

Monitoring and Tracking DFC Compliance

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**ADVANCED
GROUNDWATER
SOLUTIONS, LLC**

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DESIRED FUTURE CONDITION

Desired future condition means a quantitative description, adopted in accordance with Section 36.108, of the desired condition of the groundwater resources in a management area at one or more specified future times.

Water level decline

Volume remaining

Available drawdown remaining

Spring discharge

Water quality

Subsidence

CHAPTER 36

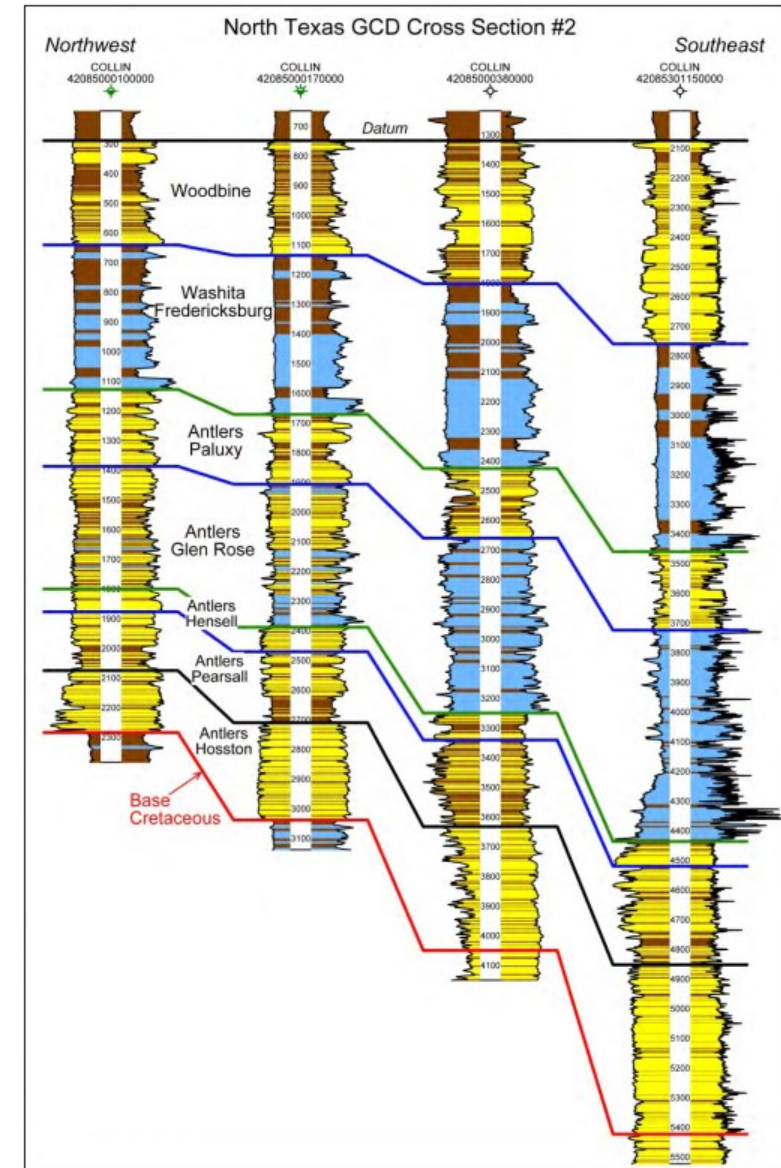
- Disclaimer: this is not legal advice!
- Sec. 36.3011 (b) An affected person may file a petition with the commission requesting an inquiry for any of the following reasons:
 - (6) a district fails to update its rules to implement the applicable desired future conditions.....
 - (7) the rules adopted by a district are not designed to achieve the adopted desired future conditions;
 - (9) the groundwater in the management area is not adequately protected due to the failure of a district to enforce substantial compliance with its rules.

A LITTLE HISTORY

- 2000 – first GAM (of many)
- 2002 – first “bottom up” State Water Plan developed by RWPGs (SB1)
 - RWPGs defined “groundwater availability”
- 2005 - Desired Future Conditions & “Managed” Available Groundwater
- 2010 – first MAGs available for RWPGs
- 2022 – 3rd Round of DFCs and MAGs
 - Almost all DFCs evaluated with the use of GAMs
 - However – Compliance is generally evaluated with **aquifer monitoring data**

MONITORING CONSIDERATIONS

- Aquifer (lump or split)
- Aquifer (confined/unconfined, outcrop/downdip)
- Geographic (regional, district, county)
- Access, ability, and cost to monitor
- Frequency of measurement (annual, more frequently)
- Other
 - Starting time for DFC
 - Changes in monitoring network in time



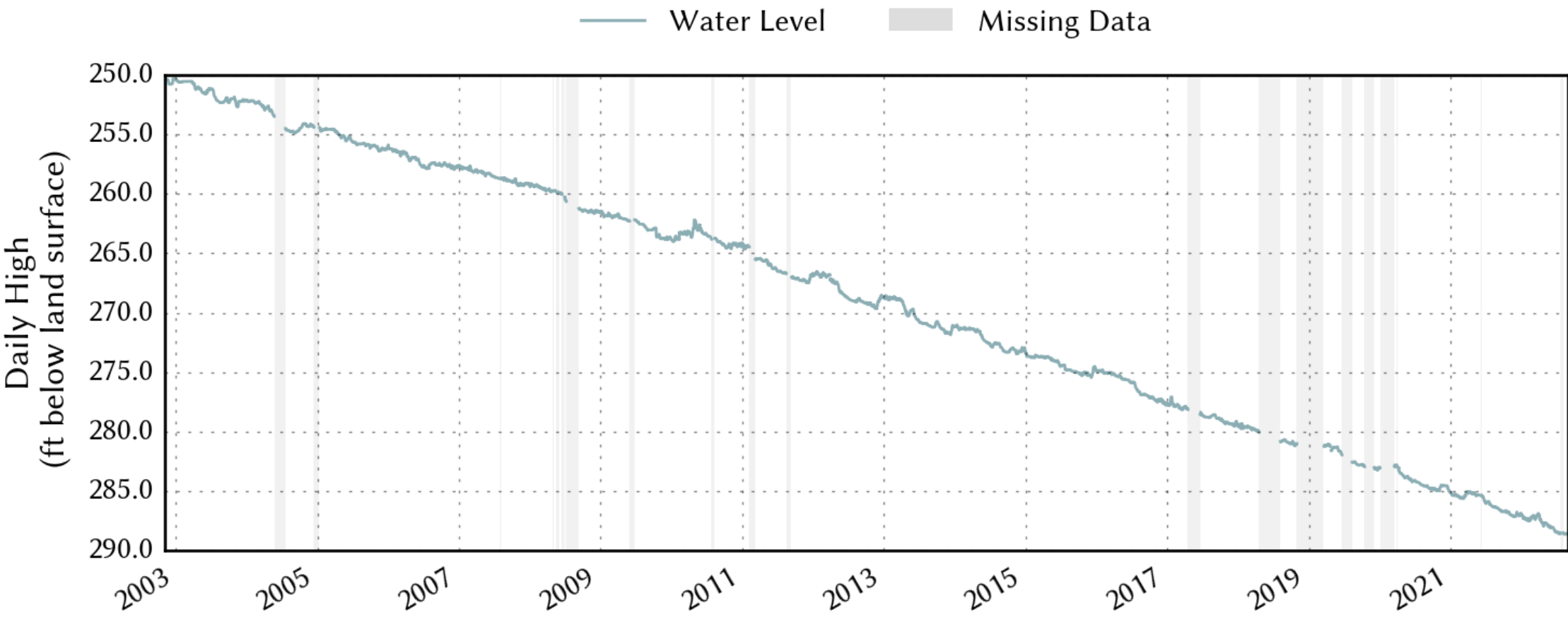
SOME POTENTIAL MONITORING CHALLENGES

- Sufficient monitoring locations in each aquifer
- Good well distribution
- Negotiating access agreements
- Identifying screened intervals in wells
- Wells screened across multiple aquifers
- Collecting consistent measurements (downtime)
- Cost to install appropriate wells
- Incorporating changes in monitoring network
- Maintaining monitoring wells for long periods

TRACKING DFCS

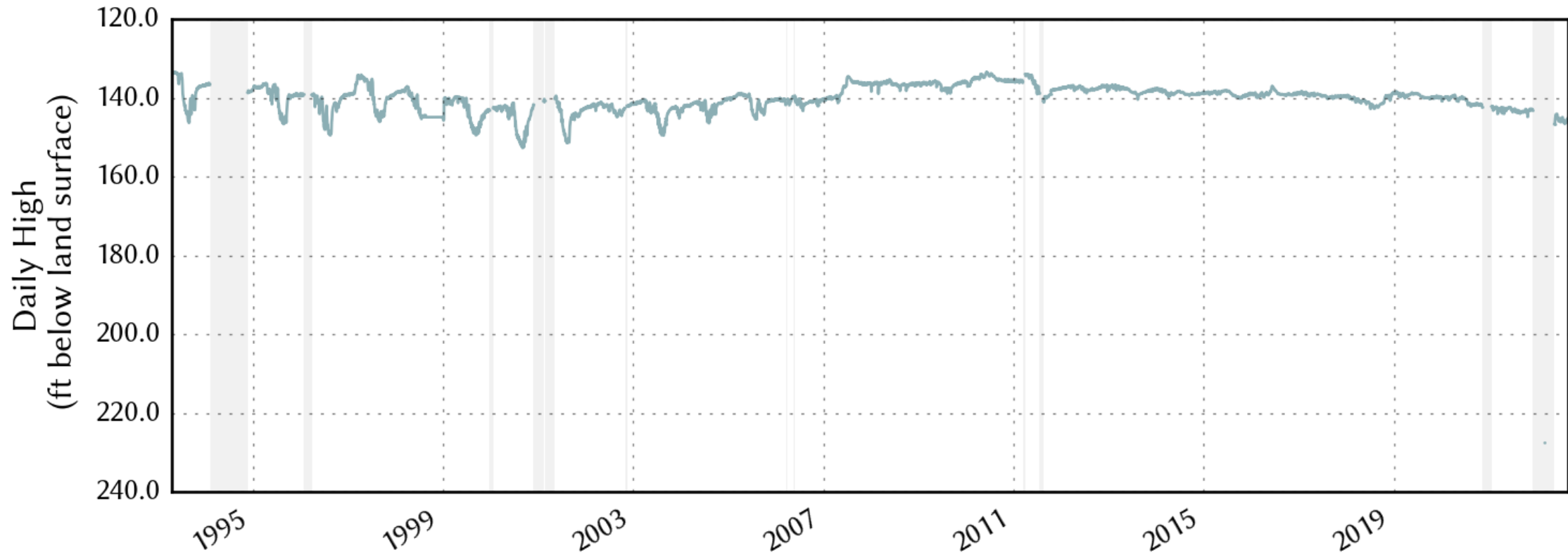


OGALLALA



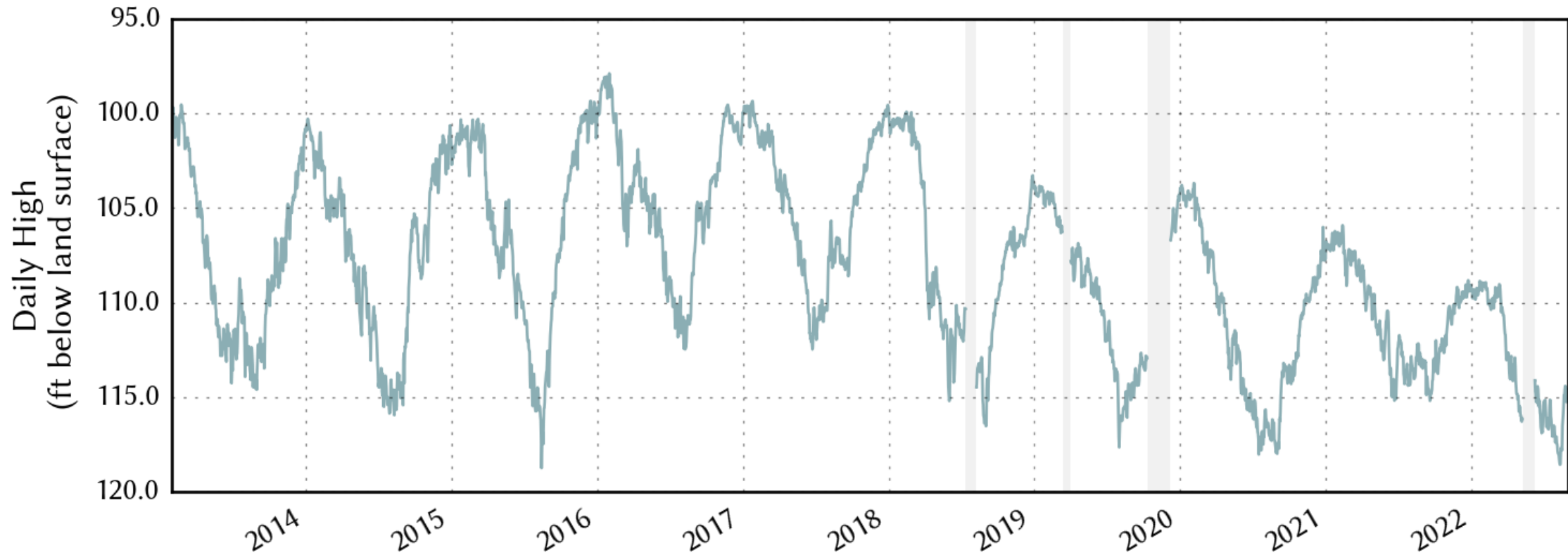
HICKORY (MCCULLOCH CO.)

— Water Level Missing Data



PECOS VALLEY (WINKLER CO.)

Water Level Missing Data



TRINITY (NORTH BEXAR COUNTY)

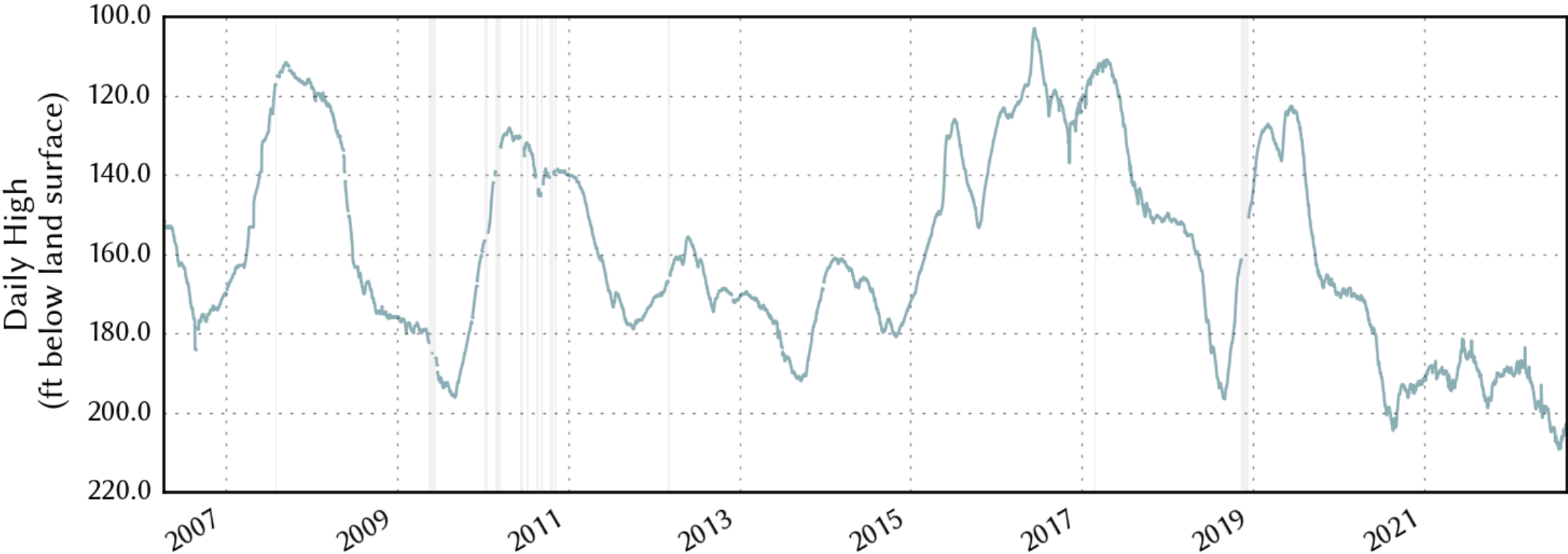
Water Level

Missing Data



TRINITY (HAYS COUNTY)

Water Level Missing Data

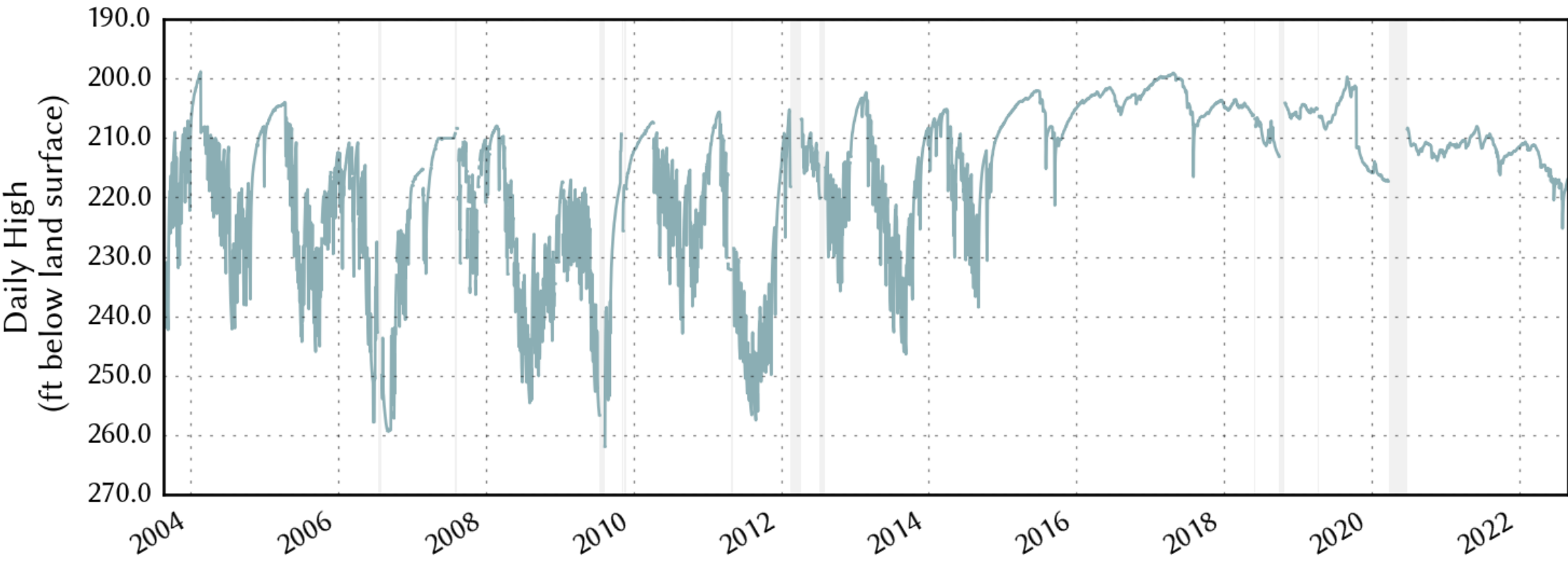


GMA 9 TRACKING (BLANCO CO.)

Trinity Aquifer DFC Compliance Analysis for Blanco County													
													Average Well
Monitor Well			Calendar Year Average Water Level Below Land Surface										Drawdown
Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Change in feet
	(Baseline Year	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	From 2008
Stanton	216.5	216.1	205.5	215.5	216.8	216.4	215.9	209.3	208.7	212.6	217.6		3.07
Rocking J Well #2	216.1	216.0	195.5	214.8	215.8	219.9	221.5	209.0	195.9	197.1	229.1		4.64
Pedernales Falls	191.6	179.3	141.9	187.2	173.6	182.1	173.1	173.3	178.2	179.2	185.6		16.25
Amil Baker	310.6	323.2	288.8	321.7	323.7	319.3	313.4	306.6	279.6	284.9	304.2		4.06
Rosa Winn	88.7	92.6	70.7	88.8	78.1	80.0	80.6	68.9	70.4	74.7	85.4		9.68
City of Blanco	41.8	72.7	21.9	46.5	25.2	25.5	24.7	21.8	21.9	23.8	36.0		9.80
Blanco River Well	84.9	108.8	66.3	89.7	91.5	80.8	80.9	65.2	44.3	50.6	77.3		9.36
Total Average Change in Trinity Aquifer Drawdown for all of Blanco County													8.1
NOTE: a positive number indicate a higher aquifer level than the 2008 Baseline Year, while a negative number indicate a lower aquifer level than the 2008 Baseline Year													
Formulas:													
Equals the sum of all water levels recorded in 2008 divided by number of measurements.													
Equals the sum of all water levels recorded in each calendar year divided by number of measurements.													
Annual Average	equals	2008 entry	minus the sum of averages for subsequent year					entries	divided by the number of subsequent years.				
= B6-(C6+D6+E6+F6+G6+H6+I6+J6+K6+L6)/10													
Equals the sum of all average changes divided by the number of wells													
= SUM(N6:N12)/7													

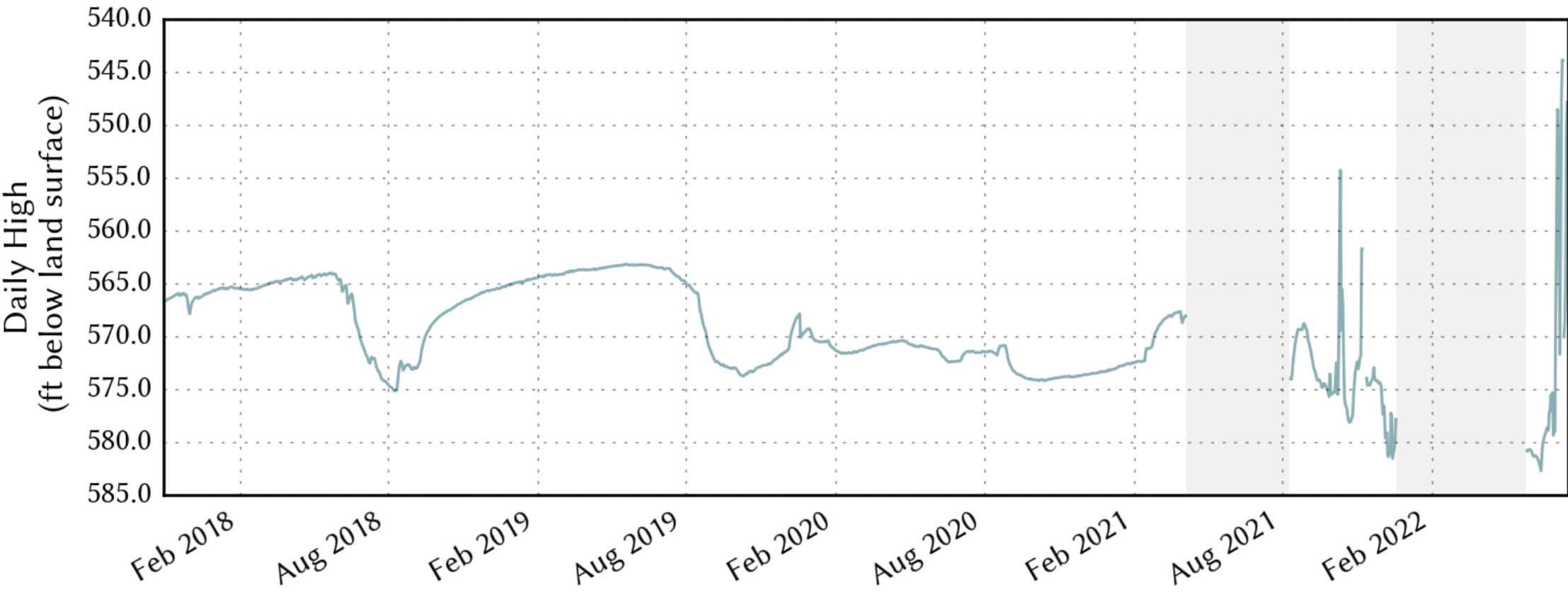
CARRIZO (BASTROP CO.)

Water Level Missing Data



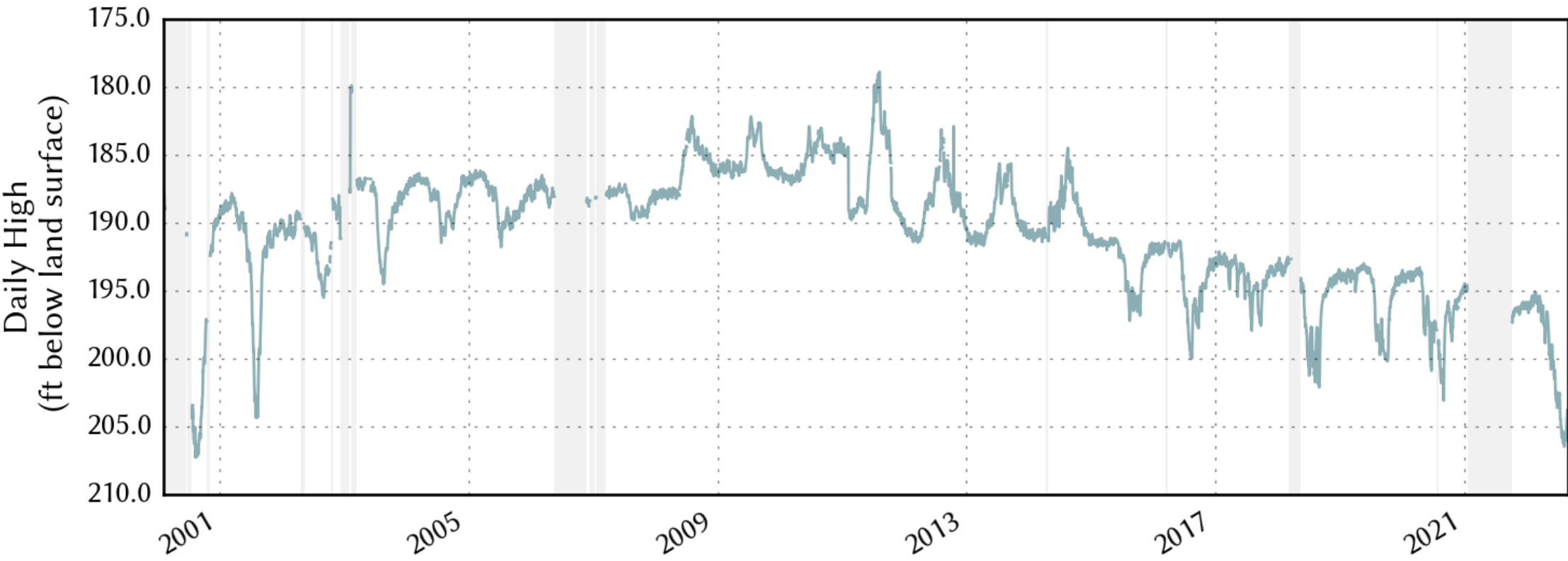
WOODBINE (ELLIS CO.)

Water Level Missing Data



TRINITY (ERATH CO.)

Water Level Missing Data



SOME POTENTIAL TRACKING CHALLENGES

- Pumping and seasonal impacts
- Availability and reliability of data at “starting time”
- Changes in use of a monitoring well (not pumping to pumping)
- Collecting consistent measurements (downtime)
- Incorporating changes in monitoring network
- Maintaining monitoring wells for long periods
- Long-term patterns in recharge, wet seasons, etc.
- Aquifer demand changes (oil/gas, commodity prices, etc.)

OTHER INTERESTING DFC DEBATES

- Planning or regulatory?
- Moving the goal posts (restarting the clock)?
 - Adaptive management?
 - Best available science
- Weighting of factors and local control?
- Timing of enforcement?
- Mitigation of impacts?

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