DREAM Pilot Project

NSJWCD

EWA

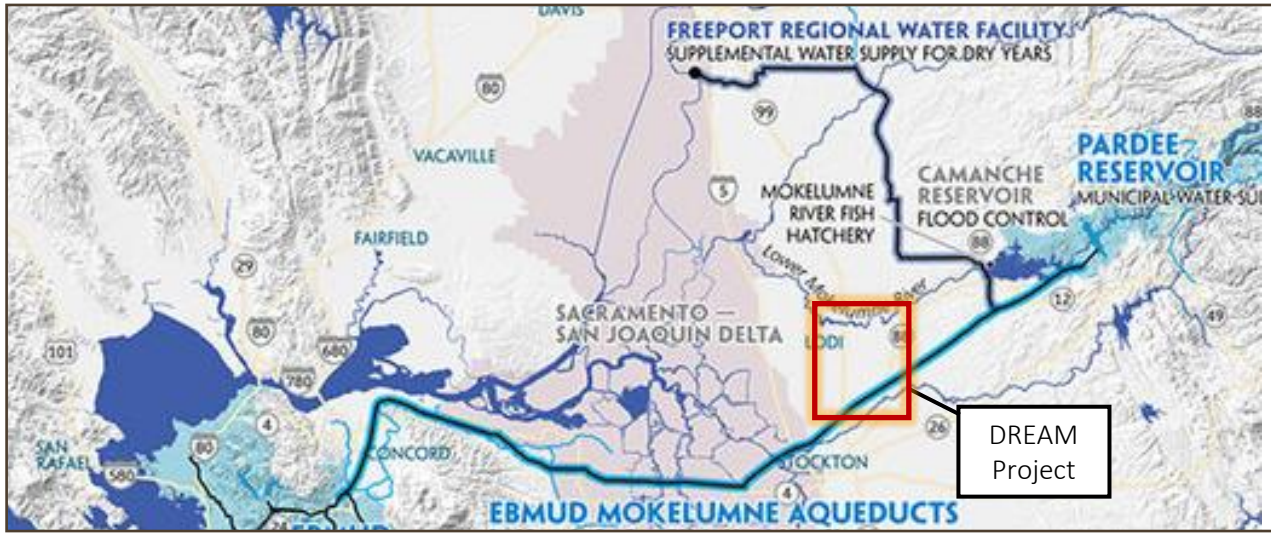
Advisory Water Commission

San Joaquin County Flood Control & Water Conservation District

March 20, 2024

Background

DREAM – Pilot Groundwater Banking Project



500 AF Groundwater to EBMUD

Minus 5% Annual Loss Factor

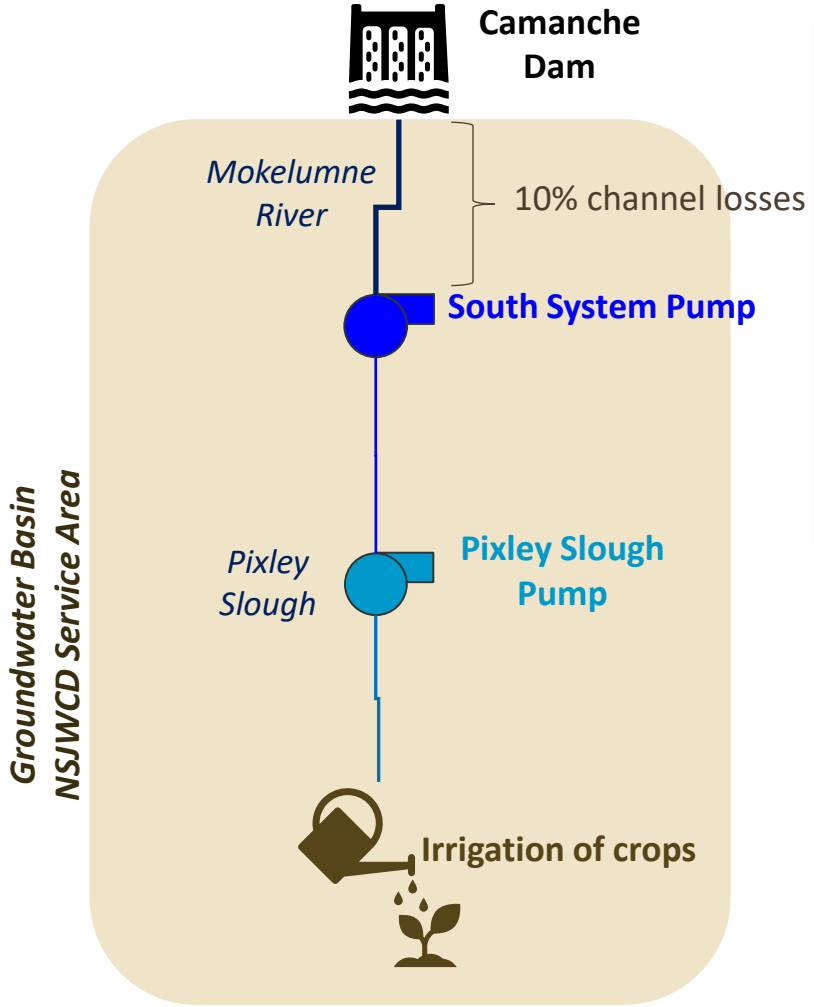
EBMUD Mokelumne River water to NSJWCD

1000 AF

- NSJWCD uses EBMUD Mokelumne River water to irrigate crops instead of pumping groundwater
- Half of the banked groundwater is credited to NSJWCD and the other half is credited to EBMUD who can request that it be returned

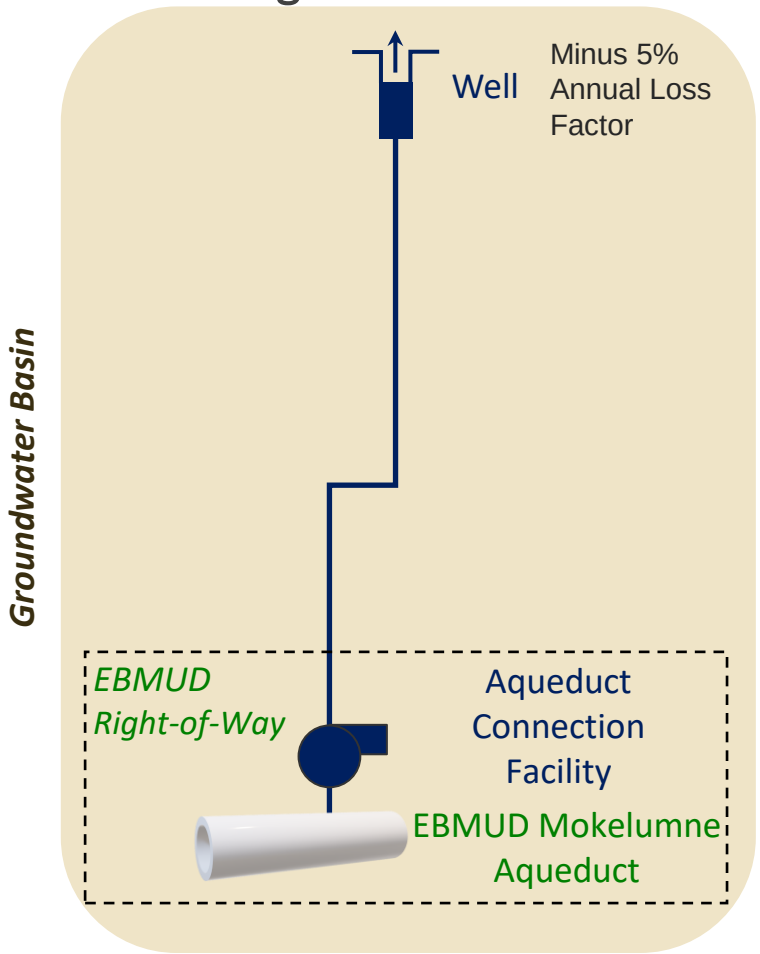
DREAM: Demonstration Recharge, Extraction and Aquifer Management

Step 1: Put EBMUD Water in San Joaquin County for In-lieu Recharge/Banking

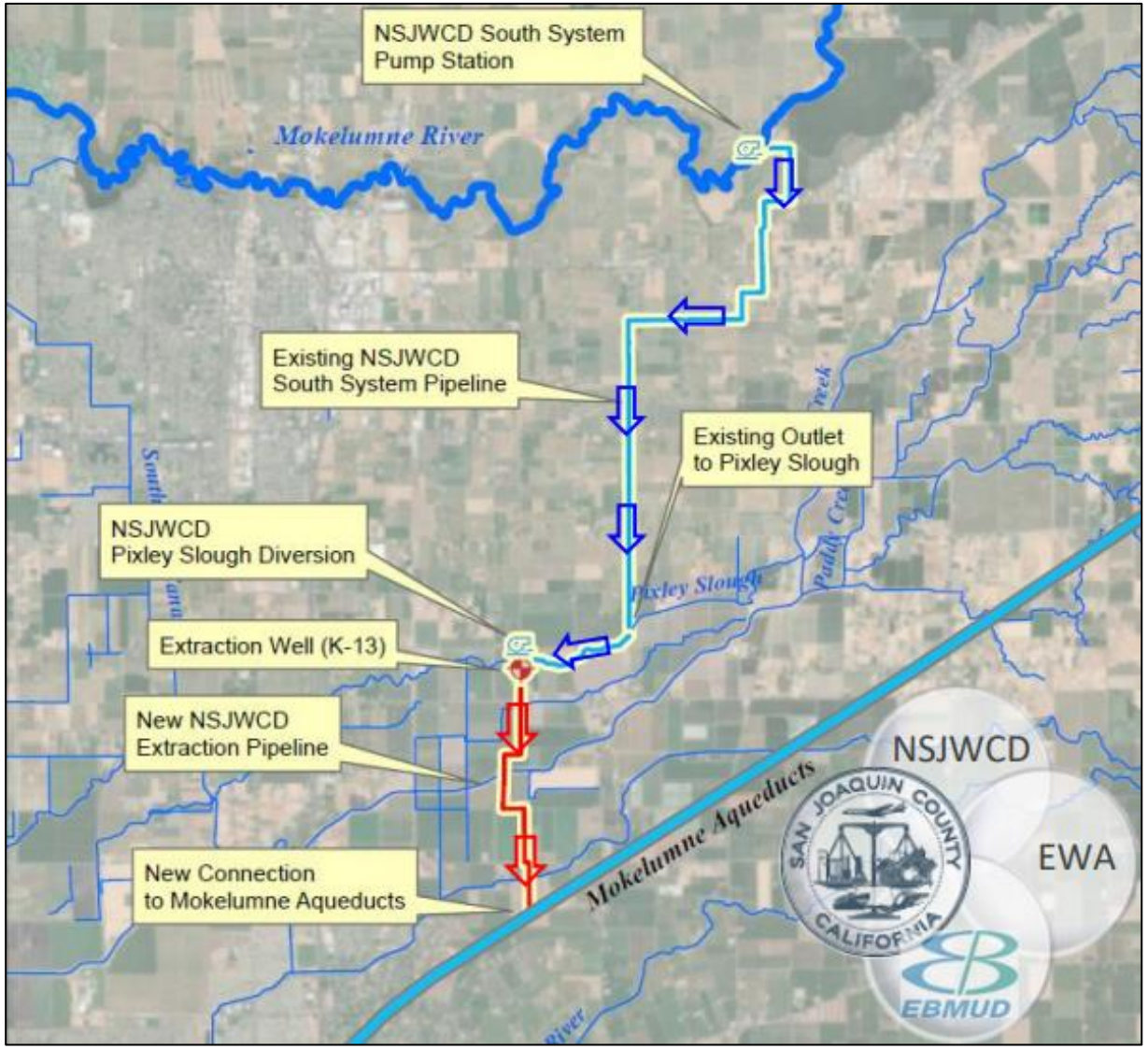


Step 2: Return EBMUD Banked Water, Less Losses

Flow Diagram



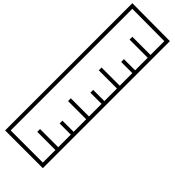
Overview Plan



Required Monitoring During Extraction

NSJWCD monitors quantity of water pumped from the well and EBMUD monitors the amount of water delivered into the aqueduct

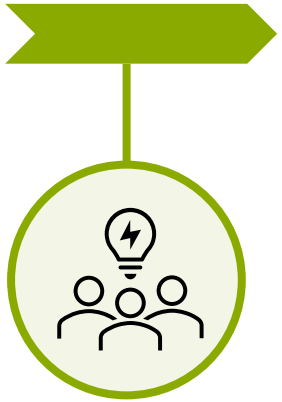
EBMUD monitors water quality to ensure safe and high-quality drinking water is delivered to customers



San Joaquin County monitors groundwater levels to ensure no adverse impacts to the aquifer

Project & Facility Development Timeline

2014

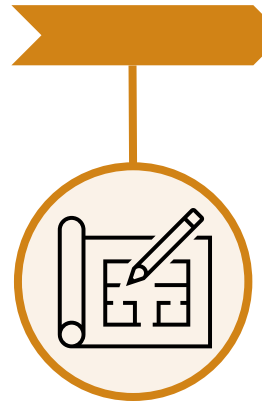


Pilot concept developed

2016 - 2017

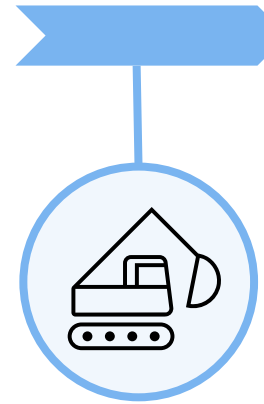
- Environmental documents completed
- Groundwater Export Permit issued
- Project agreements executed

2018 - 2020



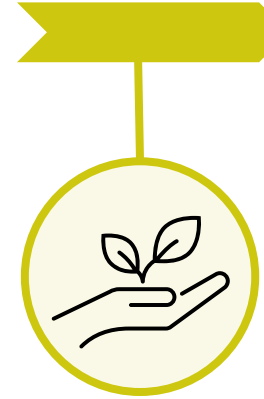
Design of new extraction facilities

2020 - 2022



Construction of facilities

2022 - 2023



Facilities start-up & testing

Recharge & Extraction Timeline & Accounting

Time frame	Summary	NSJWCD Diversion	NSJWCD Recharge (50% diversion)	EBMUD Banked (50% diversion)	EBMUD Extracted	Bank losses (5% annual)	EBMUD balance in GW bank
2018 & 2019 summer		104 AF	52 AF	52 AF			52 AF
2022 Fall & 2023 Feb	Start-up & testing				40 AF	12 AF	0
2023 Fall		592 AF	296 AF	296 AF			296 AF
2024 Jan 10 to…	Started extraction					0	296 AF
March 19 (AM)	Present				119 AF		177 AF
End of March	Extraction end date w/o extension				~144 AF		152 AF
End of April	Extraction end date w/ extension				~241 AF		55 AF

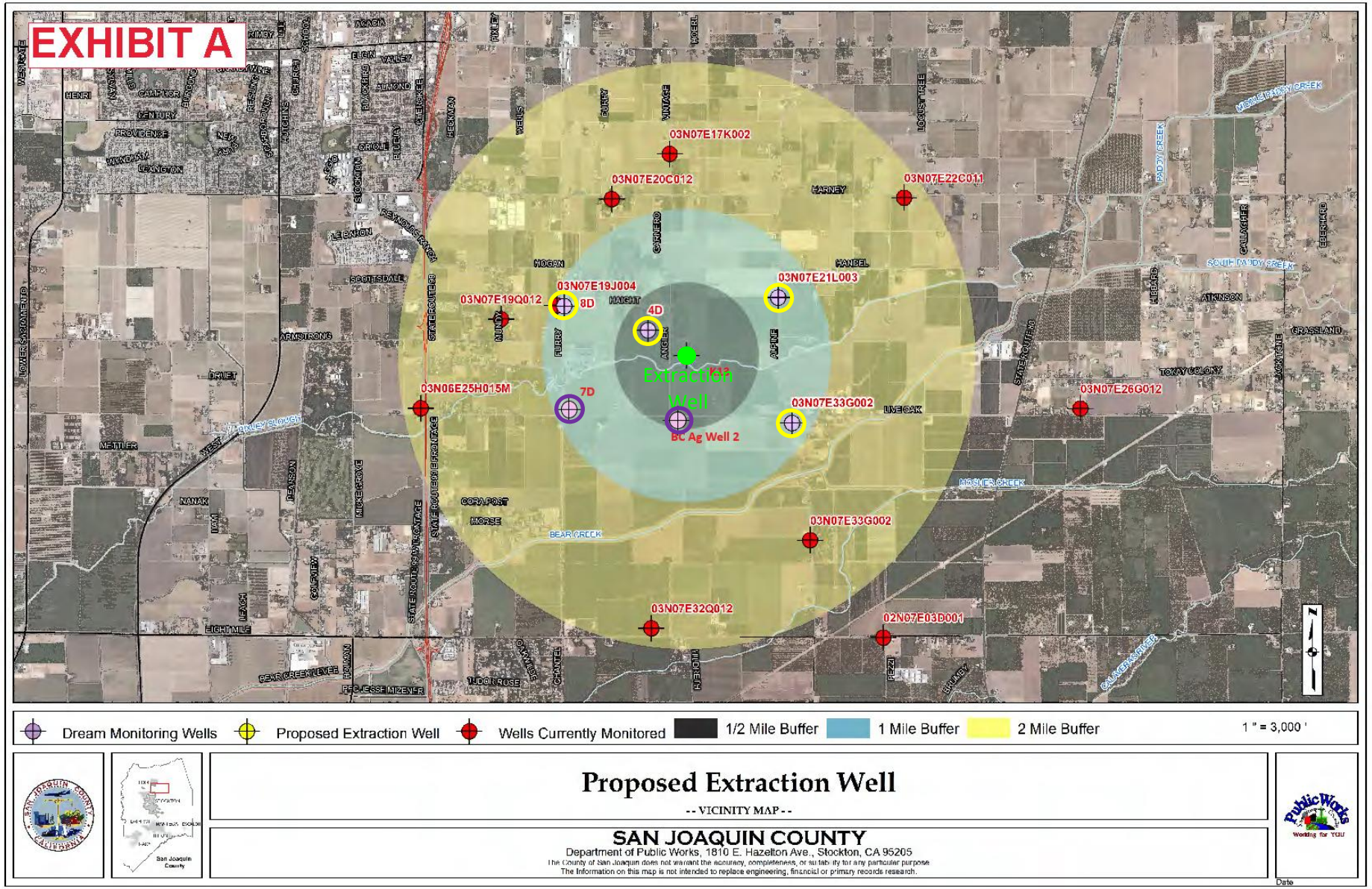
DREAM Monitoring Wells

DREAM Monitoring Wells, Monitoring Plan Amendment #1

1. MW-4D
2. MW-8D
3. 03N07E21L003
4. 03N07E33G002

Alternates

- MW-7D
- BC Ag Well 2



DREAM Groundwater Level Thresholds

- **DREAM minimum threshold** =

  Initial water level

  – regional trend

  – allowable drawdown (10 feet)

- If three (3) of four (4) DREAM monitoring wells reach the minimum threshold, extraction reduced or stopped while data is evaluated by the Monitoring Committee.

DREAM Groundwater Level Thresholds

- **DREAM maximum extraction threshold =**

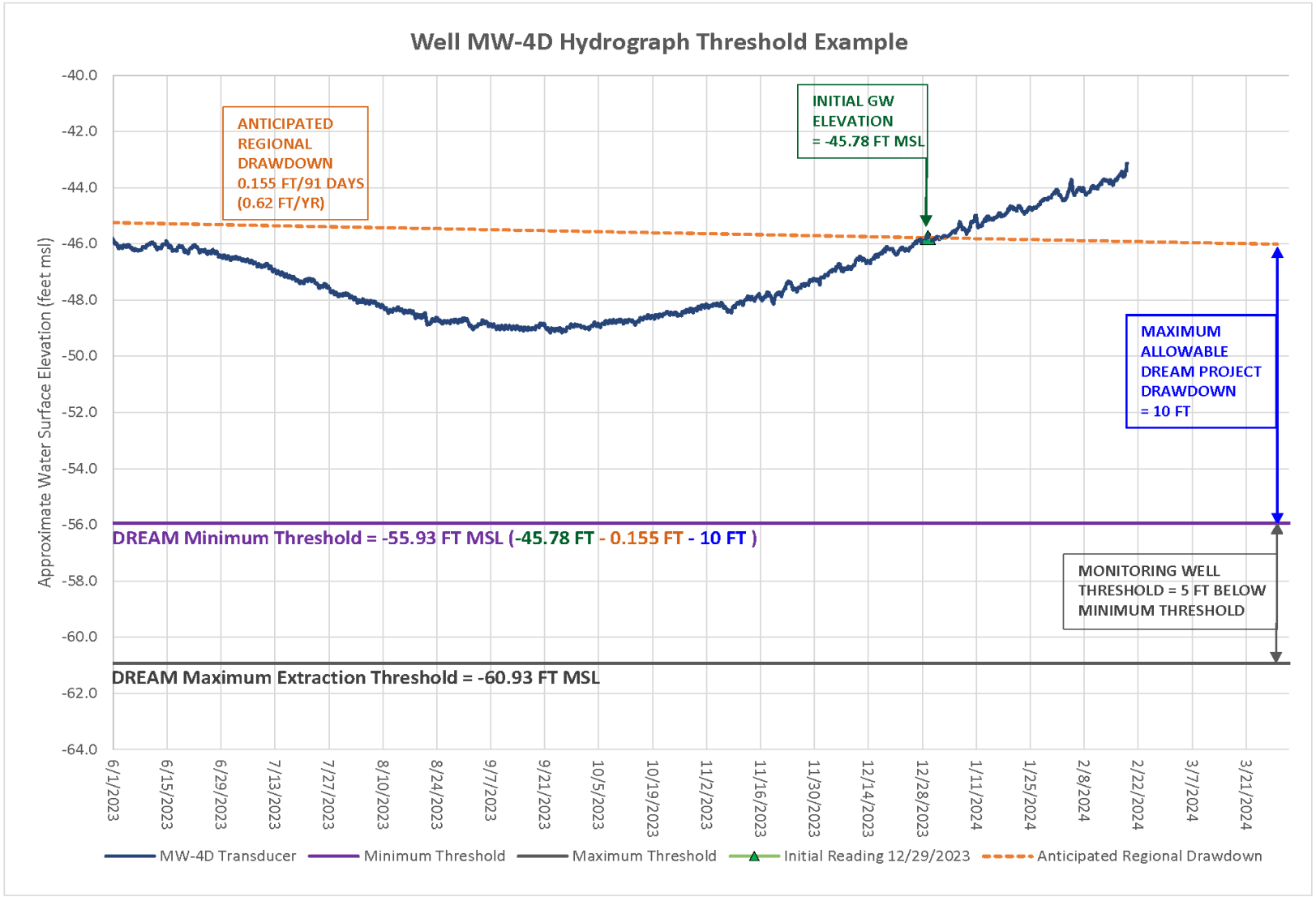
  Initial water level

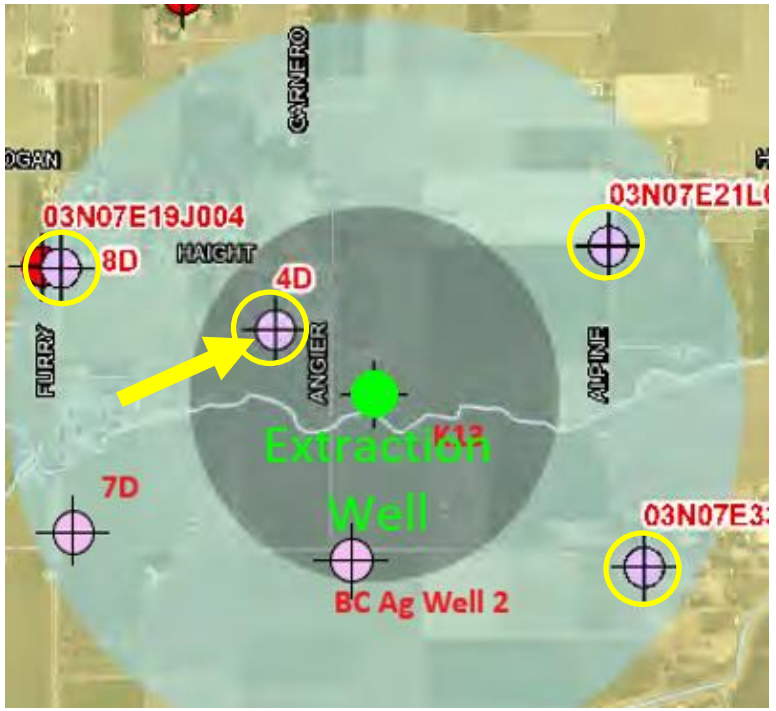
  – regional trend

  – allowable drawdown (15 feet)

- If any one (1) monitoring well reaches the maximum extraction threshold, extraction will be stopped while data is evaluated by the Monitoring Committee.
- Additionally, if well 03N07E21L003 exceeds its **SGMA minimum threshold**, extraction will cease.

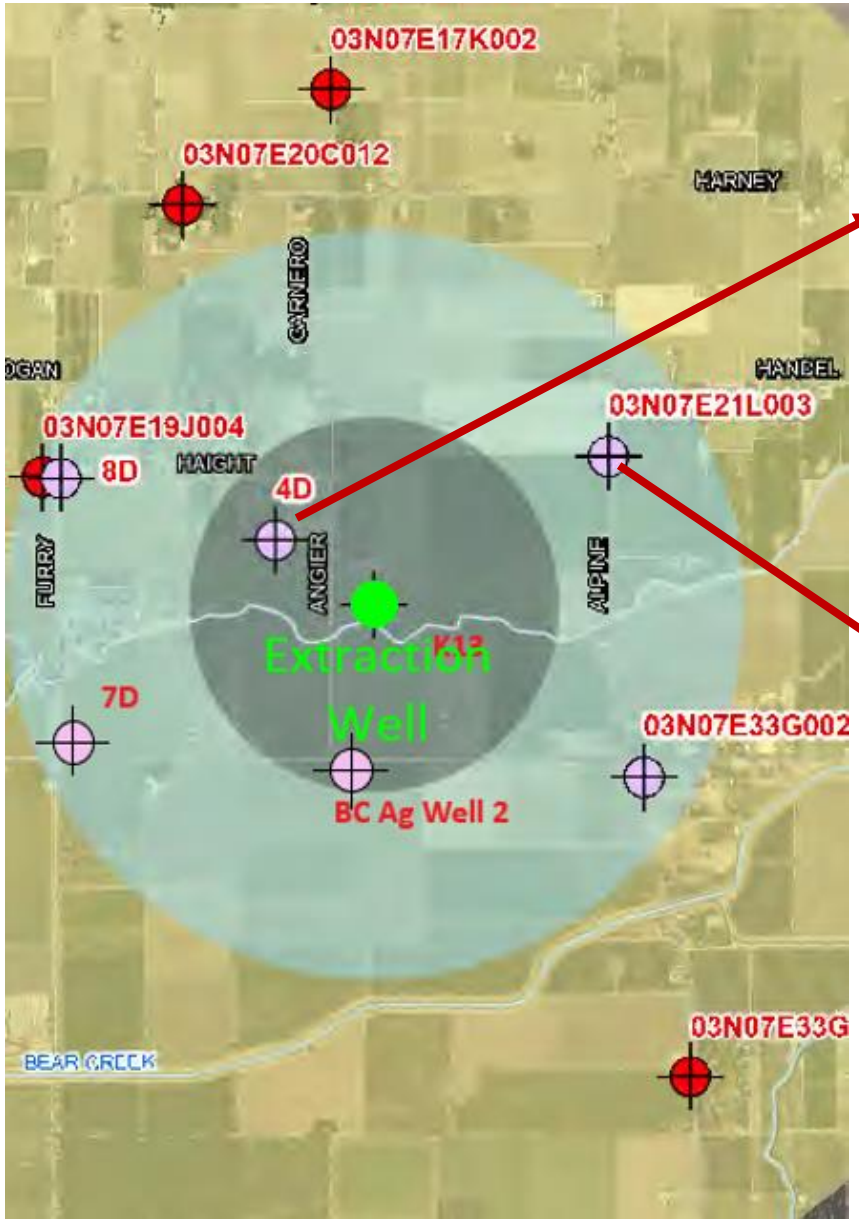
Example


Well MW-4D Hydrograph Threshold Example
Approximate Water Surface Elevation (feet msl)
-40.0
-42.0
-44.0
-46.0
-48.0
-50.0
-52.0
-54.0
-56.0
-58.0
-60.0
-62.0
-64.0
ANTICIPATED REGIONAL DRAWDOWN 0.155 FT/91 DAYS (0.62 FT/YR)
INITIAL GW ELEVATION = -45.78 FT MSL
MAXIMUM ALLOWABLE DREAM PROJECT DRAWDOWN = 10 FT
DREAM Minimum Threshold = -55.93 FT MSL (-45.78 FT - 0.155 FT - 10 FT)
MONITORING WELL THRESHOLD = 5 FT BELOW MINIMUM THRESHOLD
DREAM Maximum Extraction Threshold = -60.93 FT MSL
6/1/2023
6/15/2023
6/29/2023
7/13/2023
7/27/2023
8/10/2023
8/24/2023
9/7/2023
9/21/2023
10/5/2023
10/19/2023
11/2/2023
11/16/2023
11/30/2023
12/14/2023
12/28/2023
1/11/2024
1/25/2024
2/8/2024
2/22/2024
3/7/2024
3/21/2024
MW-4D Transducer
Minimum Threshold
Maximum Threshold
Initial Reading 12/29/2023
Anticipated Regional Drawdown

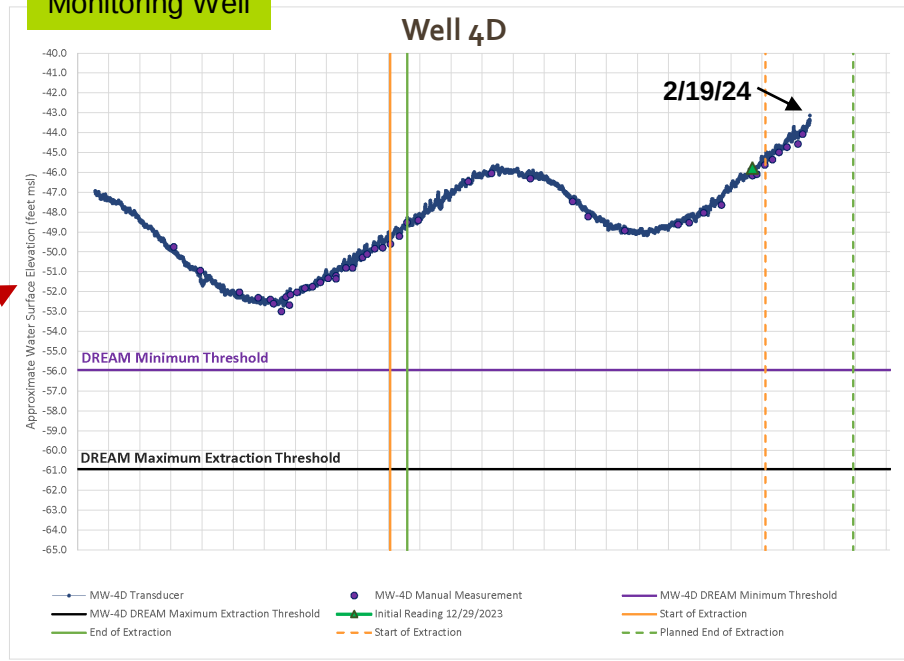

CARNERO
03N07E19J004
8D
HAIGHT
4D
03N07E21L
FURRY
ANGIER
ALPINE
Extraction Well
7D
03N07E3
BC Ag Well 2

Groundwater monitoring hydrographs

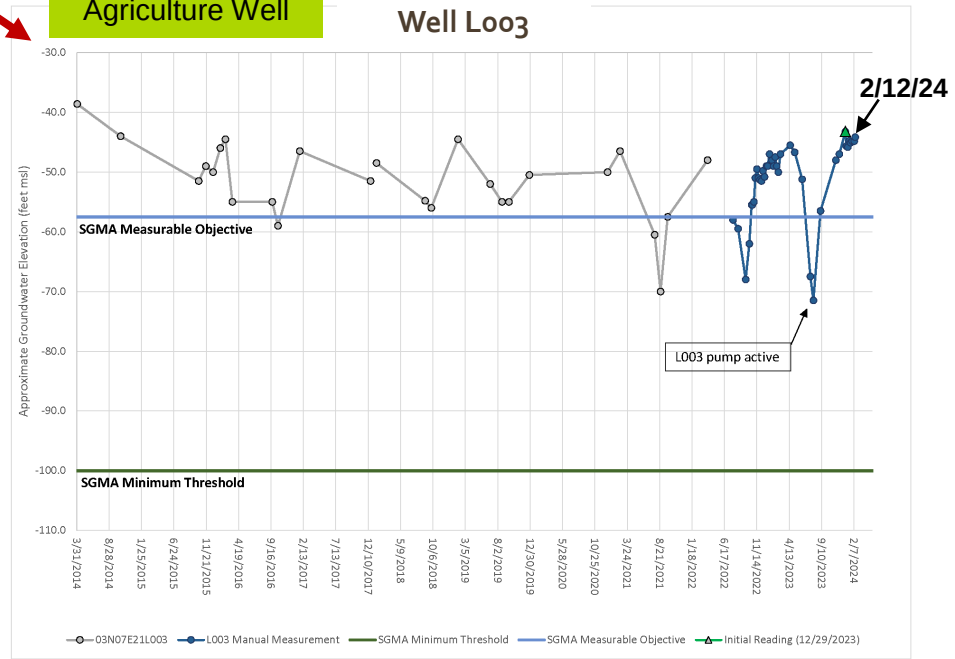
- No negative impacts on groundwater levels observed to date during extraction
- General upward trend in groundwater levels
- Levels currently > 12 feet above thresholds
- Higher resolution for monitoring wells fitted with transducers vs agriculture wells requiring manual measurements
- Manual measurements are less reliable due to access issues



Monitoring Well



Agriculture Well



Lessons Learned

- Dedicated wells are needed to monitor groundwater levels; ag well access issues result in low resolution and unclear trends
- In wet years, growers are less inclined to take irrigation water for banking due to reduced irrigation demand
- Need more acres to take irrigation water or a combination of irrigated acres and direct recharge locations
- Additional flow measurement locations would improve water accounting
- Close collaboration among partners is critical for success

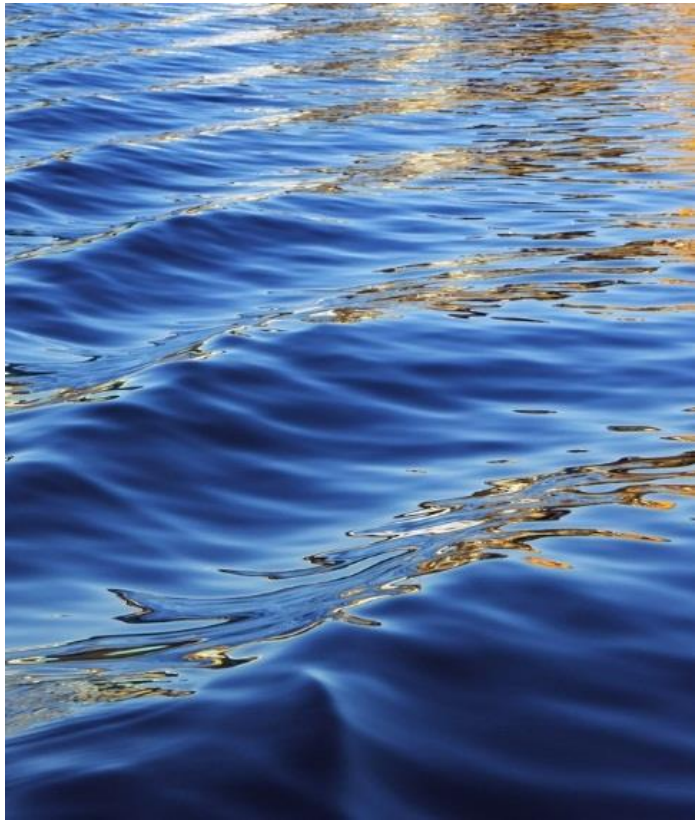
Next Steps

- Ongoing extraction and groundwater monitoring through the end of March or April if extraction period is extended
- Complete the pilot and evaluate results and operational/technical lessons learned
- Develop concepts for a larger scale regional groundwater banking program in the San Joaquin County area
- Continue to develop existing regional partnerships that improve water supply conditions

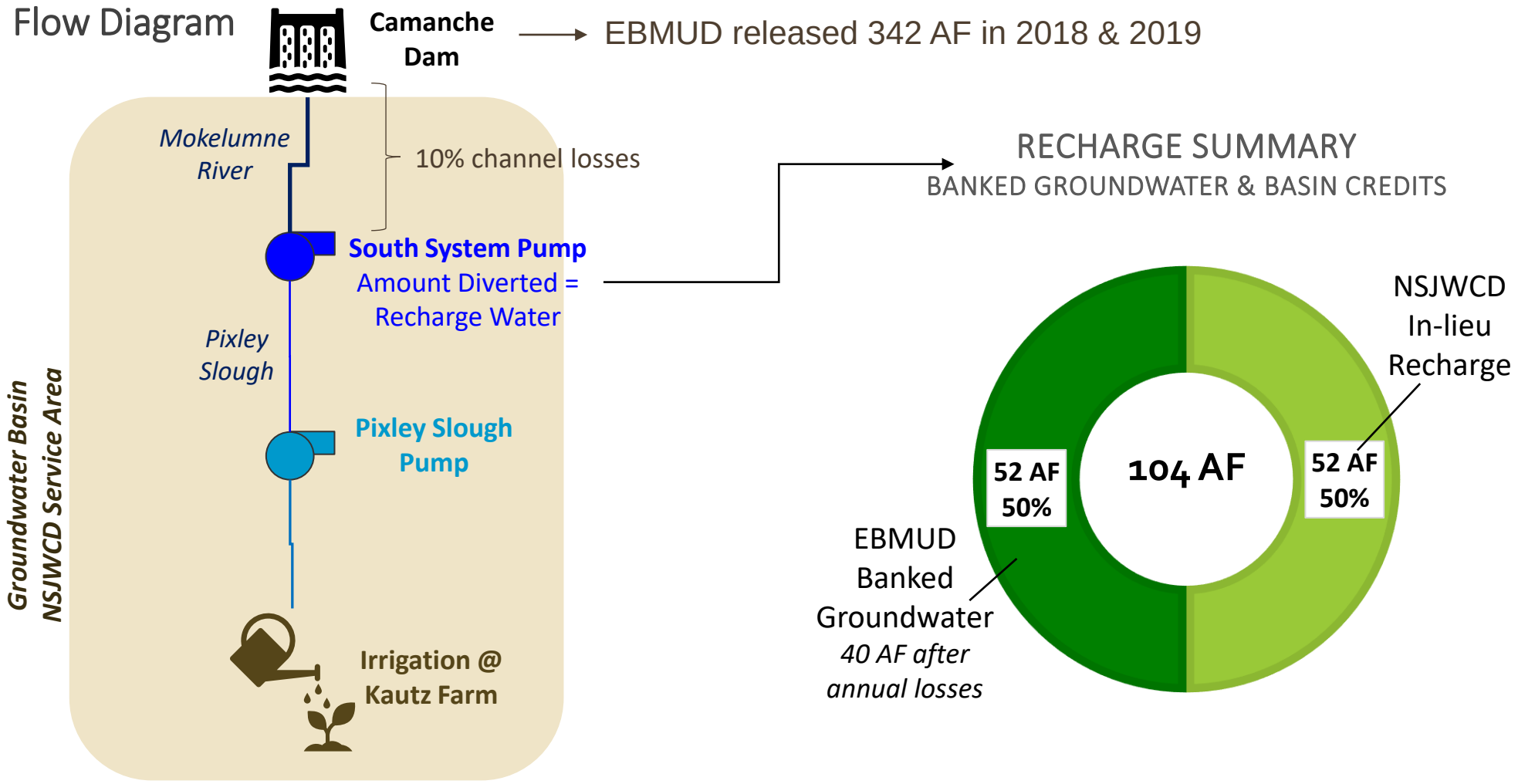
Questions?


July 2022 DREAM Tour With Board Members and Key Stakeholders

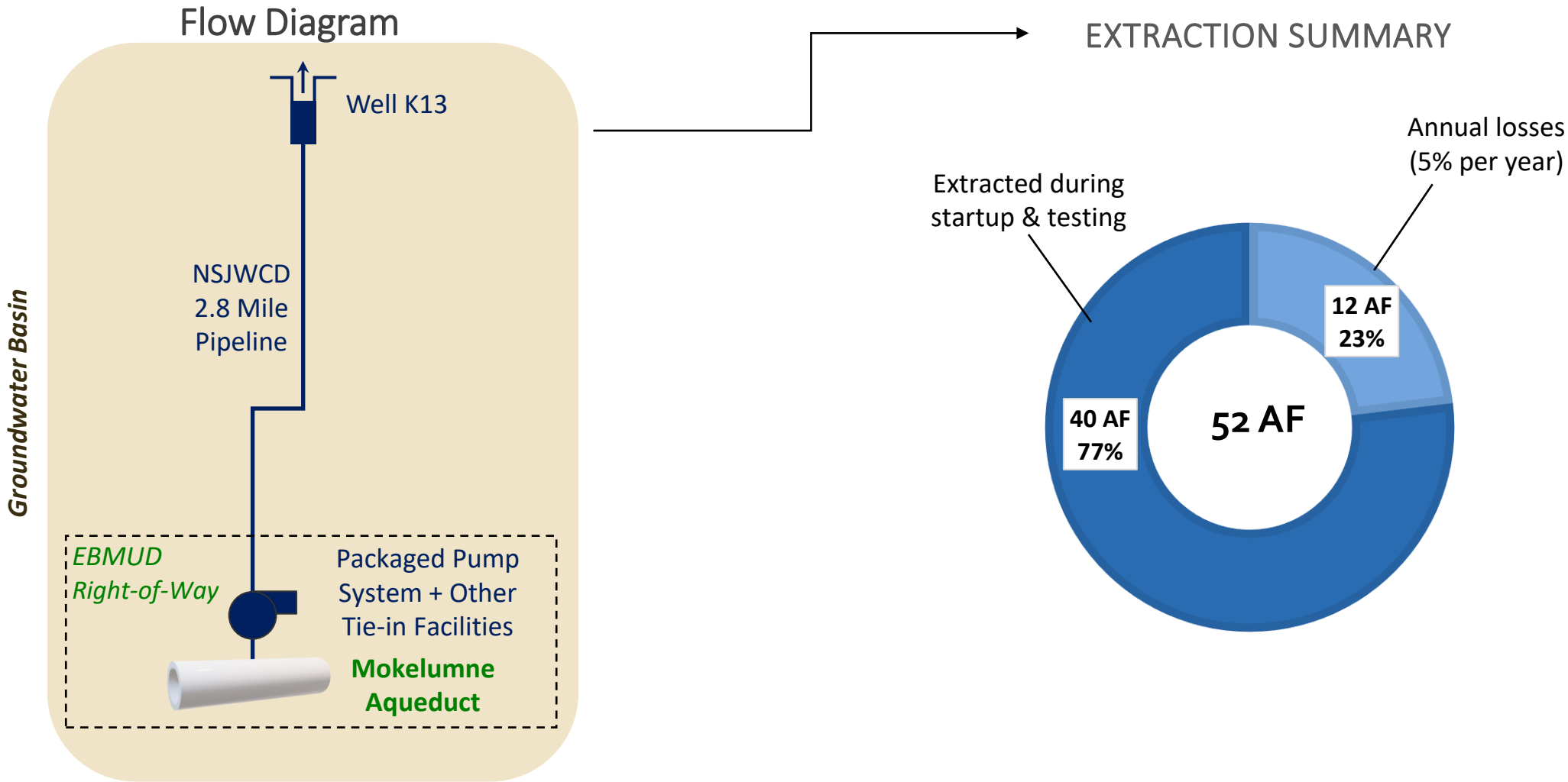
Reference/Additional Details



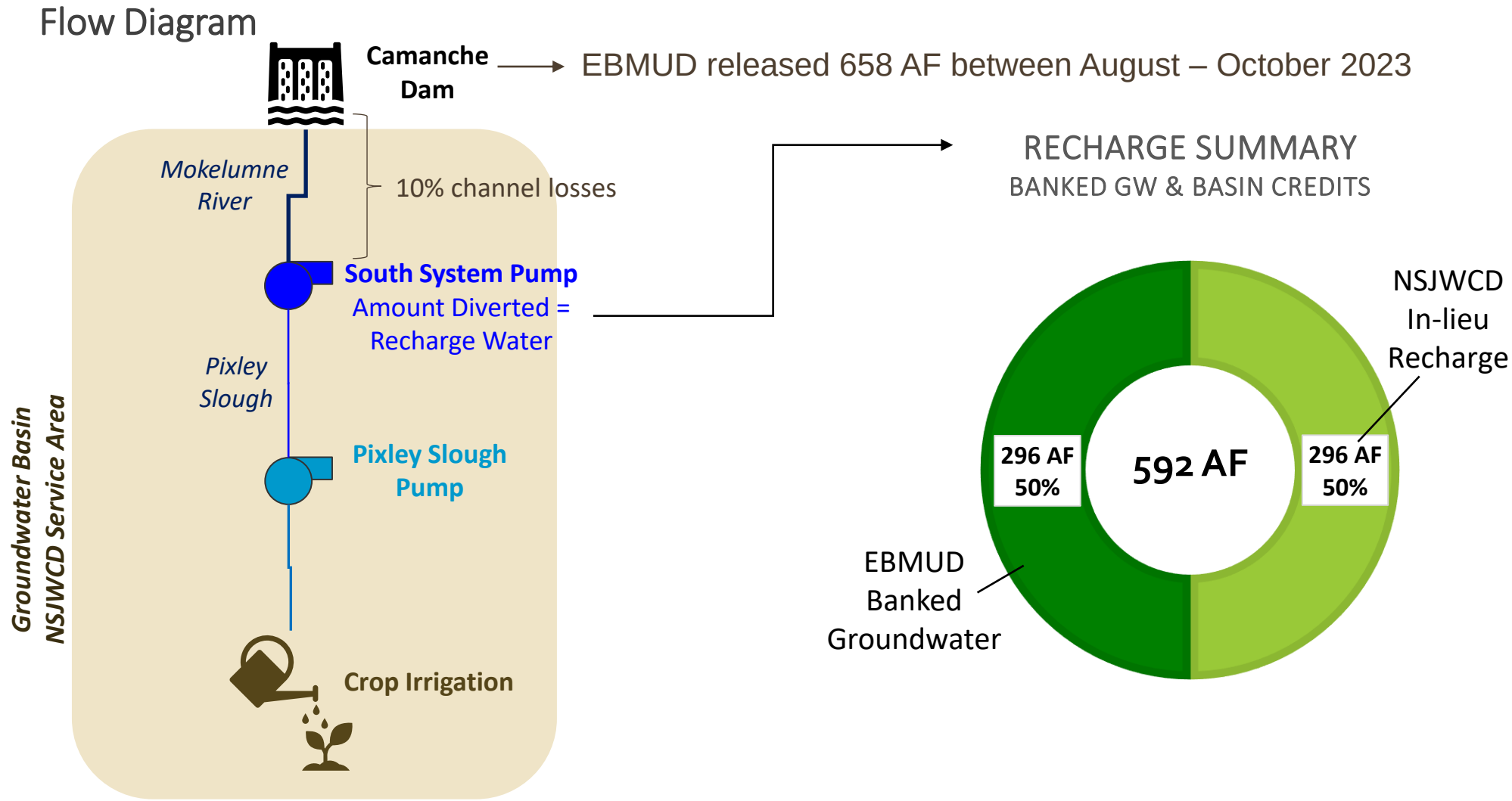
Recharge Water Accounting - 2018 & 2019



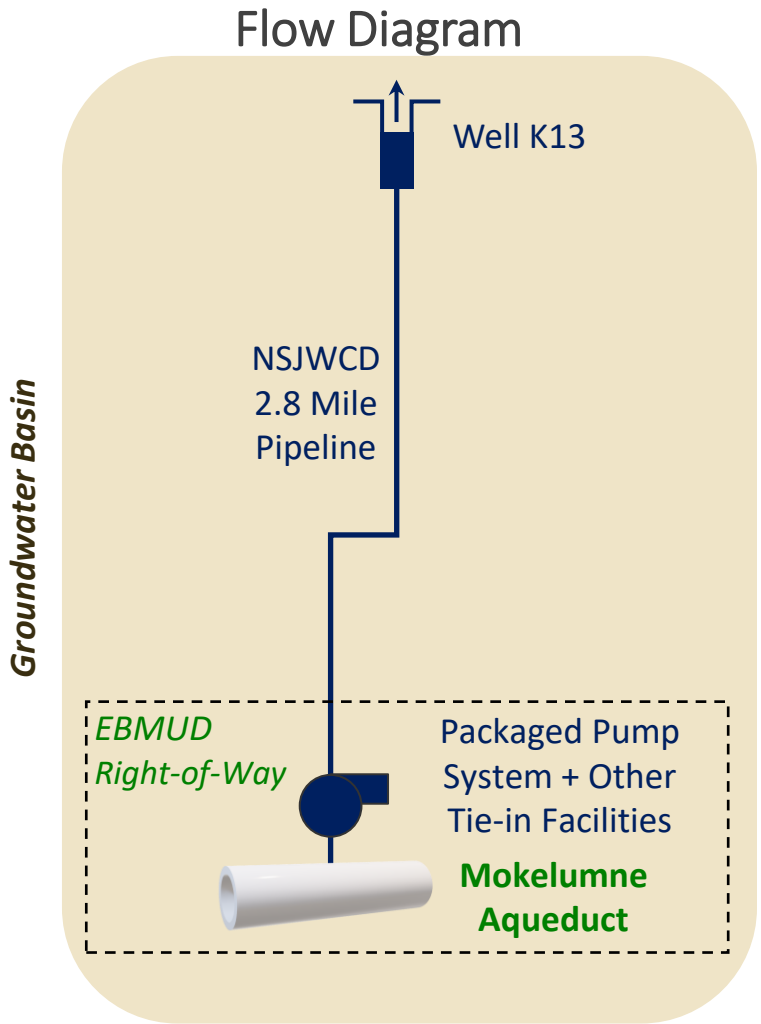
Groundwater Extraction Accounting - Fall 2022 and Feb 2023

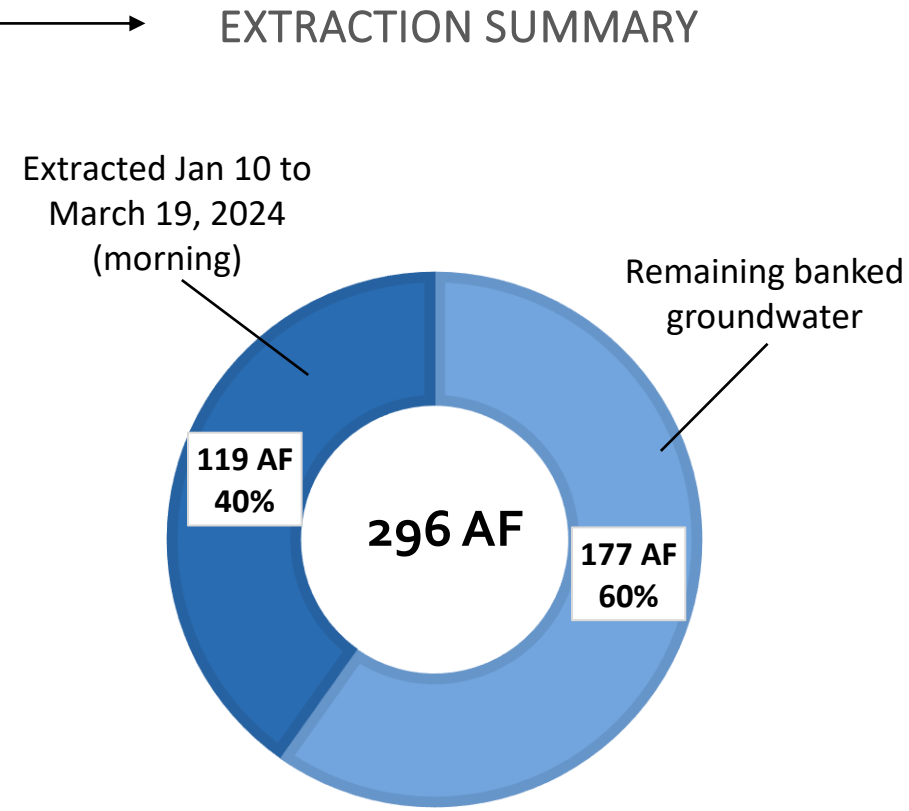


Recharge Water Accounting – Summer & Fall 2023



Groundwater Extraction Accounting

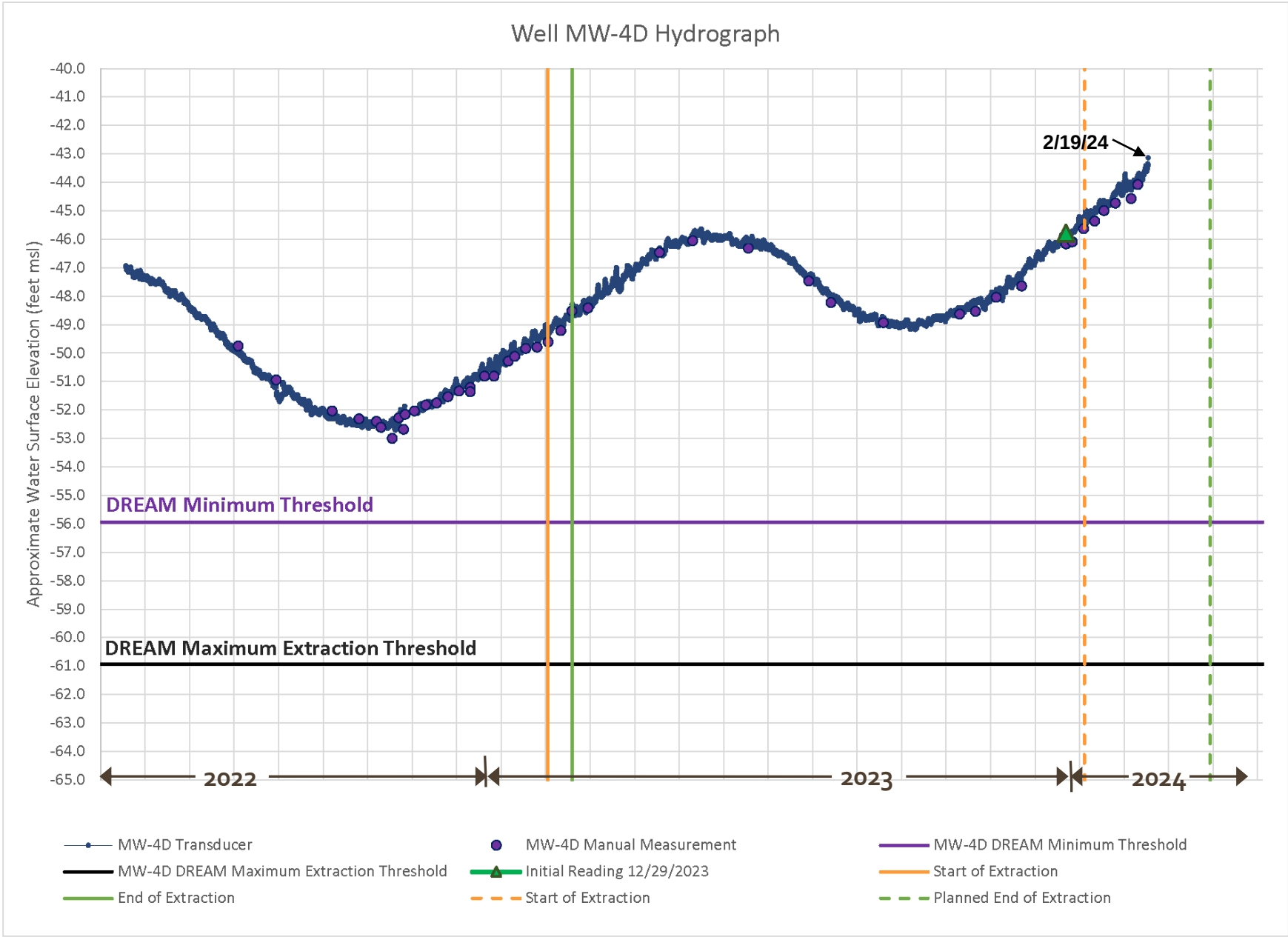




MW-4D Hydrograph

- No negative impacts on groundwater levels observed to date
- Levels increasing since extraction started on January 10
- Levels currently > 12 feet above minimum threshold

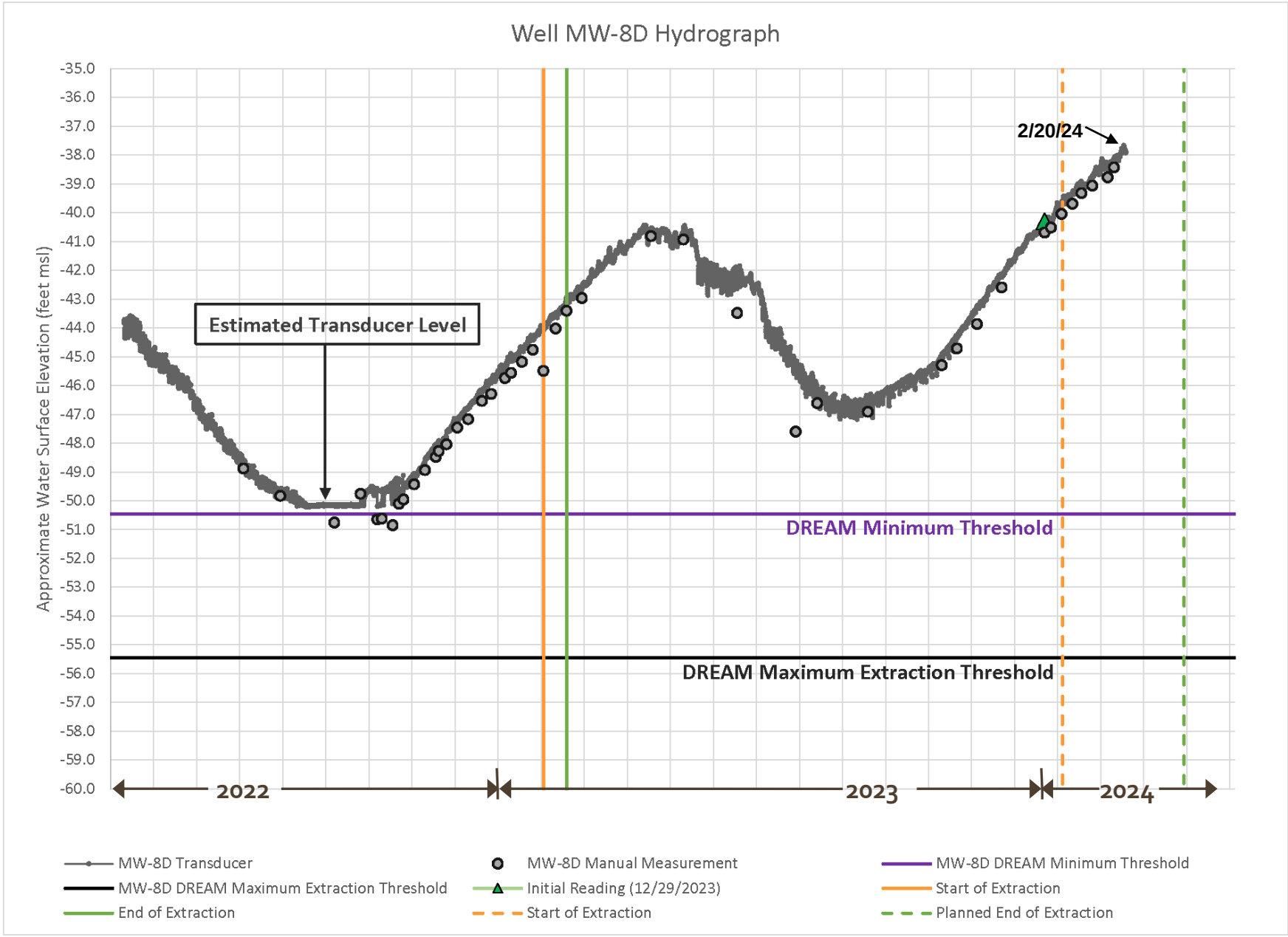
	MW-4D
Initial Reading	-45.78
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-55.93
DREAM Maximum Extraction Threshold	-60.93



MW-8D Hydrograph

- No negative impacts on groundwater levels observed to date
- Levels increasing since extraction started on January 10
- Levels currently > 12 feet above minimum threshold

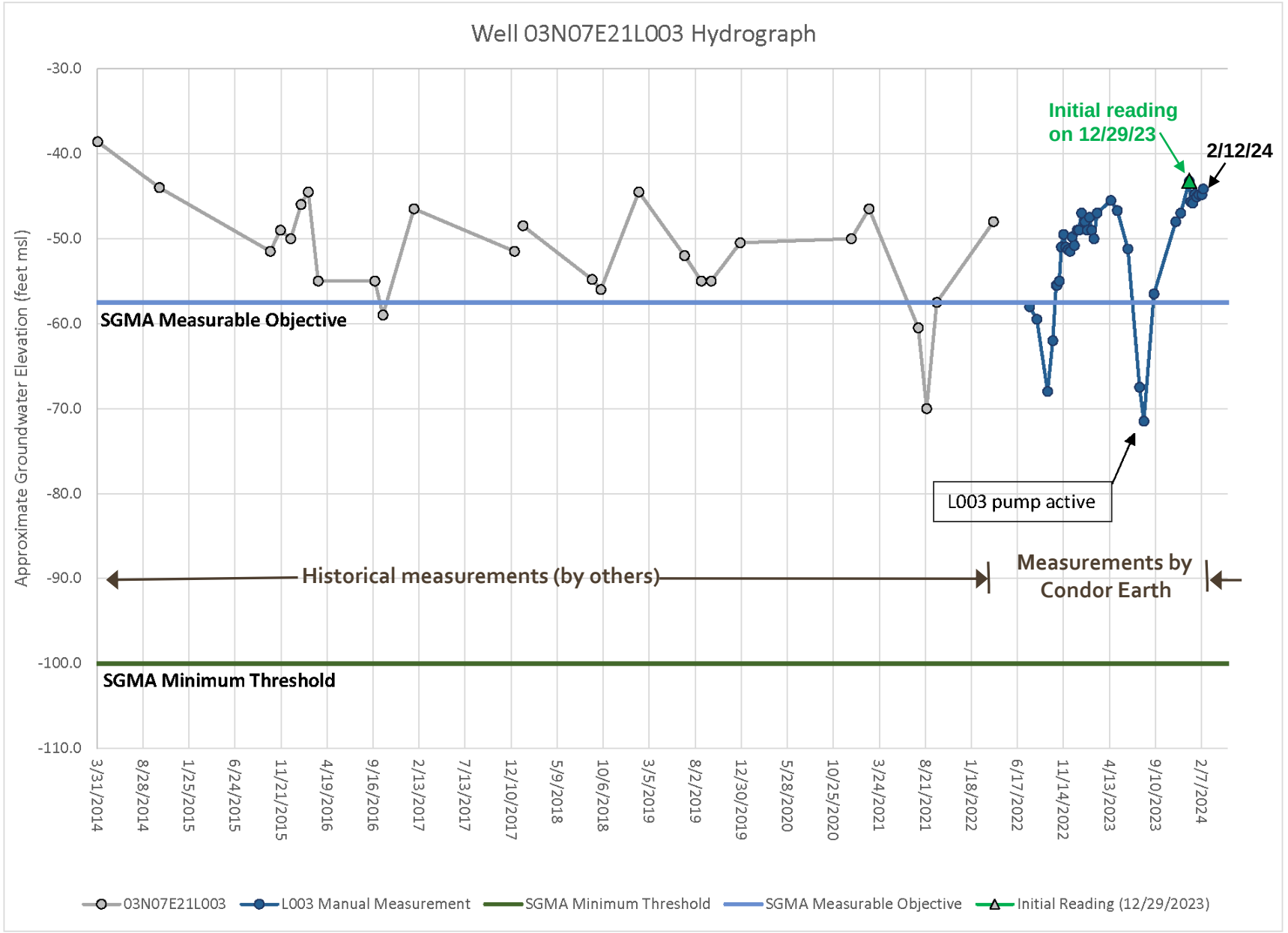
	MW-8D
Initial Reading	-40.30
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-50.45
DREAM Maximum Extraction Threshold	-55.45



03N07E21L003 Hydrograph

- Limited interpretation of data trends, but levels measured since January 10 have been ~15 feet above the measurable objective
- Measurable objective and minimum thresholds are from the Eastern San Joaquin Groundwater Sustainability Plan (SGMA representative monitoring well)
- Manual water level measurements are less reliable due to access issues
- L003 may be pumped for agricultural purposes

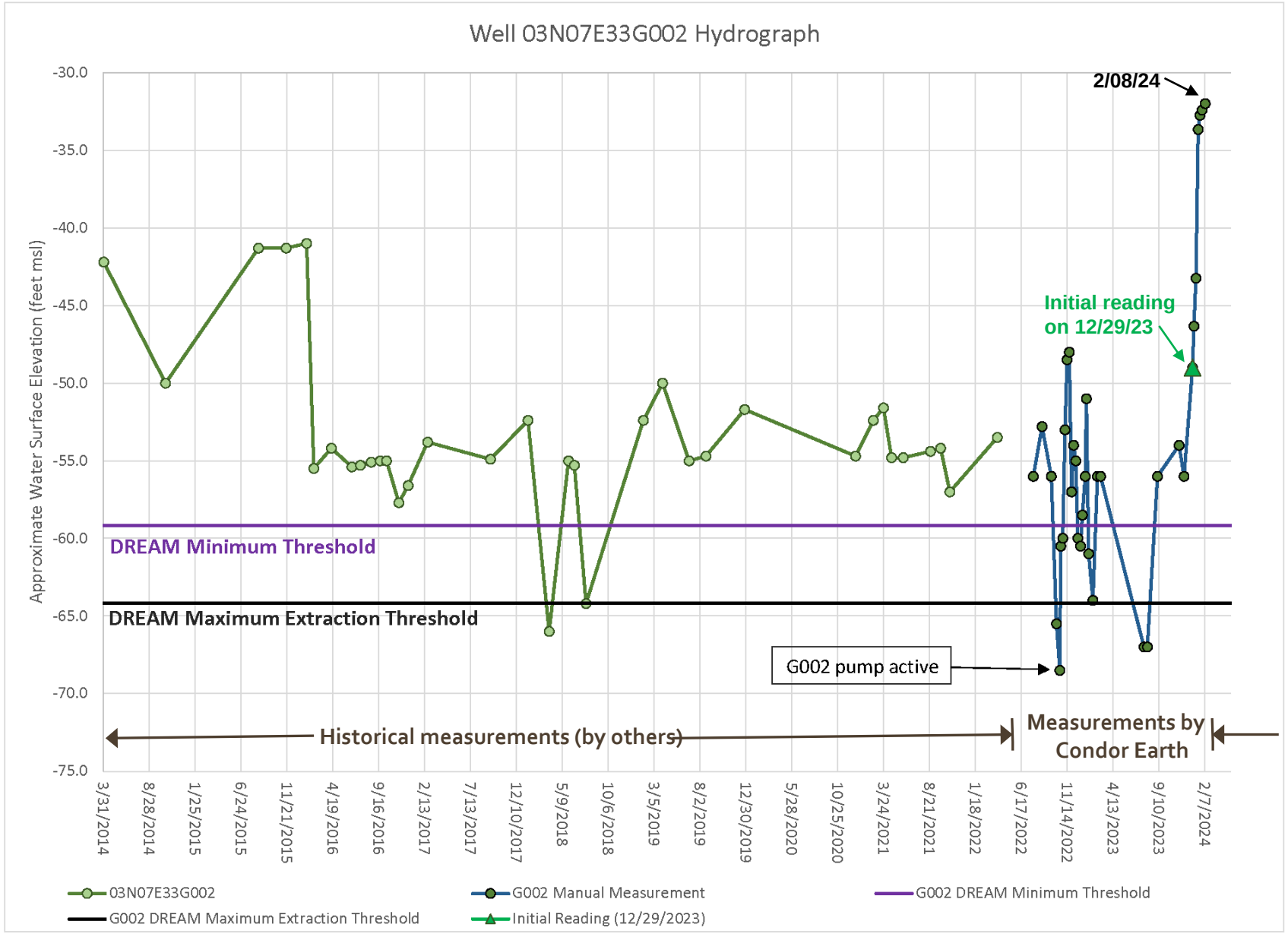
	L003
Initial Reading	-43
SGMA Measurable Objective	-57.5
SGMA Minimum Threshold	-100



03N07E33G002 Hydrograph

- Limited interpretation of data trends, but levels measured since January 10 show no negative impacts to date and have increased significantly
- Manual water level measurements less reliable due to access issues
- G002 may be pumped for agricultural purposes

	G002
Initial Reading	-49
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-59.2
DREAM Maximum Extraction Threshold	-64.2



Hydrographs through Mid-March