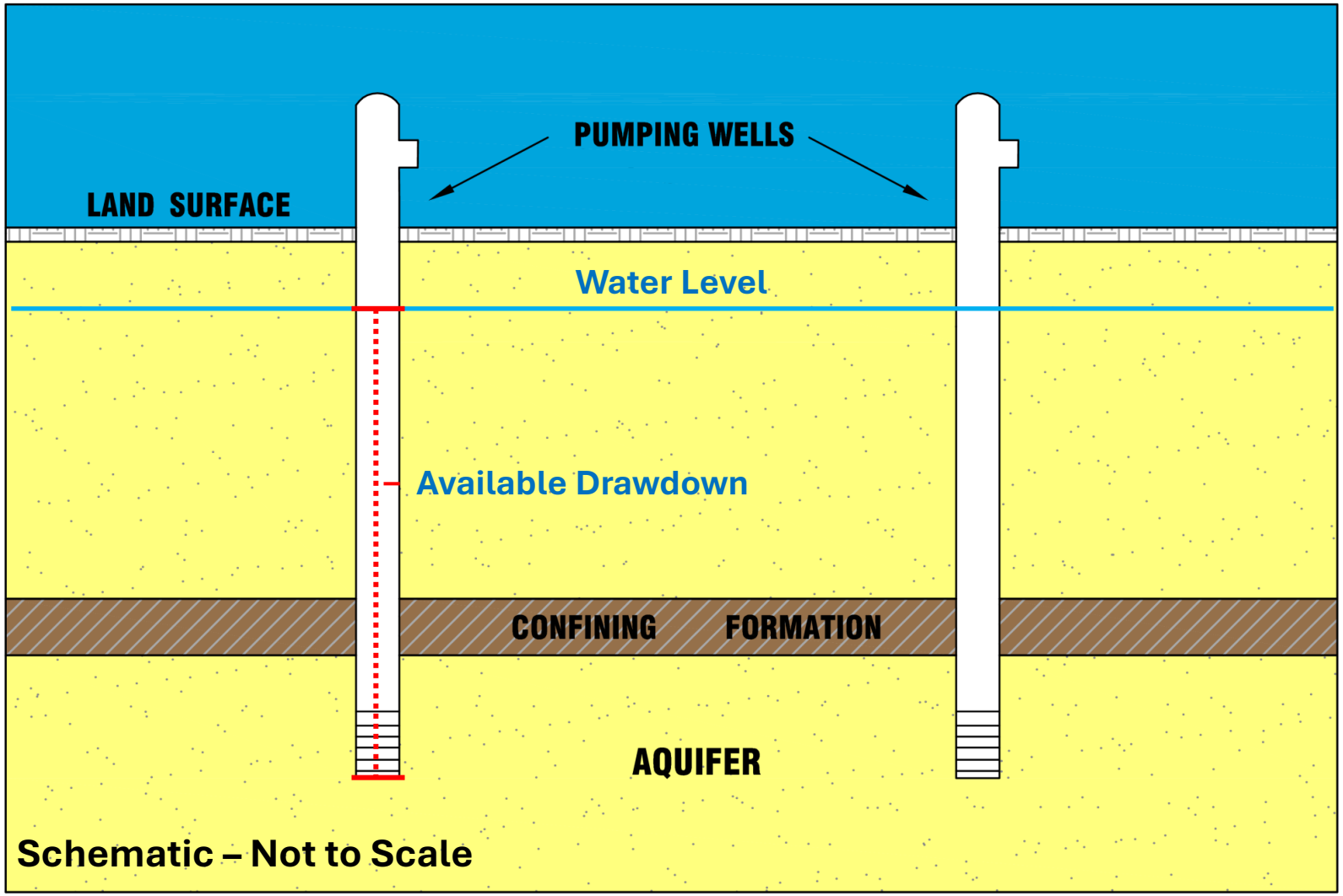

Wells impact each other, the longer that a well pumps, the more impact it has




The impact of a pumping is additive, more wells pumping causes more impact

# Available Drawdown

- Calculated different ways
- A factor in how much water can be pumped
- Decreases with declining water level



# Cooper-Jacob Method

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

**Assumptions**

- Assumes confined conditions
- Assumes impacted well is constructed the same as pumping well

**r = Distance from pumping well (feet)**

**T = Aquifer transmissivity (gpd/ft)**

**S = Aquifer storativity**

**s = Drawdown in impact well (feet)**

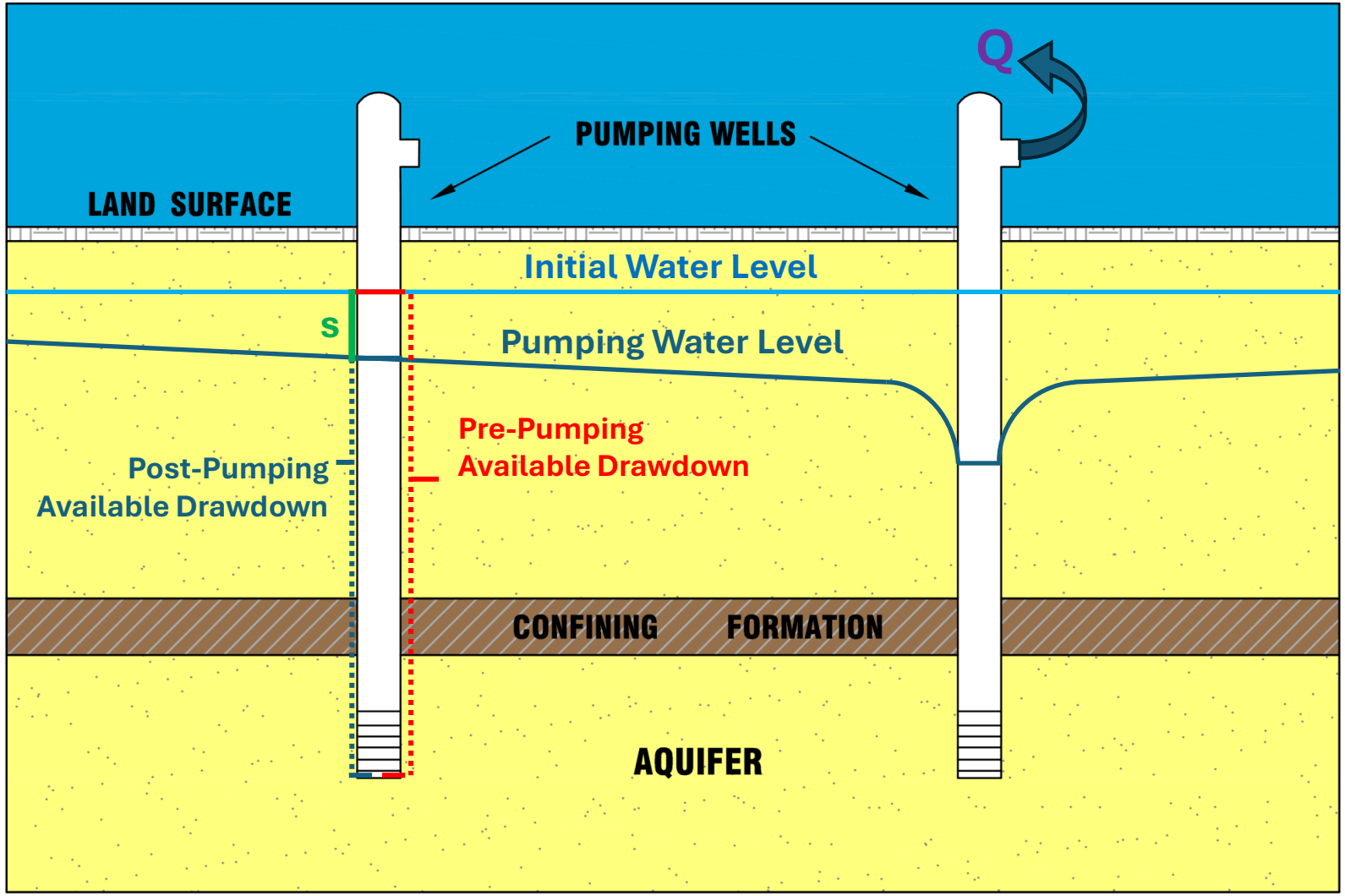
**Q = Pumping rate (gpm)**

**t = Pumping duration (days)**

- **T** = Pump Rate/drawdown * 2000
- **S** = 0.001 or $10x10^{-4}$
- **t** = 2 days
- **s** = Available Drawdown * 2% Impact
  - Explained later

# Cooper-Jacob Method

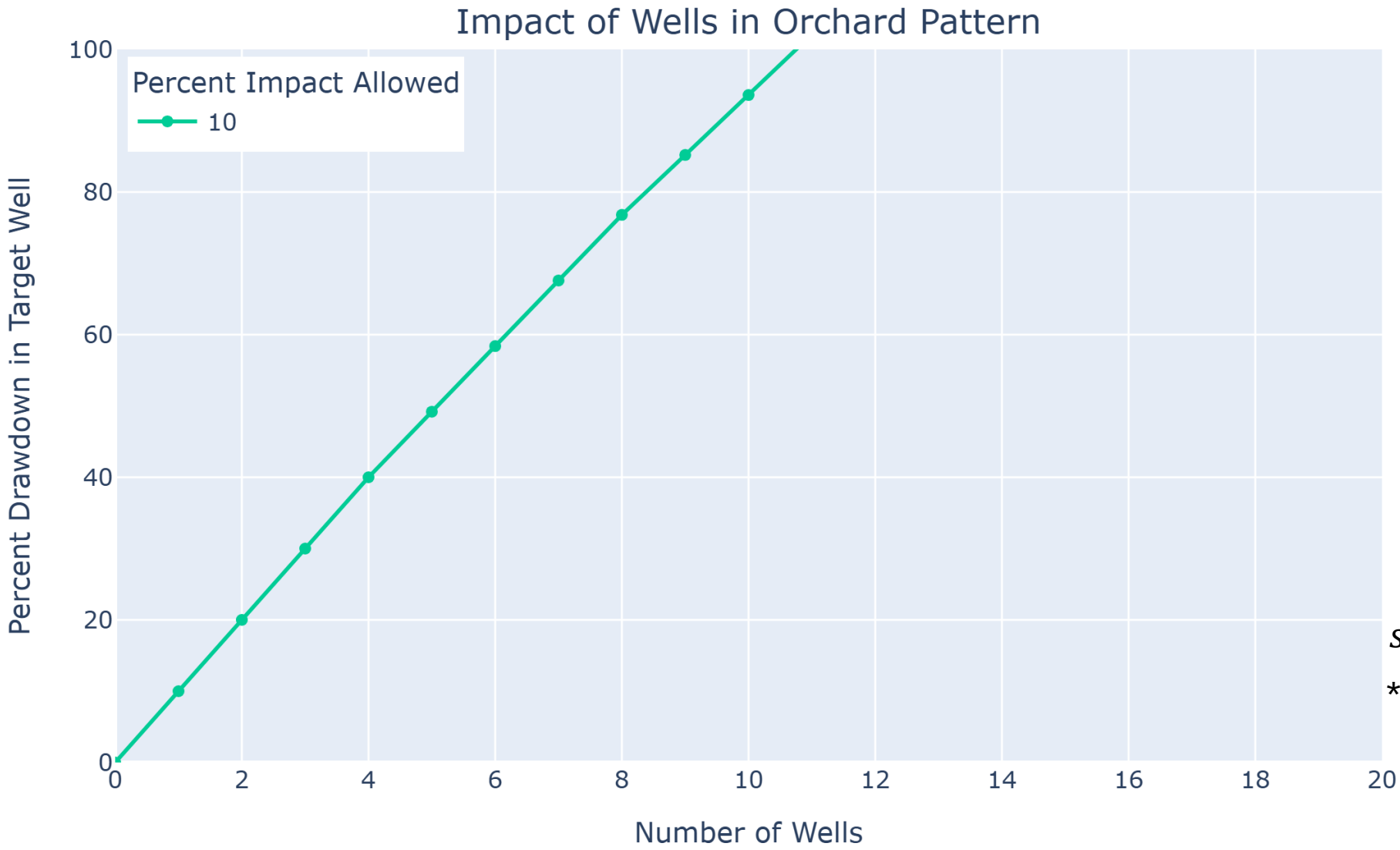
$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$



# Cumulative Impact of overlapping drawdown

- Set assumed well properties
- Simulate the impact of adding new pumping wells around a central well
- New wells fill in in the pattern below in 4 levels (for the first 20)
  - **Level 1:** Wells 1-4
  - **Level 2:** Wells 5-8
  - **Level 3:** Wells 9-12
  - **Level 4:** Wells 12-20

| | | | | |
|---|---|---|---|---|
| | 4 | 3 | 4 | |
| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

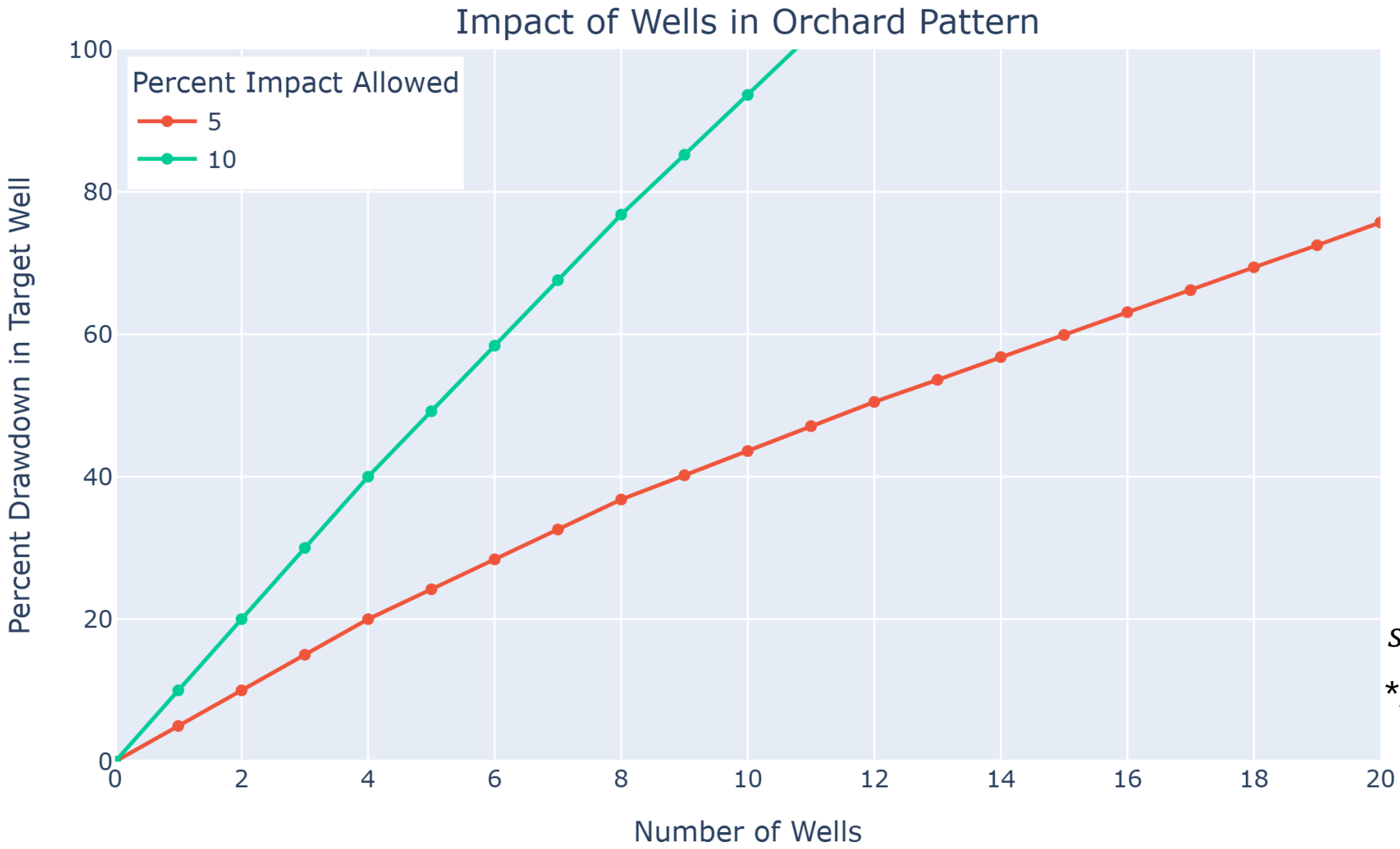



| | | | | |
|---|---|---|---|---|
| | 4 | 3 | 4 | |
| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

$$s = avail.drawdown * \%\ allowed$$

*Assumes no pumping in well x




| | | | | |
|---|---|---|---|---|
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| 4 | 2 | 1 | 2 | 4 |
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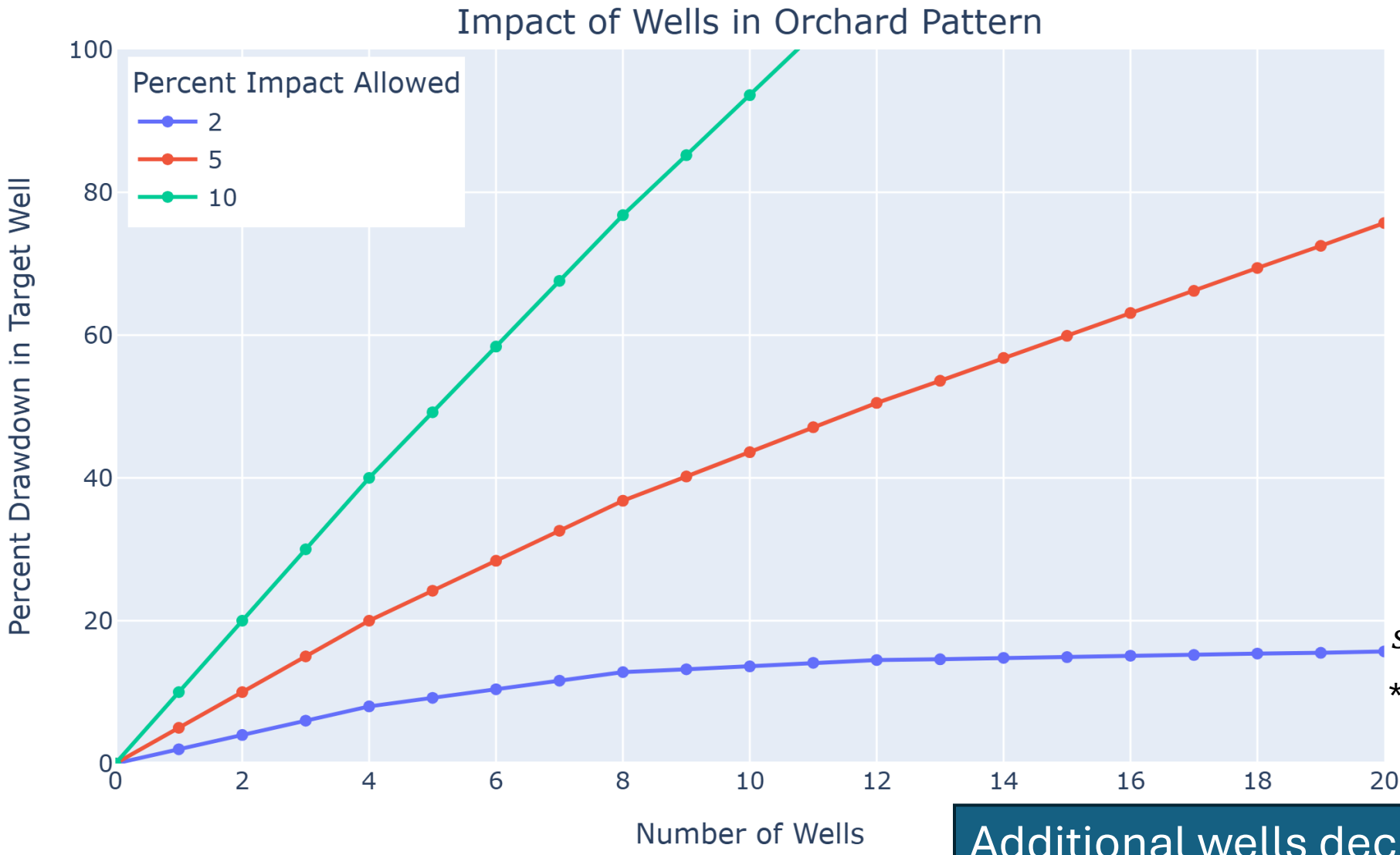


| | | | | |
|---|---|---|---|---|
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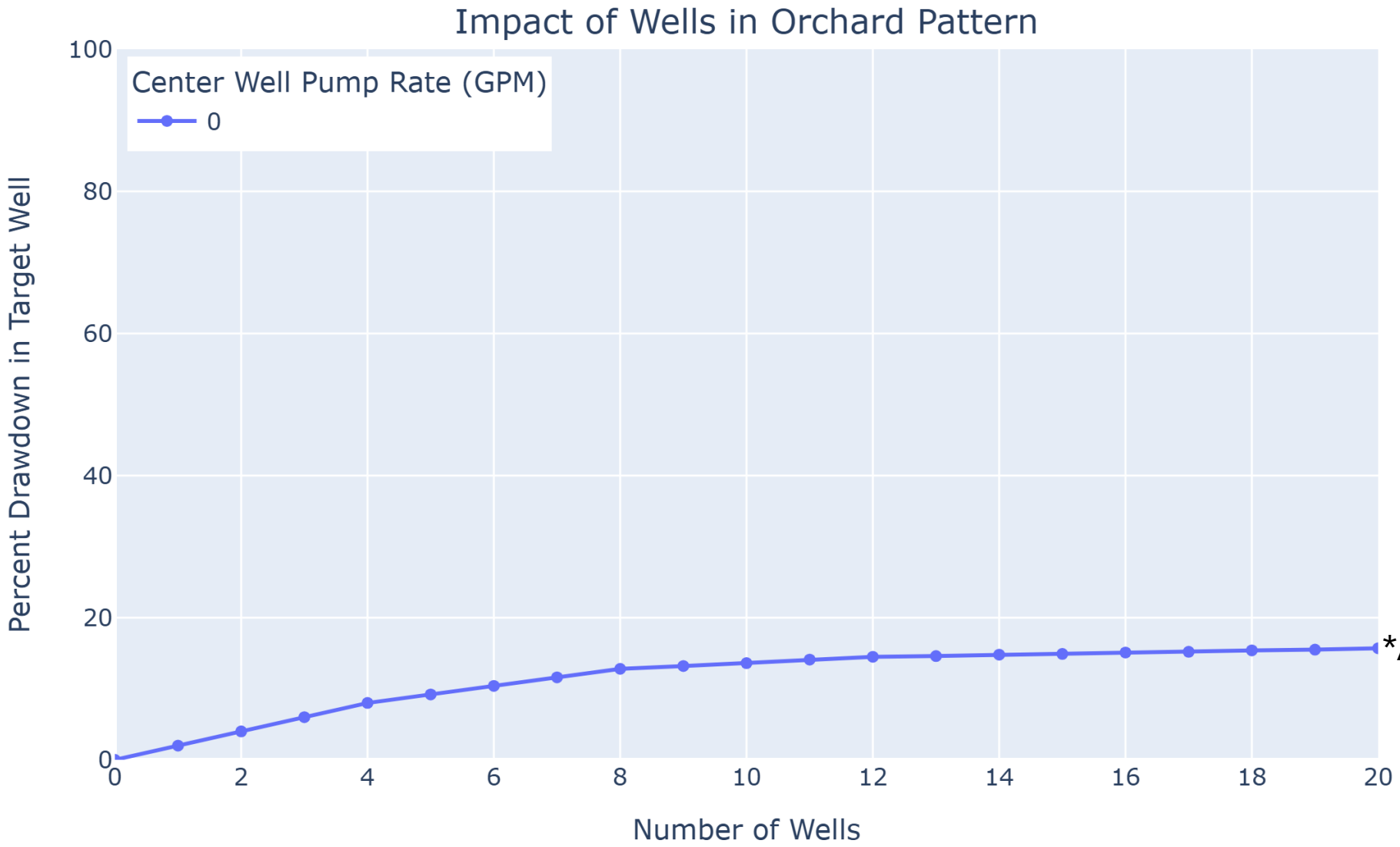
| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

$$s = avail.drawdown * \%\ allowed$$

*Assumes no pumping in well x

Additional wells decrease avail. drawdown.
2% impact levels off & maxes out at ~20%




| | | | | |
|---|---|---|---|---|
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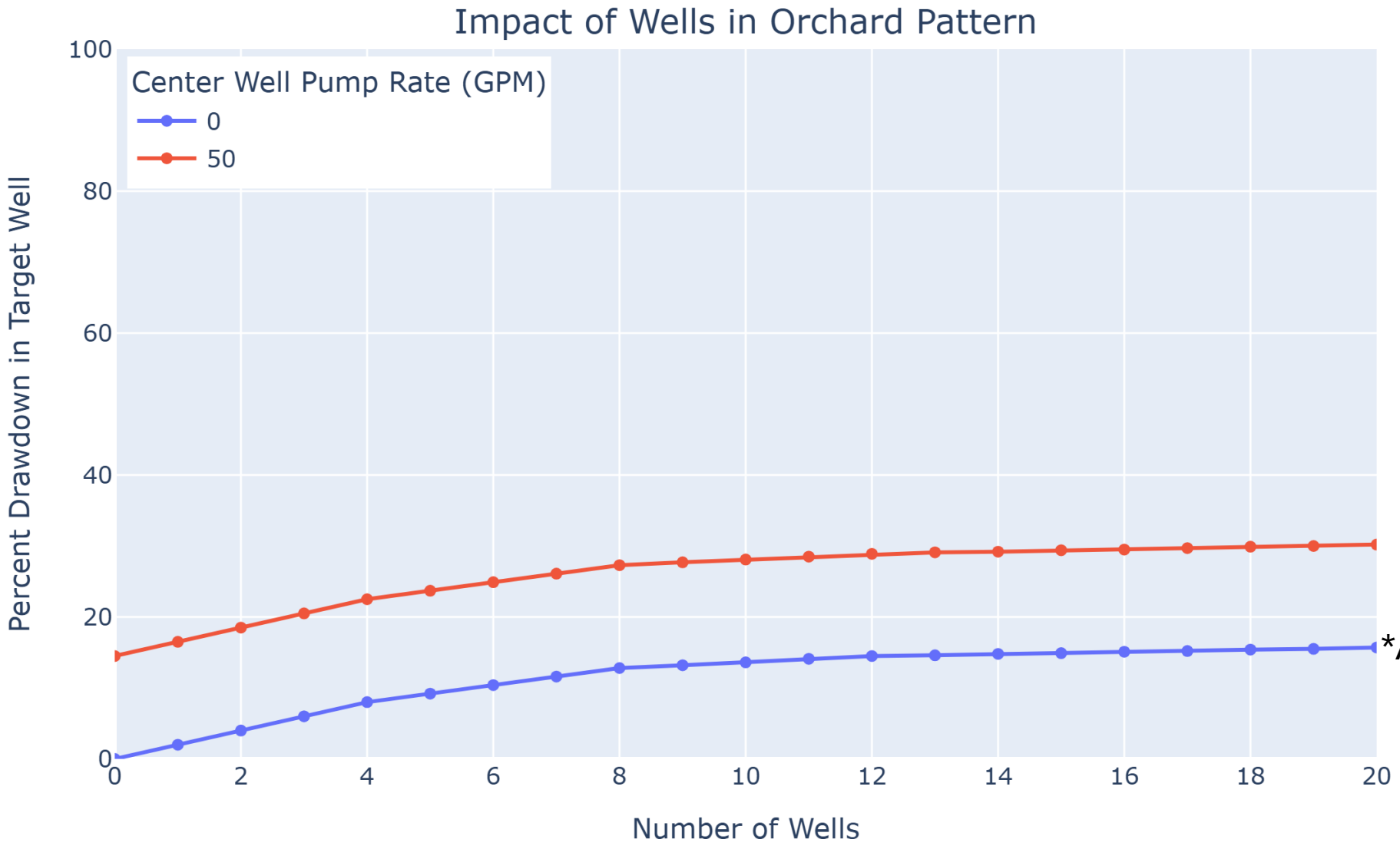
| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

*Assumes 2% impact allowed




| | | | | |
|---|---|---|---|---|
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| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

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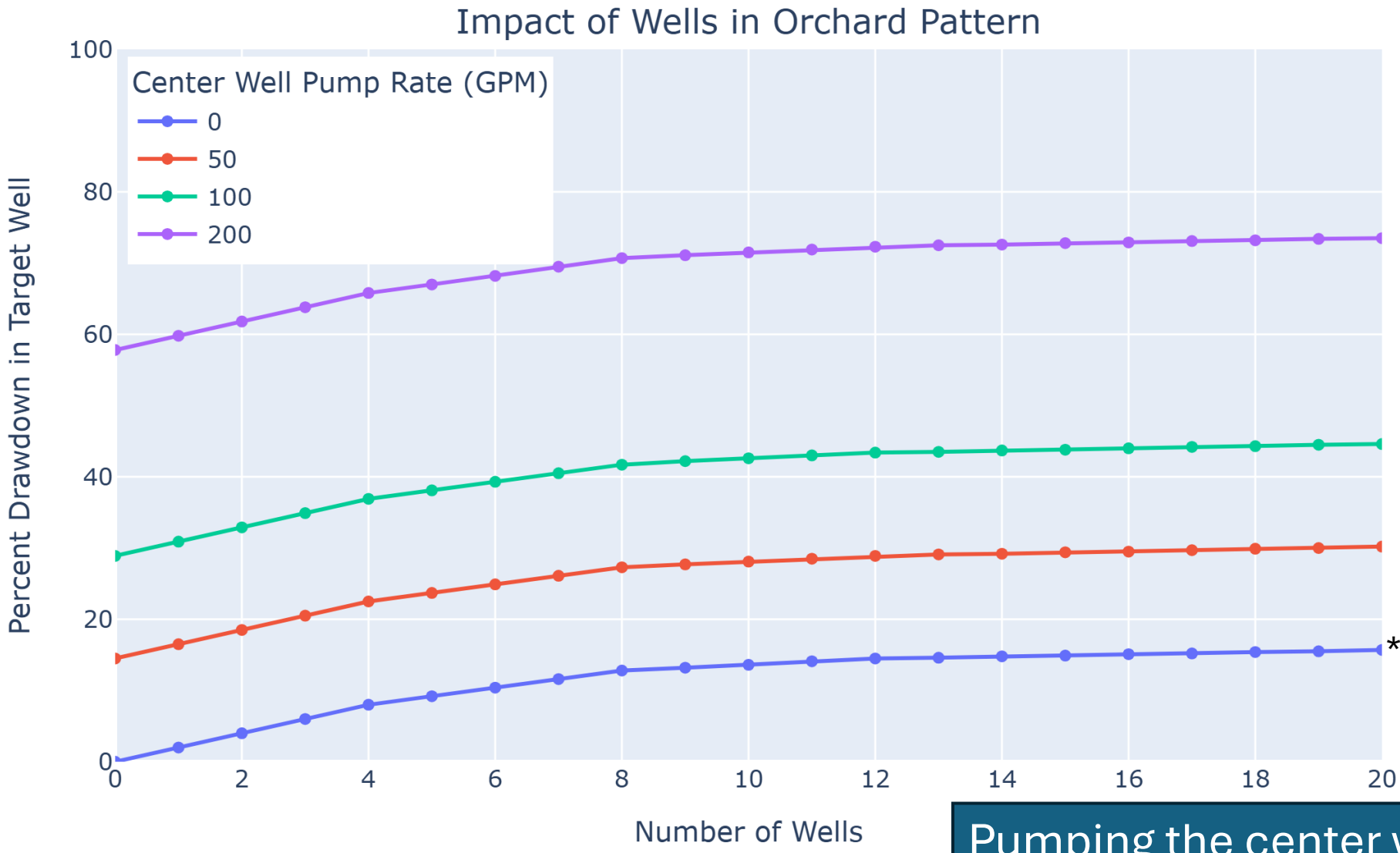
*Assumes 2% impact allowed




| | | | | |
|---|---|---|---|---|
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| 4 | 2 | 1 | 2 | 4 |
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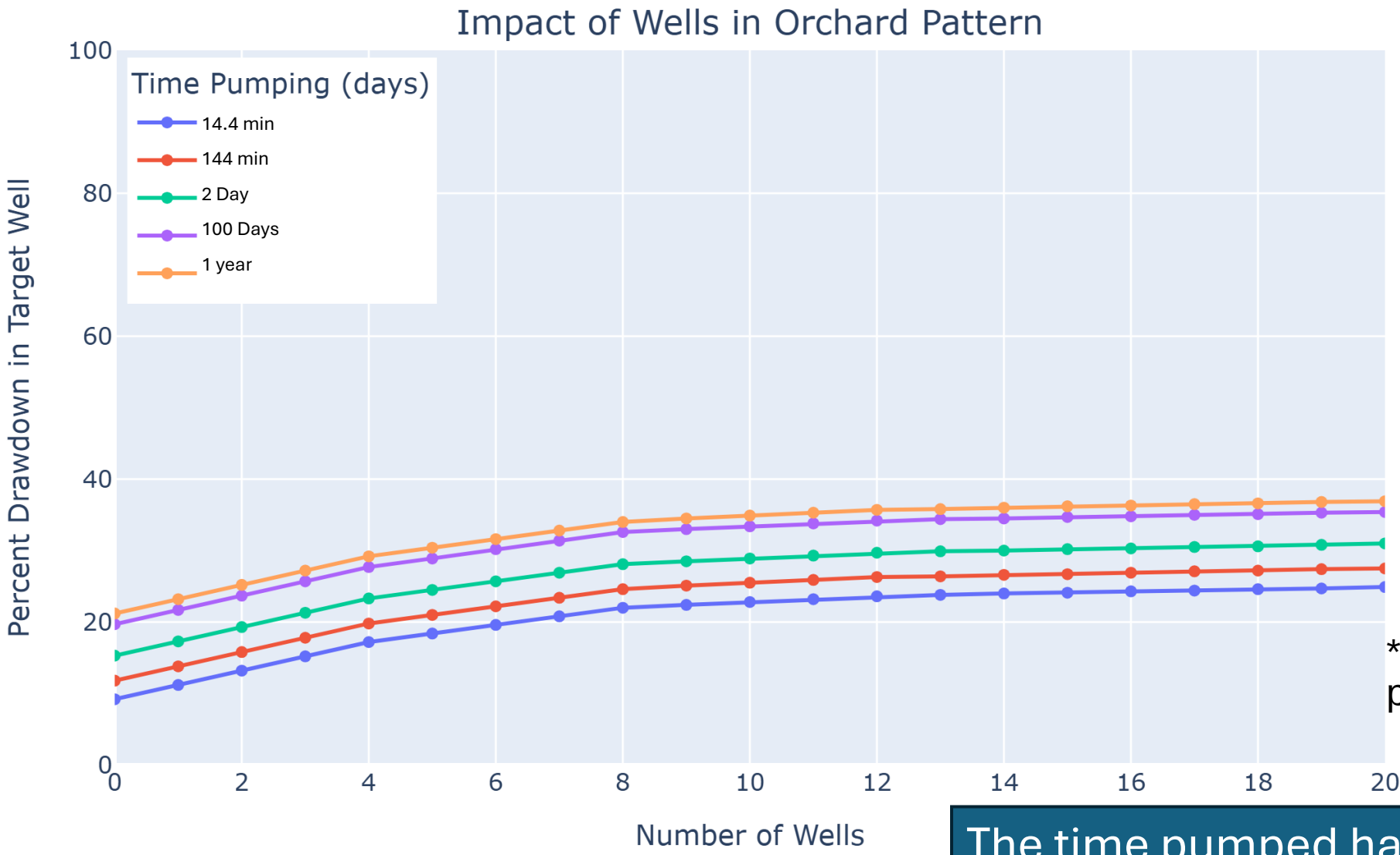
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

*Assumes 2% impact allowed

Pumping the center well decreases the remaining avail. drawdown




| | | | | |
|---|---|---|---|---|
| | 4 | 3 | 4 | |
| 4 | 2 | 1 | 2 | 4 |
| 3 | 1 | x | 1 | 3 |
| 4 | 2 | 1 | 2 | 4 |
| | 4 | 3 | 4 | |

$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

*Assumes 2% impact and 50 gpm pumping

The time pumped has minimal impact on avail drawdown, with low pump rates

# Compiled Data Sources

## TWDB

- Groundwater Database
- Submitted Driller’s Reports (TDLR)
- Aquifer Properties data from TWDB
- Aquifer tests and related well information from public supply wells in Groundwater Management Area 8 (Intera)

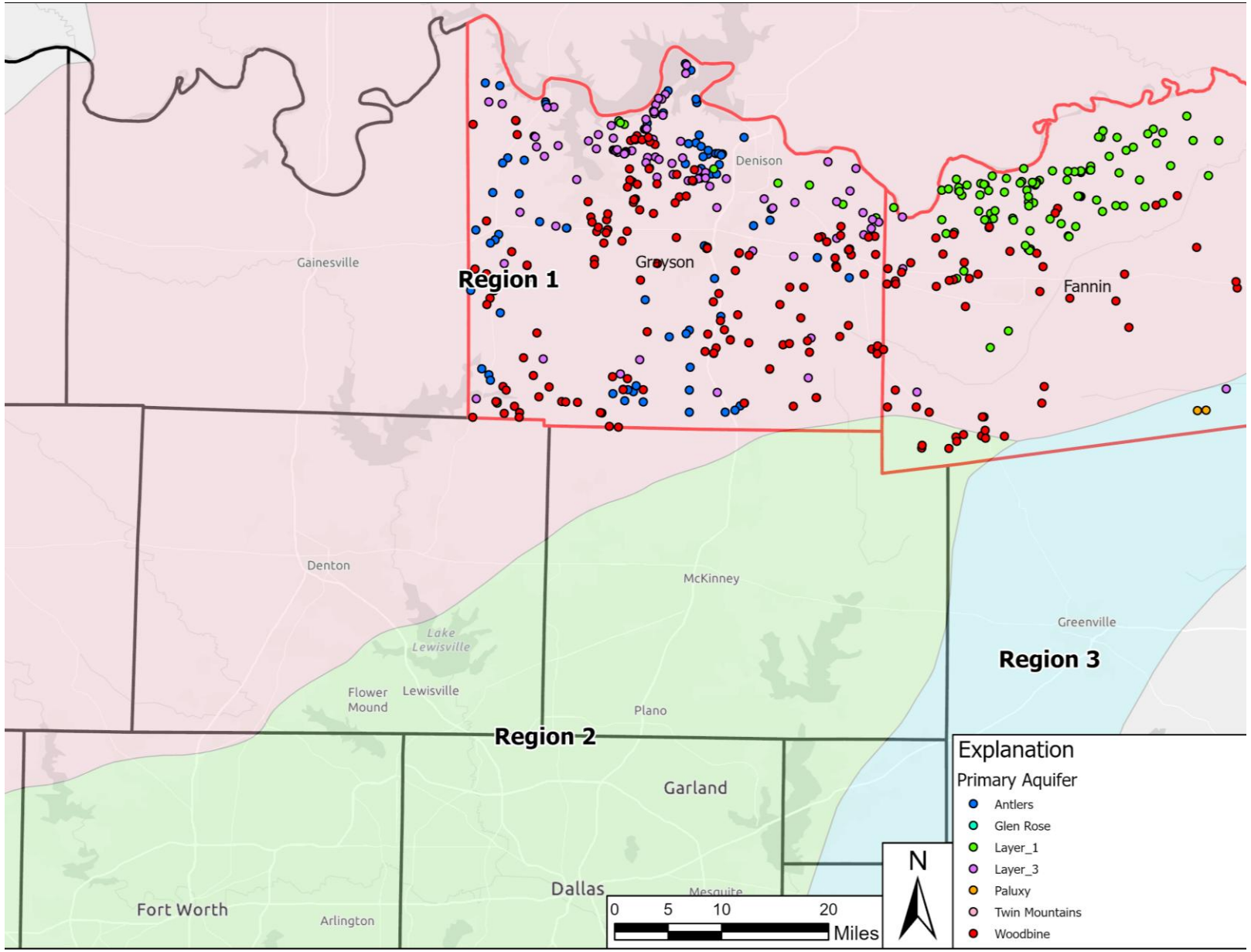
## TCEQ (Scanned PDFs)

- TCEQ Public water system completion pump tests

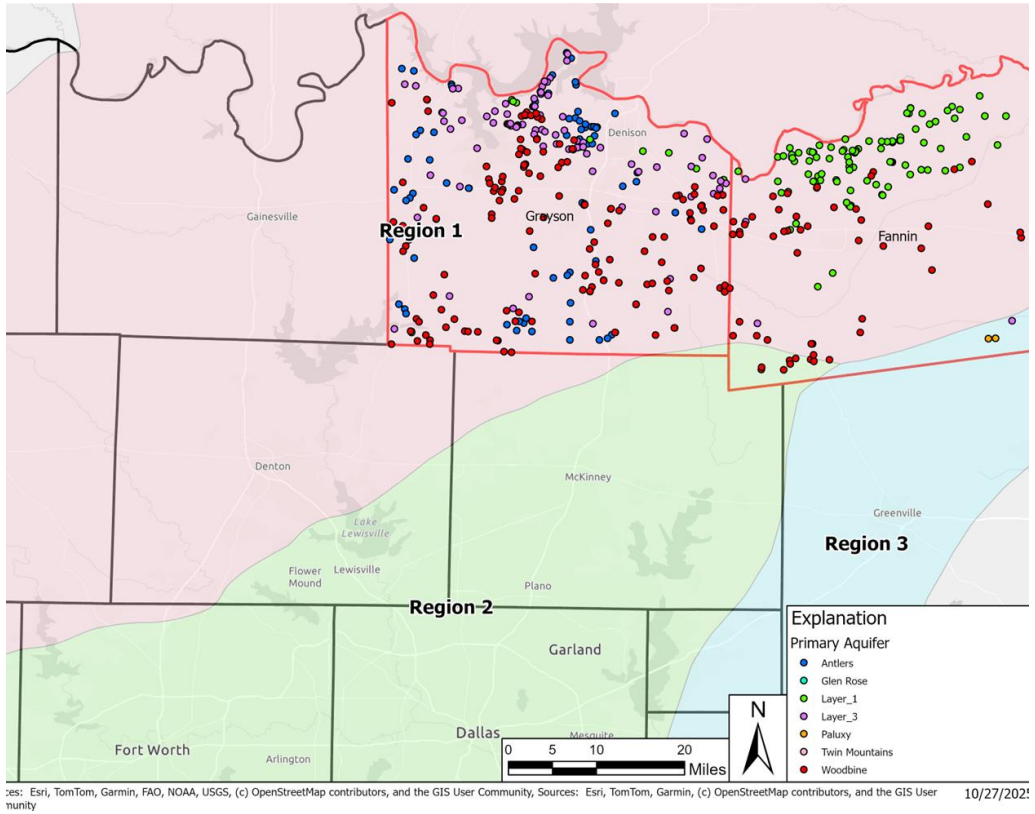
## Northern Trinity GAM

- Public Supply Well pump test data

# Plotted Wells in RRGCD



# Plotted Wells in RRGCD




| County/Aquifer | # of Wells | Max Capacity (GPM) | Avg. Capacity (GPM) |
|---|---|---|---|
| **Grayson (326)** | | | |
| Layer 1 | 13 | 25 | 15 |
| Woodbine | **138** | **708** | **86** |
| Antlers | 94 | 640 | 193 |
| Layer 3 | 81 | 200 | 30 |
| **Fannin (167)** | | | |
| Layer 1 | **101** | **200** | **20** |
| Woodbine | 56 | 752 | 197 |
| Antlers | 1 | 90 | 90 |
| Layer 3 | 6 | 350 | 137 |
| Paluxy | 3 | 278 | 249 |

Distribution of wells in each county by aquifer.

# Current Well Spacing Rules

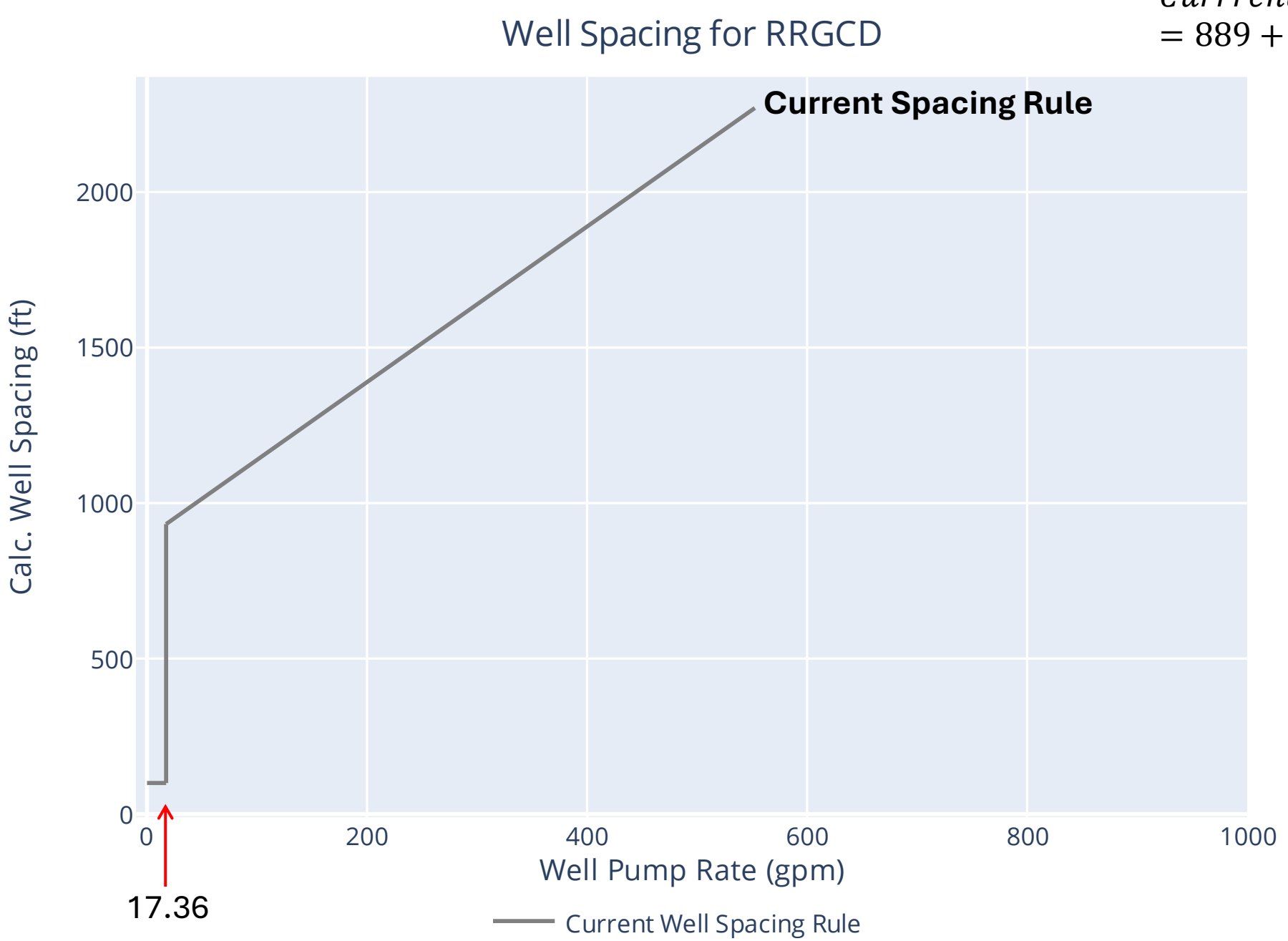
| **Minimum Spacing Requirements for All New Wells in the District**<br>***Applies to all aquifers*** | | |
|---|---|---|
| **Maximum Capacity of Well** | **Spacing from Property Line** | **Spacing from Existing Wells Completed in the Same Aquifer (in feet)** |
| 17.36 gpm or less | 50 feet | 100 feet |
| Greater than 17.36 gpm | 50 feet | 889 feet + [2.5 x (gpm of proposed well)] |

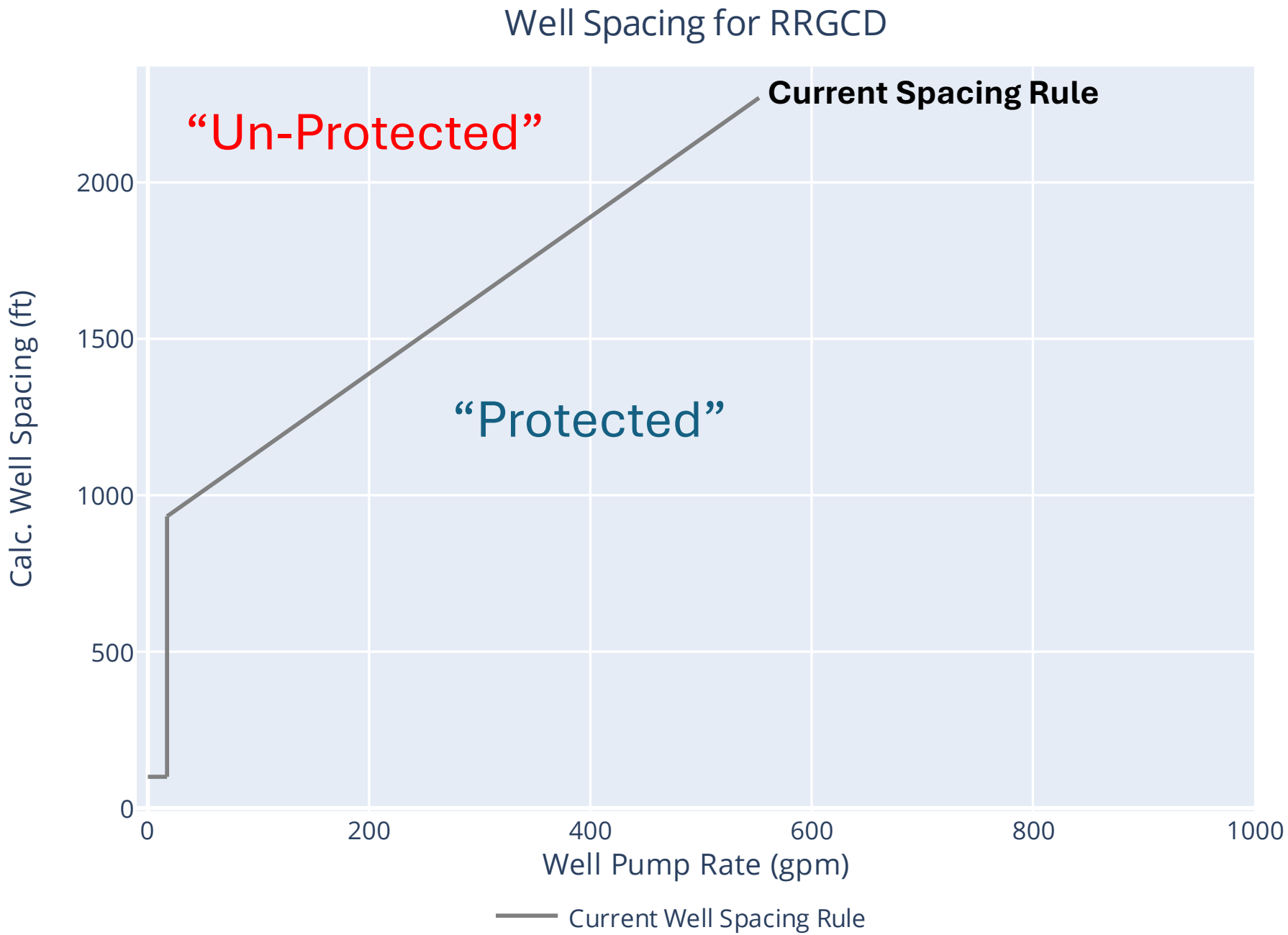
# Review of Assumptions

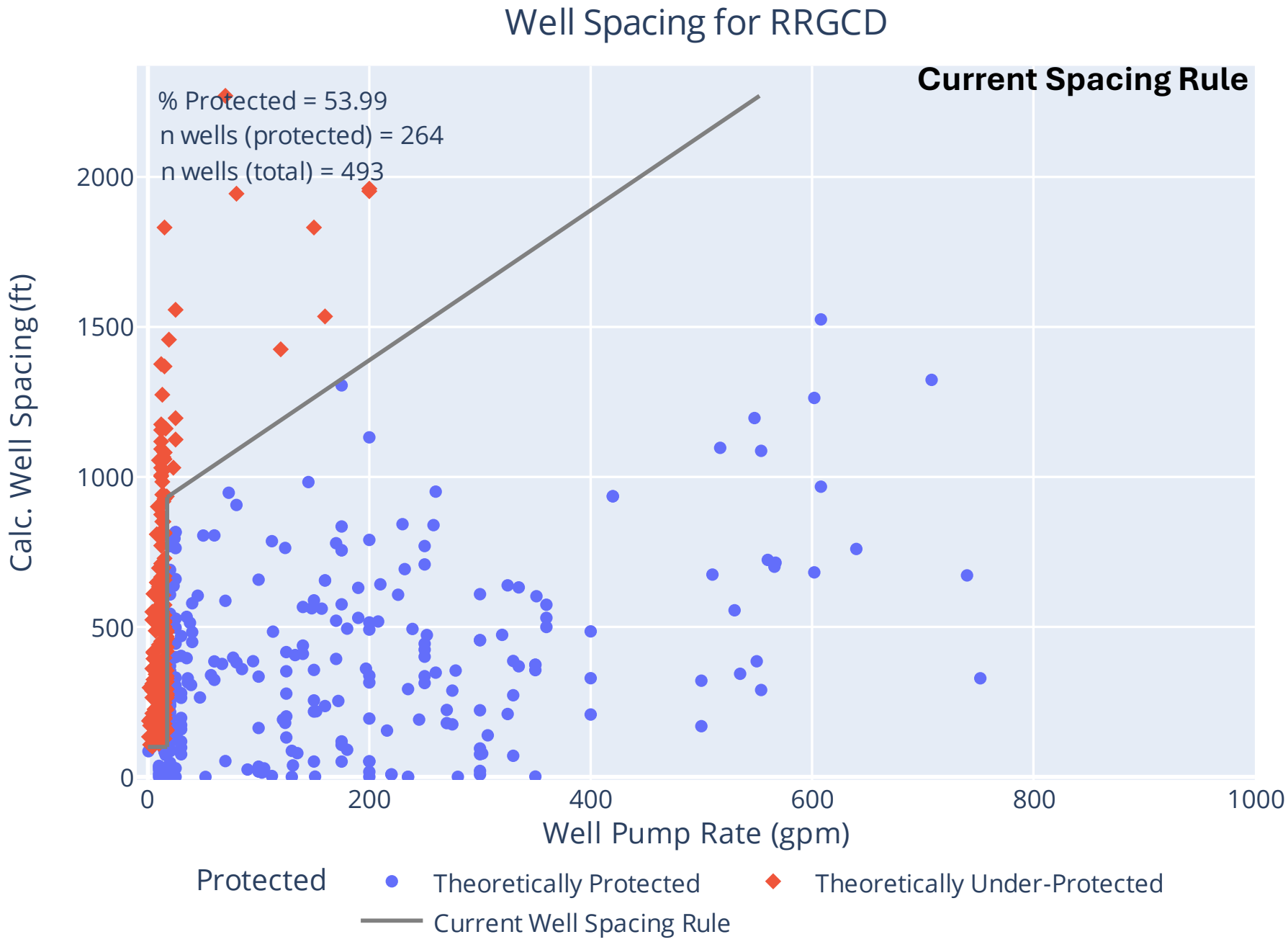
$$r = \sqrt{\frac{0.3 * T * t}{S * 10^{\frac{sT}{264*Q}}}}$$

- 2% of available drawdown
- Calculated with average screen depth
- 2 days of pumping
- S = 0.001
- T = Q/b*2000

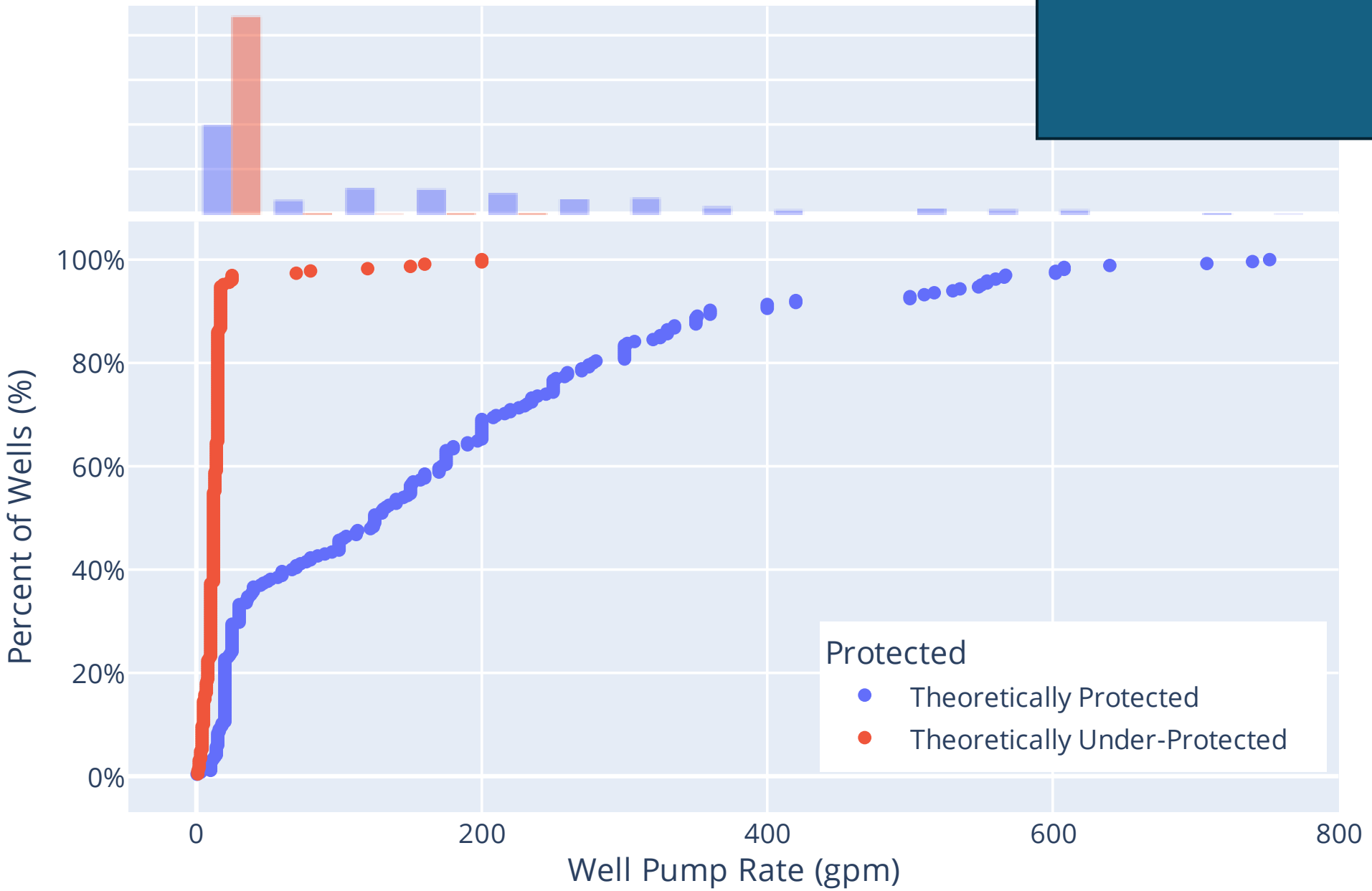
$$Currrent\ Well\ Spacing\ Rule = 889 + 2.5 * Q$$



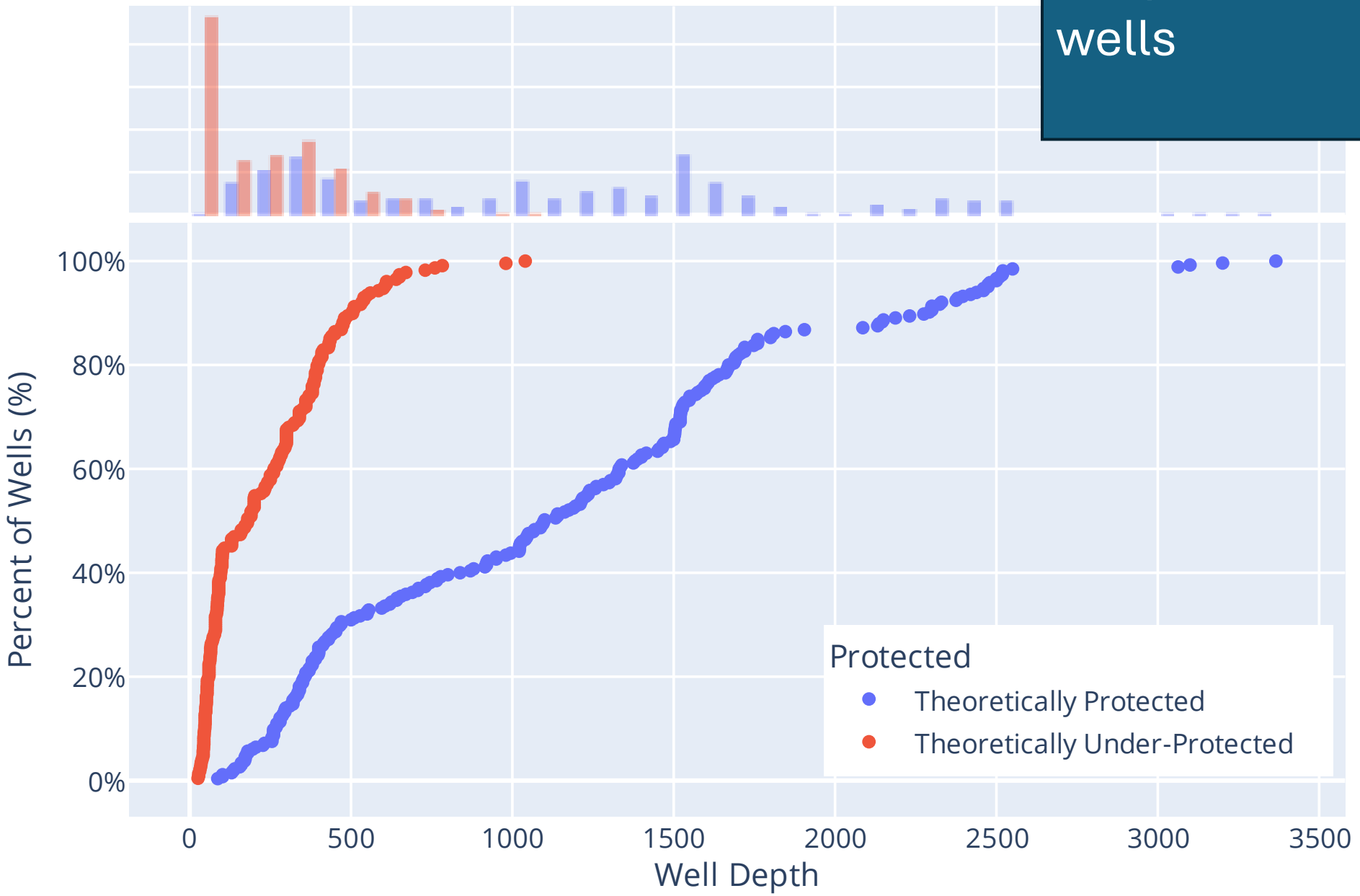

Well Spacing for RRGCD
Current Spacing Rule
“Un-Protected”
“Protected”
Calc. Well Spacing (ft)
2000
1500
1000
500
0
0
200
400
600
800
1000
Well Pump Rate (gpm)
Current Well Spacing Rule


Well Spacing for RRGCD
Current Spacing Rule
% Protected = 53.99
n wells (protected) = 264
n wells (total) = 493
Calc. Well Spacing (ft)
2000
1500
1000
500
0
0
200
400
600
800
1000
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule

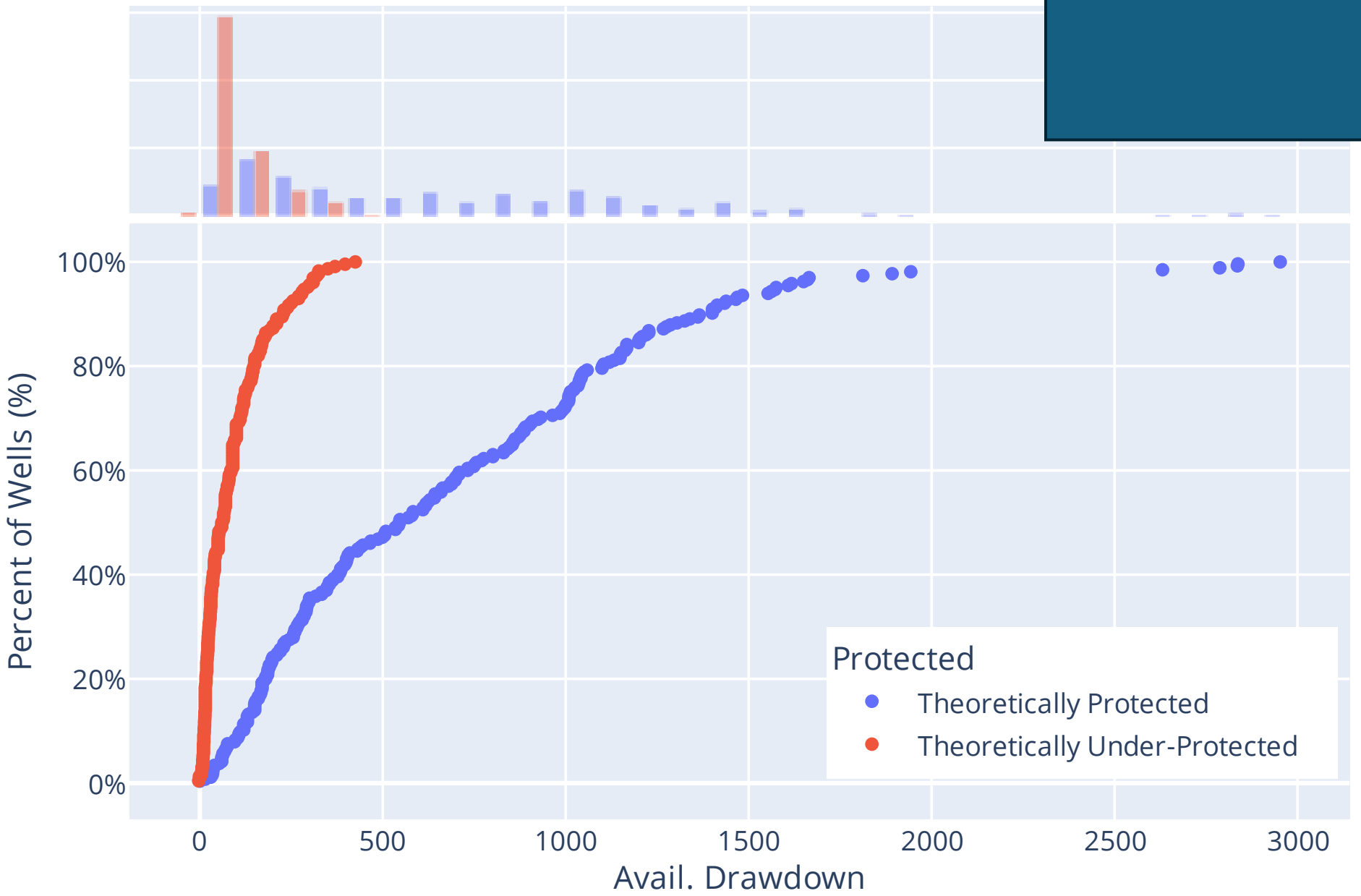
Most of the unprotected wells are low Q

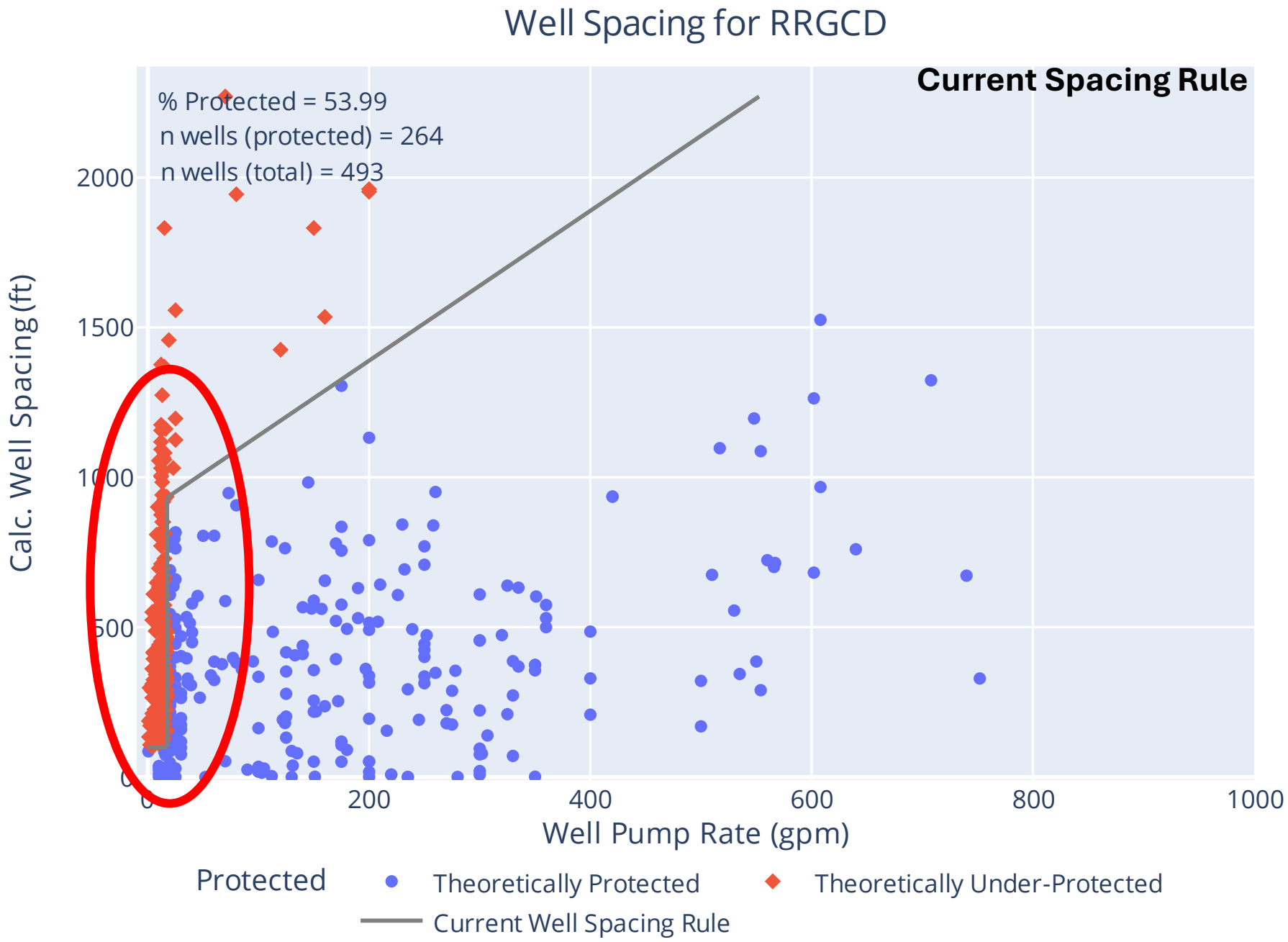


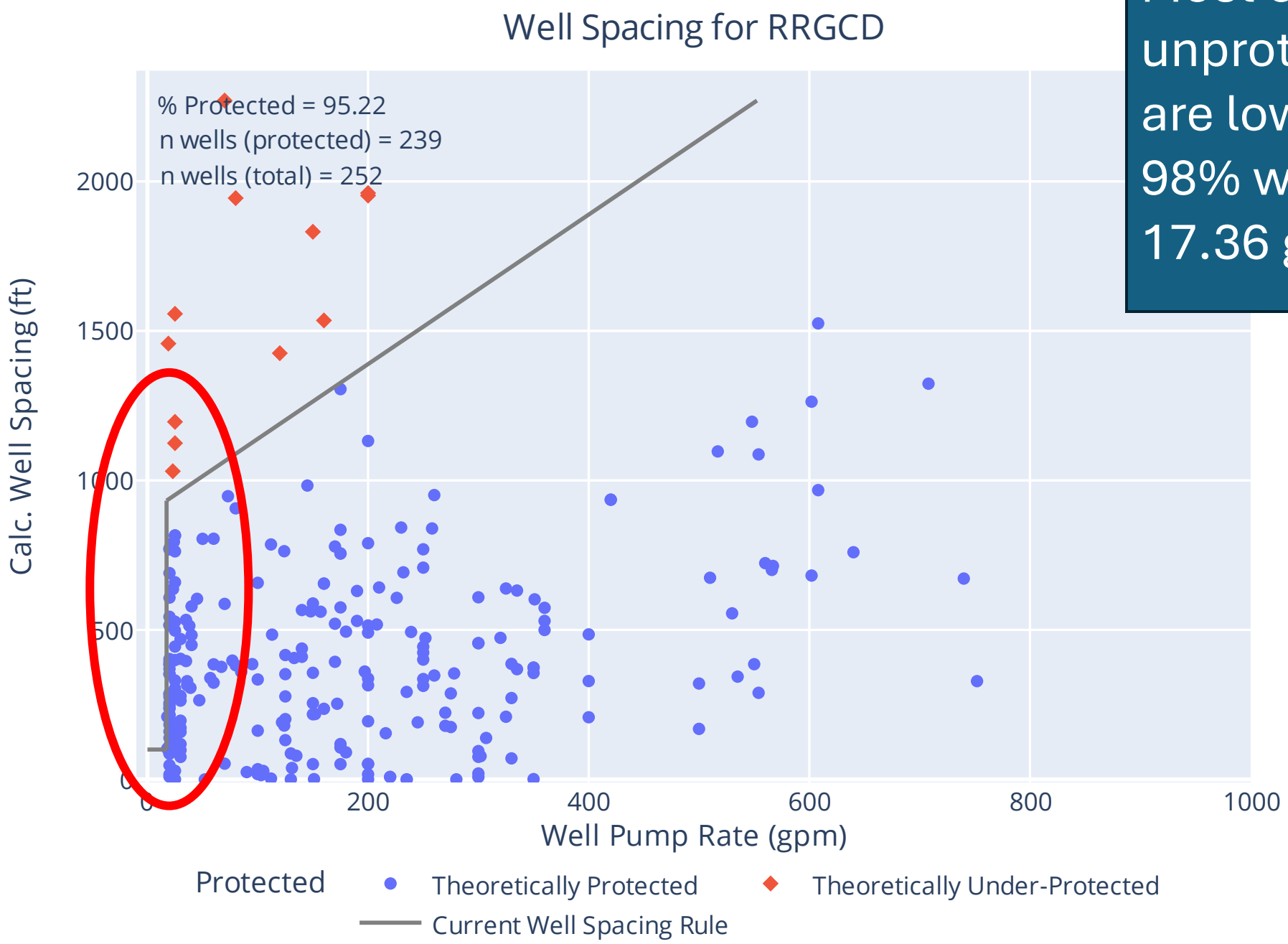
Protected wells are deeper than unprotected wells



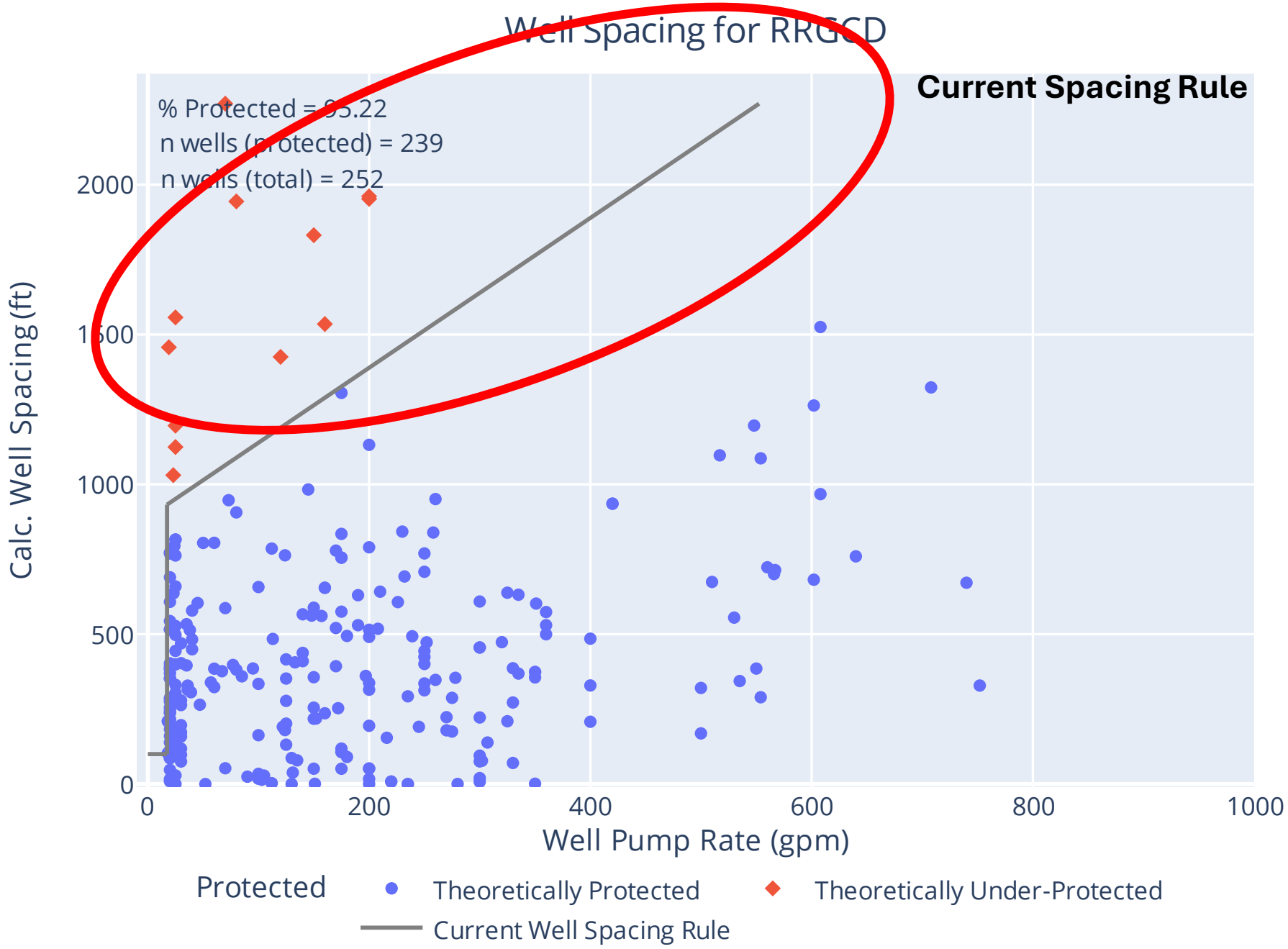
Unprotected wells have low avail. drawdown




Well Spacing for RRGCD
Current Spacing Rule
% Protected = 53.99
n wells (protected) = 264
n wells (total) = 493
Calc. Well Spacing (ft)
2000
1500
1000
500
0
0
200
400
600
800
1000
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule




Most of the unprotected wells are low Q -- up to 98% with only > 17.36 gpm


Well Spacing for RRGCD
Current Spacing Rule
% Protected = 95.22
n wells (protected) = 239
n wells (total) = 252
Calc. Well Spacing (ft)
2000
1500
1000
500
0
0
200
400
600
800
1000
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule

# Unprotected Wells Q > 17.36 (GPM)

The high Q wells that are unprotected have low Avail. Drawdown

| Well Depth | Well Use | Primary Production Layer | Aquifer Designation | Pump Rate | Transmissivity | Avail. Drawdown | Spacing Required | Rule Spacing |
|---|---|---|---|---|---|---|---|---|
| 95 | Irrigation | 1 | **Layer_1** | 120 | 4800 | **50** | 1425 | 1189 |
| 90 | Public Supply | 1 | **Layer_1** | 23 | 2300 | **15** | 1031 | 947 |
| 97 | Irrigation | 1 | **Layer_1** | 150 | 10000 | **50** | 1832 | 1264 |
| 96 | Irrigation | 1 | **Layer_1** | 200 | 10000 | **51** | 1961 | 1389 |
| 97 | Irrigation | 1 | **Layer_1** | 200 | 10000 | **52** | 1952 | 1389 |
| 95 | Irrigation | 1 | **Layer_1** | 160 | 64000 | **40** | 1535 | 1289 |
| 32 | Domestic | 1 | **Layer_1** | 19 | 6333 | **10** | 1458 | 937 |
| 80 | Stock | 1 | **Layer_1** | 80 | 8000 | **14** | 1944 | 1089 |
| 100 | Other | 1 | **Layer_1** | 25 | 5555 | **25** | 1125 | 952 |
| 80 | Irrigation | 1 | **Layer_1** | 70 | 14000 | **14** | 2270 | 1064 |
| 54 | Domestic | 1 | **Layer_1** | 25 | 12500 | **19** | 1196 | 952 |
| 48 | Domestic | 1 | **Layer_1** | 25 | 6250 | **10** | 1557 | 952 |

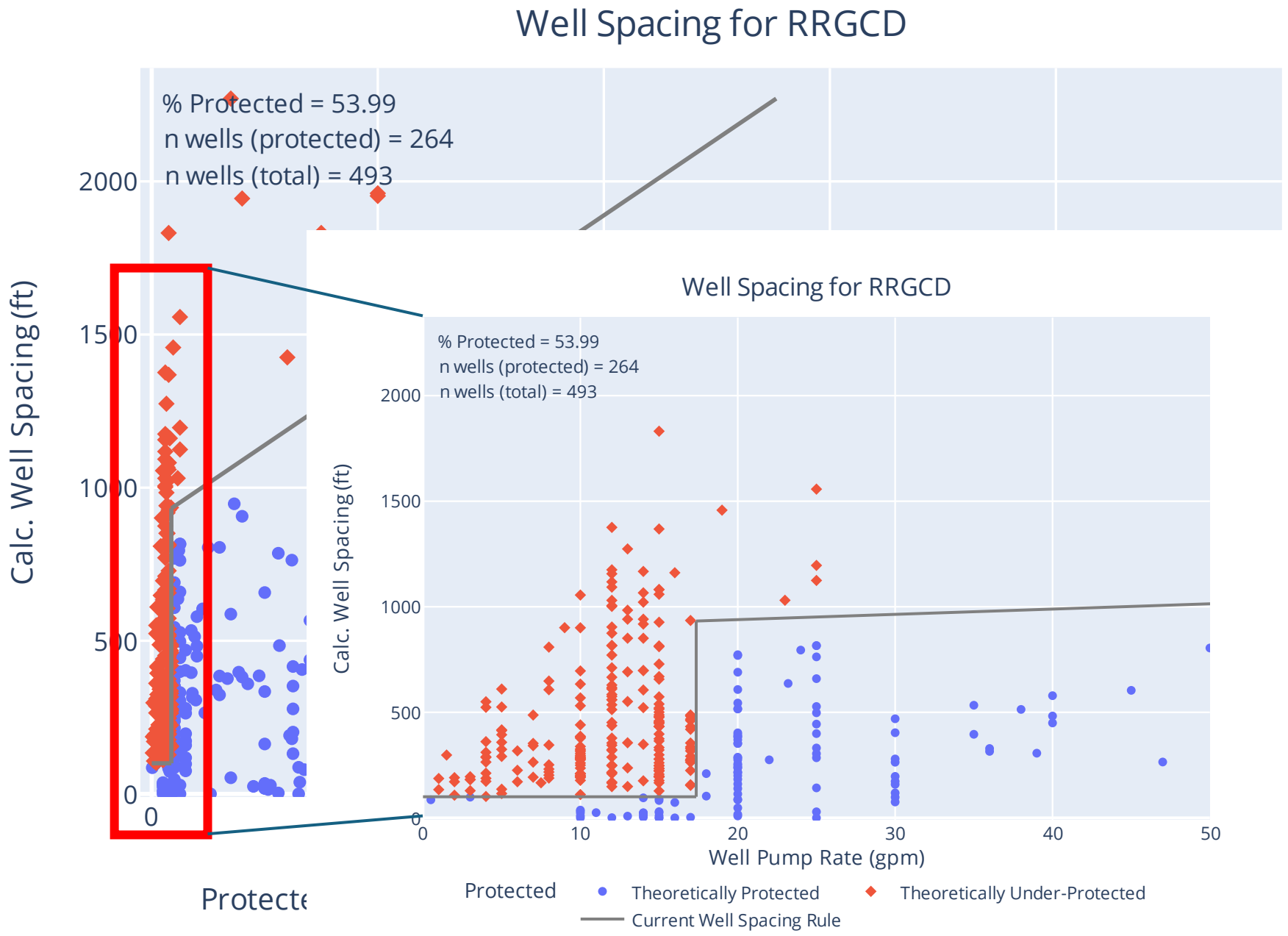
# Observations

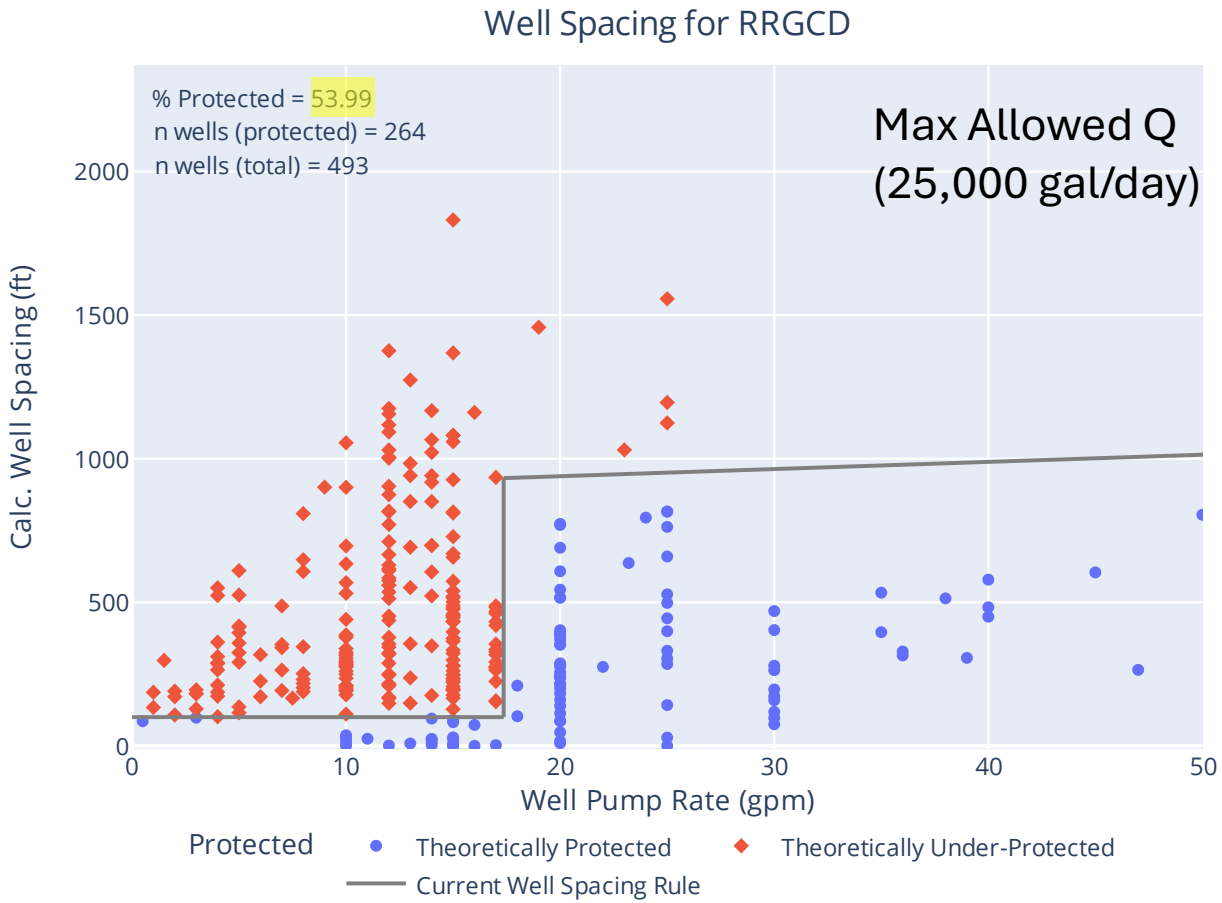
- Most of the unprotected wells are low Q (<17.36 gpm)
- Most of the wells that are unprotected are shallow outcrop wells with limited available drawdown
- An important factor to the analysis is available drawdown and the % impact that allowed, therefore the method and assumptions are important

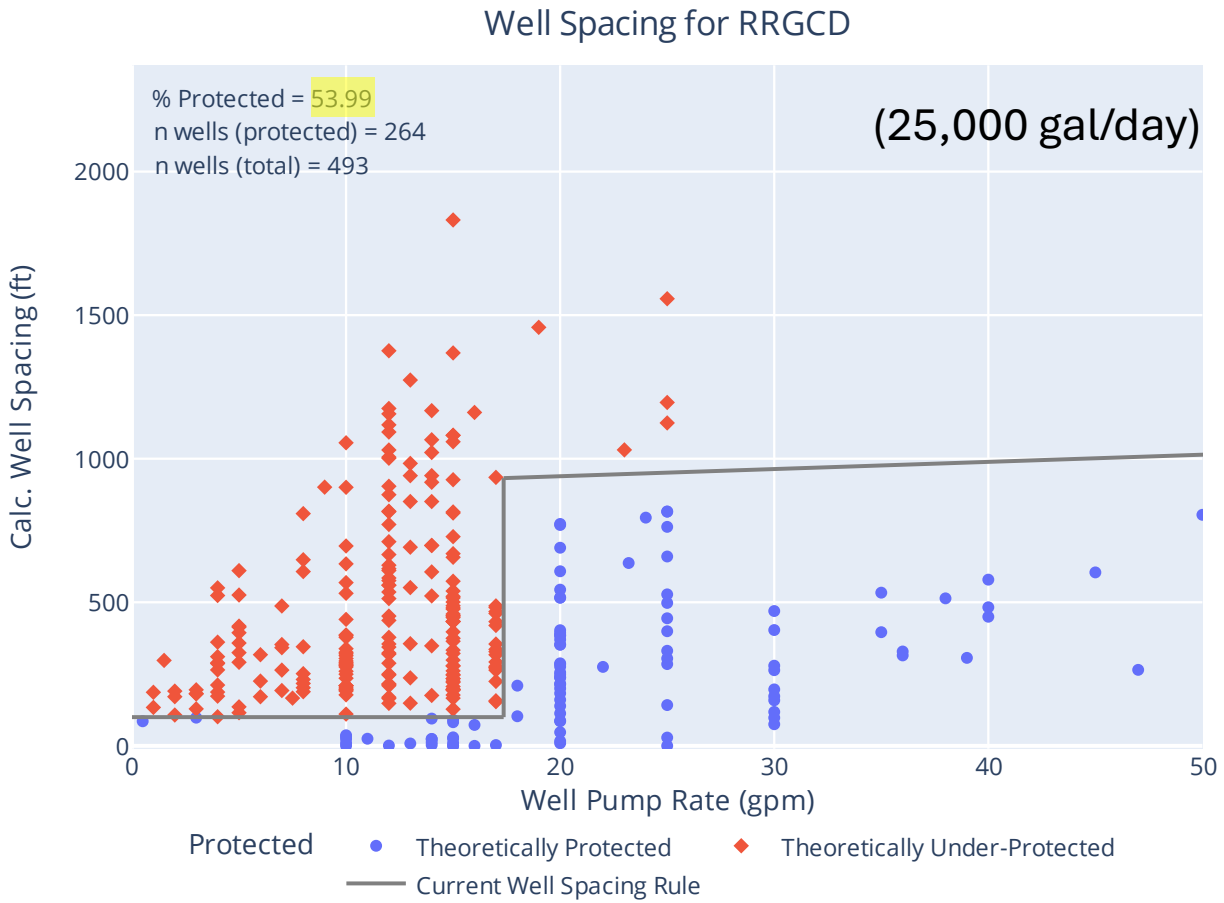
# Further Discussion of Exempt Wells

- 17.36 GPM is derived from 25,000 gal/day
- Most domestic wells pump much less, generally less than 500 gallons
- How does lower pumping rates (Q) change the proportion of wells protected?

- Source T
- Source DTW
- All wells




Well Spacing for RRGCD
% Protected = 53.99
n wells (protected) = 264
n wells (total) = 493
Max Allowed Q
(25,000 gal/day)
Calc. Well Spacing (ft)
2000
1500
1000
500
0
0
10
20
30
40
50
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule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Theoretically Protected
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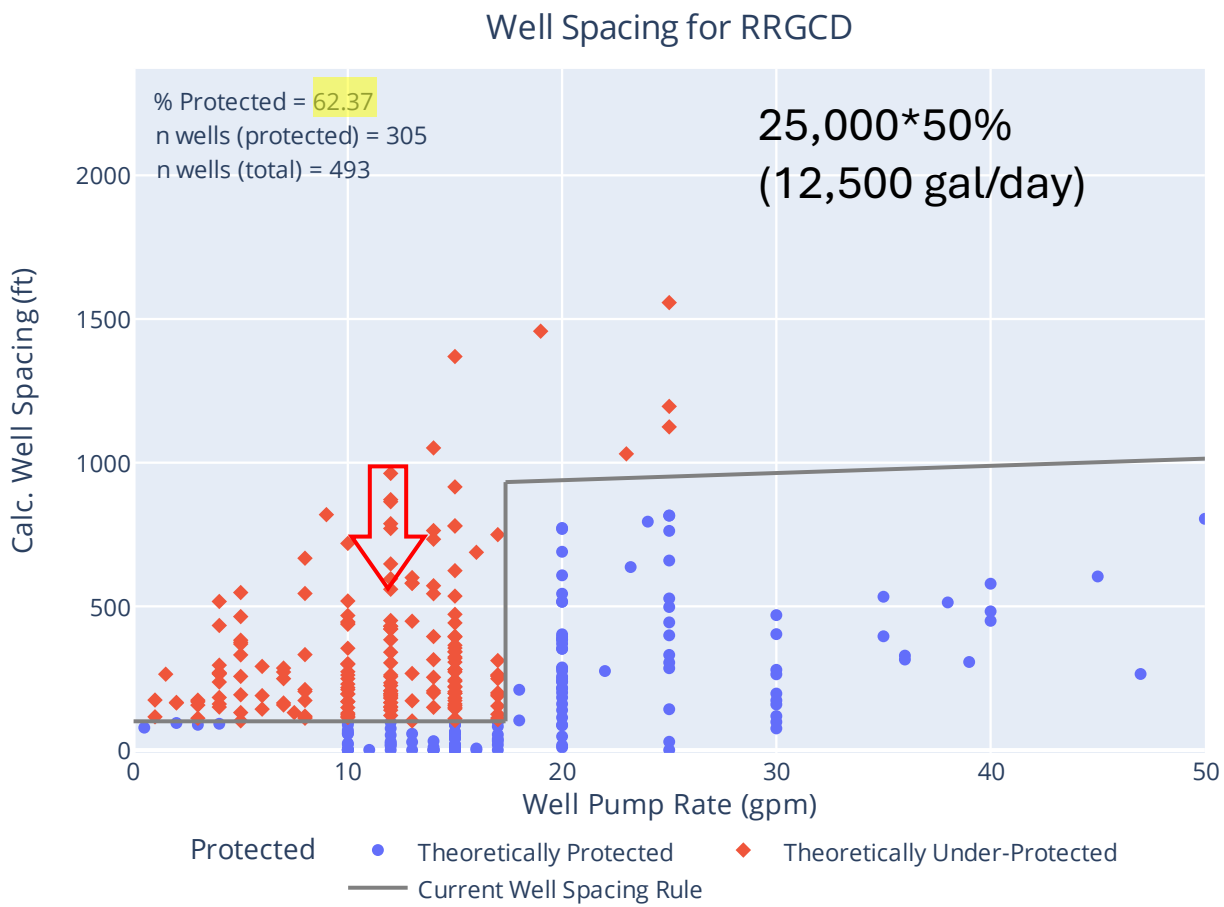
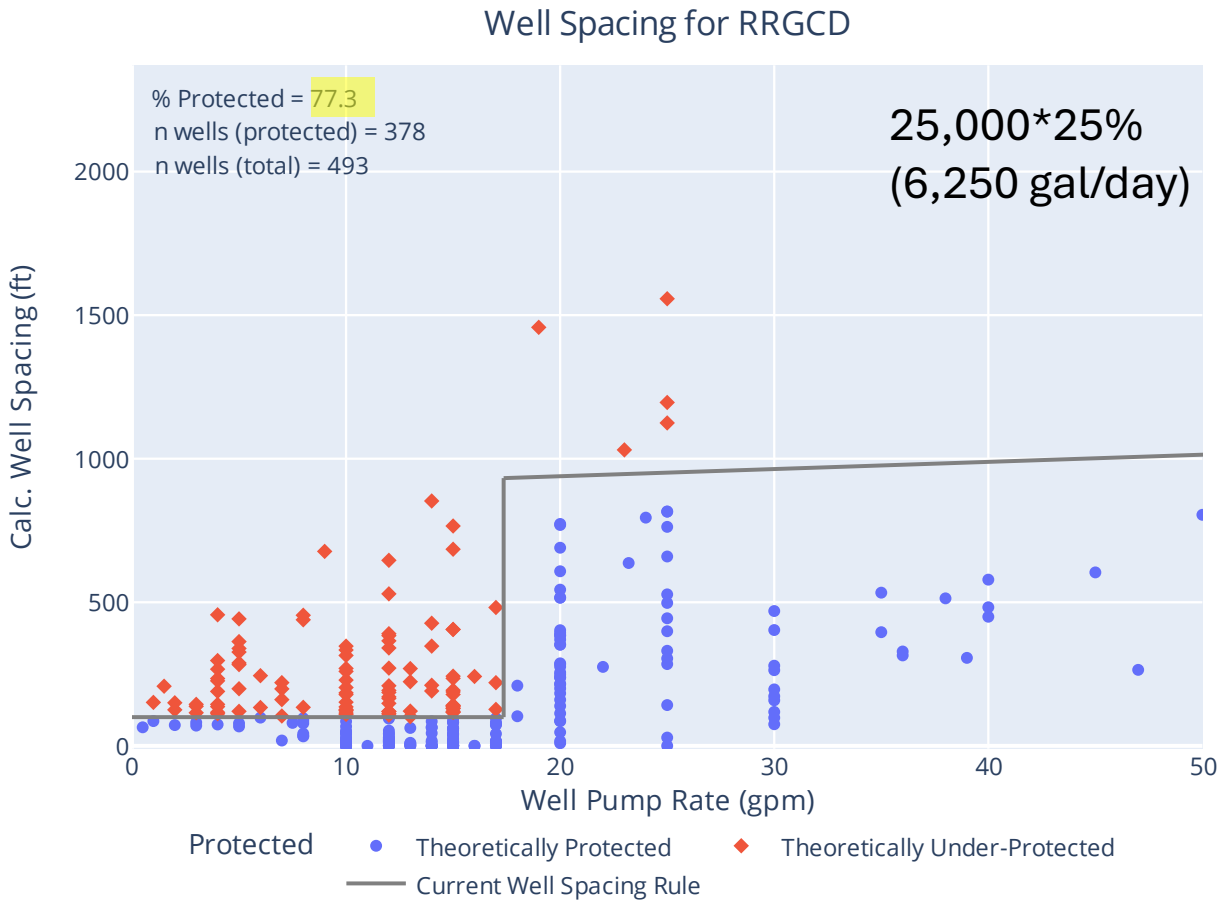
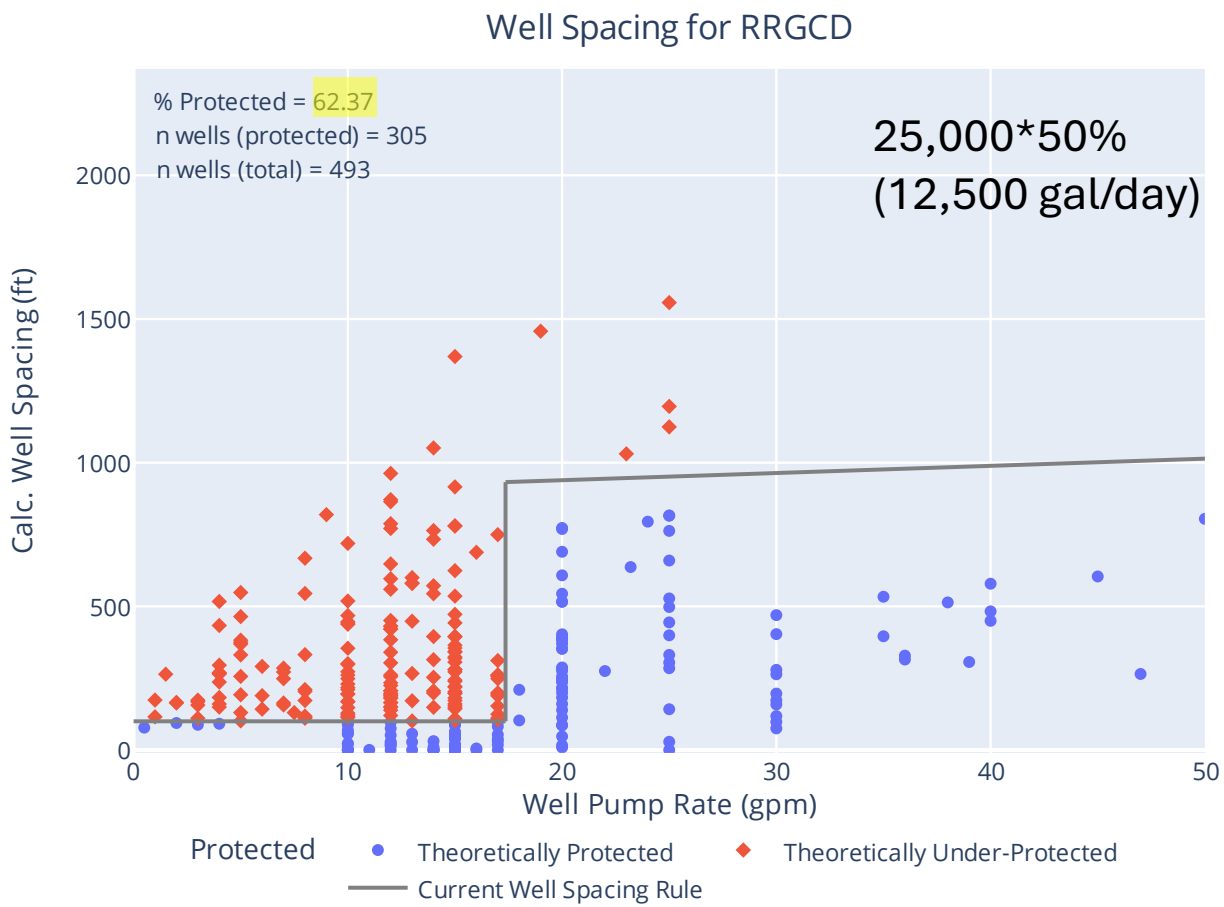

Well Spacing for RRGCD
% Protected = 62.37
n wells (protected) = 305
n wells (total) = 493
25,000*50%
(12,500 gal/day)
Calc. Well Spacing (ft)
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule


Well Spacing for RRGCD
% Protected = 77.3
n wells (protected) = 378
n wells (total) = 493
25,000*25%
(6,250 gal/day)
Calc. Well Spacing (ft)
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule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Well Pump Rate (gpm)
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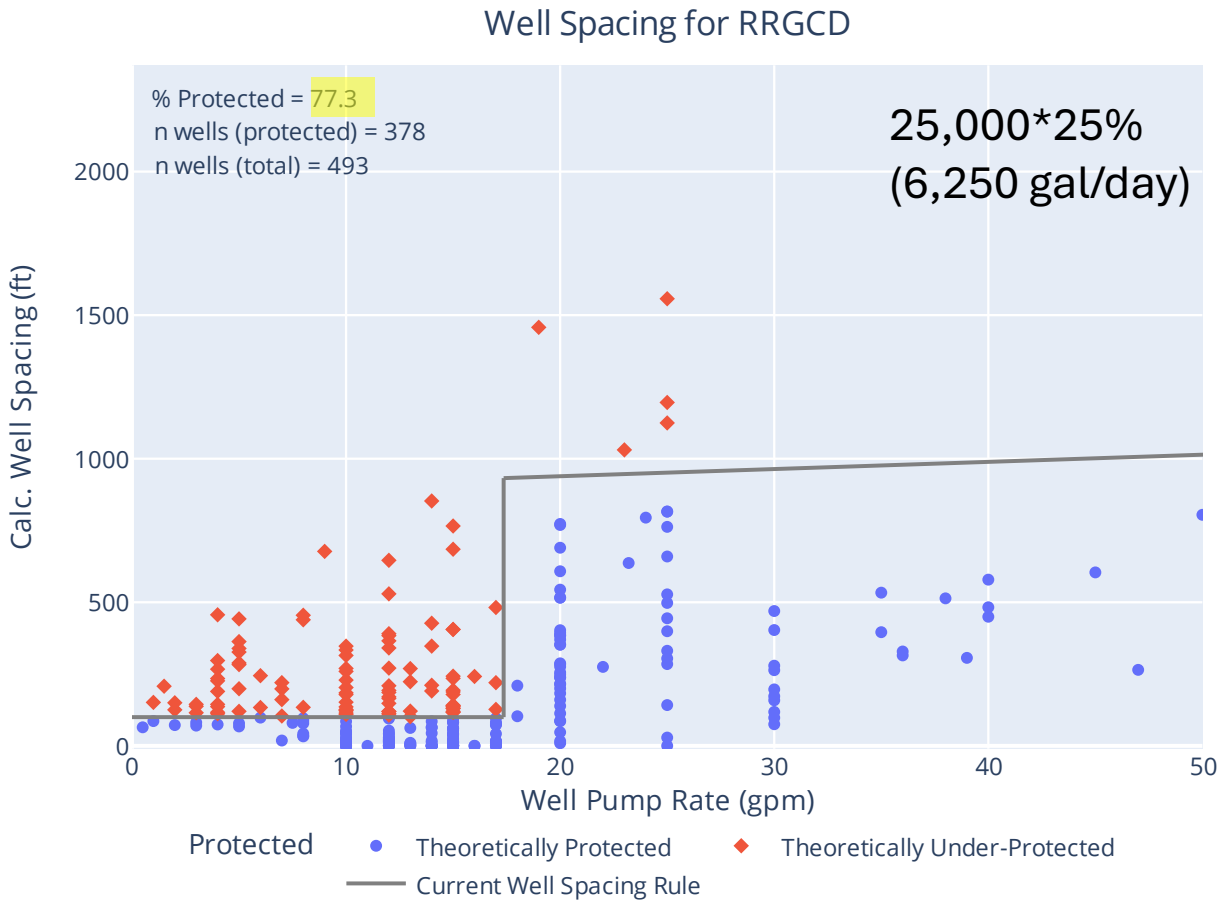
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule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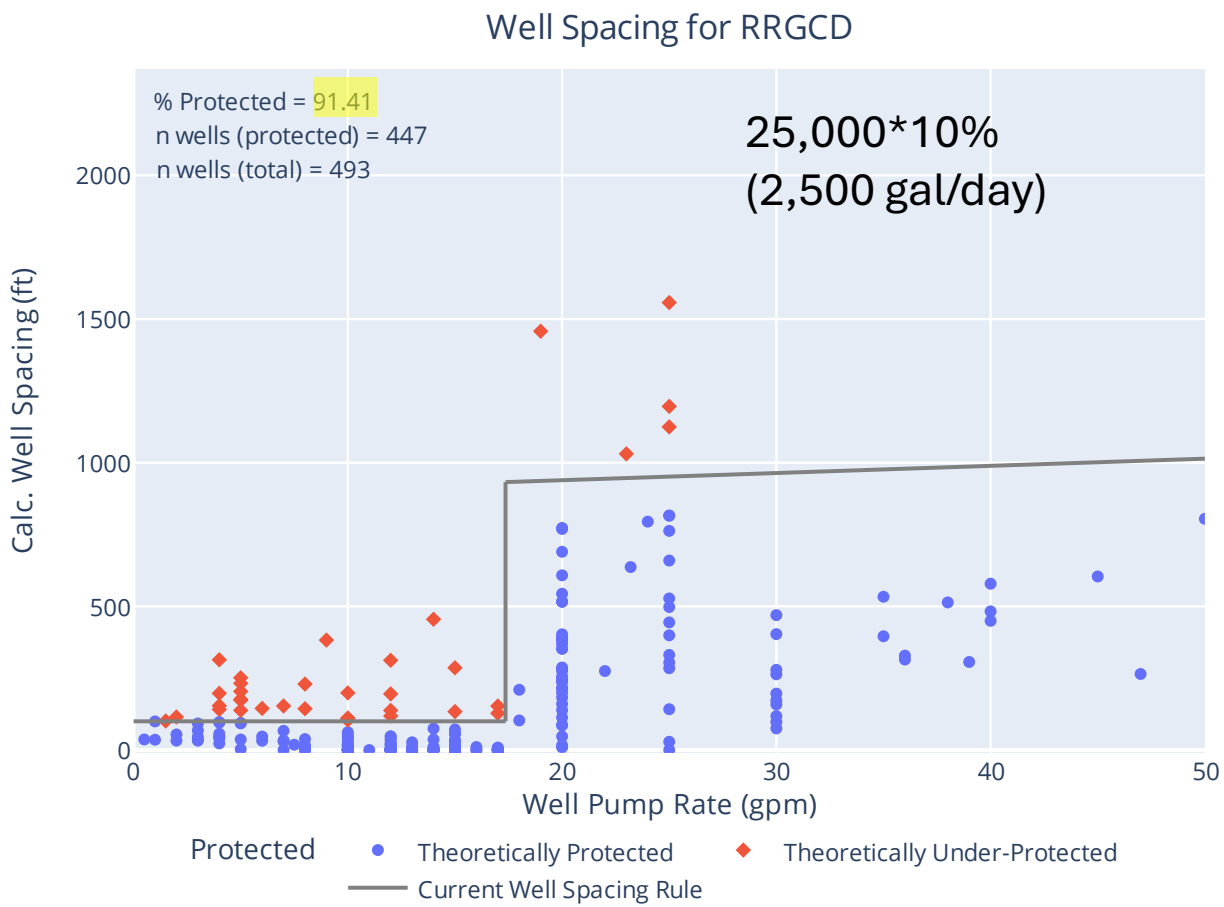
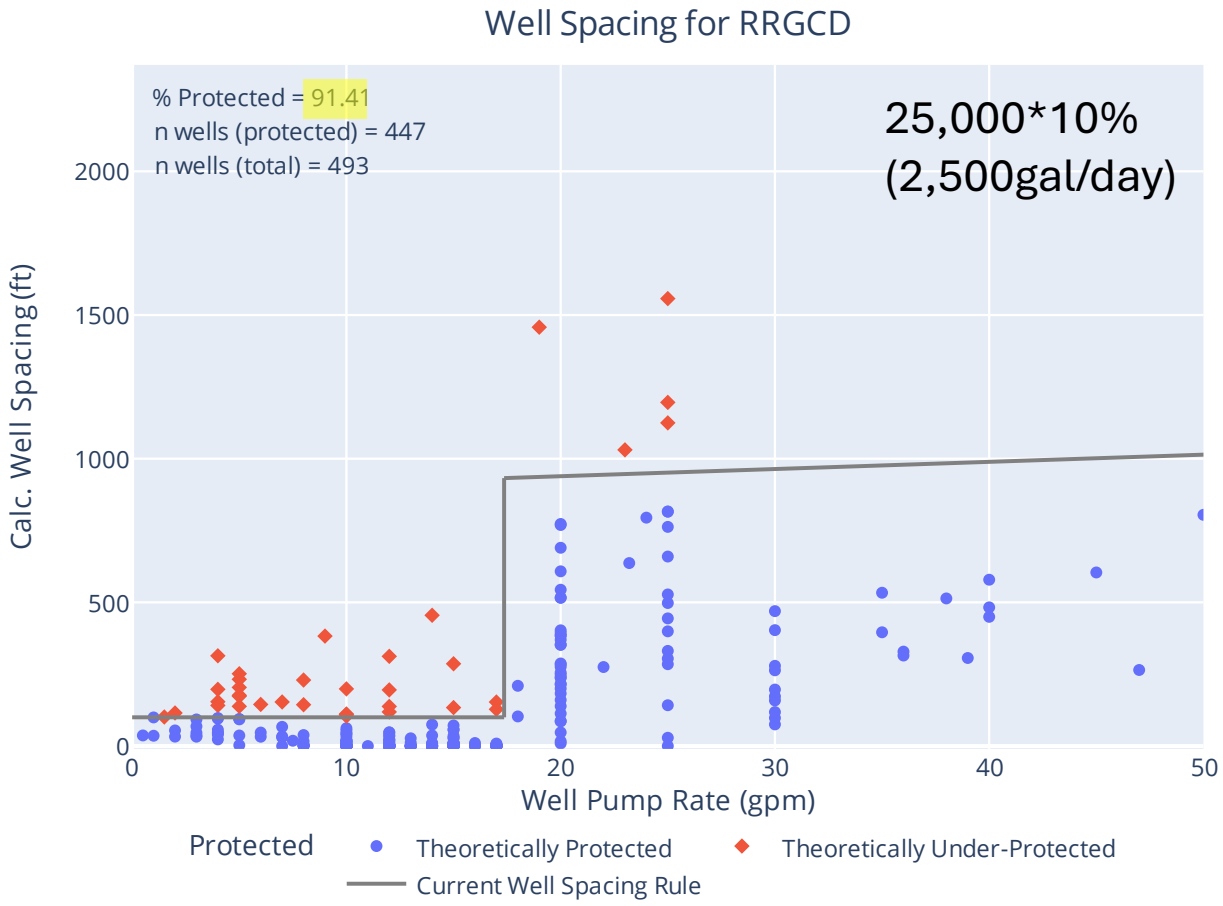

Well Spacing for RRGCD
% Protected = 91.41
n wells (protected) = 447
n wells (total) = 493
25,000*10%
(2,500 gal/day)
Calc. Well Spacing (ft)
Well Pump Rate (gpm)
Protected
Theoretically Protected
Theoretically Under-Protected
Current Well Spacing Rule

- At 5x the average household usage, most wells are compliant with spacing
- Remaining wells that are under-protected generally have low available drawdown (<100ft)



# Some limitations of approach

- assumes that the impacted well is identical to the pumping well
- Potential bias in available data
- Transmissivity estimates for small wells (and poorly completed wells) are more uncertain
- Assumes that only one well is pumping
- Older wells with significant water level decline may not be well represented due to limited data

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- assumes that the impacted well is identical to the pumping well
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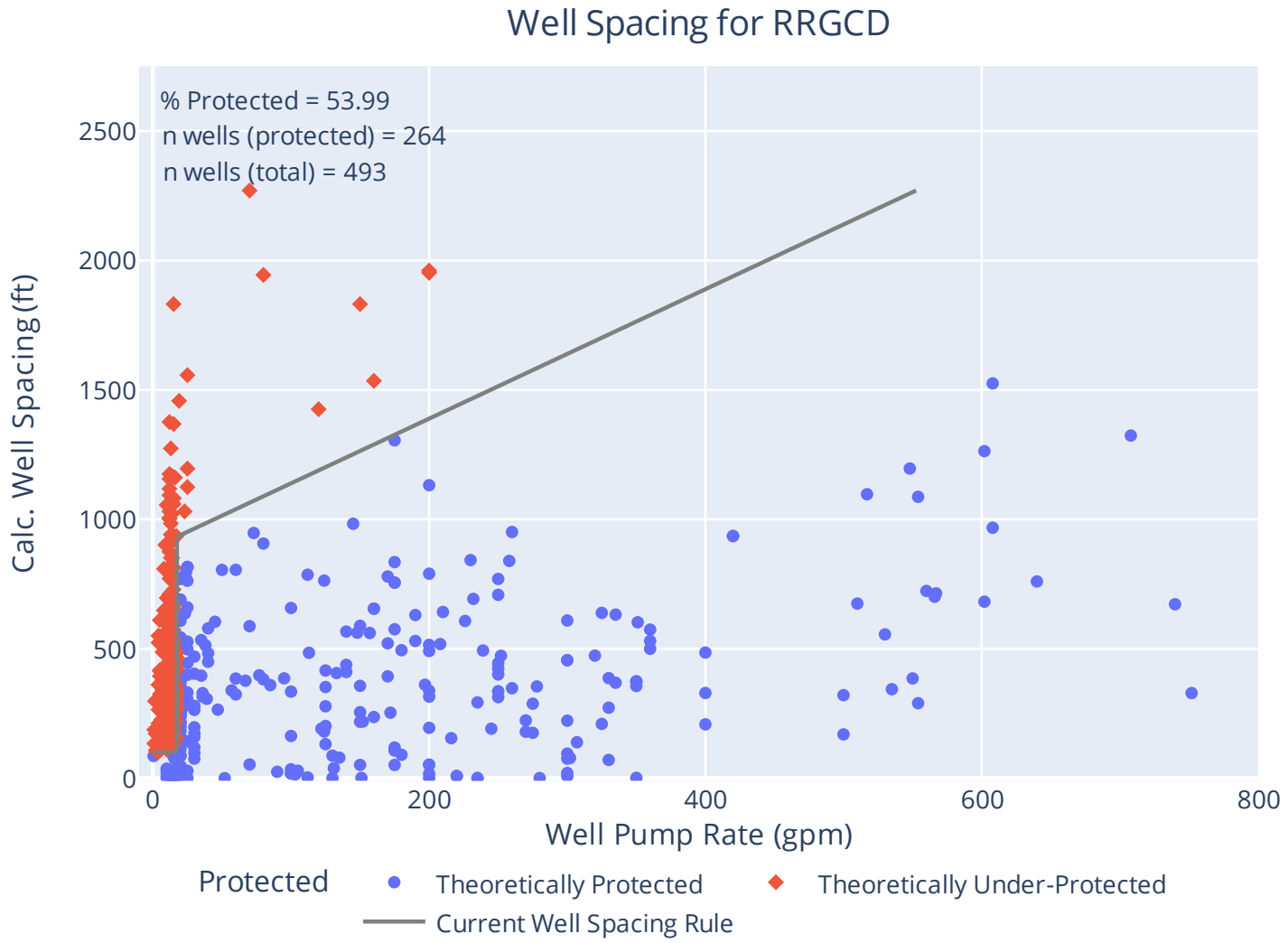
# Various Transmissivity Sources

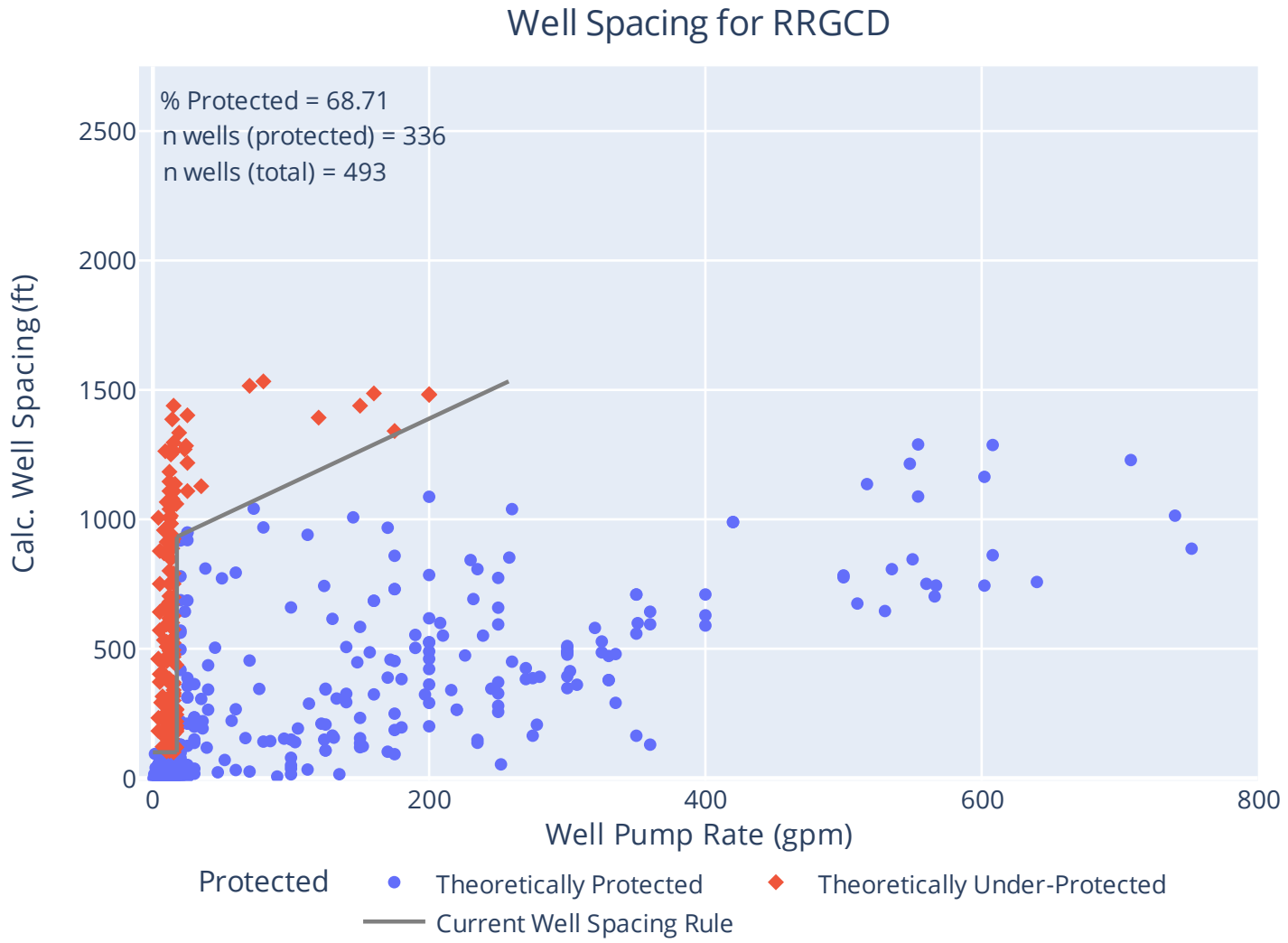
- **Source pump test**
- Layer average
- GAM



# Various Transmissivity Sources

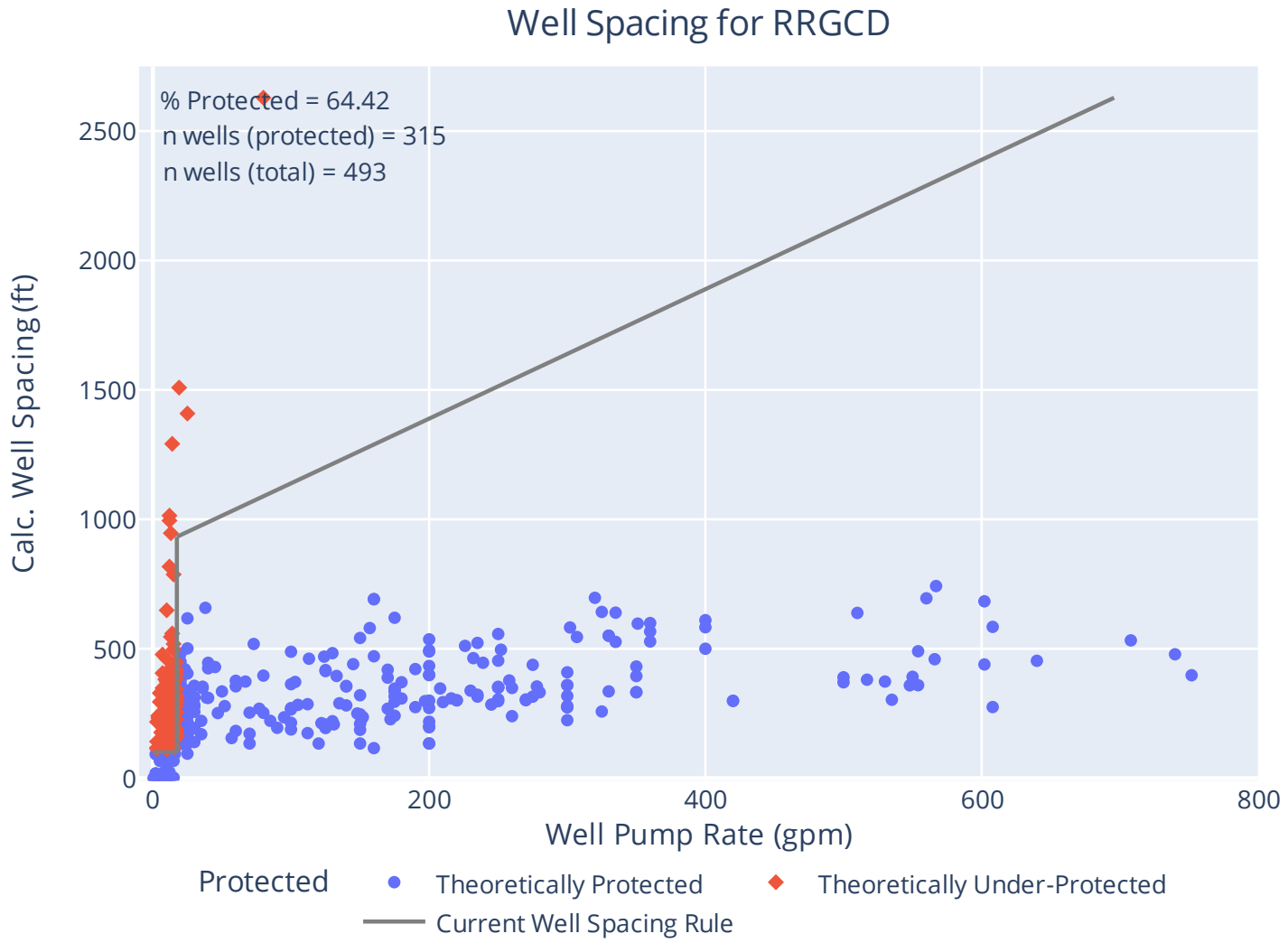
- Source pump test
- **Layer average**
  - Average of T from pump tests in the pumping layer
- GAM

Less high spacing wells



# Various Transmissivity Sources

- Source pump test
- Layer average
- **GAM**



# Various Transmissivity Sources Conclusions

- Source pump tests that have low T yield high spacing
- Average T values decrease spacing

# Limitations of approach

- This approach assumes that the impacted well is identical to the pumping well
- Data availability (so bias in the data that are available)
- Transmissivity estimates for small wells (and poorly completed wells) are more uncertain
- This analysis assumes that only one well is pumping
- **Older wells with significant water level decline may not be well represented**

# Declining Water Levels

- Water levels have declined and will continue to decline
- Available drawdown will continue to decrease

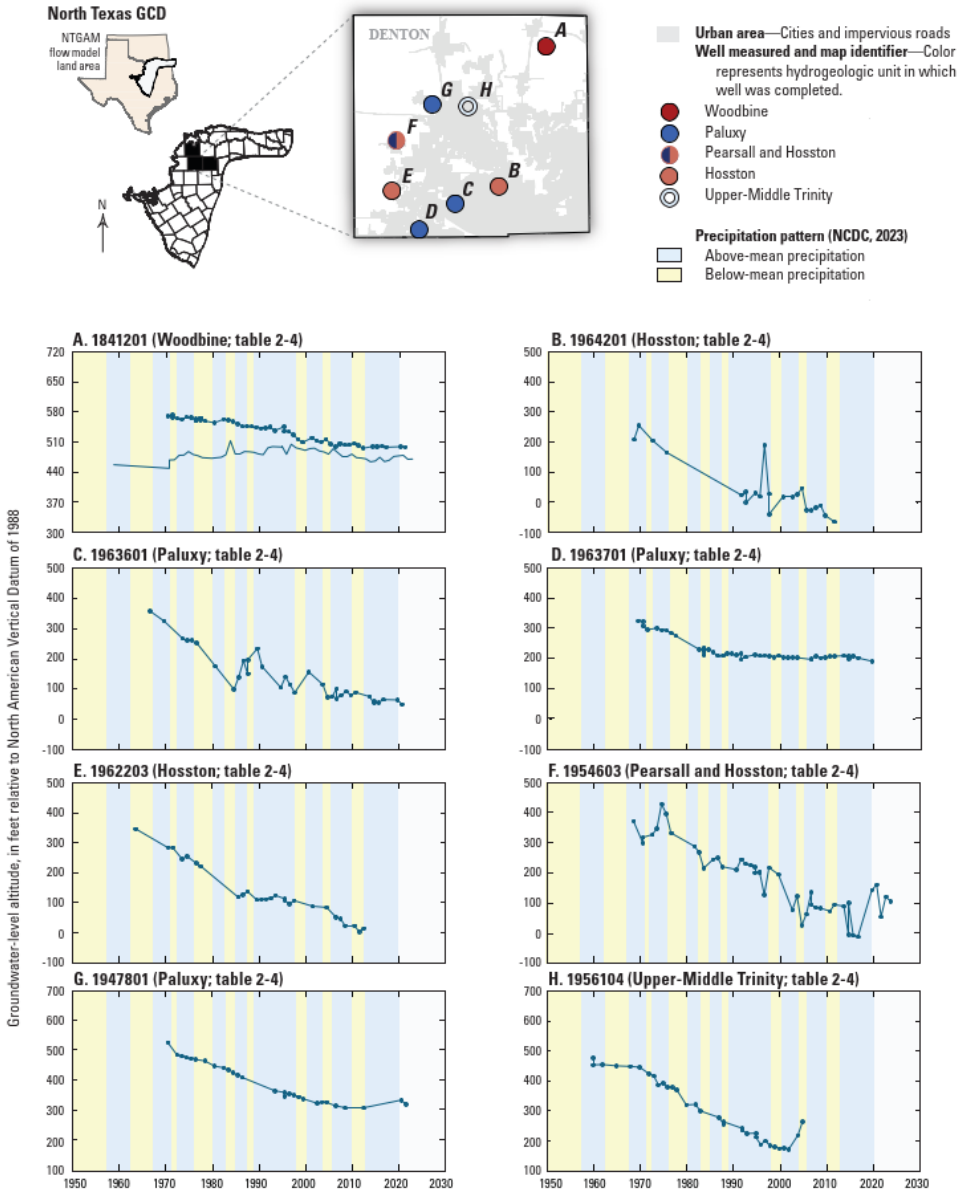
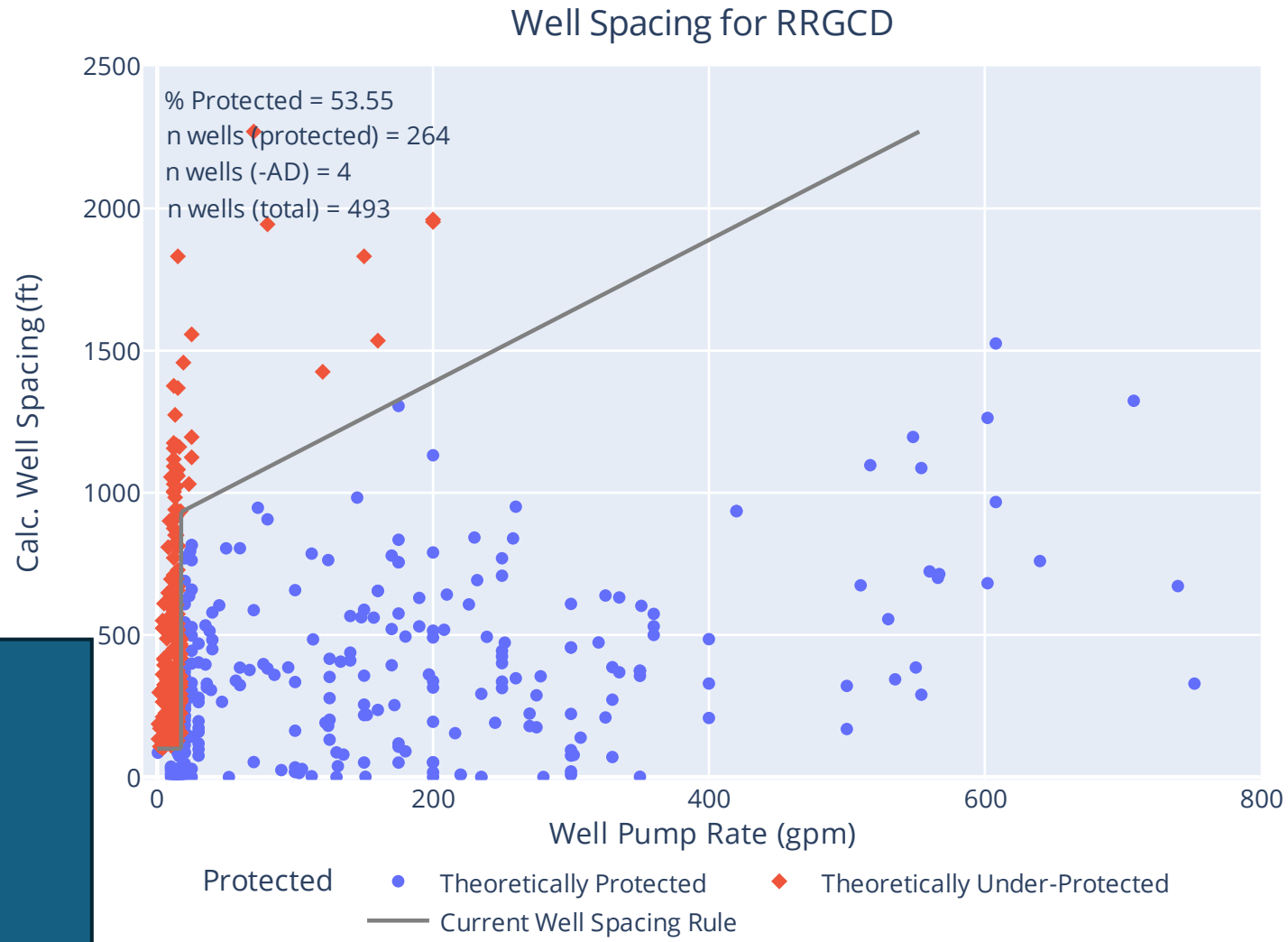



**Figure 2-25** Locations and hydrographs of groundwater levels for selected wells in the North Texas Groundwater Conservation District in Denton County from 1950 to 2024.

*Ellis and others 2025*

# Declining Water Levels

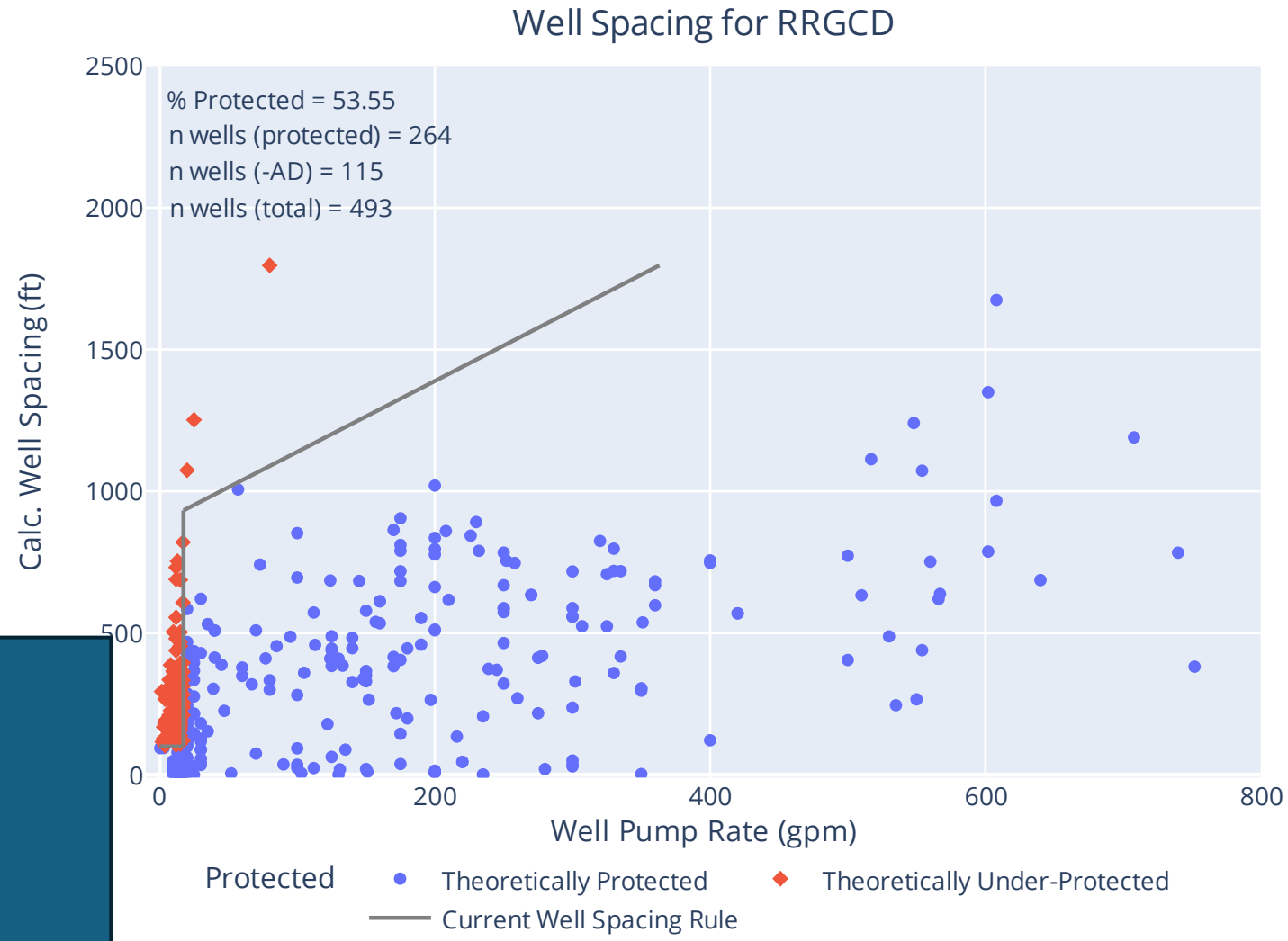
- Using drilling water levels




4 negative avail. drawdown
54% protected

# Declining Water Levels

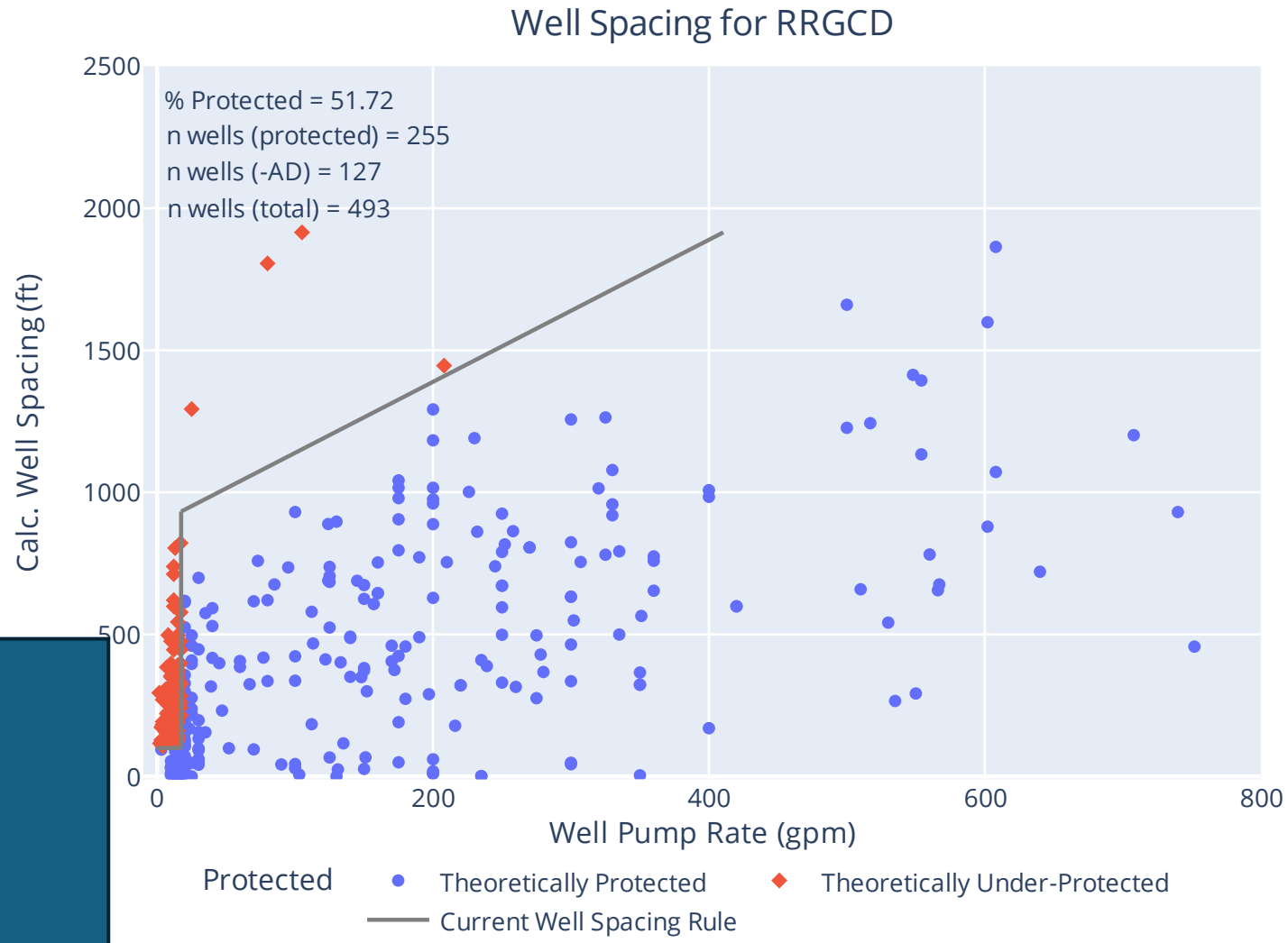
- Using 2020 GAM water levels




115 negative avail. drawdown (increasing)
54% protected (Similar)

# Declining Water Levels

- Using 2050 GAM water levels



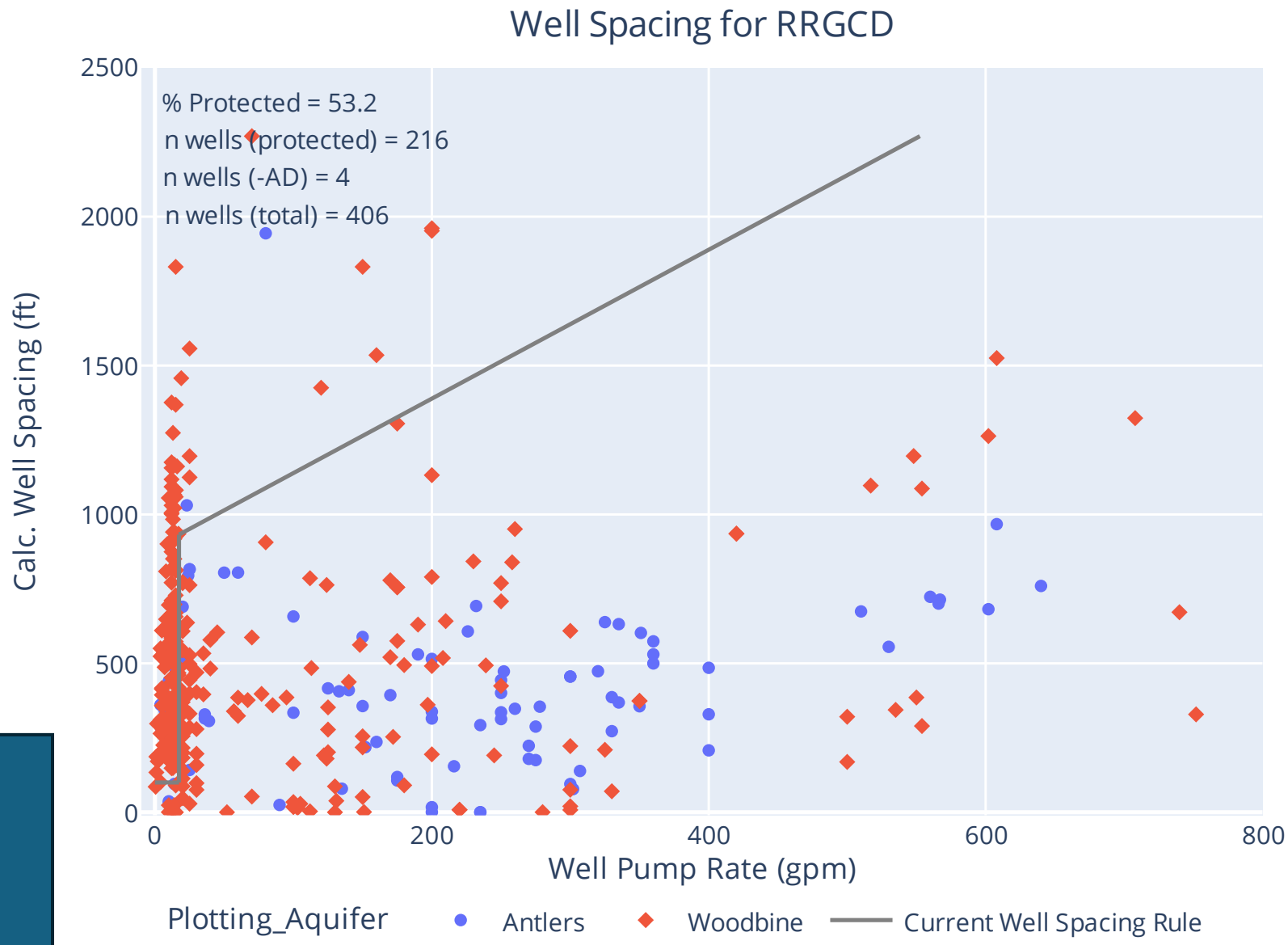

127 negative avail. drawdown (increasing)
52% protected (Similar)

# Separated by Aquifer

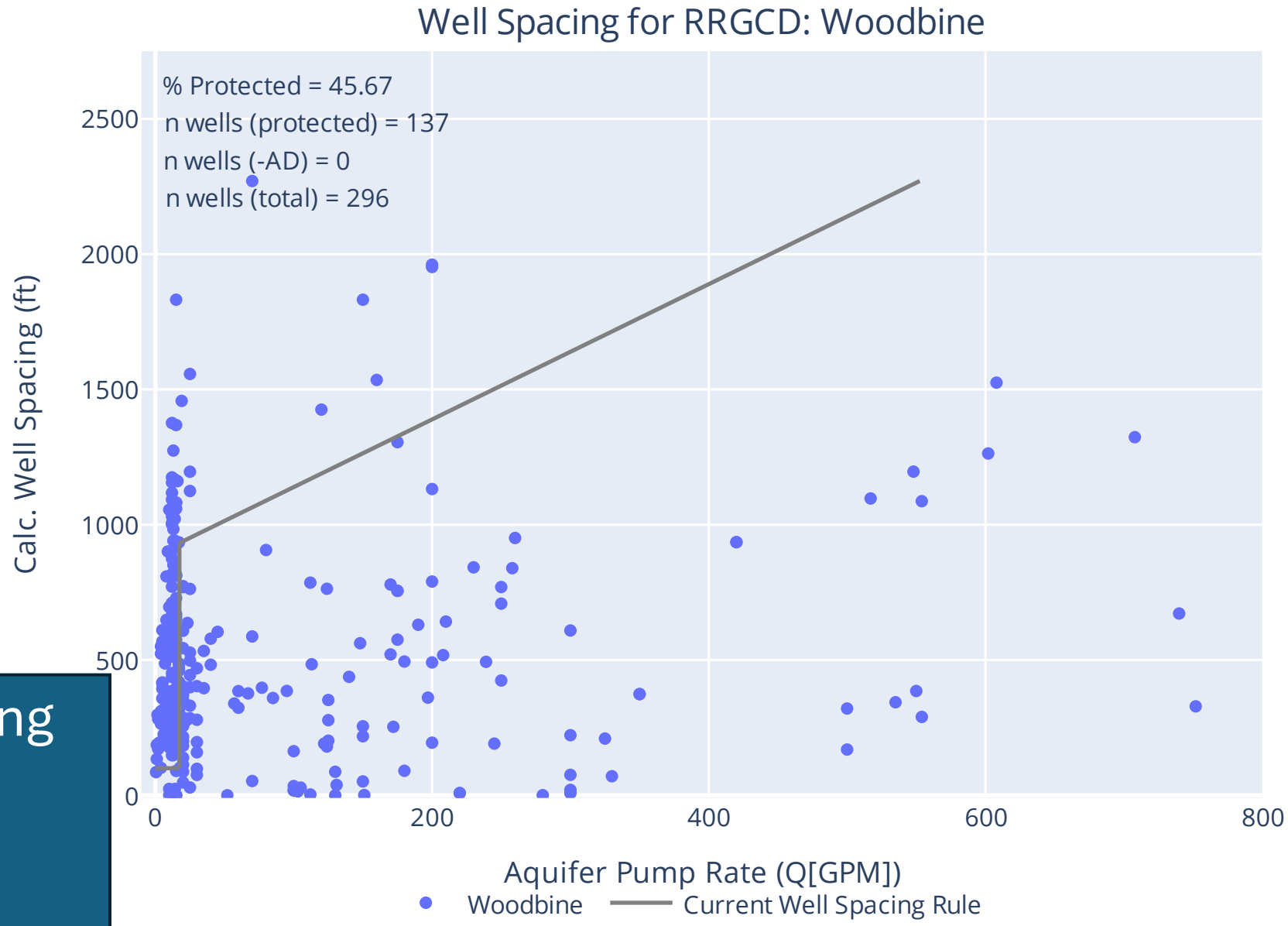
| Model Terminology | Region 1 |
|---|---|
| Woodbine Aquifer | Woodbine |
| Washita/ Fredericksburg Groups | Washita/ Fredericksburg |
| Paluxy Aquifer | Antlers |
| Glen Rose Formation | Antlers |
| Hensell Aquifer | Antlers |
| Pearsall Formation | Antlers |
| Hosston Aquifer | Antlers |

*Kelly and Ewing, 2014*

Most unprotected wells are Woodbine (and outcrop)

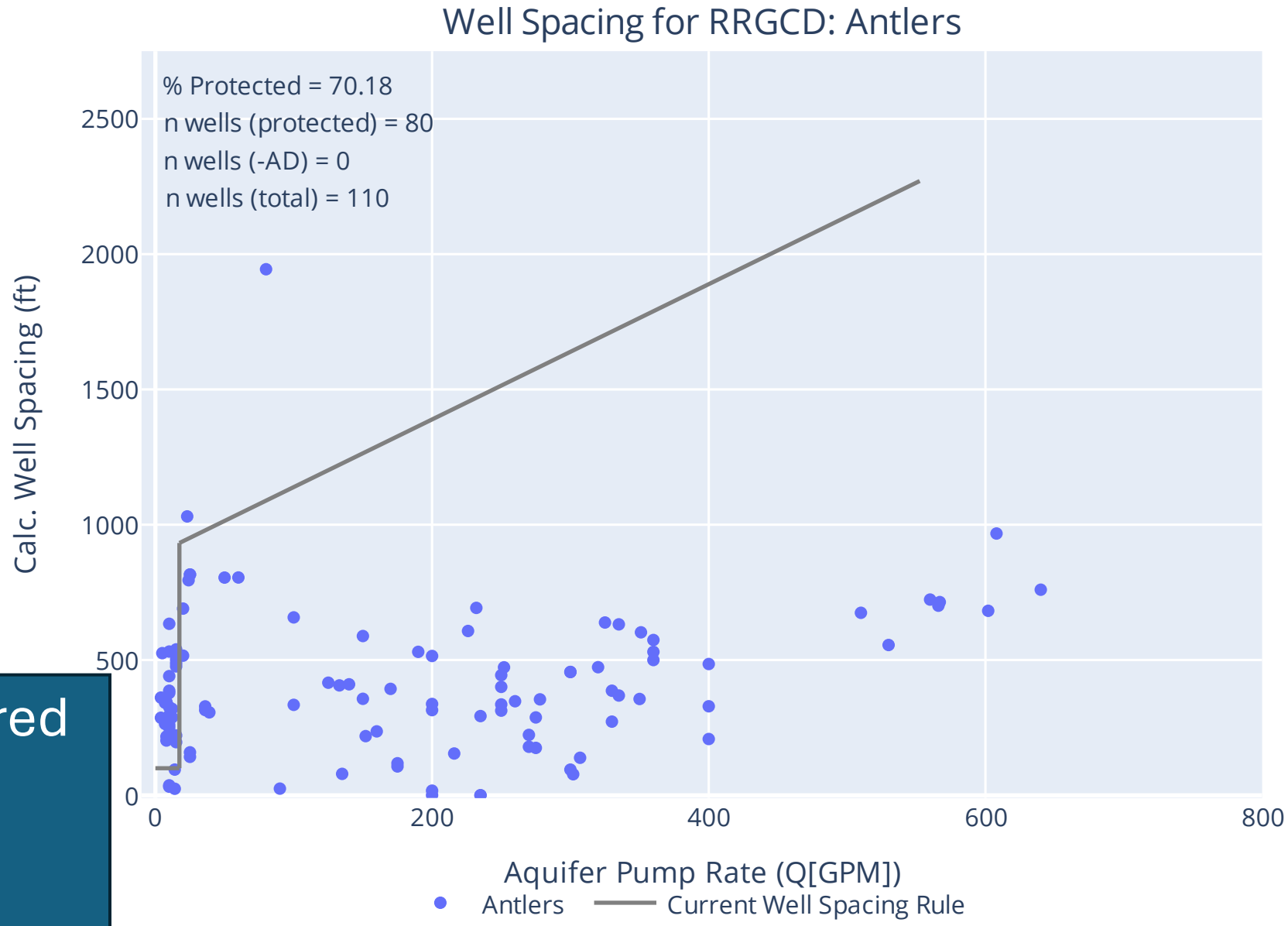


# Separated by Aquifer: Woodbine



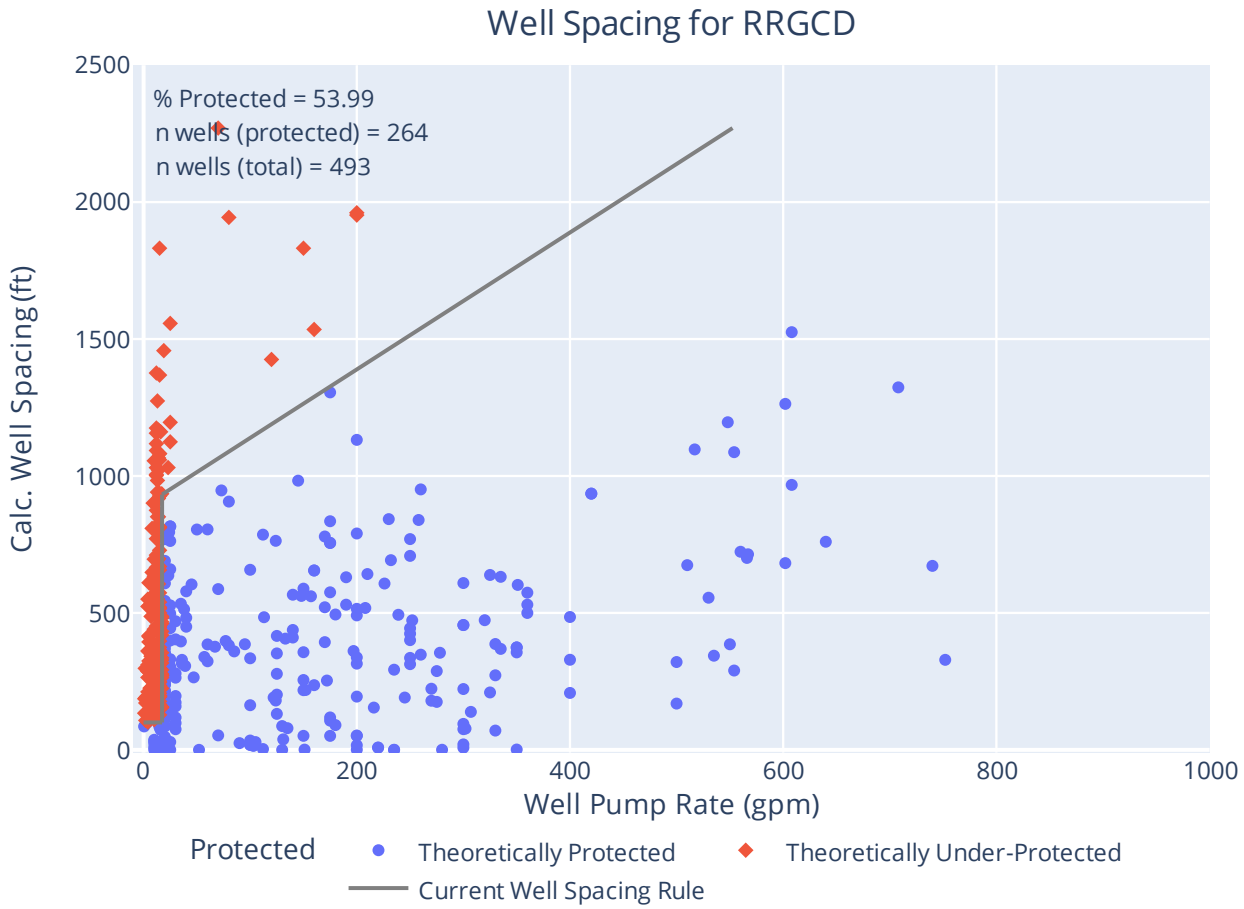

Higher required spacing in the woodbine

# Separated by Aquifer: Antlers




Generally lower required spacing

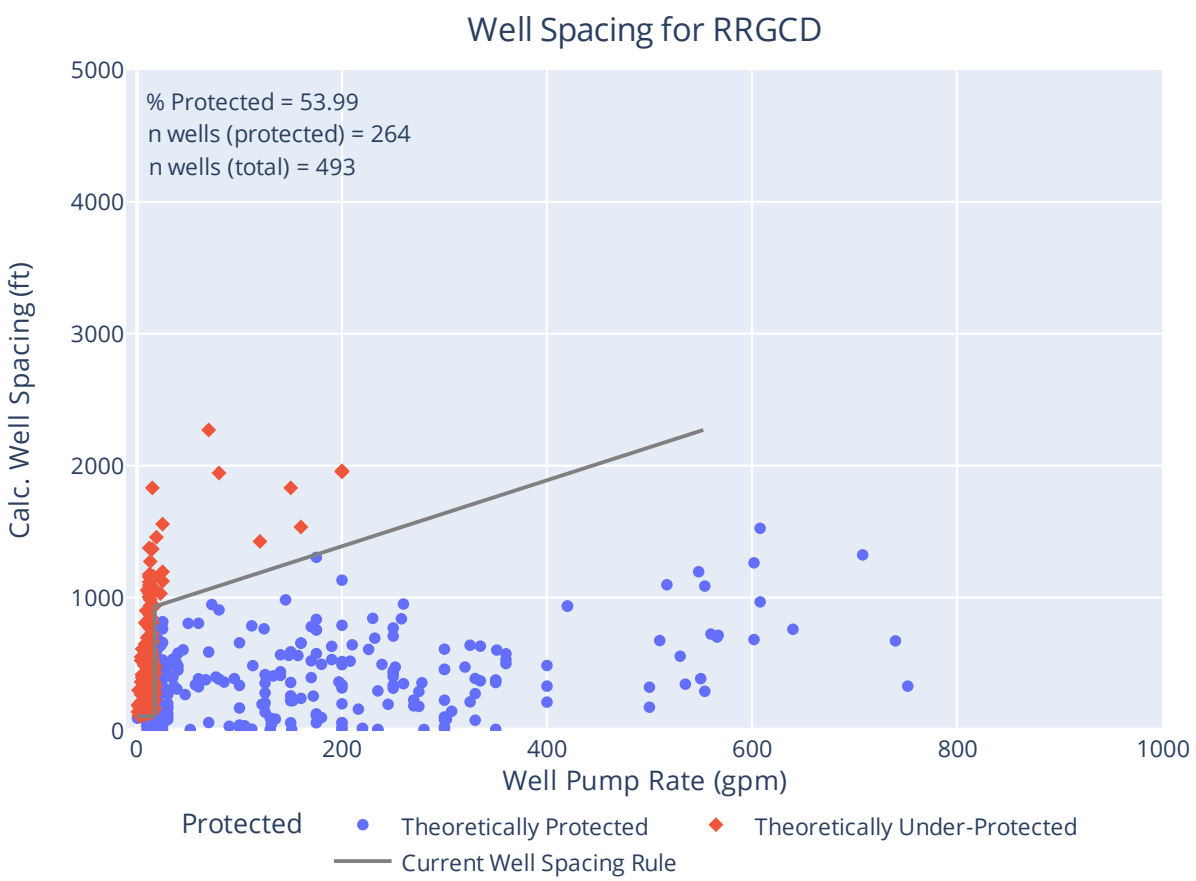
# Impact of Policy Decisions



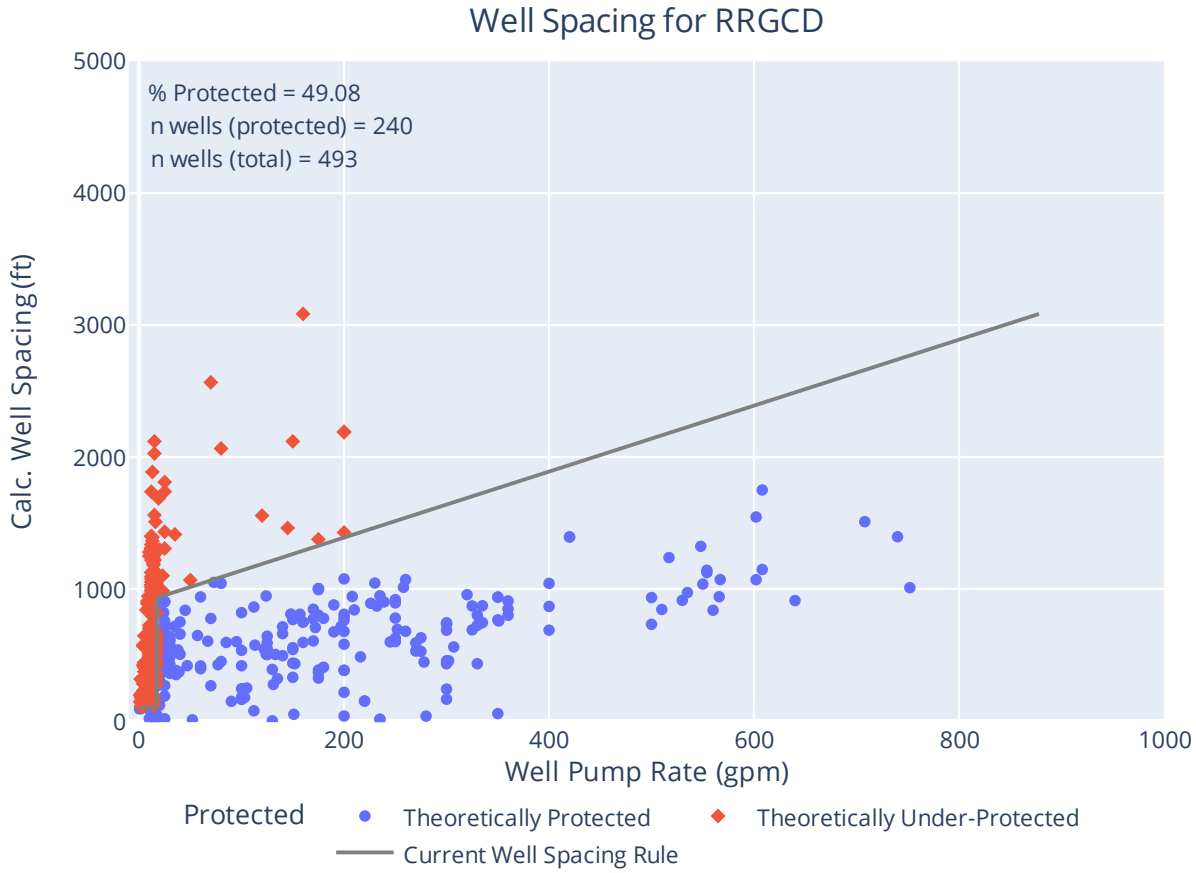

- **% Impact**
- Time pumped
- Avail. Drawdown method
- **Scale will change, left is always this graph**

# Impact of Policy Decisions

2% allowed



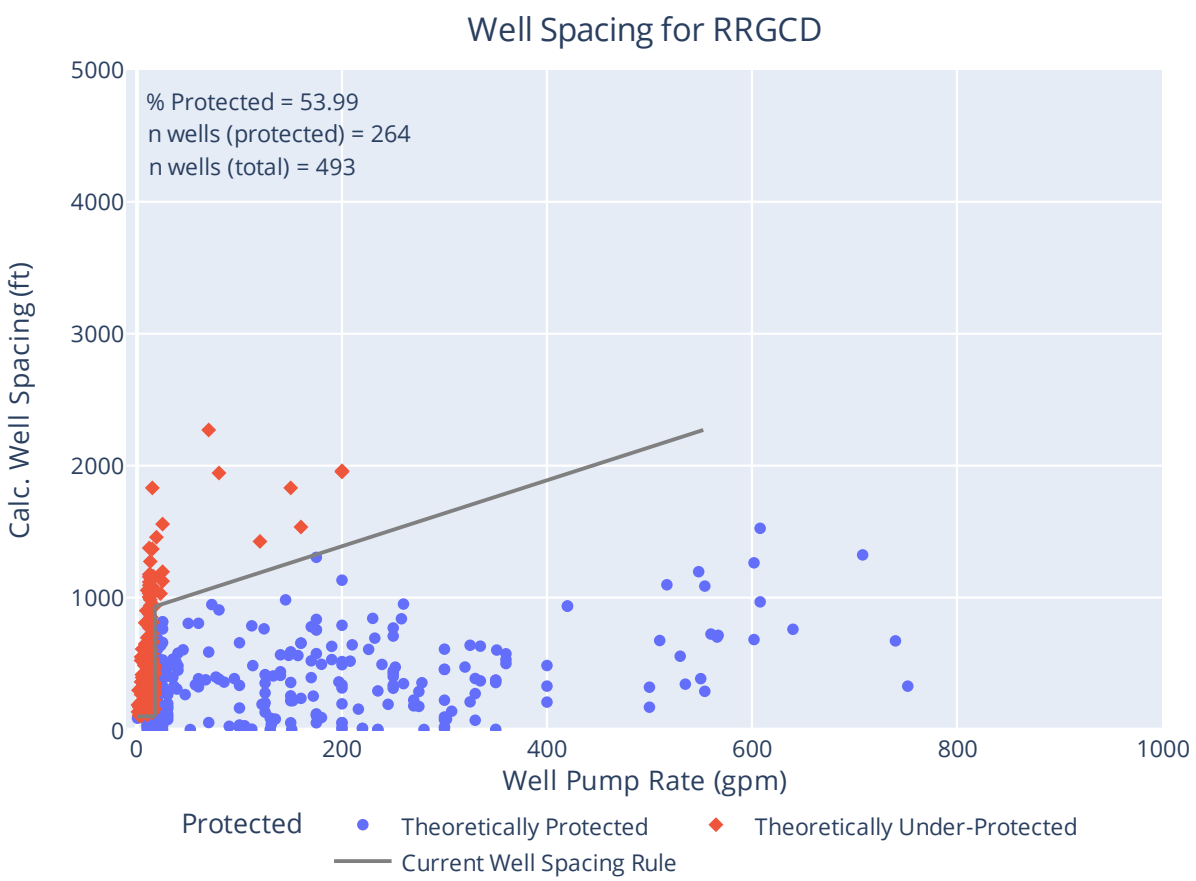

1% allowed



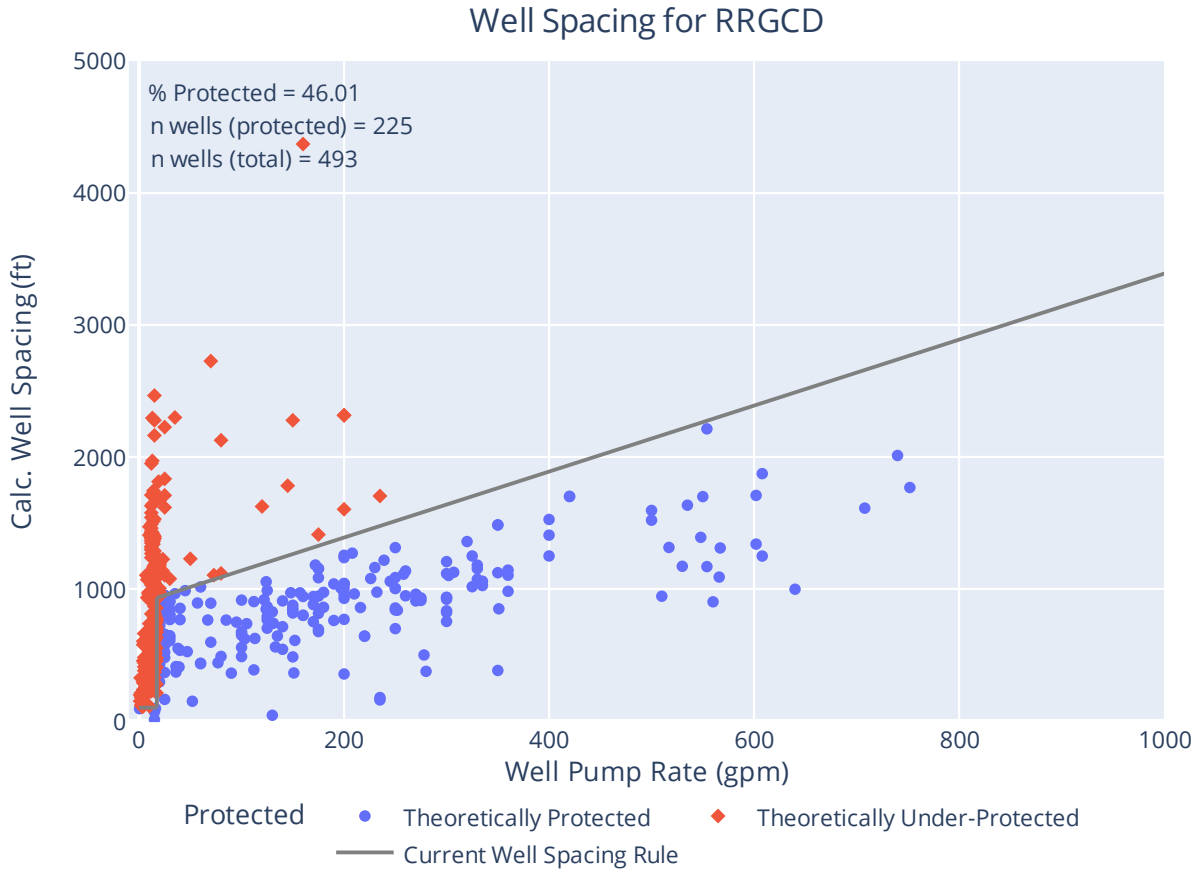
# Impact of Policy Decisions

If less impact is allowed
→ less wells are protected under current rule

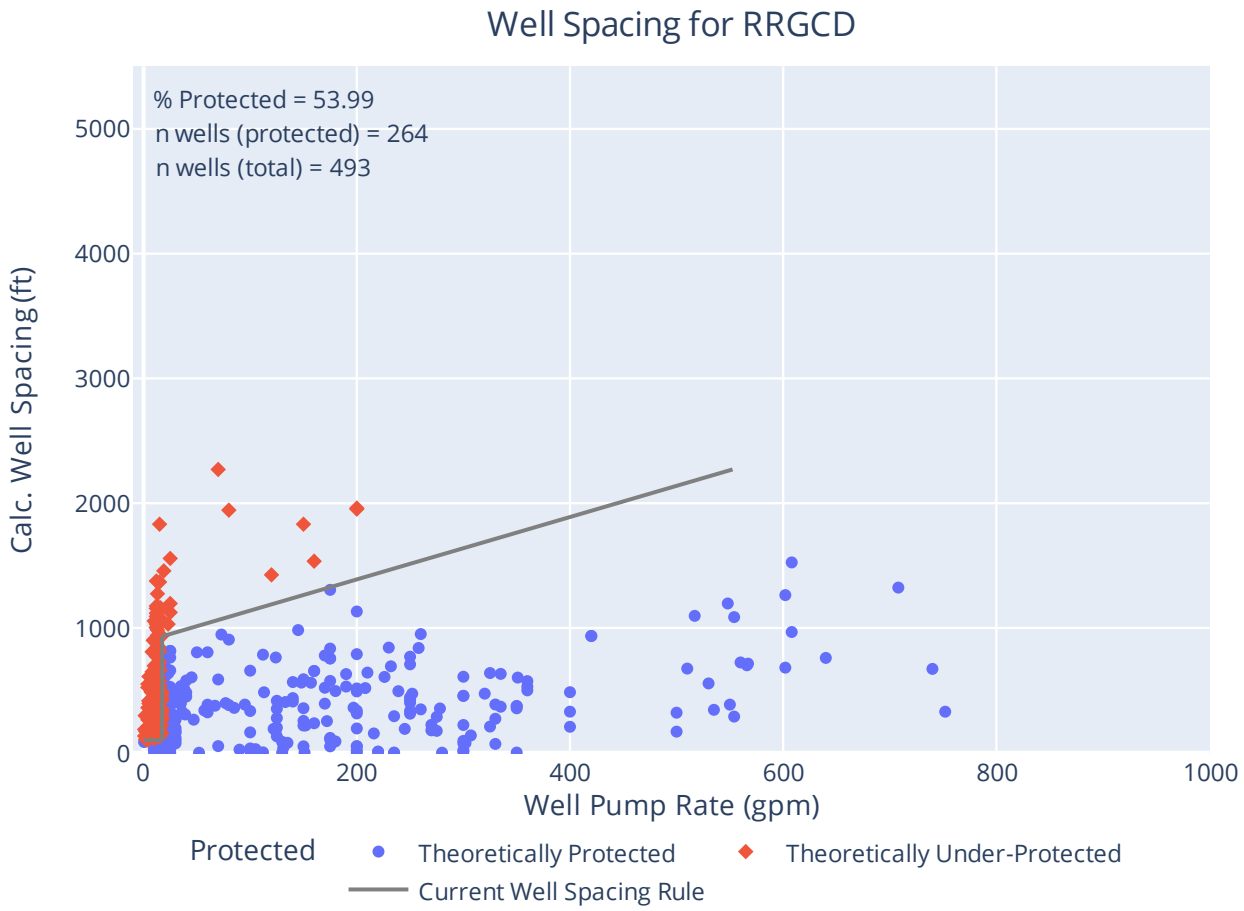
2% allowed




0.5% allowed



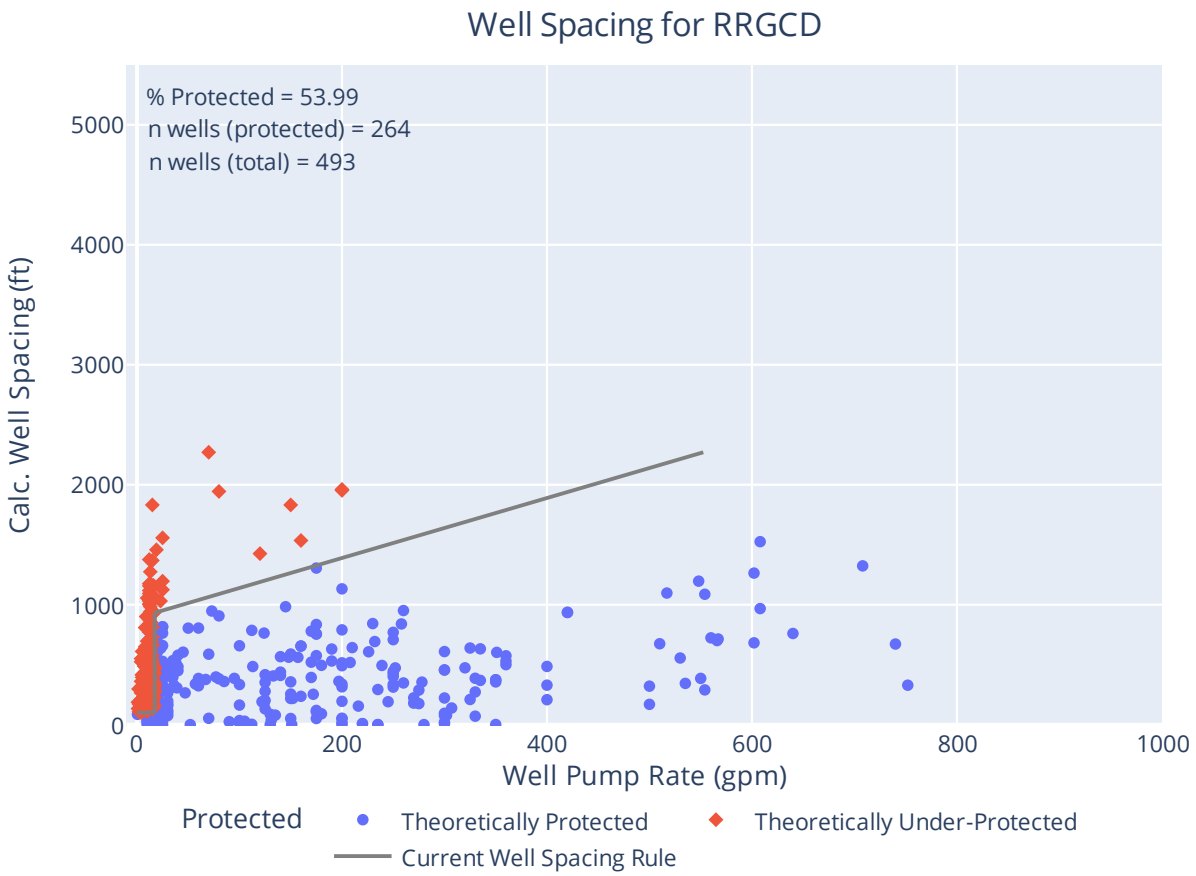
# Impact of Policy Decisions



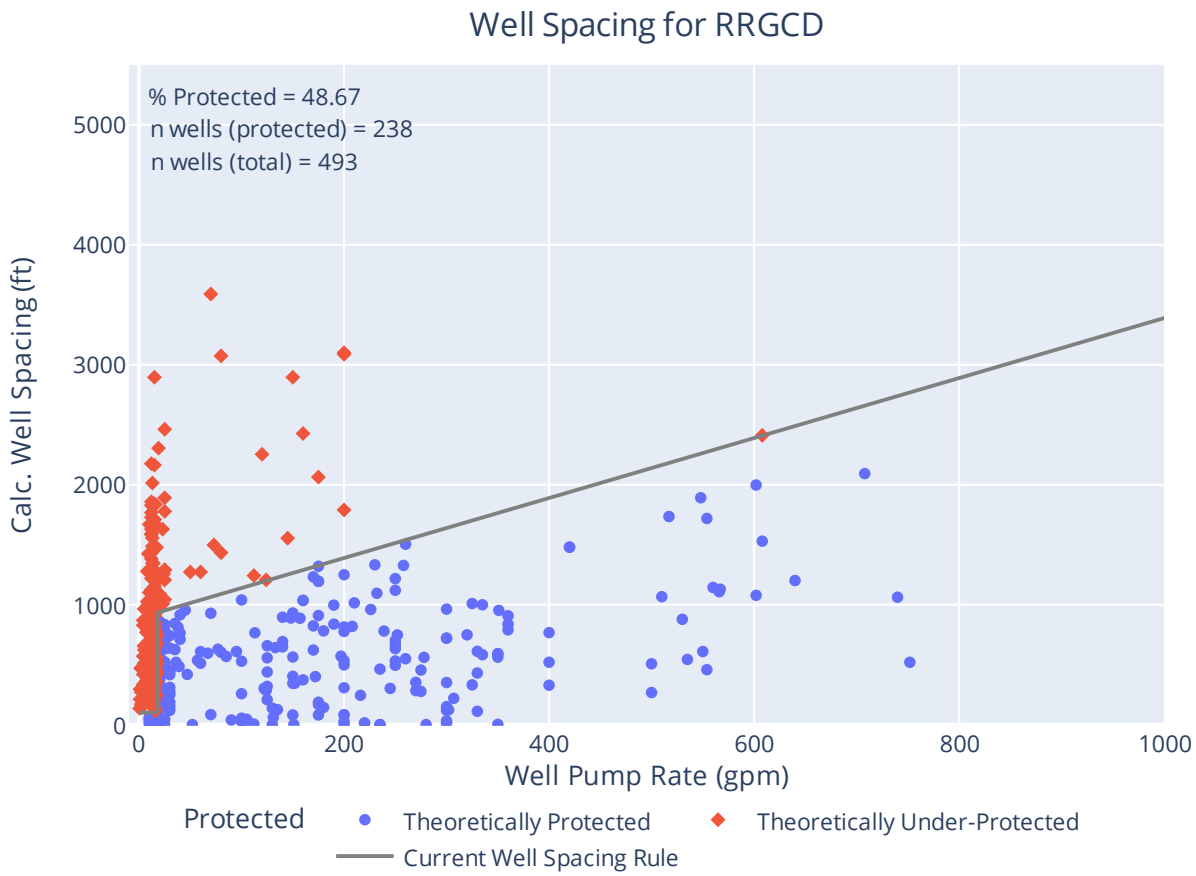

- % Impact
- **Time pumped**
- Avail. Drawdown method

# Impact of Policy Decisions

## 2 days of pumping



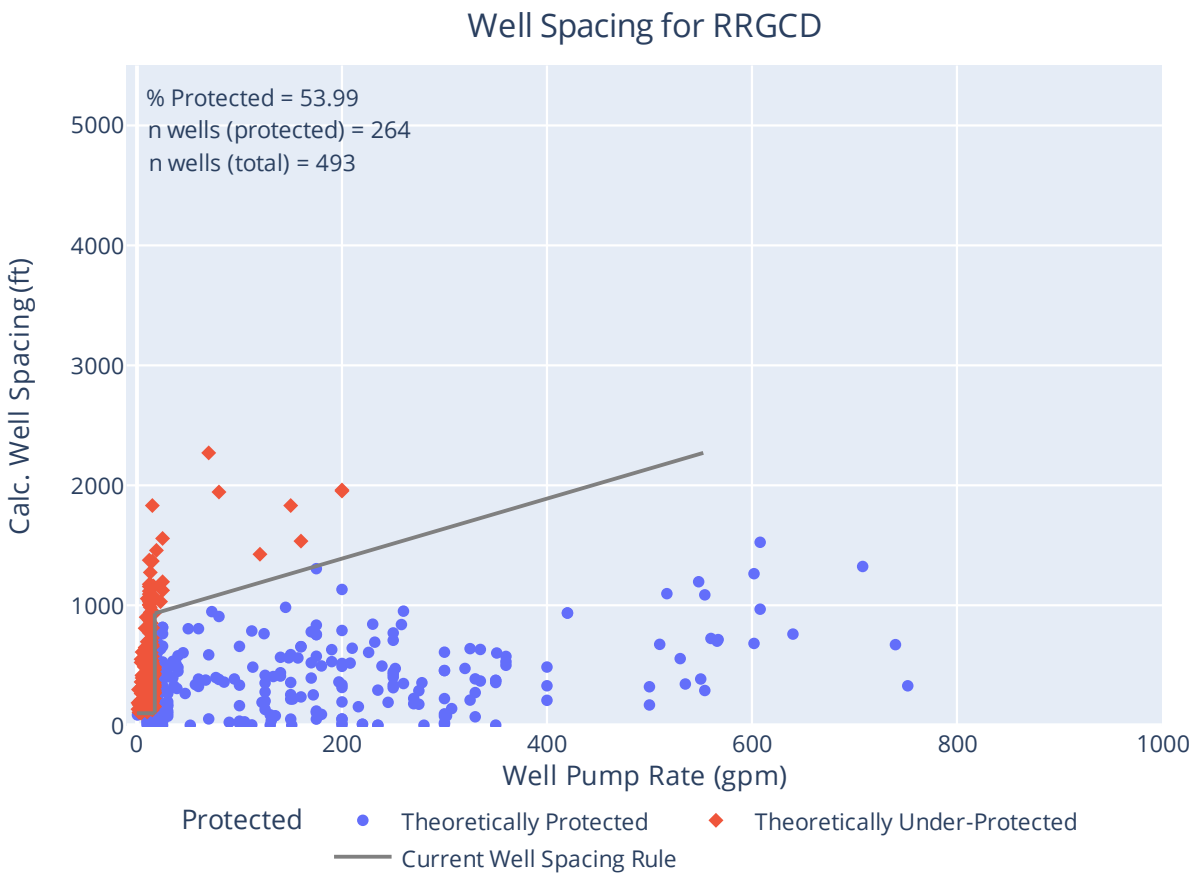

## 5 days of pumping



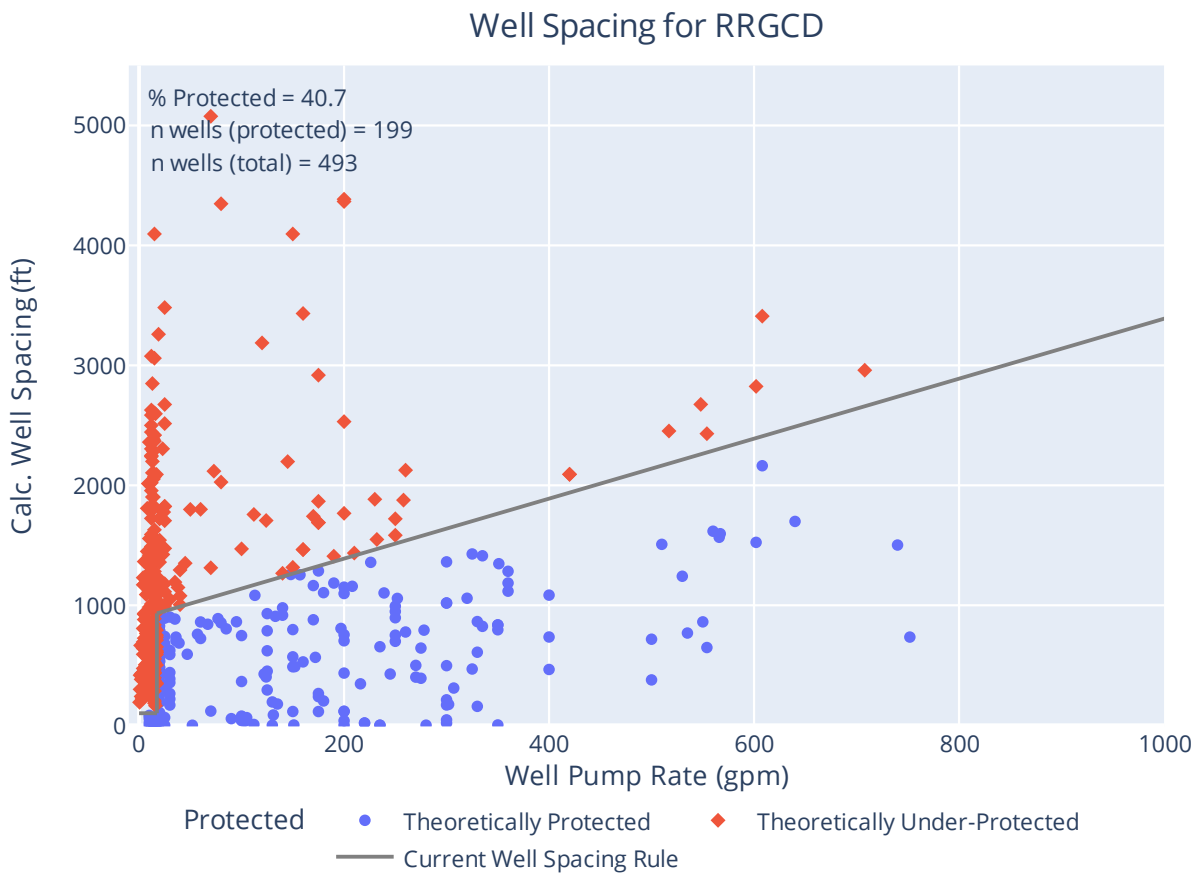
# Impact of Policy Decisions

As pumping time increases → less wells are protected under current rule

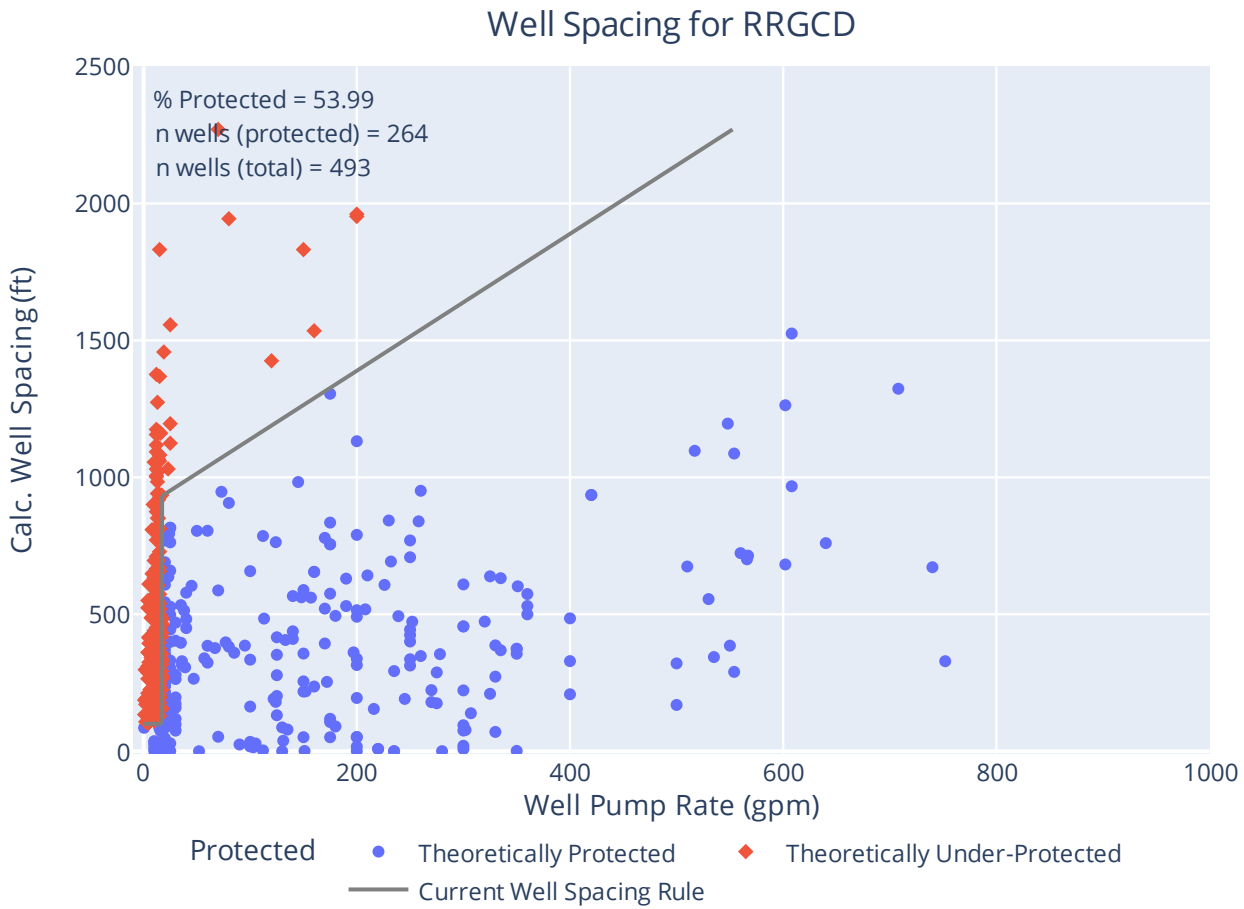
2 days of pumping




10 days of pumping



# Impact of Policy Decisions

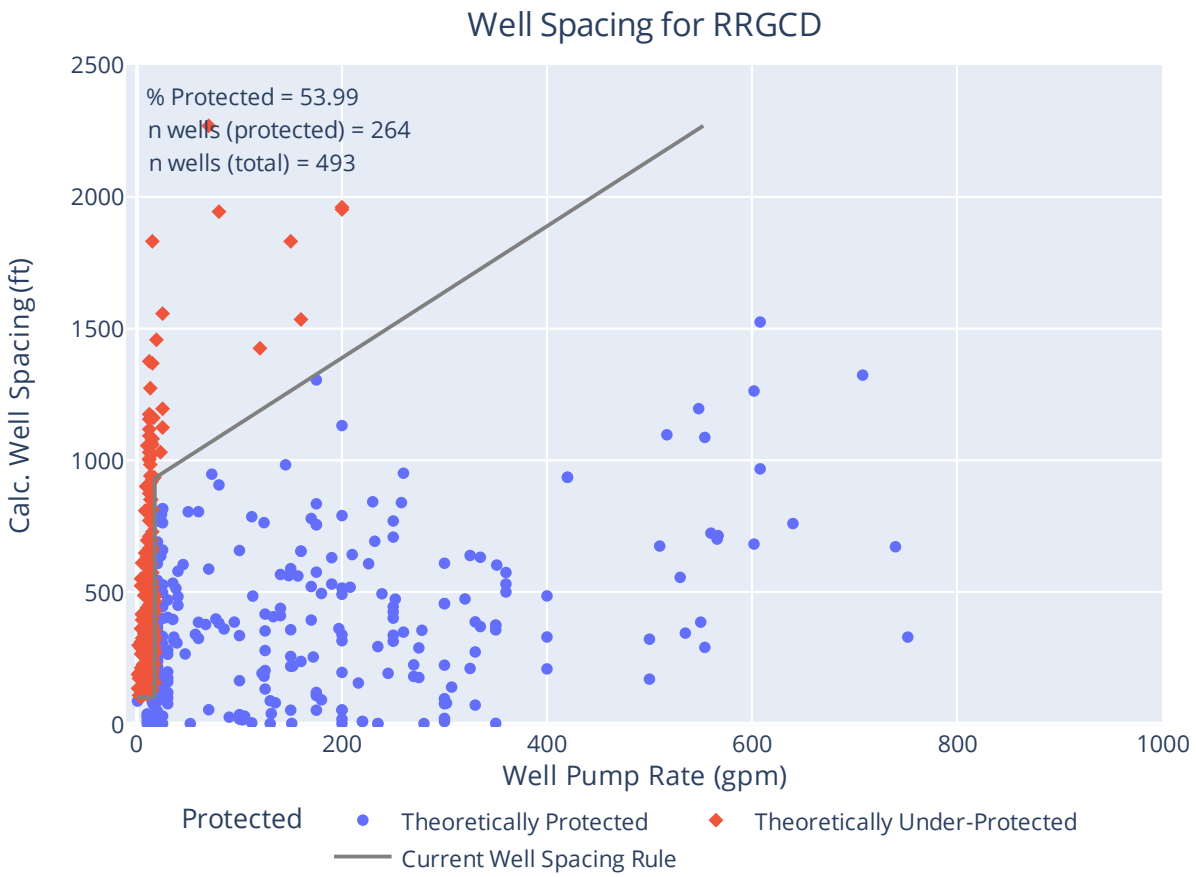



- % Impact
- Time pumped
- **Avail. Drawdown method**

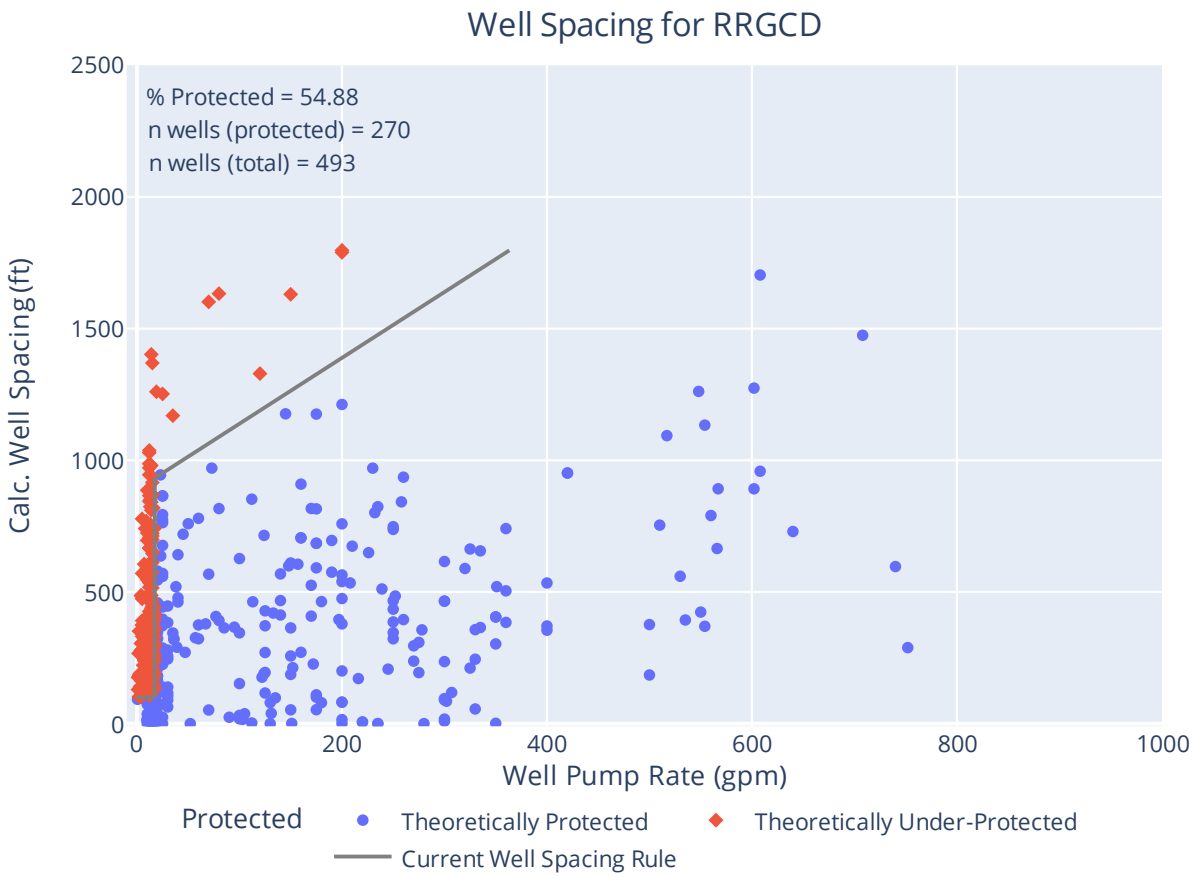
# Impact of Policy Decisions

Minimal changes - mostly single screen wells/tight interval

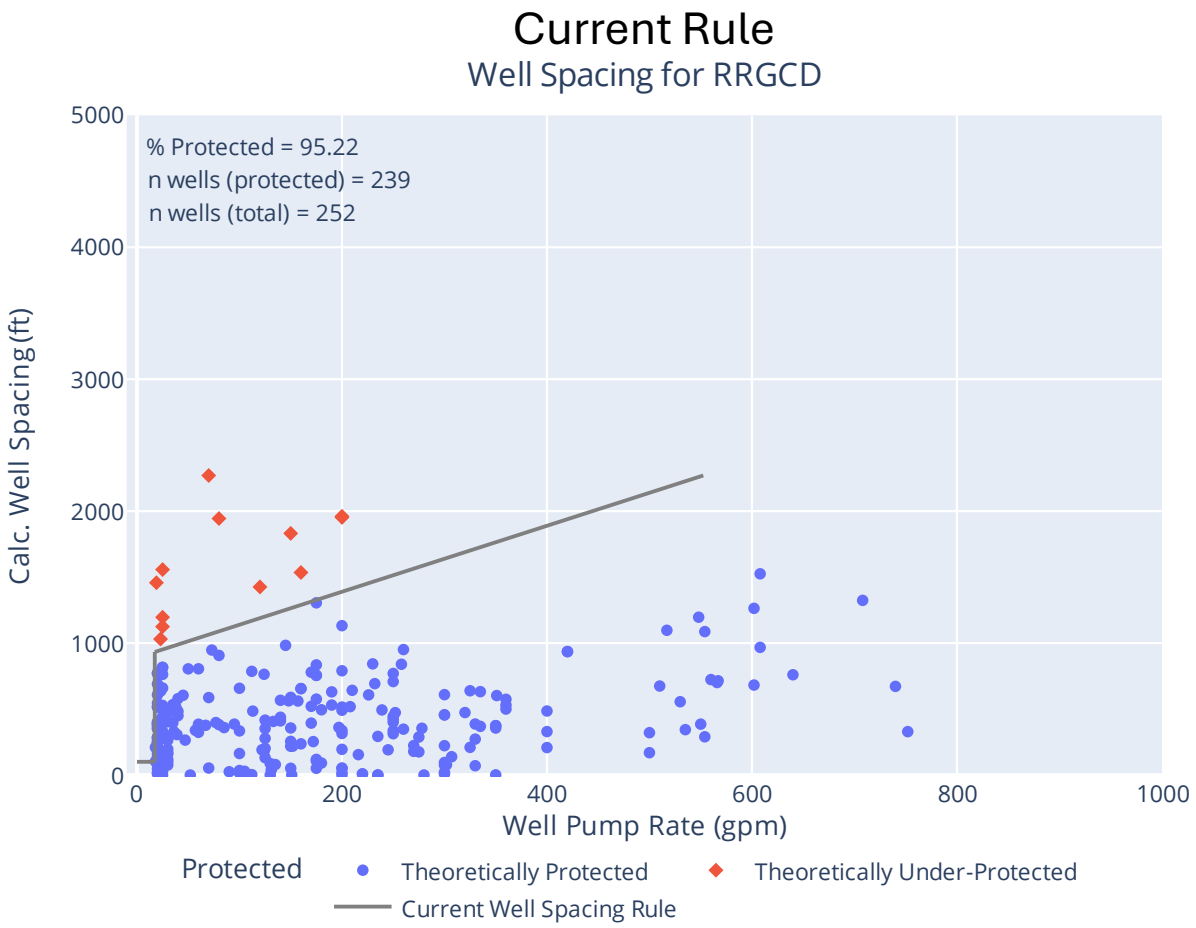
Avg. Screen Interval



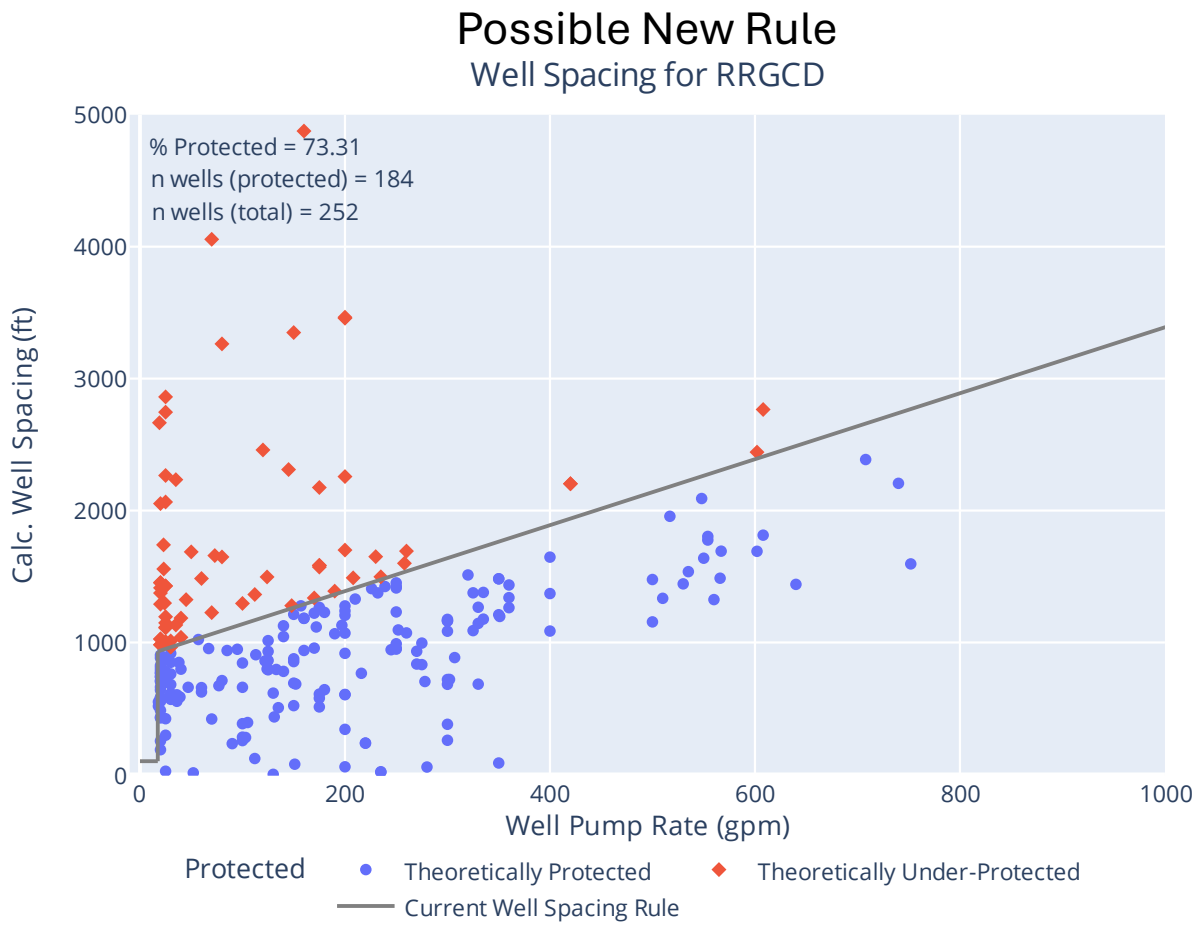

First Screen



# Possible Rules

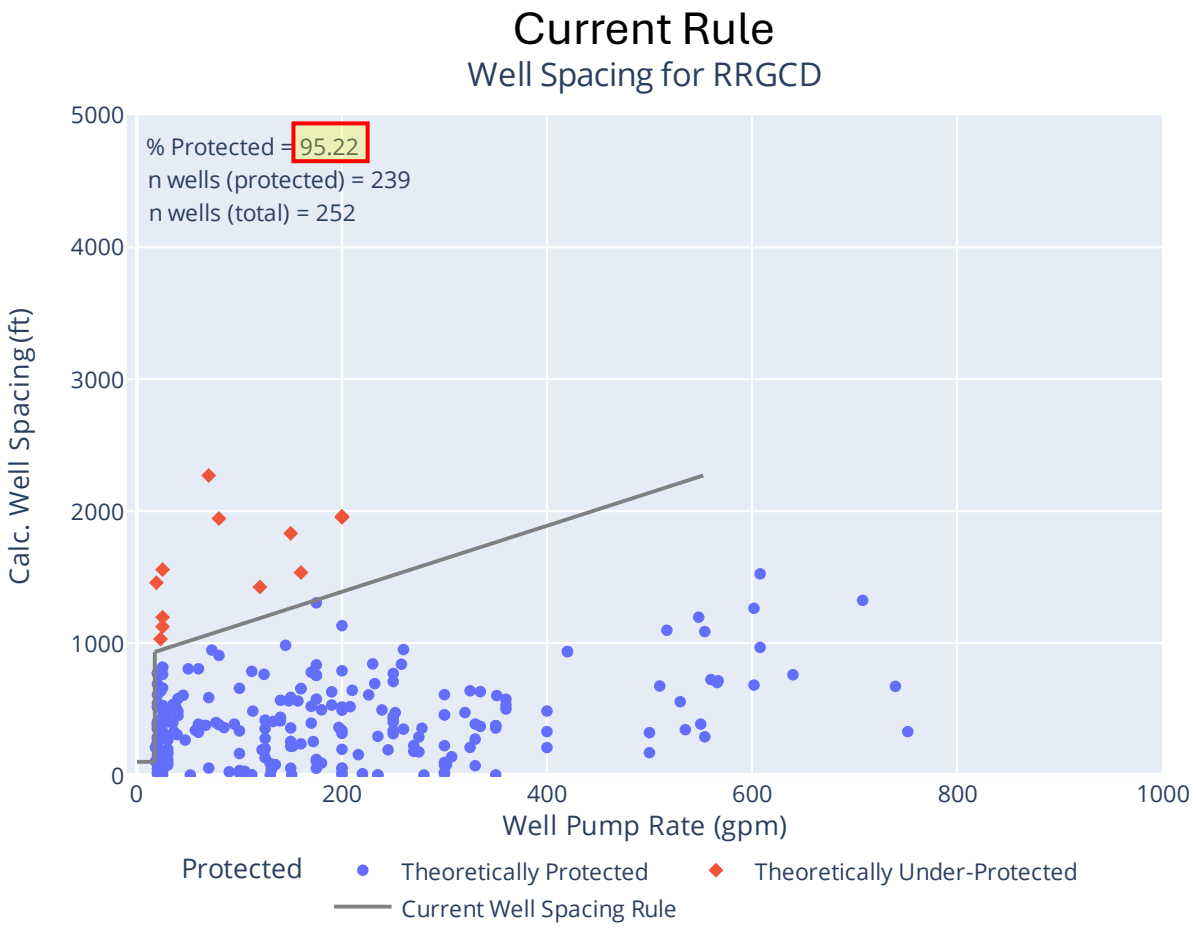



- 2%
- 2 days
- Avg. Screen
- Pump Test T
- Q > 17.36
- 889 + 2.5* GPM

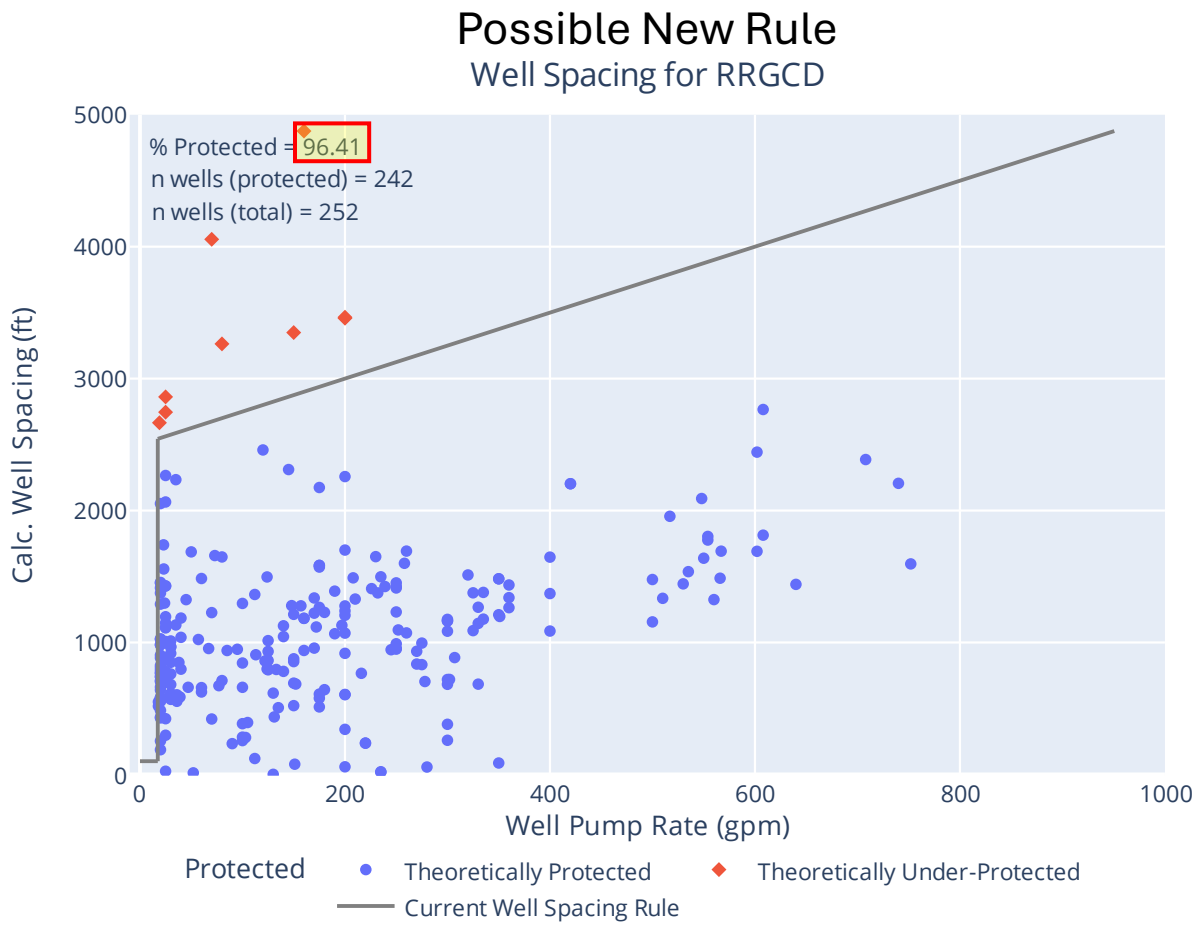



- 1%
- 5 days
- Avg. Screen
- Pump Test T
- Q > 17.36
- 889 + 2.5* GPM

# Possible Rules




- 2%
- 2 days
- Avg. Screen
- Pump Test T
- Q > 17.36
- 889 + 2.5* GPM




- 1%
- 5 days
- Avg. Screen
- Pump Test T
- Q > 17.36
- 2500 + 2.5*GPM

# Findings

- Technical assessment
  - Illustrates and quantifies hydrogeologic principles
  - Provides a basis for policy decisions
  - Has limitations

- Policy decisions are also critical in spacing rules

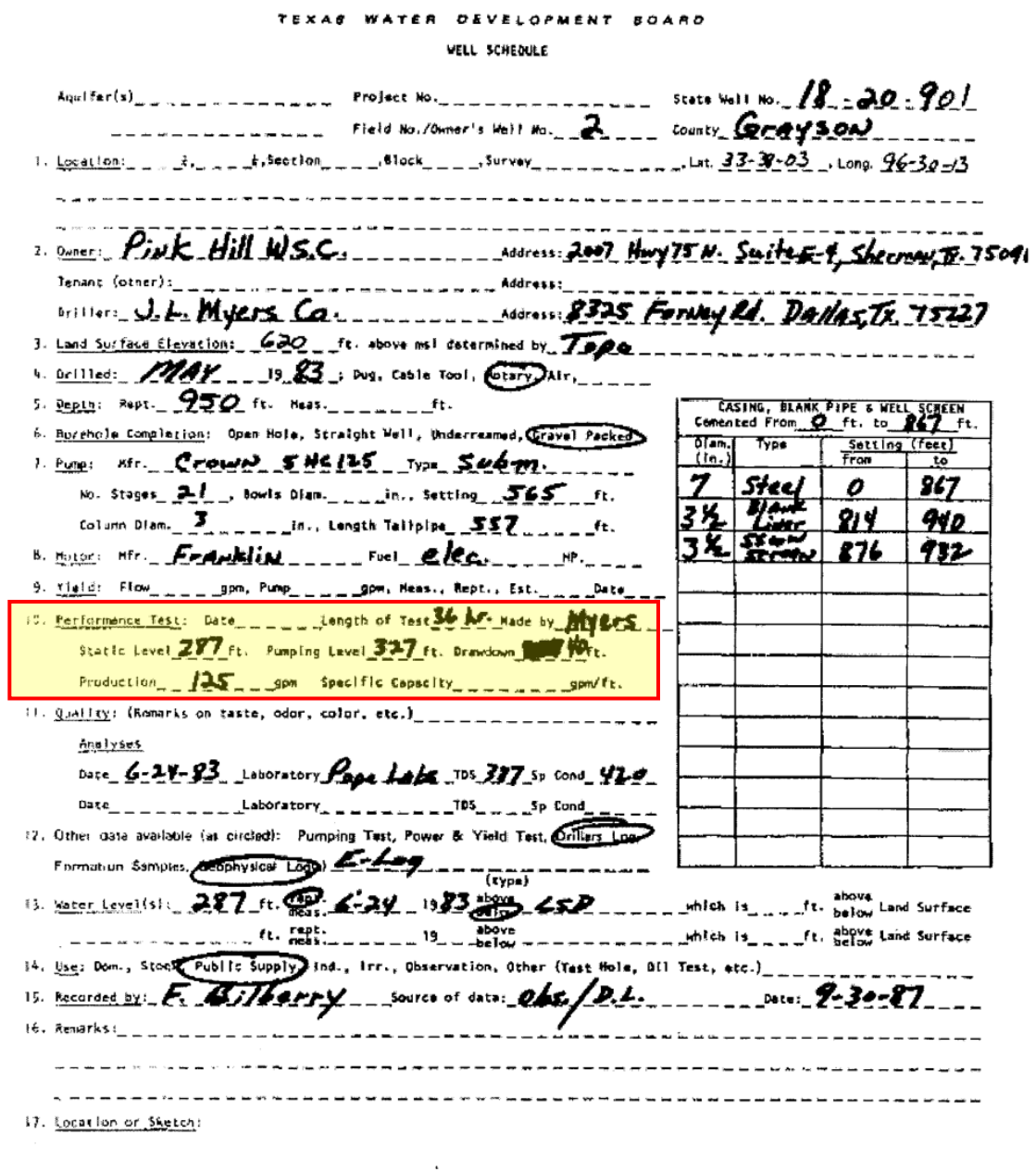
AGS
Advanced Groundwater Solutions, LLC

# Support Slides

# Acquiring TCEQ Public Supply Well Pump Test Data

We contacted the TCEQ to request any pump test data available for public supply wells to ensure that they were accounted for.

We received 123 scanned documents in RRGCD.



TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer(s) _____ Project No. _____ State Well No. 18-20-901

Field No./Owner's Well No. 2 County Grayson

1. Location: ¼, ¼, ¼, Section ____, Block ____, Survey _____, Lat. 33-38-03, Long. 96-30-13

2. Owner: Pink Hill W.S.C. Address: 2007 Hwy 75 N. Suite E-1, Sherman, Tx. 75091

Tenant (other): _____ Address: _____

Driller: J.L. Myers Co. Address: 8325 Forney Rd. Dallas, Tx. 75227

3. Land Surface Elevation: 620 ft. above msl determined by Topo

4. Drilled: MAY 19 83; Dug, Cable Tool, (Rotary) Air, _____

5. Depth: Rept. 950 ft. Meas. _____ ft.

6. Borehole Completion: Open Hole, Straight Wall, Underreamed, (Gravel Packed)

7. Pump: Mfr. Crown SHC125 Type Subm.

No. Stages 21, Bowls Diam. ____ in., Setting 565 ft.

Column Diam. 3 in., Length Tailpipe 557 ft.

8. Motor: Mfr. Franklin Fuel elec. HP. ____

9. Yield: Flow ____ gpm, Pump ____ gpm, Meas., Rept., Est. Date ____

10. Performance Test: Date ____ Length of Test 36 hr. Made by Myers

Static Level 287 ft. Pumping Level 327 ft. Drawdown [redacted] ft.

Production 125 gpm Specific Capacity _____ gpm/ft.

11. Quality: (Remarks on taste, odor, color, etc.) _____

Analyses

Date 6-24-83 Laboratory Pape Lab TDS 237 Sp Cond 420

Date _____ Laboratory _____ TDS ____ Sp Cond ____

12. Other data available (as circled): Pumping Test, Power & Yield Test, (Drillers Log)

Formation Samples, (Geophysical Logs) E-Log (type)

13. Water Level(s): 287 ft. (rept. meas.) 6-24 1983 above (below) LSD which is ____ ft. above (below) Land Surface

____ ft. rept. meas. ____ 19__ above (below) which is ____ ft. above (below) Land Surface

14. Use: Dom., Stock, (Public Supply) Ind., Irr., Observation, Other (Test Hole, Oil Test, etc.) _____

15. Recorded by: E. Gilberry Source of data: obs./D.L. Date: 9-30-87

16. Remarks: _____

17. Location or Sketch:

CASING, BLANK PIPE & WELL SCREEN
Cemented From 0 ft. to 867 ft.

| Diam. (in.) | Type | Setting (Feet) From | to |
|---|---|---|---|
| 7 | Steel | 0 | 867 |
| 3½ | Blank Liner | 814 | 940 |
| 3½ | Slotted Screen | 876 | 932 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# Acquiring TCEQ Public Supply Well Pump Test Data

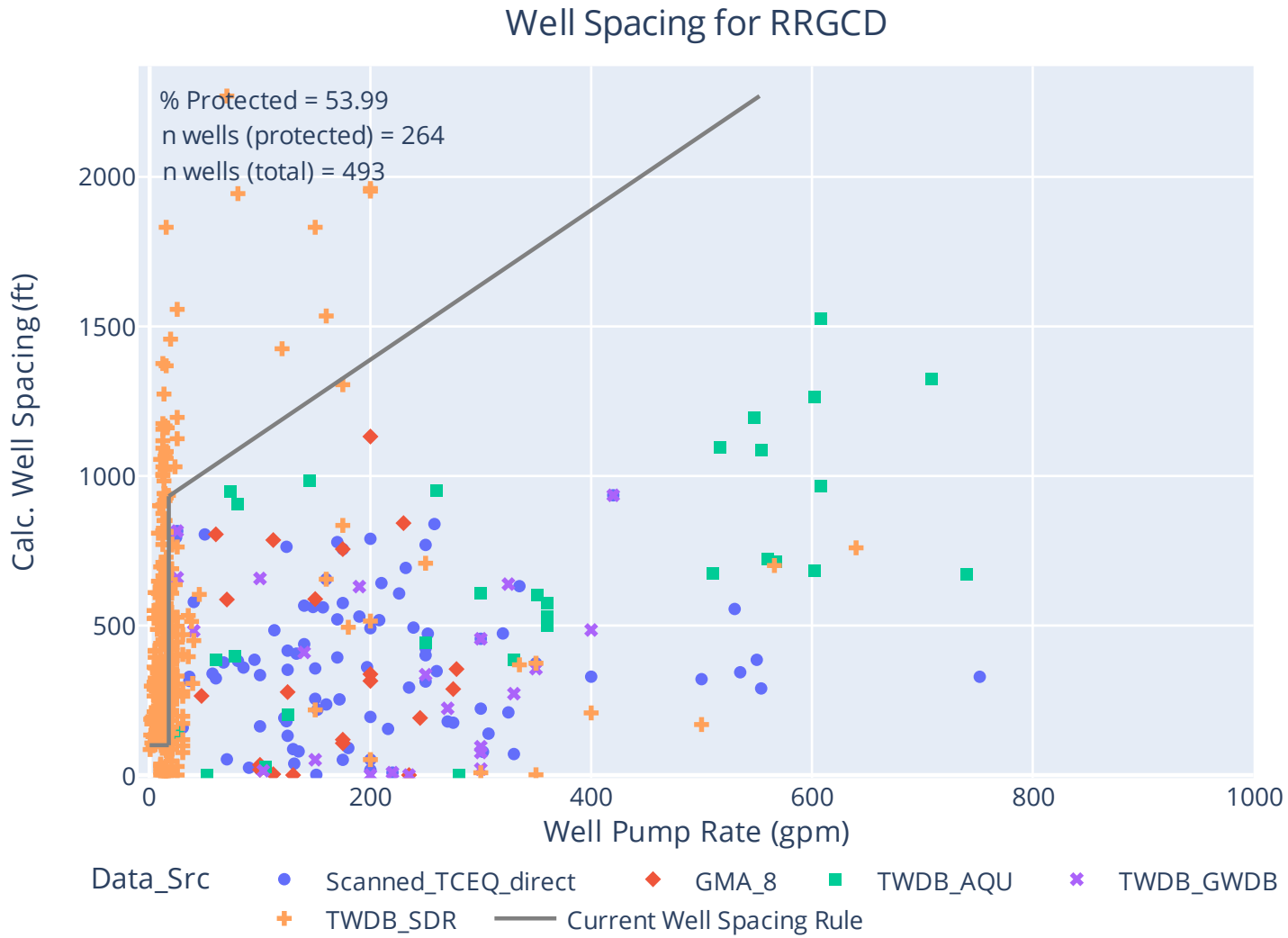
| | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB | AC | AD | AE | AF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | lev | Drilling_Date | Plugging_Date | GCD | Coun | Driller | Well_Depth | Multi_Section | Top_Section | Bottom_Section | Pump_Rate | Drawdown | T_gpd_ft | DTW | suri | Well_Use | Aquifer_Repo | Scanned_Aqu |
| 123 | ) | 10/15/1955 | | RRGCD | Fannin | Sharp & Bradley | 1640 | N | 1200 | 1640 | 30 | | | 355 | 1 | PS | Y | Woodbine |
| 124 | ? | 10/17/2009 | | RRGCD | Fannin | J L Myers | 1630 | N | 1470 | 1566 | 180 | 65 | 5538 | 399 | | PS | N | |
| 125 | ? | 7/25/2010 | | RRGCD | Fannin | Brian K. Hillard | 1905 | N | 1601 | 1760 | 752 | 94 | 16000 | 461 | | PS | Y | Woodbine |
| 126 | ? | 6/1/1957 | | RRGCD | Fannin | J L Myers | 1690 | N | 1523 | 1673 | 330 | 56 | 11786 | 432 | 1 | PS | Y | Woodbine |
| 127 | 3 | 6/23/1975 | | RRGCD | Fannin | J L Myers | 1720 | Y | 1464 | 1606 | 300 | 80 | 7500 | 500 | | PS | Y | Woodbine |
| 128 | | 7/27/2000 | | RRGCD | Fannin | JJ Biffle | 1664 | N | 1620 | 1644 | 500 | 81 | 12346 | 539 | | PS | Y | Woodbine |
| 129 | ) | 10/13/1959 | | RRGCD | Fannin | )rin Witherspoo | 533 | N | 513 | 531 | 50 | | | 273 | 2 | PS | Y | Woodbine |
| 130 | | 1/1/1936 | | RRGCD | Fannin | ML Witherspoor | 528 | N | 508 | 528 | 57 | 45 | 2533 | 185 | | PS | Y | Woodbine |
| 131 | | 7/20/2007 | | RRGCD | Fannin | Utility Construc | 670 | N | 420 | 670 | 170 | 242 | 1405 | 318 | | PS | N | |
| 132 | | 12/1/2002 | | RRGCD | Fannin | J L Myers | 920 | N | 846 | 898 | 200 | 112 | 3571 | 476 | | PS | N | |
| 133 | ) | 10/3/1988 | | RRGCD | Fannin | th Texas Water \ | 1602 | Y | 1508 | 1598 | 200 | 80 | 5000 | 550 | | PS | N | |
| 134 | ) | 1/1/1966 | | RRGCD | Fannin | J L Myers | 1693 | N | 1480 | 1564 | 100 | 105 | 1905 | 390 | | PS | Y | Woodbine |
| 135 | | 5/1/1965 | | RRGCD | Fannin | J L Myers | 3063 | Y | 2949 | 3002 | 90 | 138 | 1304 | 140 | | PS | Y | Paluxy |
| 136 | | 4/1/1962 | | RRGCD | Fannin | J L Myers | 1454 | Y | 1368 | 1432 | 150 | 124 | 2419 | 296 | | PS | Y | Woodbine |
| 137 | | 8/1/1967 | | RRGCD | Fannin | J L Myers | 1585 | Y | 1486 | 1581 | 175 | 50 | 7000 | 475 | | PS | N | |
| 138 | | 3/18/1982 | | RRGCD | Fannin | J L Myers | 1530 | N | 1444 | 1510 | 201 | | | | | PS | N | |
| 139 | | 1/14/1987 | | RRGCD | Fannin | J L Myers | 1260 | Y | 1060 | 1246 | 175 | 30 | 11667 | | | PS | N | |
| 140 | | 7/23/1997 | | RRGCD | Fannin | J L Myers | 1100 | Y | 924 | 1076 | 157 | 139 | 2259 | 395 | | PS | N | |
| 141 | | 5/7/2001 | | RRGCD | Fannin | J L Myers | 1200 | N | 1030 | 1168 | 160 | 67 | 4776 | | | PS | N | |
| 142 | | 11/24/2004 | | RRGCD | Fannin | J L Myers | 1687 | Y | 1490 | 1596 | 325 | 76 | 8553 | 506 | | PS | N | |
| 143 | ) | 8/21/2007 | | RRGCD | Fannin | J L Myers | 1215 | Y | 1020 | 1215 | 80 | 342 | 468 | 463 | | PS | N | |
| 144 | | 3/10/2009 | | RRGCD | Fannin | ler Irrigation and | 1272 | Y | 882 | 980 | 270 | 90 | 6000 | | | PS | N | |
| 145 | | 9/13/2006 | | RRGCD | Fannin | J L Myers | 1760 | N | 1610 | 1734 | 220 | 35 | 12571 | 505 | | PS | N | |
| 146 | | 12/23/1964 | | RRGCD | Fannin | J L Myers | 1237 | Y | 1100 | 1152 | 70 | 47 | 2979 | 255 | | PS | Y | Woodbine |
| 147 | | 2/1/1995 | | RRGCD | Fannin | J L Myers | 1062 | Y | 990 | 1046 | 226 | 53 | 8528 | | | PS | N | |
| 148 | | 2/4/2002 | | RRGCD | Fannin | J L Myers | 1097 | N | 990 | 1078 | 250 | 82 | 6098 | 326 | | PS | N | |
| 149 | 3 | 5/25/2009 | | RRGCD | Fannin | J L Myers | 1095 | N | 970 | 1094 | 239 | 106 | 4509 | 300 | | PS | N | |
| 150 | | 6/2/1966 | | RRGCD | Fannin | e Pump and Sup | 734 | Y | 644 | 734 | 67 | 86 | 1558 | 224 | | PS | N | |
| 151 | | 7/24/2018 | | RRGCD | Fannin | C Miller Drilling | 1065 | N | 878 | 1032 | 113 | 294 | 769 | 385 | | PS | N | |
| 152 | | 4/27/1956 | | RRGCD | Fannin | e Texas Water W | 1596 | N | 1530 | 1580 | 151 | 25 | 12080 | 406 | | PS | Y | Woodbine |
| 153 | | 12/10/2003 | | RRGCD | Fannin | J L Myers | 1504 | N | 1322 | 1495 | 535 | 85 | 12588 | 395 | | PS | N | |
| 154 | | 10/20/2011 | | RRGCD | Fannin | Powell Drilling | 1502 | Y | 1278 | 1454 | 550 | 85 | 12941 | 402 | | PS | N | |
| 155 | | 4/17/2020 | | RRGCD | Fannin | Powell Drilling | 1503 | Y | 1020 | 1130 | 350 | 76 | 9211 | 274 | | PS | N | |
| 156 | ) | 2/1/1981 | | RRGCD | Grayson | J L Myers | 2150 | Y | 1934 | 2096 | 150 | 625 | 480 | 550 | | PS | N | |
| 157 | | 7/25/2006 | | RRGCD | Grayson | Utility Construc | 800 | Y | 685 | 785 | 135 | 97 | 2784 | 595 | | PS | N | |

# Data Source Distribution

| Data Source | RRGCD Well Tests | |
|---|---|---|
| | Available | Used |
| TWDB Groundwater Database | 39 | 23 |
| TWDB Submitted Drillers Reports | 993 | 330 |
| TWDB Aquifer Properties Data | 59 | 30 |
| TCEQ Public Supply Well Pump Test Data | 123 | 110 |
| **Total Number of Well Tests Considered** | **1,214** | **493** |

*counts subject to change

# Data Sources




Almost all of the low Q wells are from the SDR