FEBRUARY ADVISORY COMMITTEE MEETINGS

Scott Valley Groundwater Advisory Committee Meeting

LARRY WALKER ASSOCIATES
science | policy | solutions

Stantec

Agenda

- Annual Report: Water Year 2023
- Monitoring data, monitoring network expansion, data gaps
- Implementation Project Updates
  - SVID Recharge
  - Ditch Infiltration Studies
- DMS introduction and summary
- Model Updates
  - PRMS
  - SVIHM
- Project schedule

Annual Report

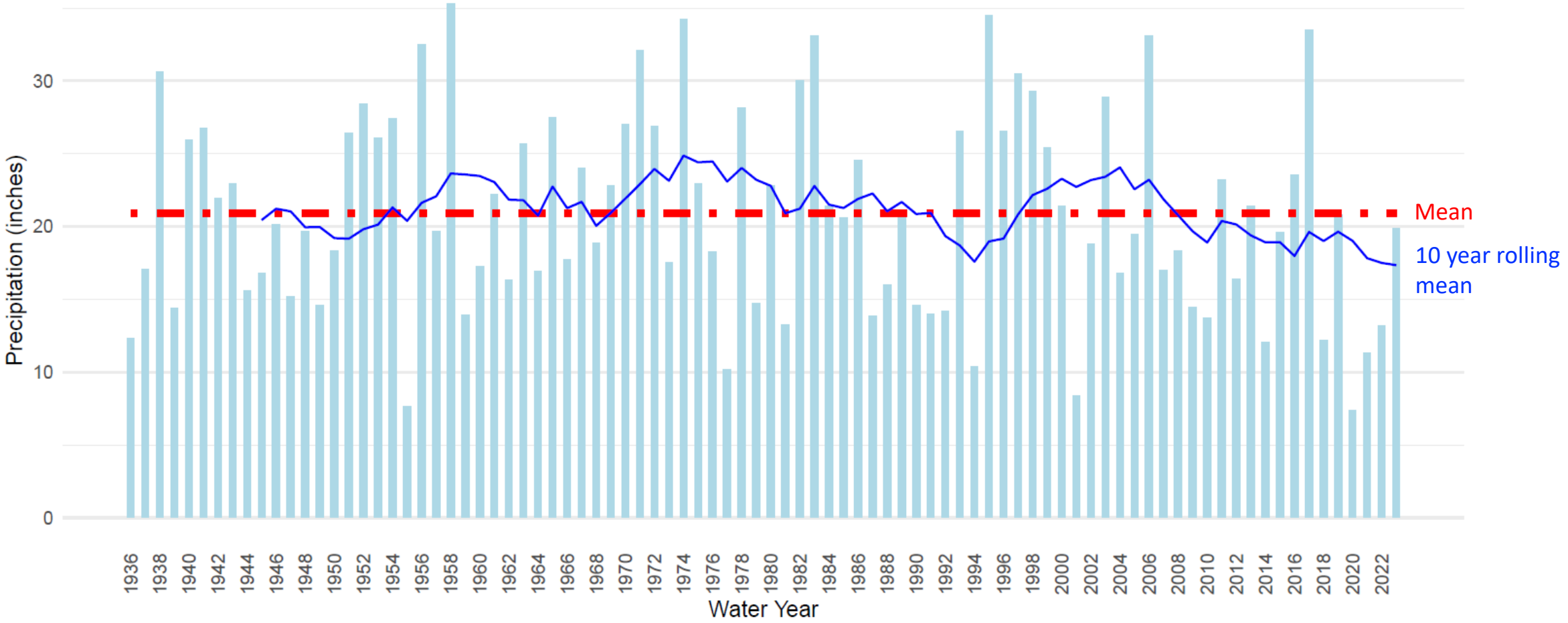
Water Year 2023

Annual Report, Water Year 2023

- Annual reports are to be submitted each year on April 1st
- This report covers October 2022 to September 2023
- Annual Reports include:
  - GSA's progress in GSP implementation
  - Data collected from monitoring network
  - Groundwater extractions, surface water supply, total water use and changes in groundwater storage

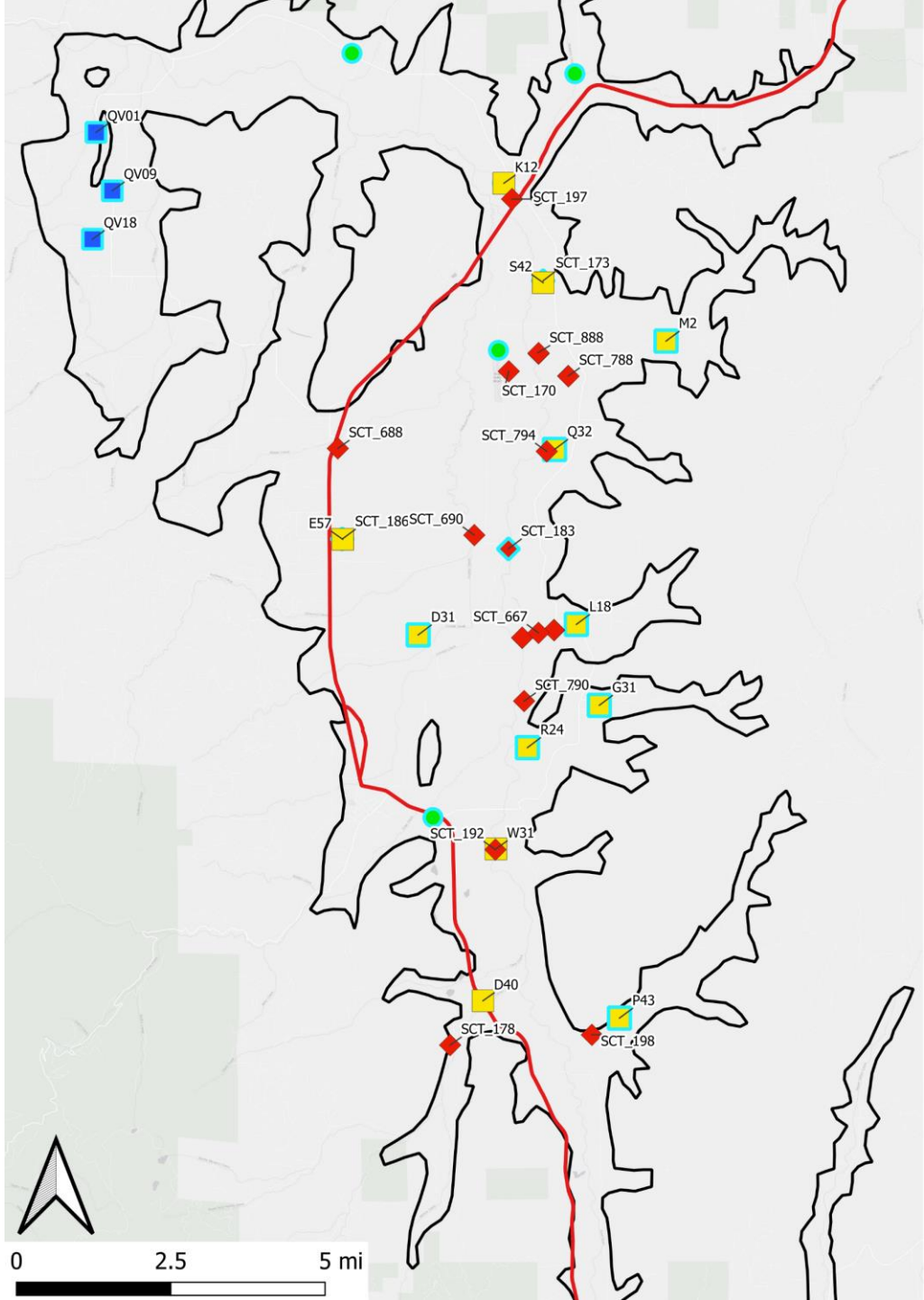
Annual Report Updates

Hydrologic Conditions-Precipitation

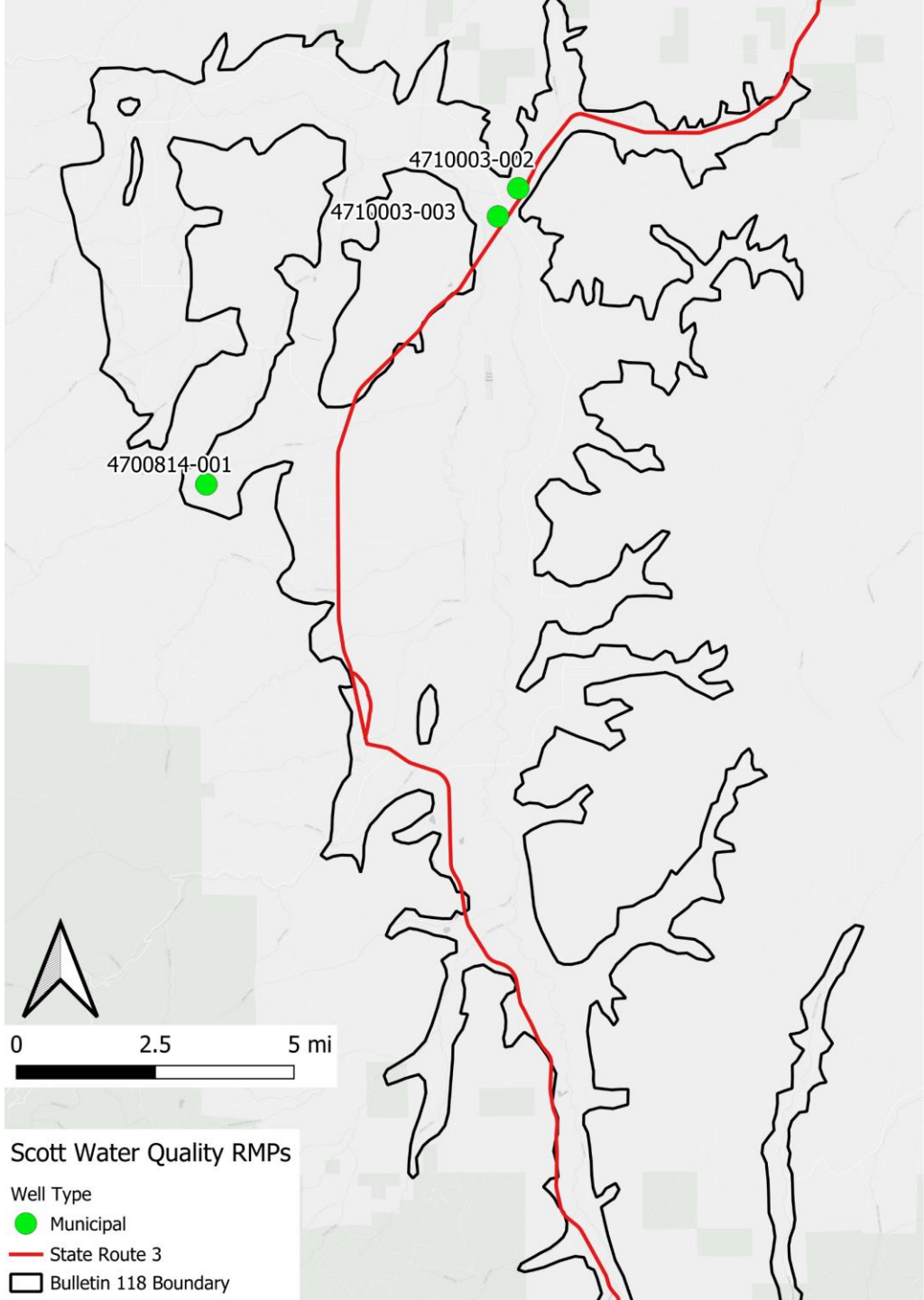


Groundwater Levels Monitoring

- 26 LWA wells
  - Measured continuously
- 13 Community Groundwater Measuring Program Wells
  - Measured monthly
- 3 QVIR Wells
  - Measured monthly
- 5 CASGEM Wells
  - Measured twice per year

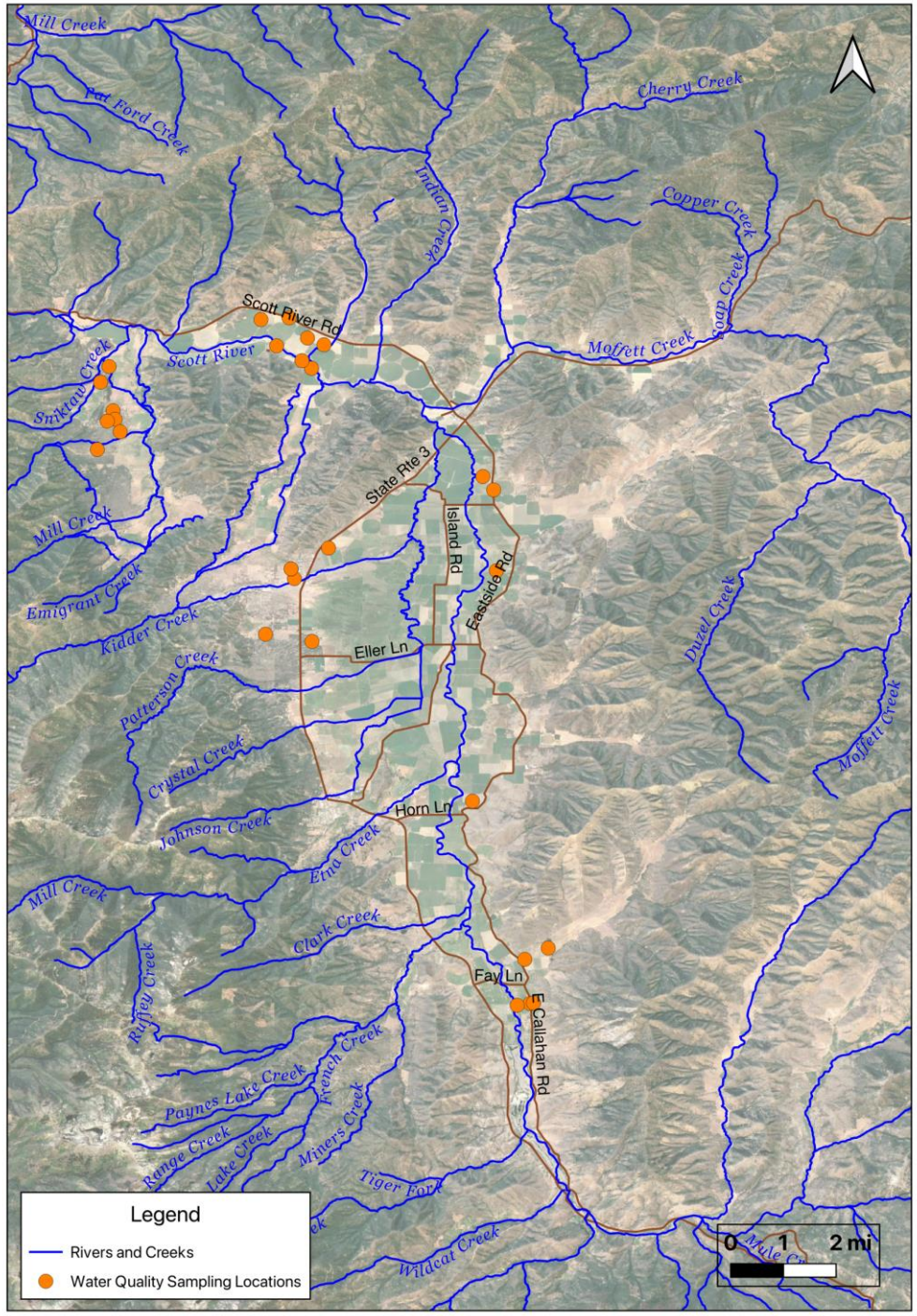


Groundwater Quality Monitoring

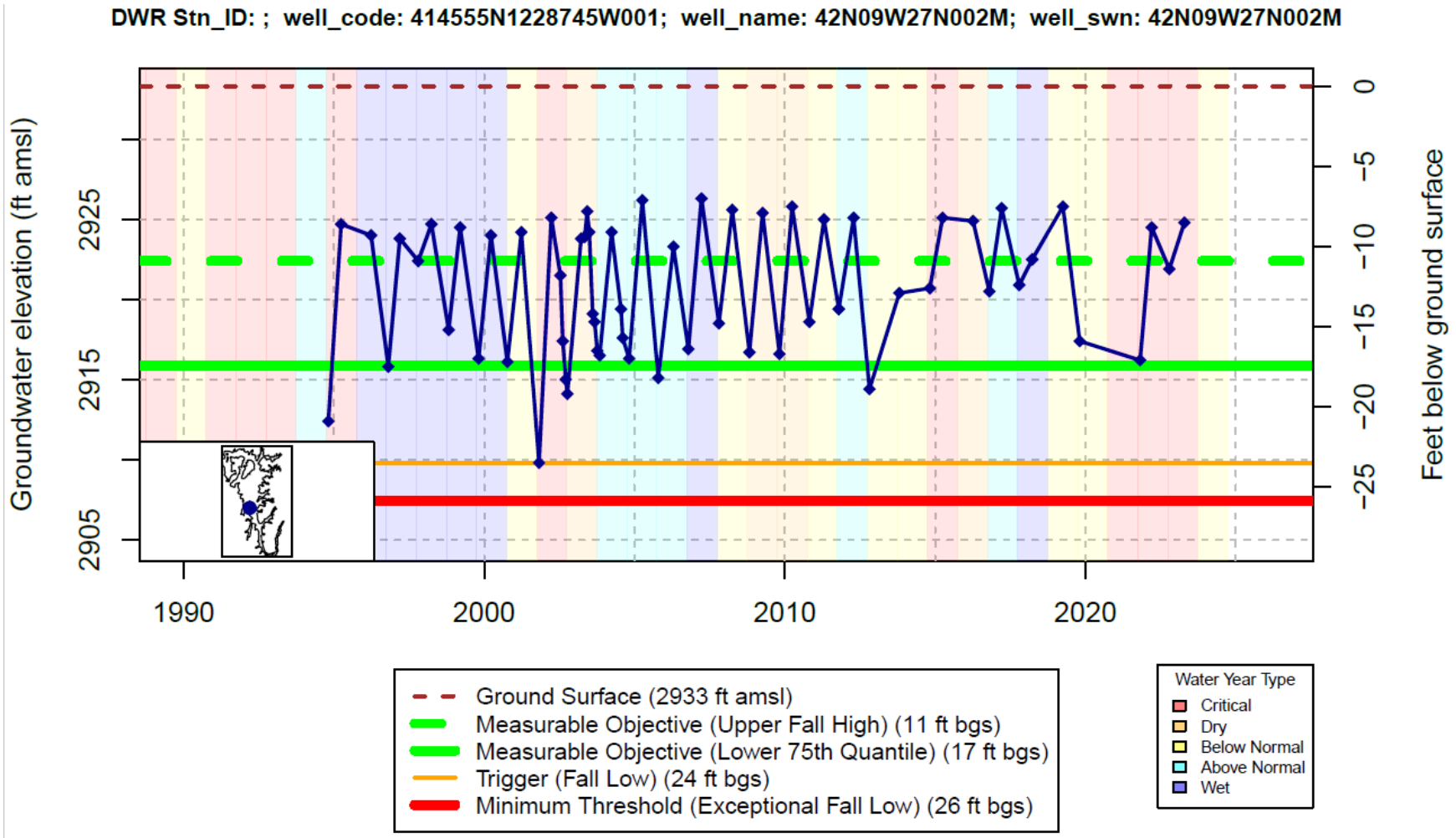


Planned Expansion

- Aligns with NCRWQCBs previous monitoring locations

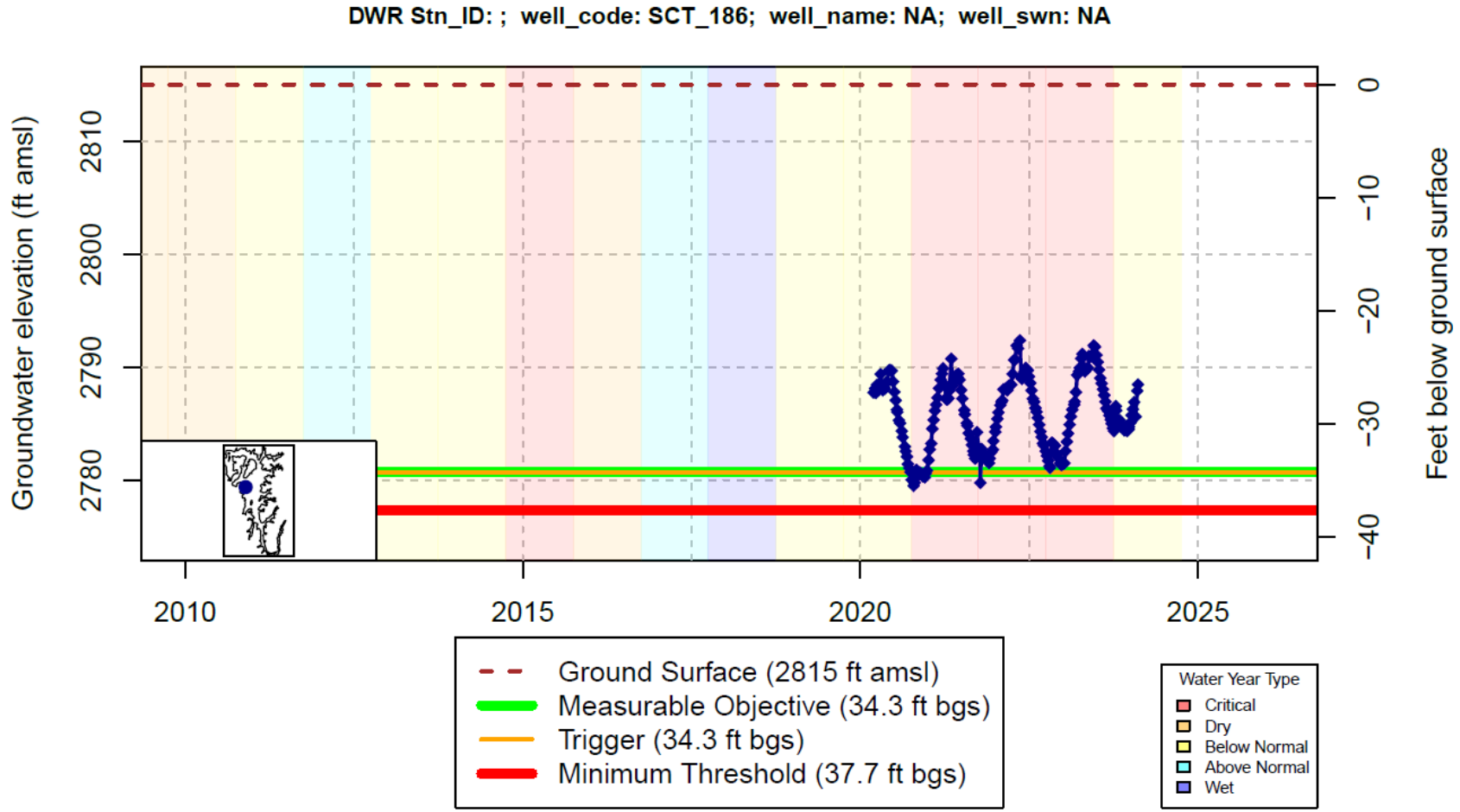


Groundwater Level Updates



Water Year Types from WY 2019–2023 are preliminary results calculated based on SGMA Water Year Type Dataset Development Report. The results will be finalized once DWR updates the water year type dataset for these years.

Groundwater Level Updates



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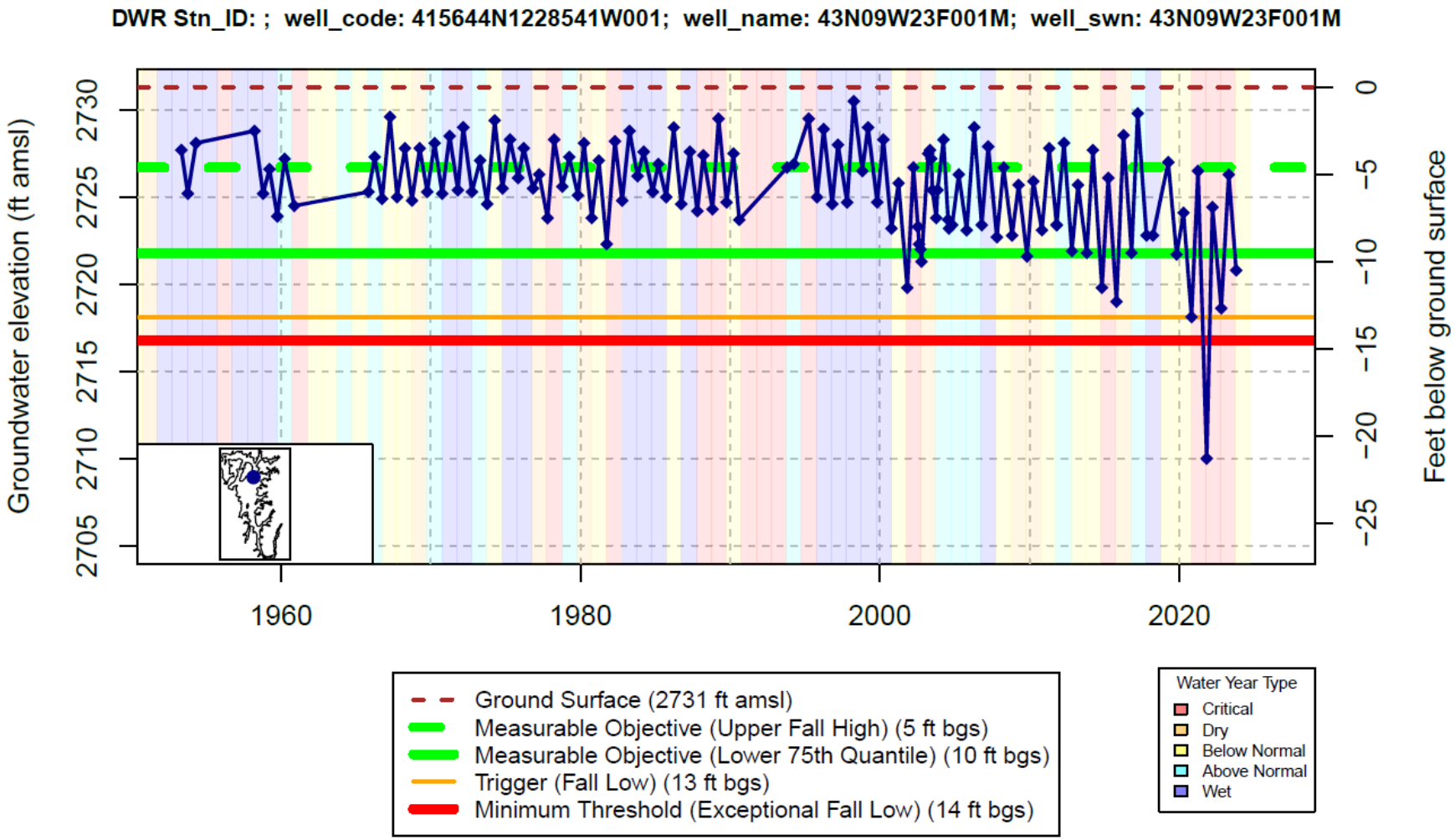

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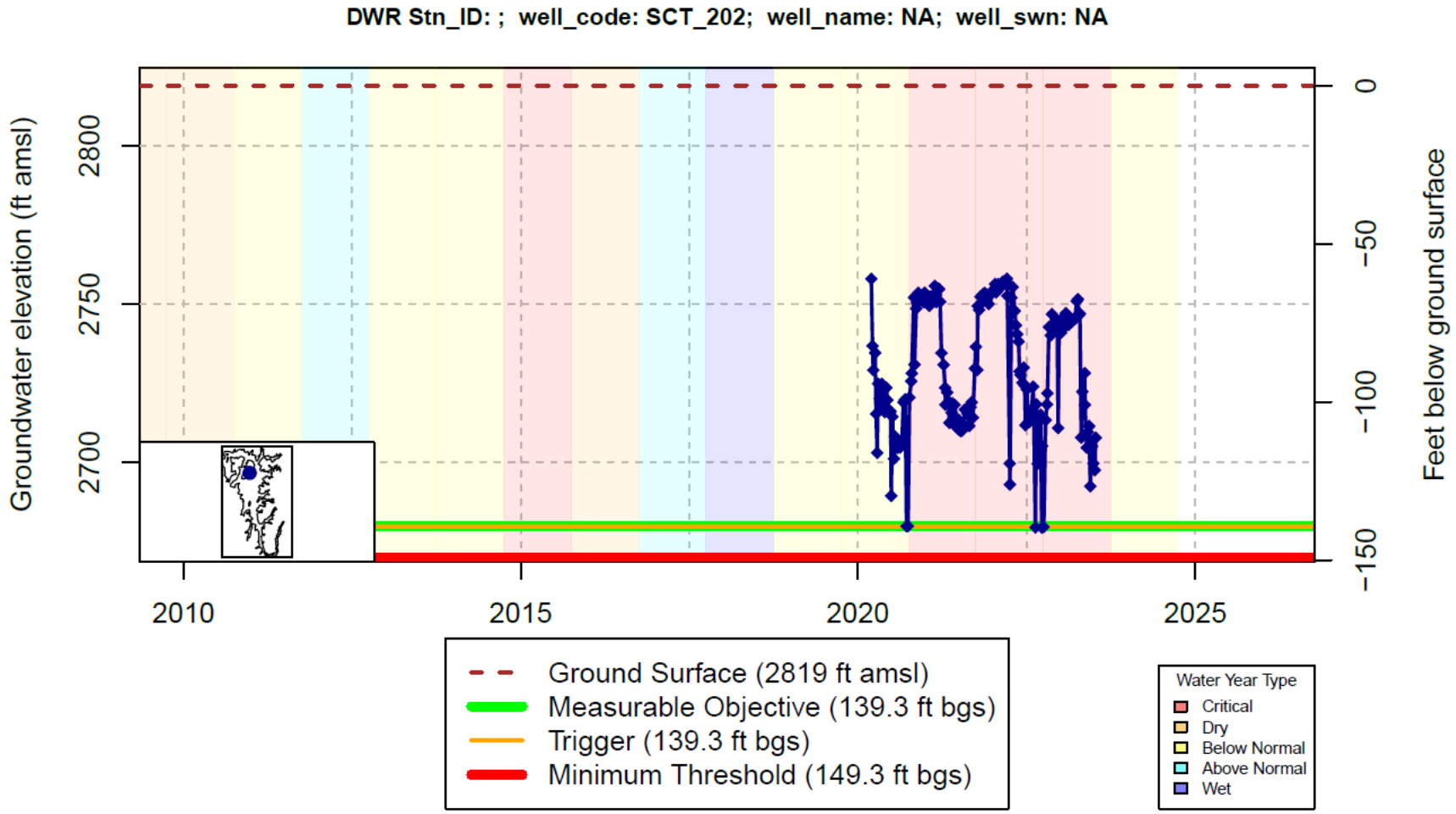

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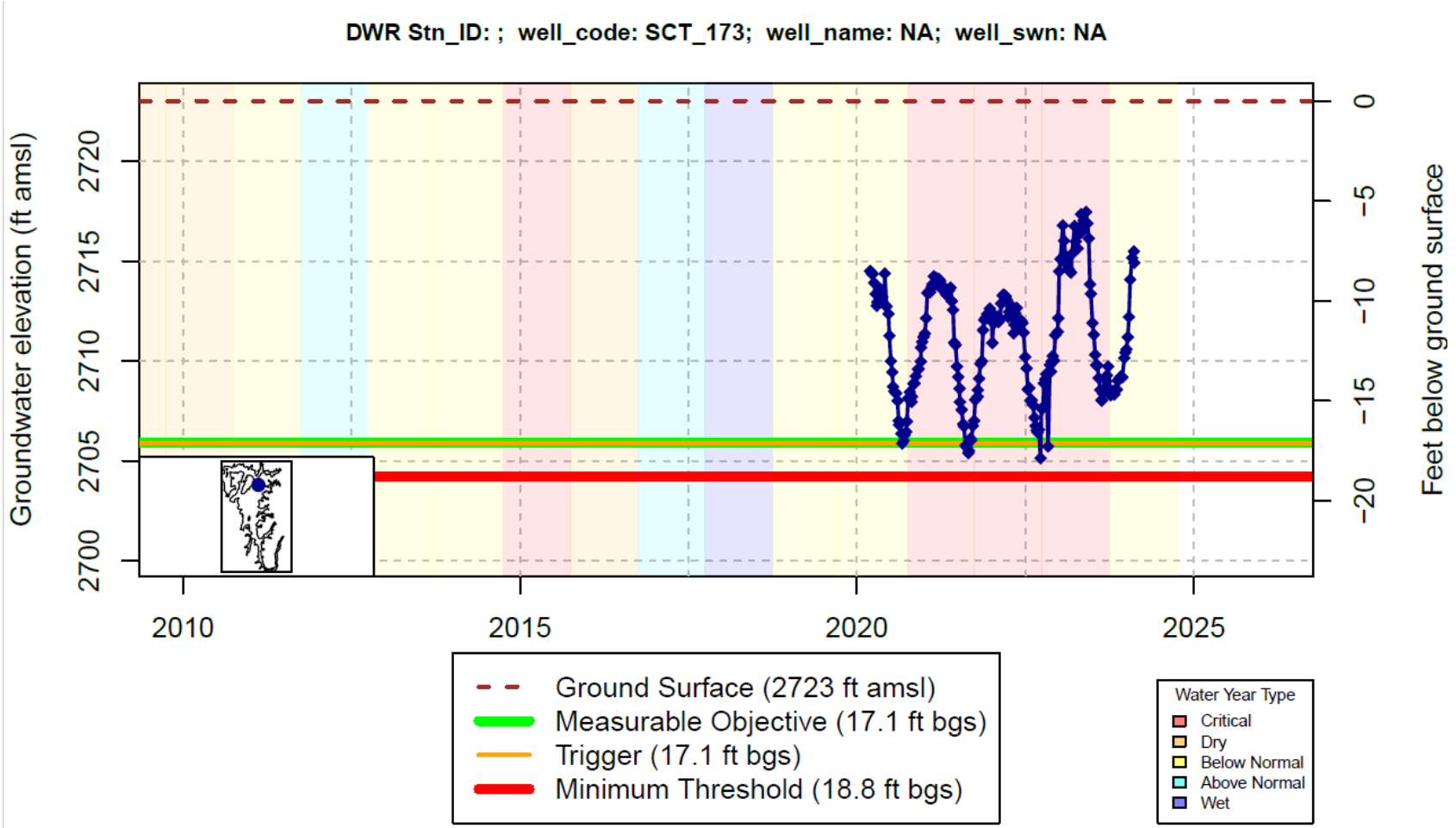

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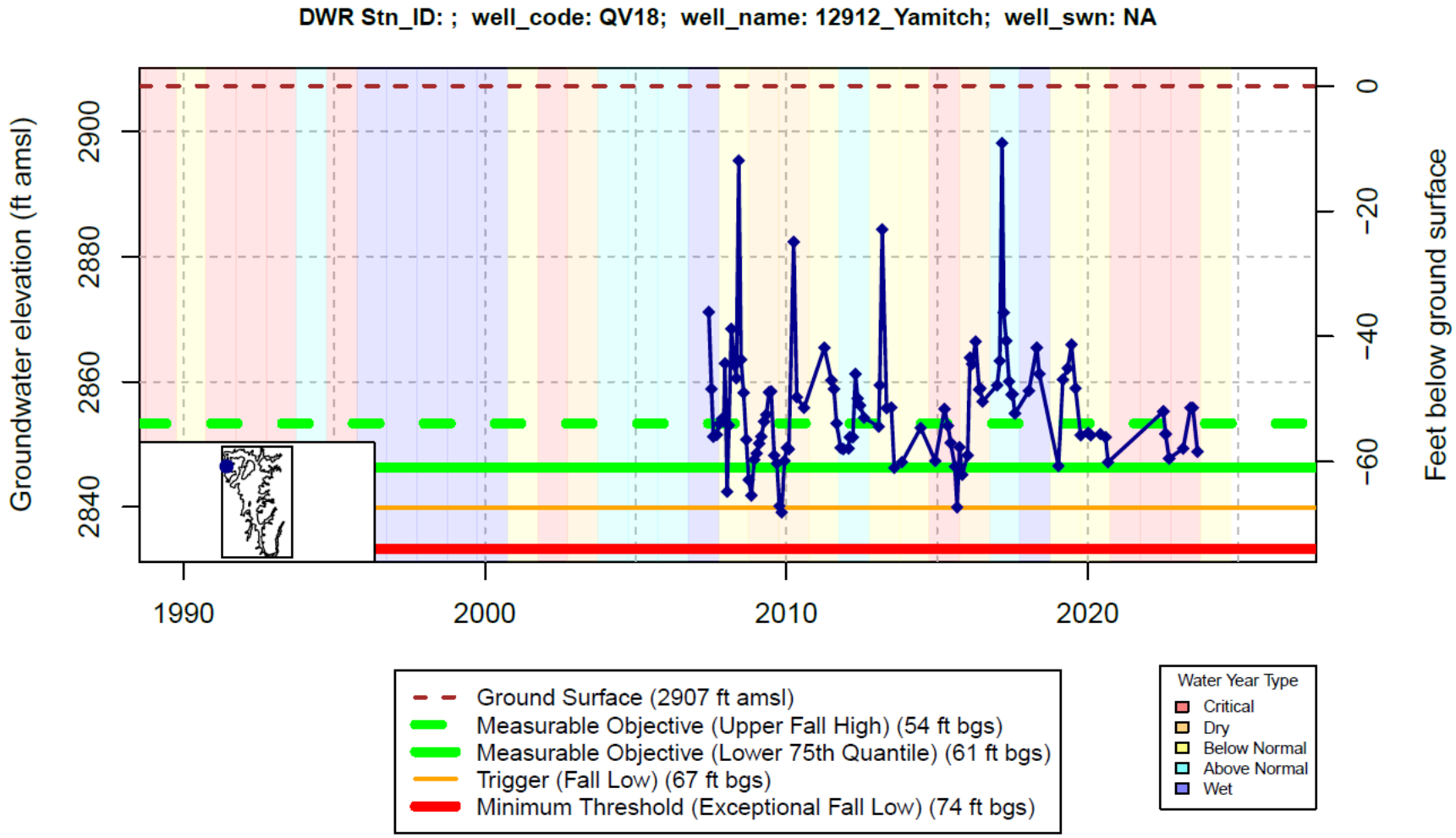

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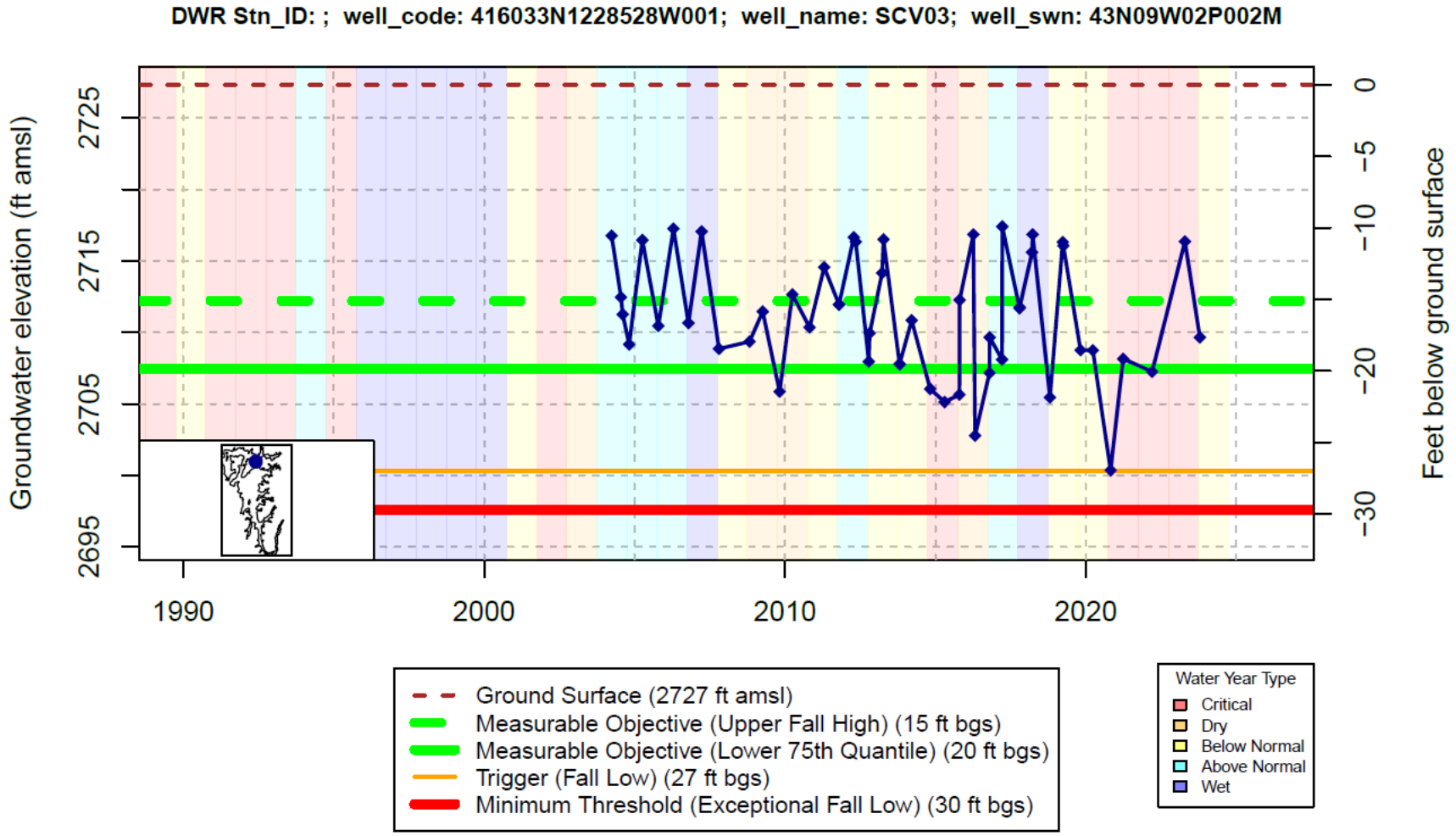

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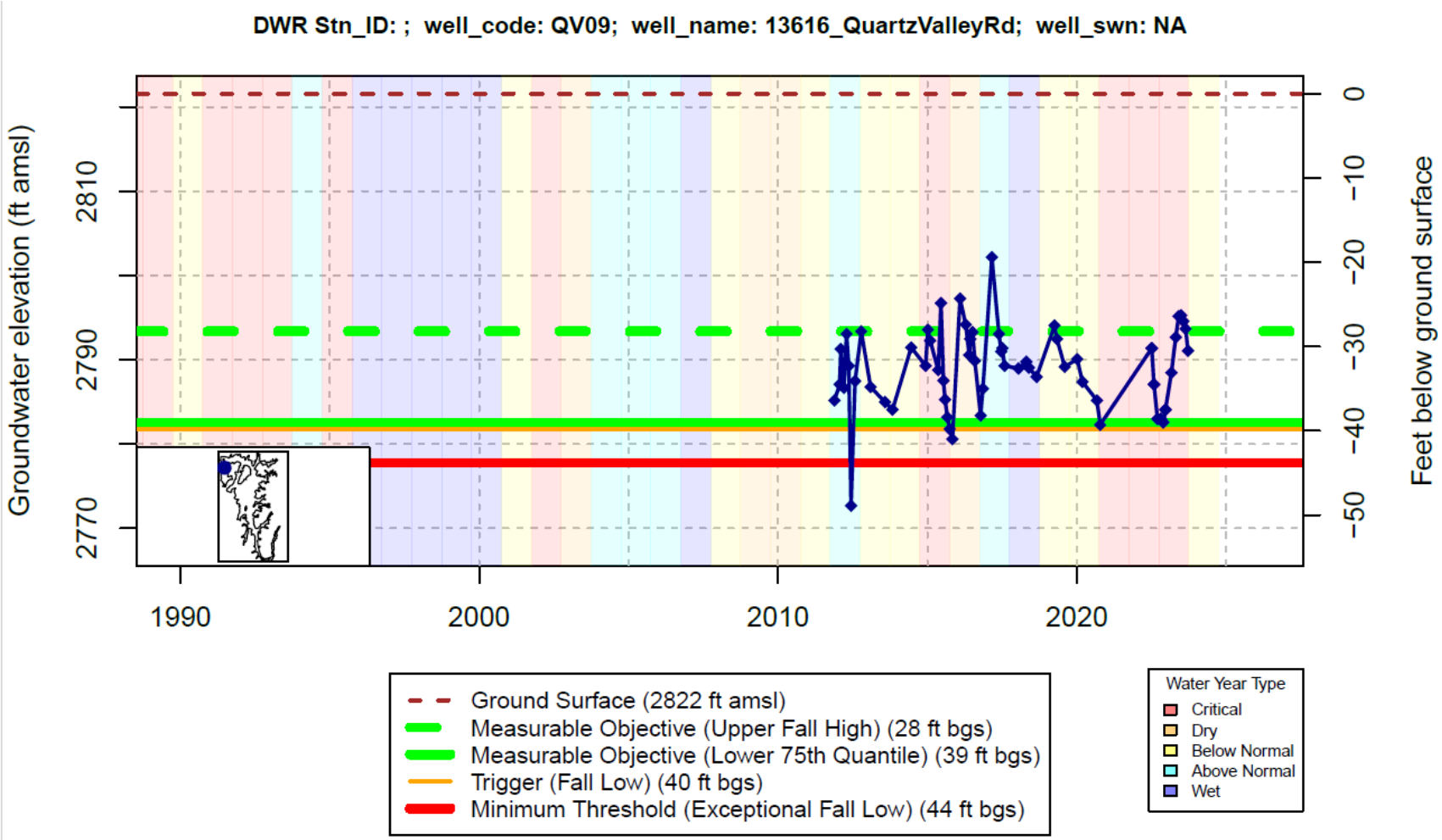

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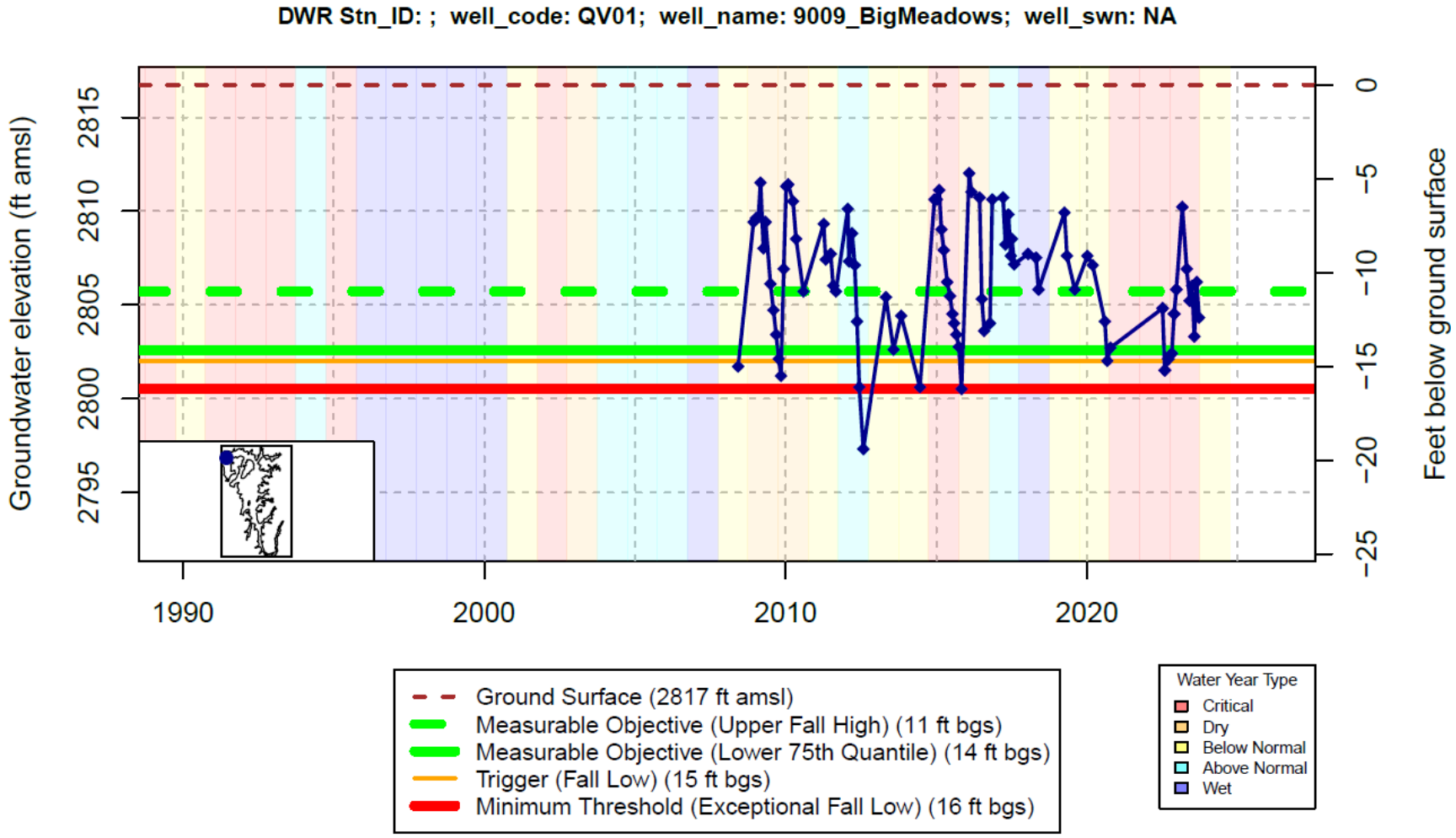

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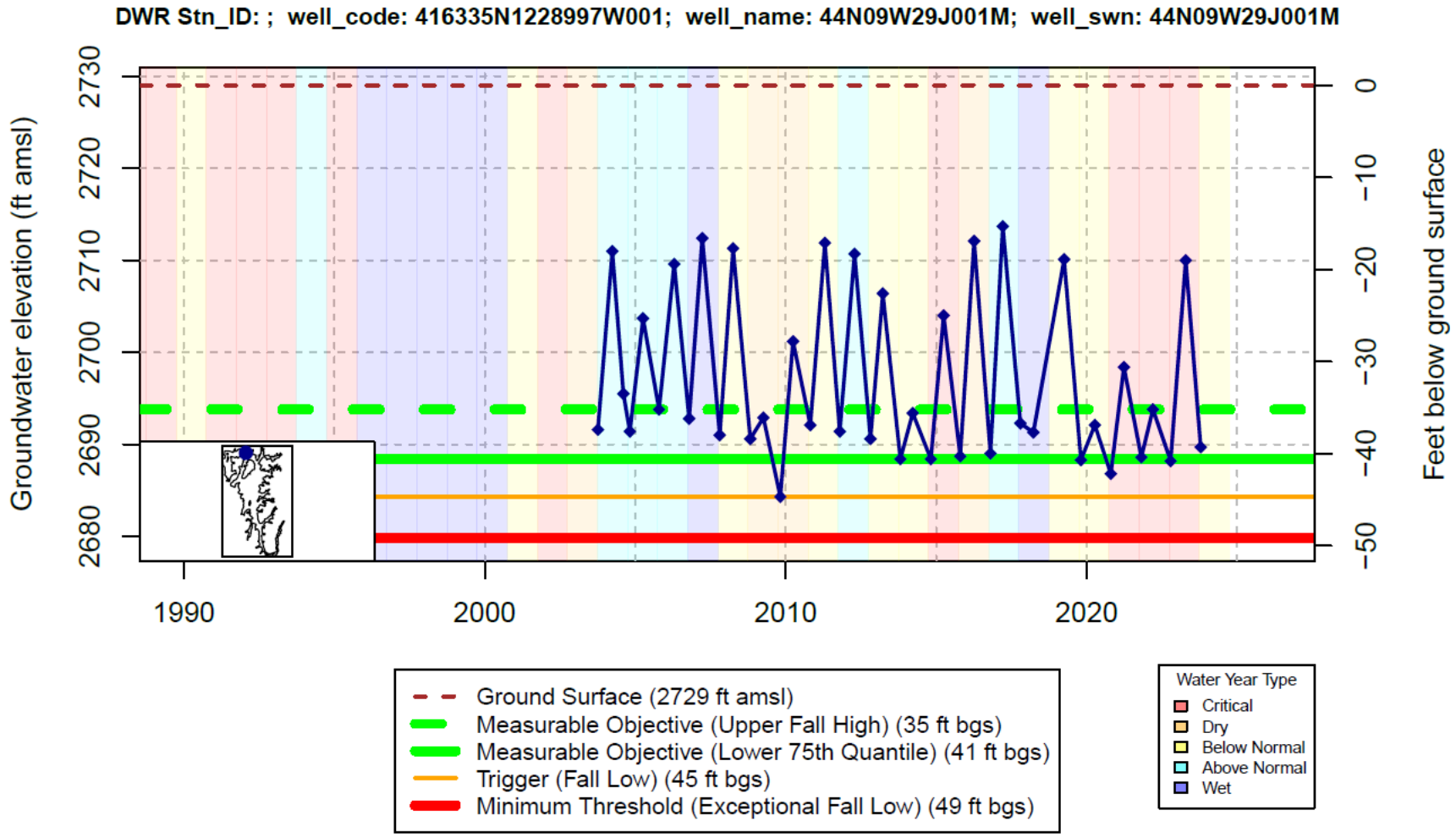

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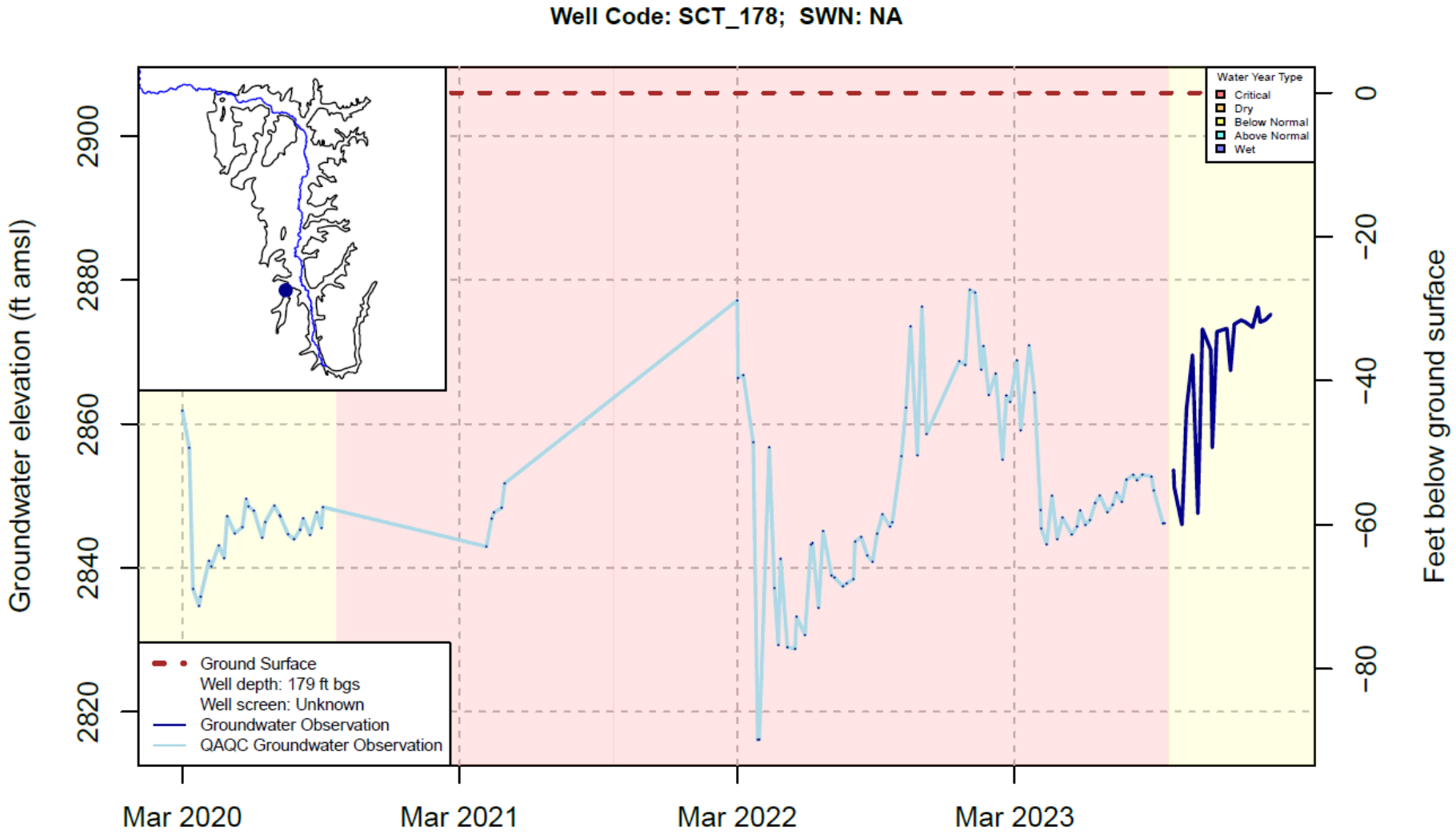
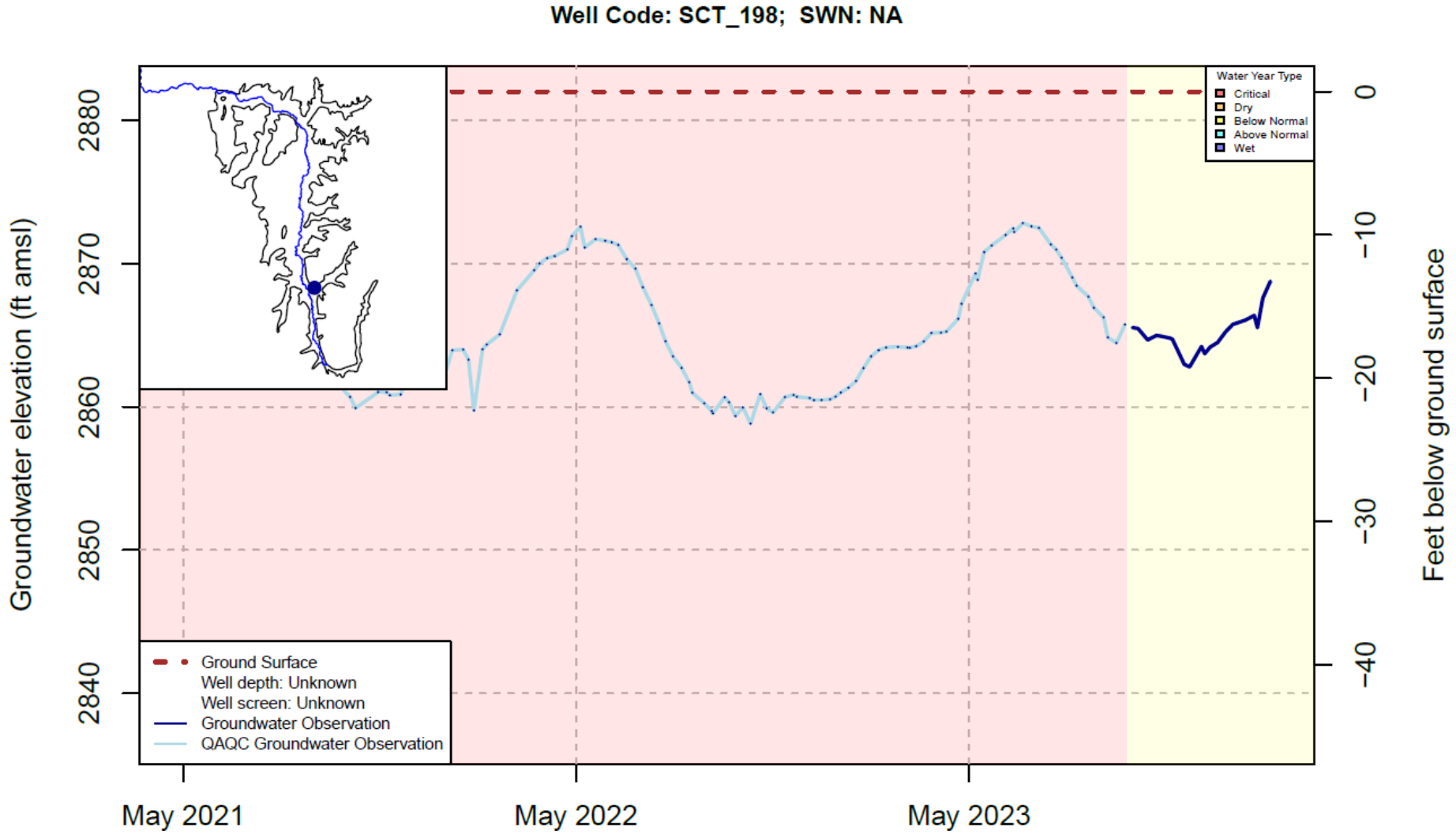


Groundwater Level Updates



Implementation Grant Funded Projects

- SGMA Compliance and GSP Updates
- Fee Study and Economic Analysis
- Well Inventory
- Irrigation Ditch Recharge Projects
- Upland Management

Implementation Approach

- Work group formation
- Work groups will oversee project design, progress, and evaluation of results
- Updates for each project will be provided to the larger group at quarterly advisory committee meetings

Timeline

2023 Q3

- Formation of work groups in August AC Meetings
- Work groups approve draft project scope and schedule
- Final grant awards expected in September

2023 Q4

- October AC Meetings- review of final funding awards
- Detailed scope and schedule for funded projects provided to Advisory Committee

2024 Q1

- February AC Meetings- updates from project work groups, updates depend on individual project schedules
- SGMA Compliance- Annual Report for WY 2023

In Progress | Added to Backlog | Complete | Blocked

Implementation Grant Progress *Through February 2024*

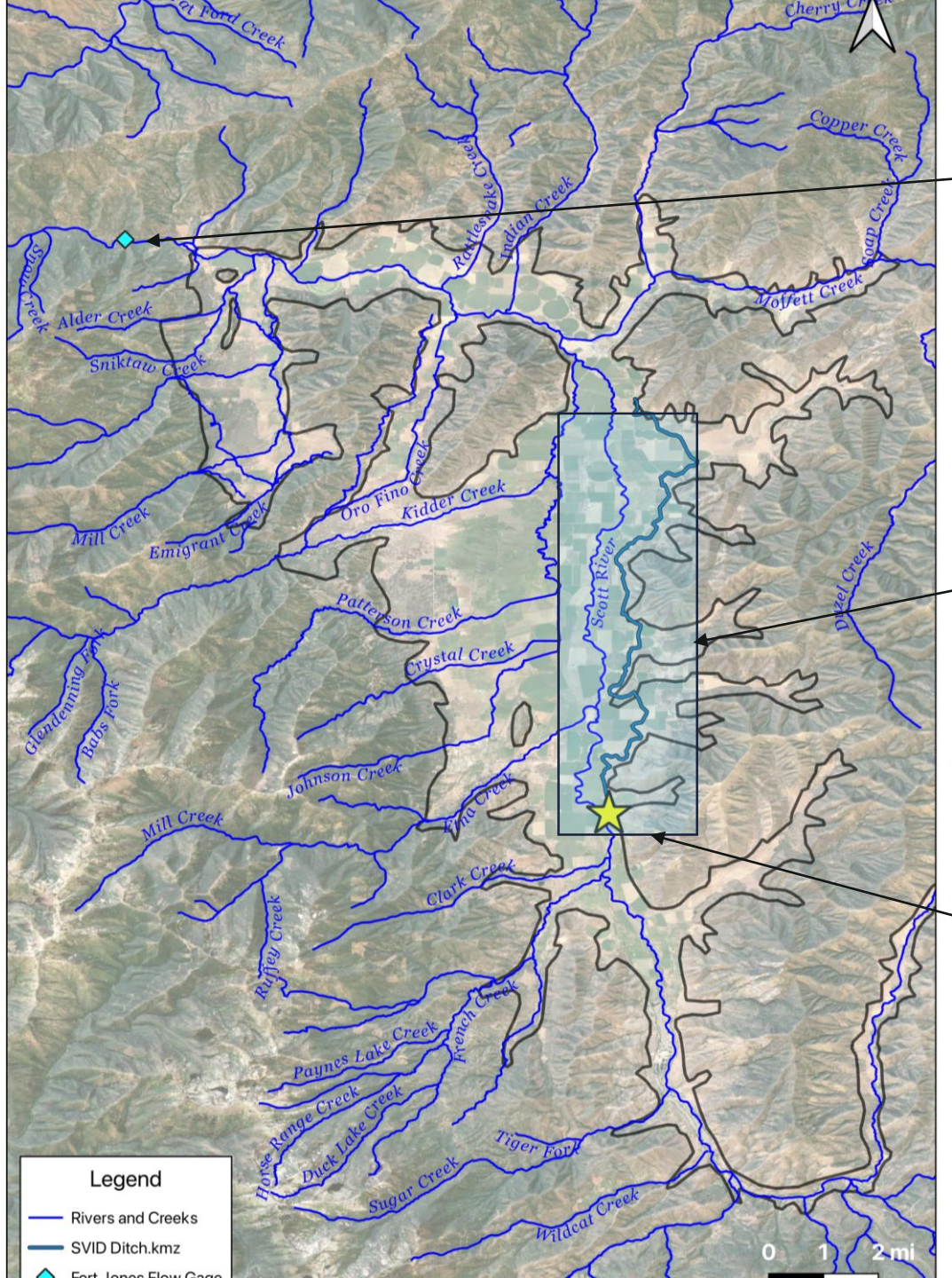
#	Component	Notes	Status
1	**SGMA Compliance and GSP Updates**		
1.1	GSP Revisions	Due January 2027	In Progress
1.2	Reporting (Data and Annual Report)	Annual Reports due April 1 of each year	In Progress
1.3	Model Updates and Scenario Evaluation		In Progress
1.4	Data Gaps and Monitoring Expansion and DMS		In Progress
2	**Fee Study and Economic Analysis**		
2.1	Evaluation of Fee/Rate Options and Schedule Development		Not Started
2.2	Parcel scale groundwater use estimate		In Progress
2.3	Economic Analysis		Not Started
3	**Well Inventory**		
3.1	Database Development and Well Risk Assessment		In Progress
3.2	Monitoring Well Construction or Well Instrumentation		Not Started
4	**Irrigation Ditch Recharge Projects**		
4.1	Planning/Permitting, Installation of Monitoring Infrastructure	Diversion permits, diversion infrastructure, flowmeters	In Progress
4.2	Monitoring and Data Analysis, Annual Diversion Reports	Biological monitoring, flow measurements, water quality	Not Started
5	**Upland Management**		
5.1	Project Planning and Environmental Documentation	Develop workplan	Not Started
5.2	Monitoring Design, Data Collection, and Data Analysis	Assess monitoring needs,	Not Started

Implementation Project Update

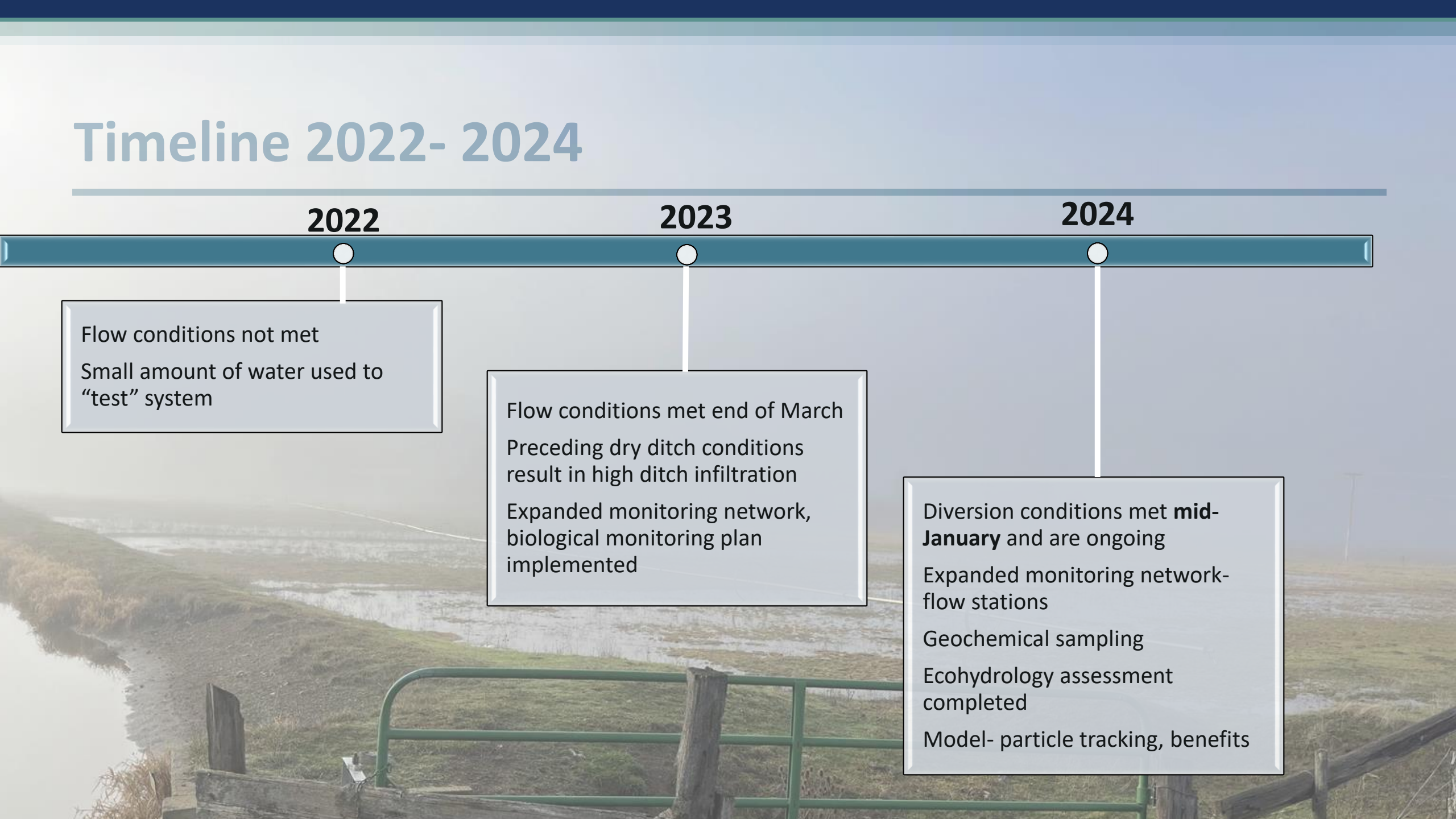
- SVID Recharge Project 2024 Update
- Ditch Infiltration Studies

SVID Recharge Project Overview

- Use existing Scott Valley Irrigation District (SVID) ditch to divert water from Scott River during periods of higher flow and apply to agricultural land for groundwater recharge
- Diversion period January through March in current permits
- Long-term implementation to understand:
  - Results under different conditions/ water year types
  - Potential longer-term benefits of groundwater recharge
- **Evaluate impact to instream flows, particularly in the late summer and fall**



Timeline 2022- 2024



2022

Flow conditions not met

Small amount of water used to "test" system

2023

Flow conditions met end of March

Preceding dry ditch conditions result in high ditch infiltration

Expanded monitoring network, biological monitoring plan implemented

2024

Diversion conditions met **mid-January** and are ongoing

Expanded monitoring network- flow stations

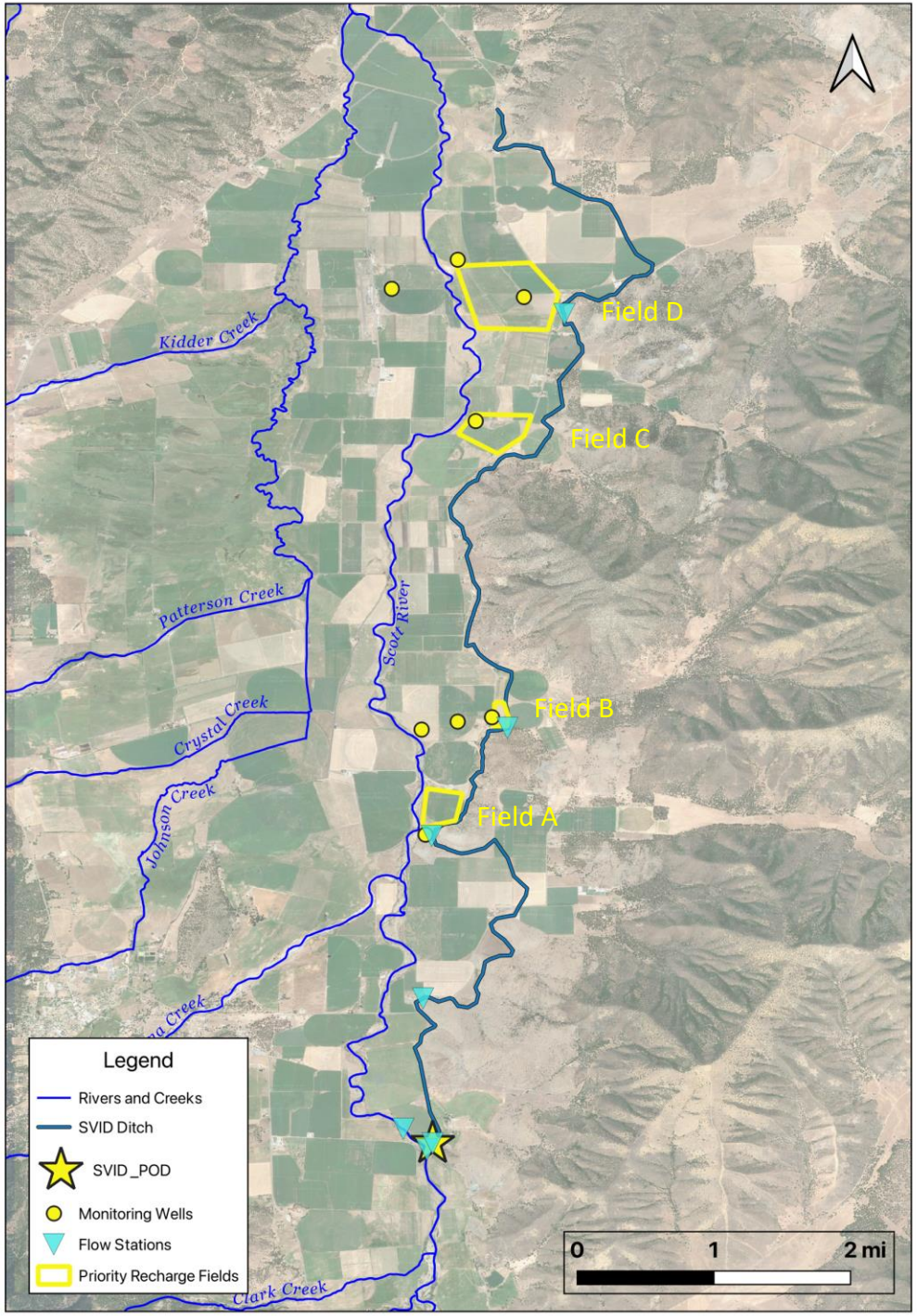
Geochemical sampling

Ecohydrology assessment completed

Model- particle tracking, benefits

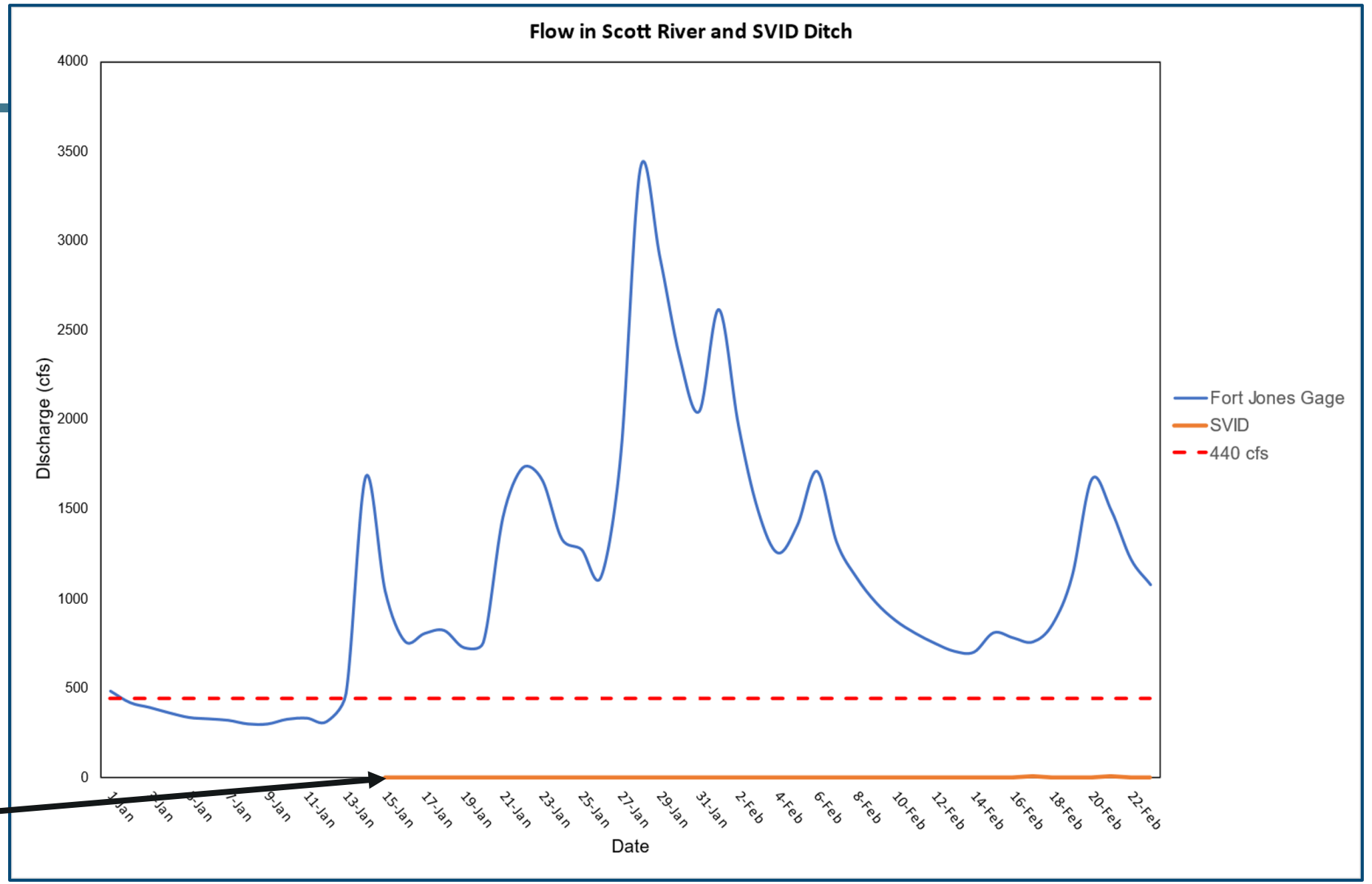
Monitoring, 2024 Update

- Evaluate recharge from water applied to fields AND due to infiltration along the ditch
- 8 groundwater wells in recharge project area
- Temperature sensors
- 2 flow stations in Scott River
- 5 flow stations along the ditch
- Biological Monitoring (throughout recharge period)
- Geochemical eight sites (surface and groundwater) for: isotopes, major ions, radon
  - Use to better understand recharge dynamics, as natural tracers for the movement of water



2024 Flow

Flow diverted to SVID ditch at the point of diversion (POD), Young's Dam is a fraction of flow measured at the Fort Jones USGS gage.



Diversion started January 15, 2024

2024 Timeline

1 Jan. – 31 Mar.

Maximum potential recharge period January 1st through March 31st

15 Jan. 2024

Diversions at Young's Dam (point of diversion) commence

15 Jan. 2024

Water starts to be applied to **Field B** for recharge

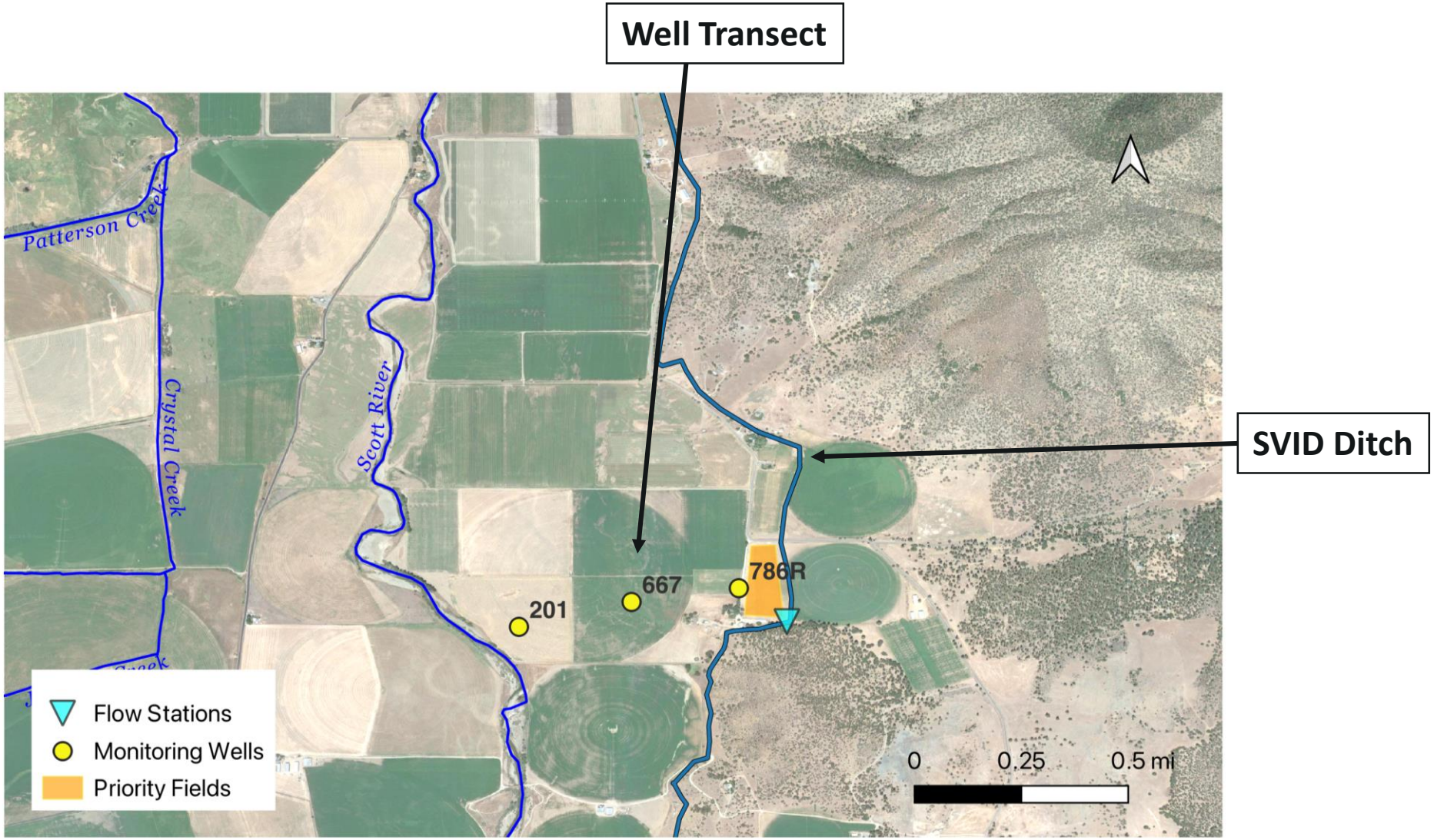
9 Feb. 2024

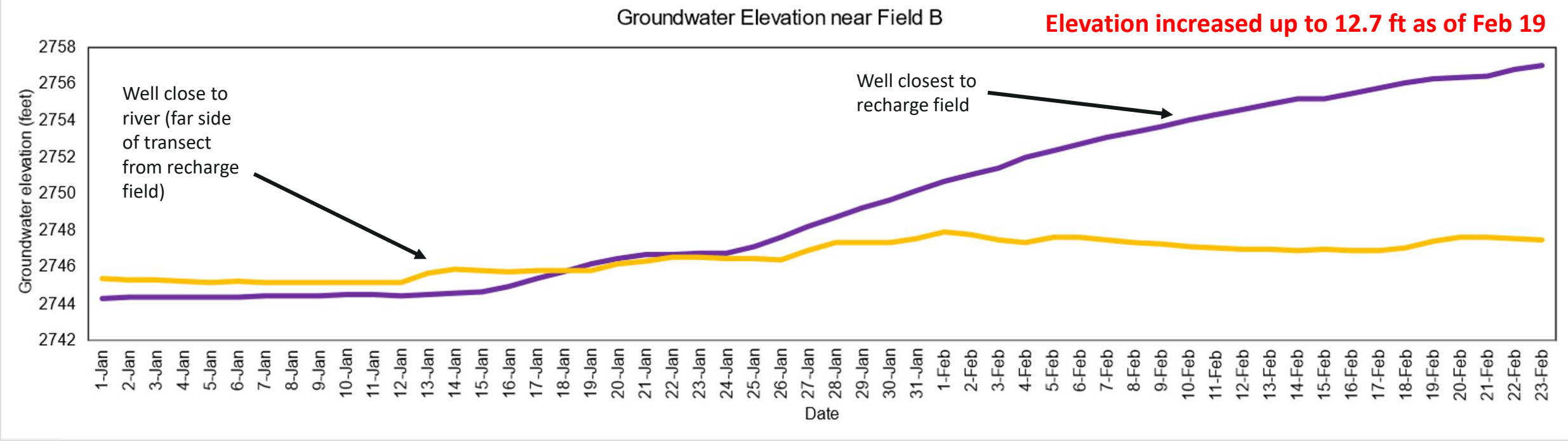
Water starts to be applied to **Field C** for recharge

16 Feb. 2024

Water starts to be applied to **Field D** for recharge

Continuous Data Snapshot at Field B




Groundwater Elevation near Field B
Elevation increased up to 12.7 ft as of Feb 19
Well close to river (far side of transect from recharge field)
Well closest to recharge field
Groundwater elevation (feet)
2758
2756
2754
2752
2750
2748
2746
2744
2742
1-Jan
2-Jan
3-Jan
4-Jan
5-Jan
6-Jan
7-Jan
8-Jan
9-Jan
10-Jan
11-Jan
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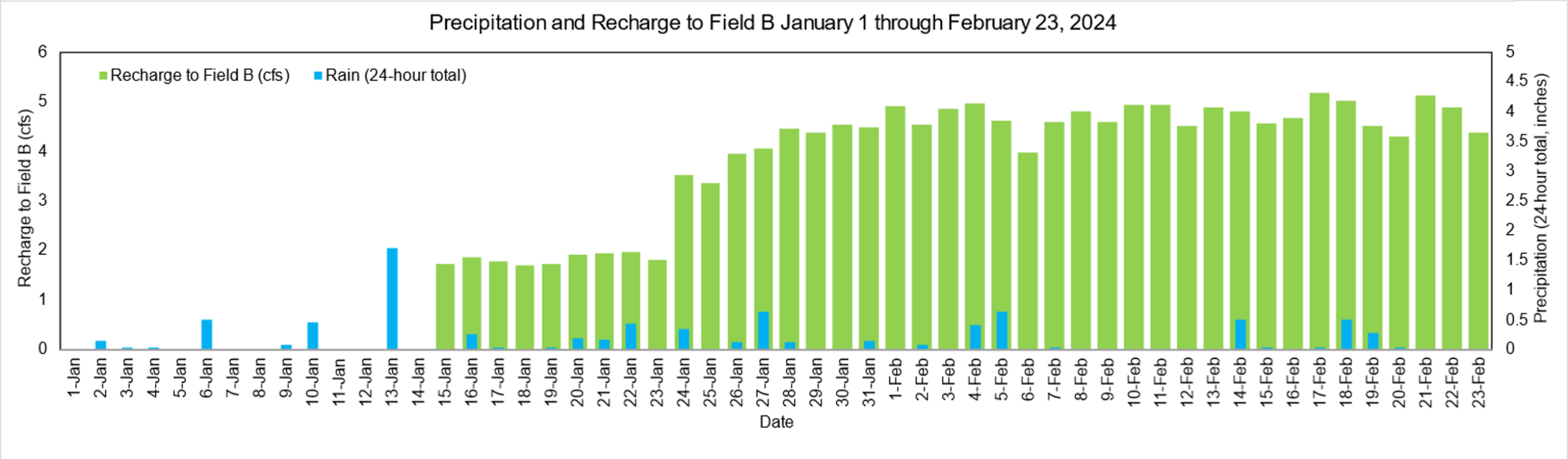
Date


Precipitation and Recharge to Field B January 1 through February 23, 2024
Recharge to Field B (cfs)
Rain (24-hour total)
Recharge to Field B (cfs)
6
5
4
3
2
1
0
Precipitation (24 hour total, inches)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
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2-Jan
3-Jan
4-Jan
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7-Jan
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22-Feb
23-Feb
Date

What does this look like year-by-year?

Modelled Benefits- Streamflow Depletion Reversal

Scenario Type	Scenario ID	Scenario Depletion Reversal, Sep-Nov '91-'18 (TAF)	Relative Depletion Reversal, Sep-Nov '91-'18
	MAR (Managed Aquifer Recharge) in Jan-Mar	13	10%

Scenario depletion reversal (average/year) = **464 AF**

On-Farm Recharge so far:

2024 cumulative on-farm recharge ~ **280 AF**

Still need to consider:

1. Still need to consider the rest of the recharge period
2. Water recharged through ditch infiltration

Total Volume Recharged in 2024 through SVID Recharge Project

SVIHM

Depletion Reversal achieved in 2024 due to MAR

Ditch Infiltration Studies

- Role of ditch infiltration in groundwater recharge in Scott Valley
- Uses existing, unlined ditches in Scott Valley
- Combination of modelled, physical (flow, groundwater level), and geochemical sampling
- Where are we now?
- Started with one location:
  - Designed Monitoring Network
  - Geochemical Sampling Plan
  - Baseline Measurements

Sampling Conducted and Results

- Sample Collection for:
  - Radon
  - Major Ions
  - Isotopes
  - Field measurements

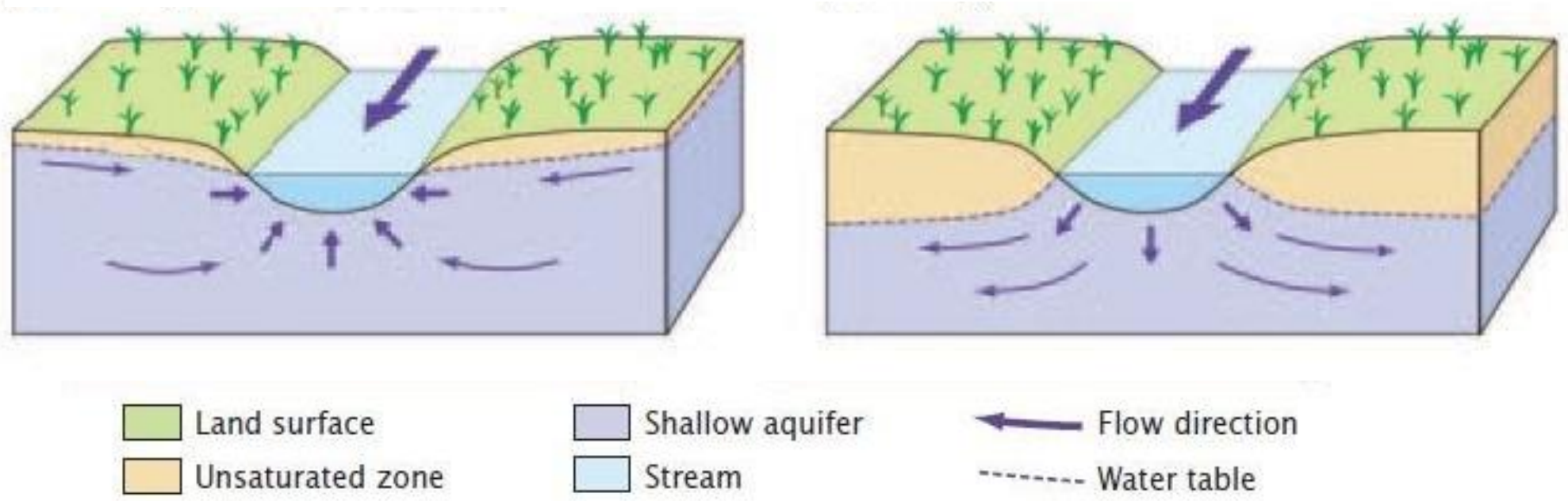
Radon Activity in Gaining vs. Losing Streams

Gaining Stream

High Radon Activity due to Localized Groundwater Influx

Losing Stream

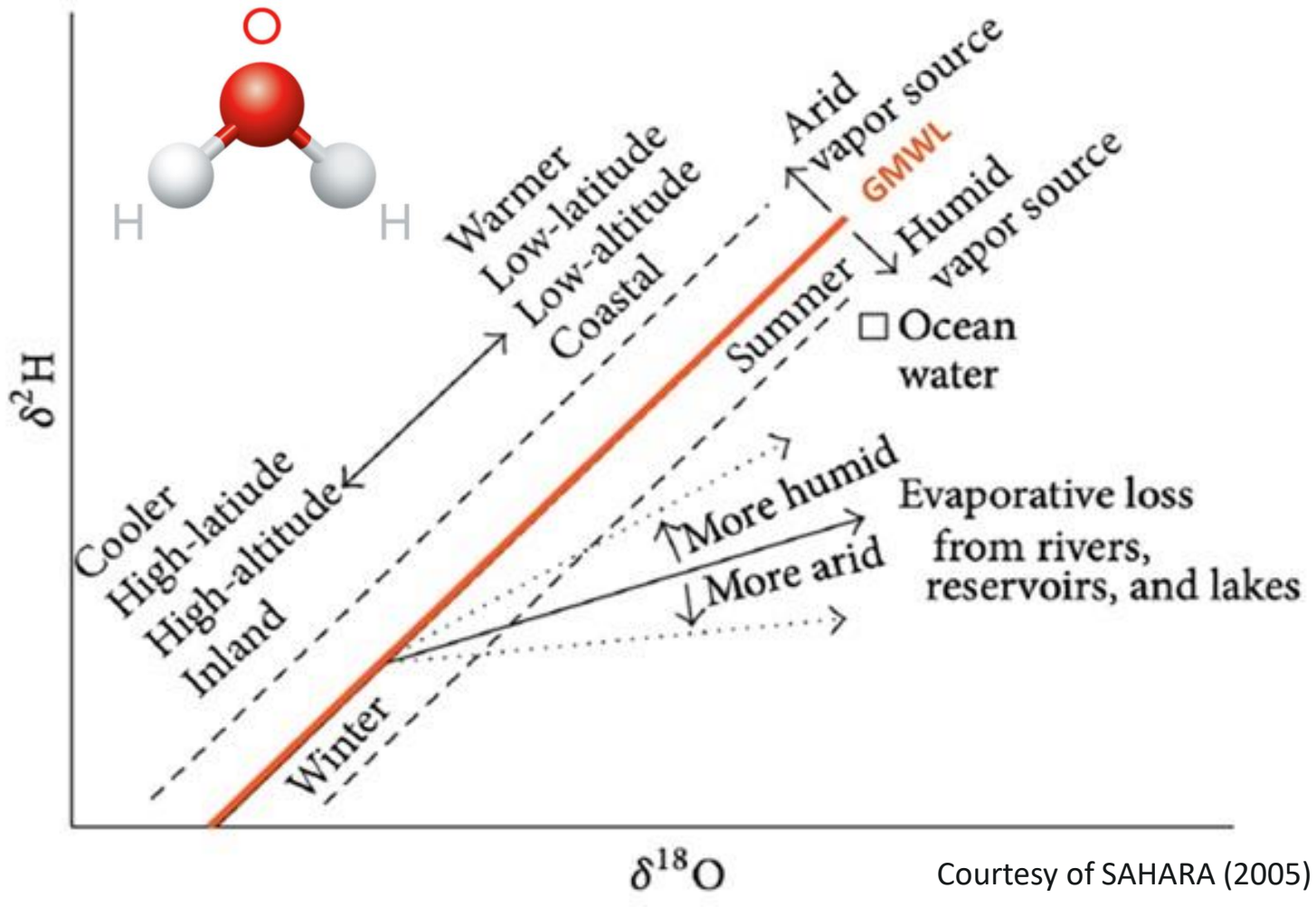
Low Radon Activity due to Degassing, Decay, and Groundwater Recharge



Adapted from Berthane (2015)

Water Isotopes

- Water molecules have different masses depending on which O, H isotopes they contain
  - $\delta^{18}O$ and δD, normalized ratio of heavy to light isotopes
- Hydrological processes separate out or 'fractionate' water molecules depending on mass
- **Different water sources have naturally distinct isotopic signatures**



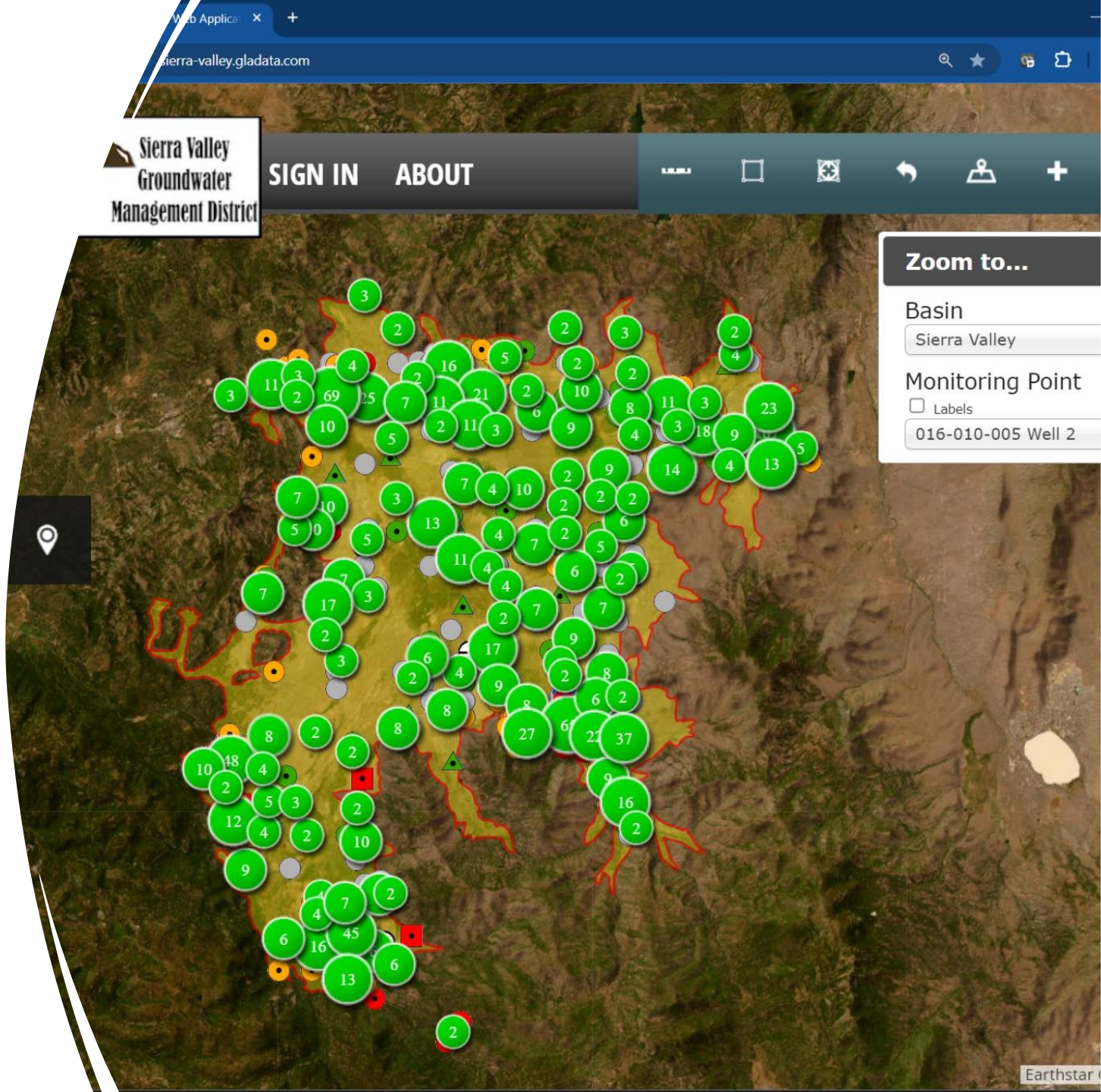
Courtesy of SAHARA (2005)

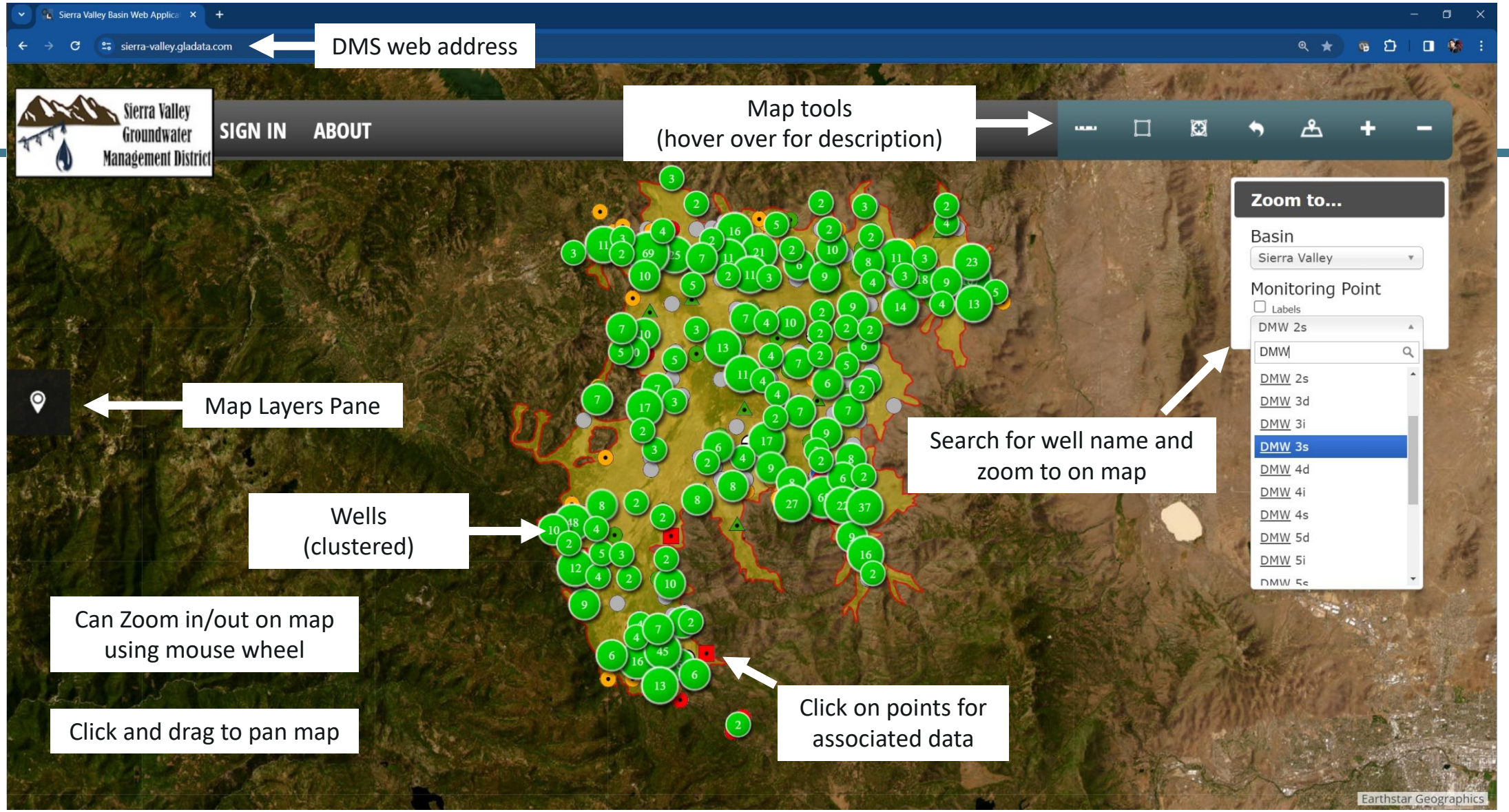
Data SGMA Data Management System (DMS)

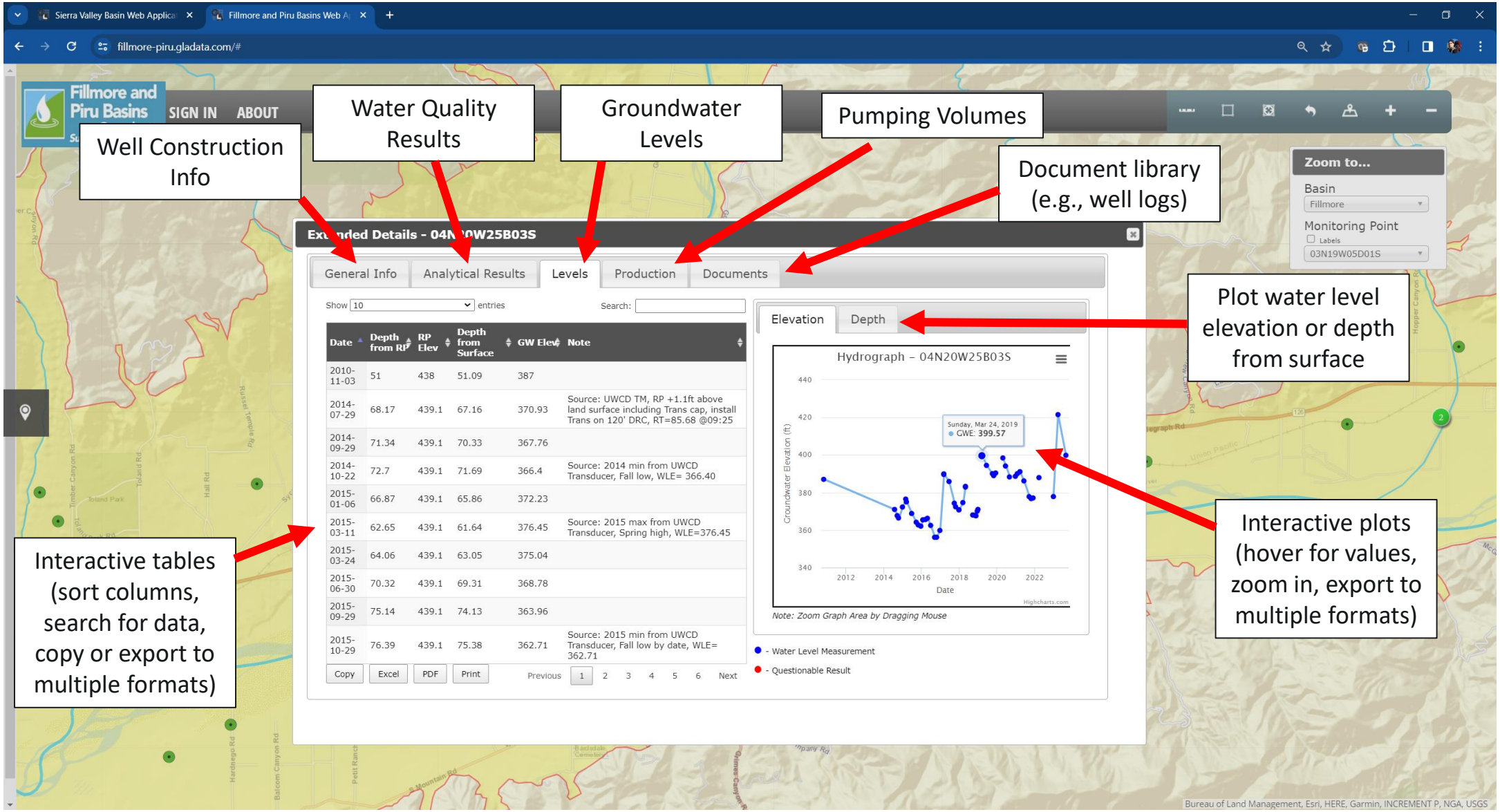
- Provides an effective and affordable option for storing, visualizing, and managing basin data.

- Web accessible, map-based user interface (front end).

- SQL-server relational database (backend).

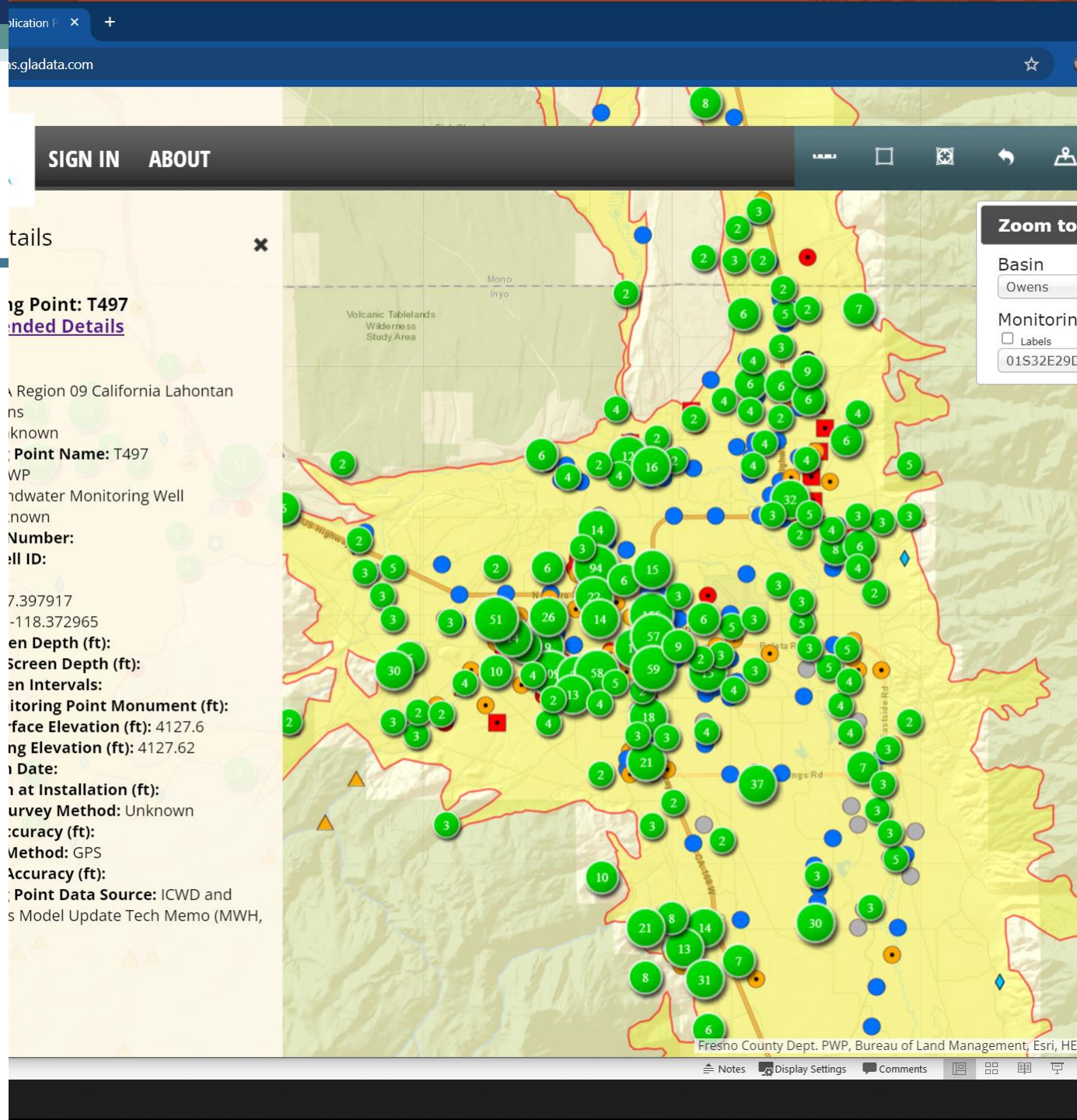


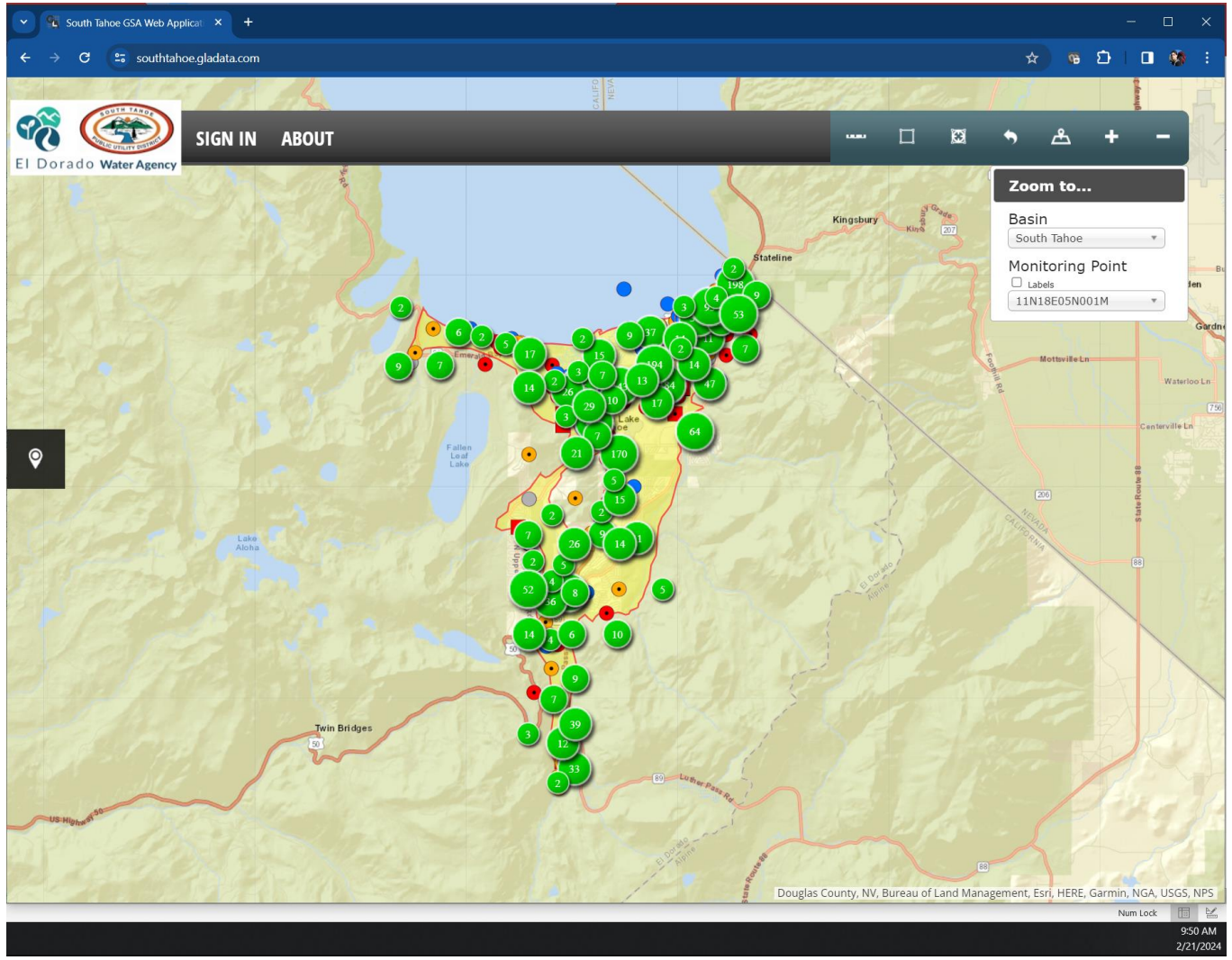

DMS web address
sierra-valley.gladata.com
Sierra Valley Groundwater Management District
SIGN IN
ABOUT
Map tools
(hover over for description)
Zoom to...
Basin
Sierra Valley
Monitoring Point
Labels
DMW 2s
DMW
DMW 2s
DMW 3d
DMW 3i
DMW 3s
DMW 4d
DMW 4i
DMW 4s
DMW 5d
DMW 5i
Search for well name and zoom to on map
Map Layers Pane
Wells
(clustered)
Can Zoom in/out on map using mouse wheel
Click and drag to pan map
Click on points for associated data
Earthstar Geographics


Sierra Valley Basin Web Applica
Fillmore and Piru Basins Web A
fillmore-piru.gladata.com/#
Fillmore and Piru Basins
SIGN IN
ABOUT
Well Construction Info
Water Quality Results
Groundwater Levels
Pumping Volumes
Document library (e.g., well logs)
Zoom to...
Basin
Fillmore
Monitoring Point
Labels
03N19W05D01S
Extended Details - 04N20W25B03S
General Info
Analytical Results
Levels
Production
Documents
Show 10 entries
Search:
Date
Depth from RP
RP Elev
Depth from Surface
GW Elev
Note
2010-11-03 51 438 51.09 387
2014-07-29 68.17 439.1 67.16 370.93 Source: UWCD TM, RP +1.1ft above land surface including Trans cap, install Trans on 120' DRC, RT=85.68 @09:25
2014-09-29 71.34 439.1 70.33 367.76
2014-10-22 72.7 439.1 71.69 366.4 Source: 2014 min from UWCD Transducer, Fall low, WLE= 366.40
2015-01-06 66.87 439.1 65.86 372.23
2015-03-11 62.65 439.1 61.64 376.45 Source: 2015 max from UWCD Transducer, Spring high, WLE=376.45
2015-03-24 64.06 439.1 63.05 375.04
2015-06-30 70.32 439.1 69.31 368.78
2015-09-29 75.14 439.1 74.13 363.96
2015-10-29 76.39 439.1 75.38 362.71 Source: 2015 min from UWCD Transducer, Fall low by date, WLE= 362.71
Copy
Excel
PDF
Print
Previous 1 2 3 4 5 6 Next
Elevation
Depth
Hydrograph – 04N20W25B03S
Groundwater Elevation (ft)
Date
Sunday, Mar 24, 2019
GWE: 399.57
Note: Zoom Graph Area by Dragging Mouse
- Water Level Measurement
- Questionable Result
Plot water level elevation or depth from surface
Interactive tables (sort columns, search for data, copy or export to multiple formats)
Interactive plots (hover for values, zoom in, export to multiple formats)
Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, NGA, USGS

SGMA DMS

- Provides a single location to easily store, access, and visualize basin data.
- Simplifies SGMA data management
- Increases data transparency
- Customizable





Active SGMA DMS Systems

- https://sierra-valley.gladata.com
- https://fillmore-piru.gladata.com
- https://owens.gladata.com
- https://bigvalley.gladata.com
- https://southtahoe.gladata.com

Scott PRMS Update

- Extended model to the end of WY2023
- Implemented automatic updates with R scripting for extending the model in the future
- Currently updating the calibration
  - Incorporated NLDAS data for calibrating solar radiation and potential evapotranspiration
    - NASA North American Land Data Assimilation System (NLDAS)
  - Calibrating to new daily surface water diversion estimates from SVIHM
    - Monthly estimates previously
  - Updating deep recharge based on SVIHM and past study estimates

SVIHM Update

- Extended model period through end of 2023 - ongoing monthly updates now possible
- Moved streamflow to daily (to better capture storm peaks)
- Developed model results to explore impacts of Local Cooperative Solutions program

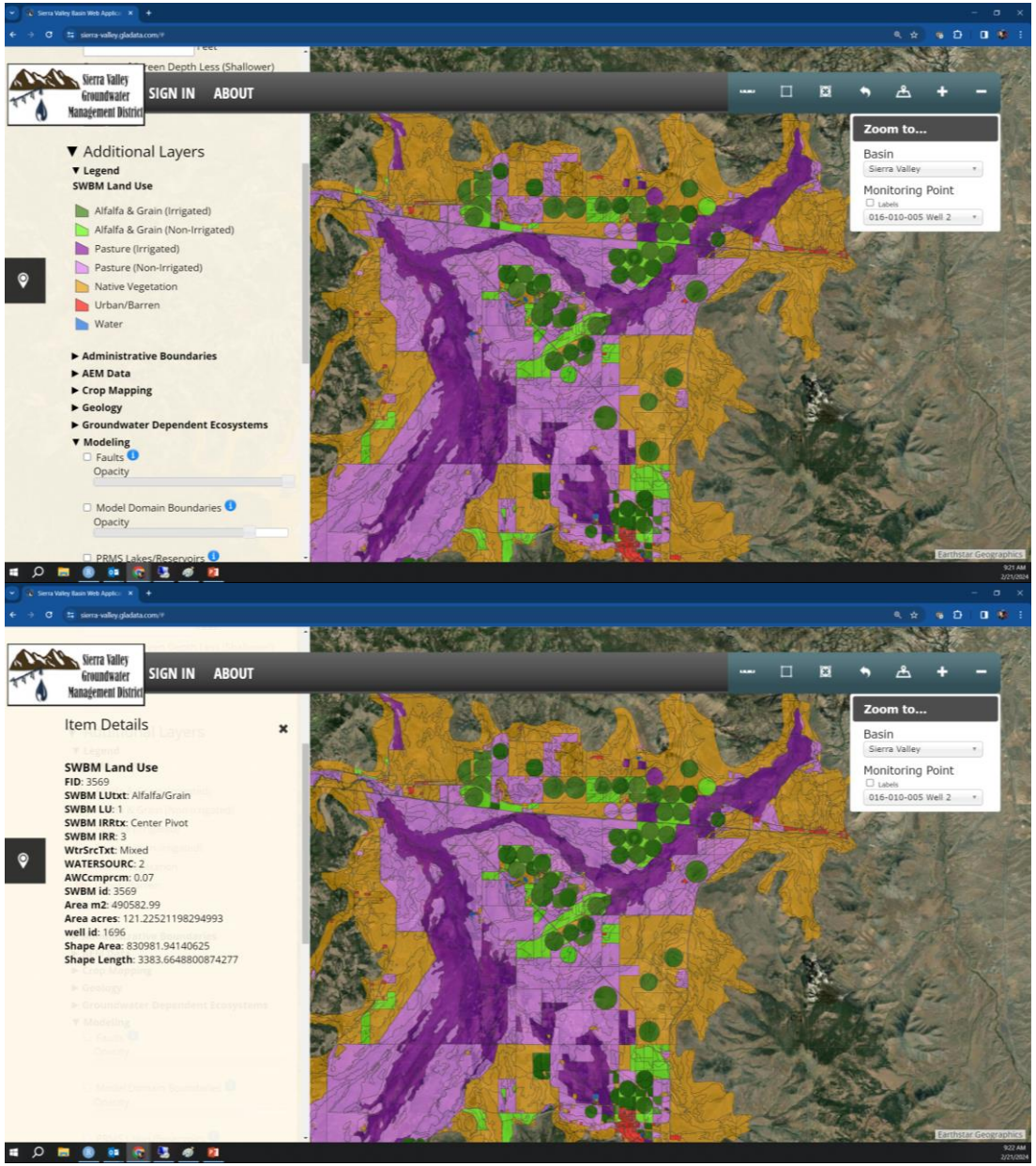
Upcoming Irrigation Efficiency Workshop

- “Workshop on Efficient Water Management for Forage Crops”
- Wednesday March 13th, 1-5pm, Montague Community Hall
- UC Davis, UC ANR, Tehama County RCD, LWA, Siskiyou County, Tulelake Irrigation District
- Free Registration: https://mailchi.mp/181f31fc2c0f/march13


LWA
Thank You

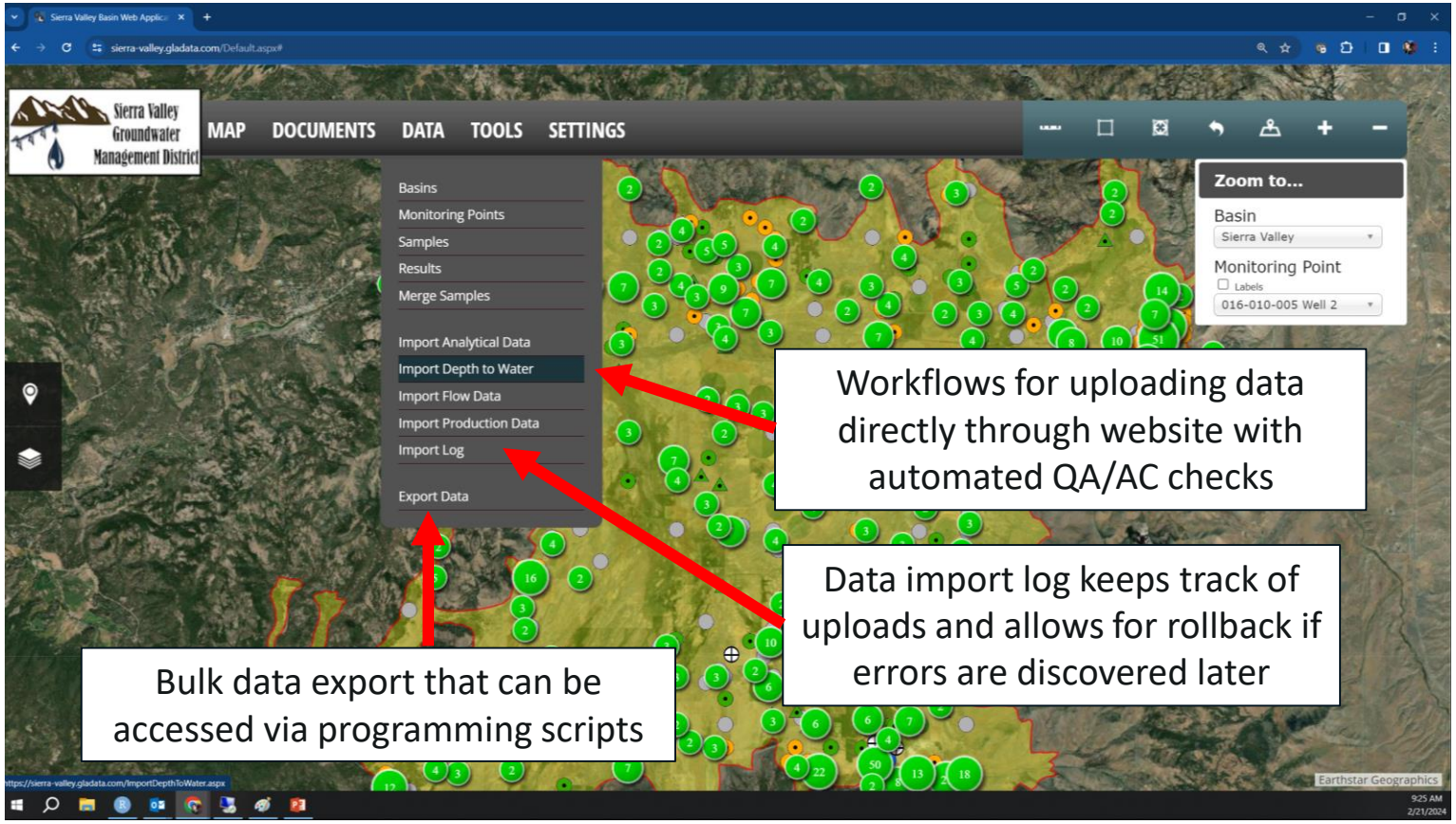
Display publicly available or custom spatial layers (e.g., land use, irrigation type, soil type)

Clicking on feature brings up attribute table information

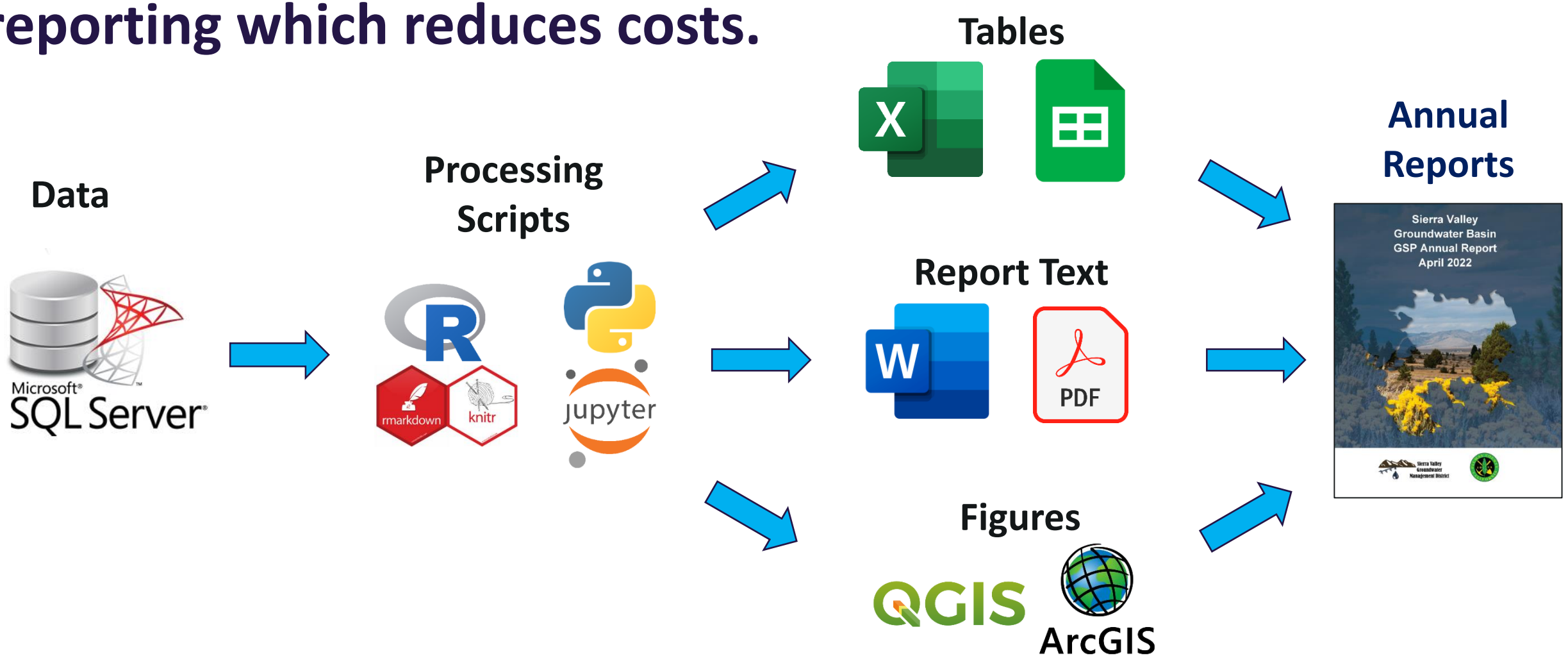


Advanced features available for authorized users

4 credential levels are available with varying access to functionality



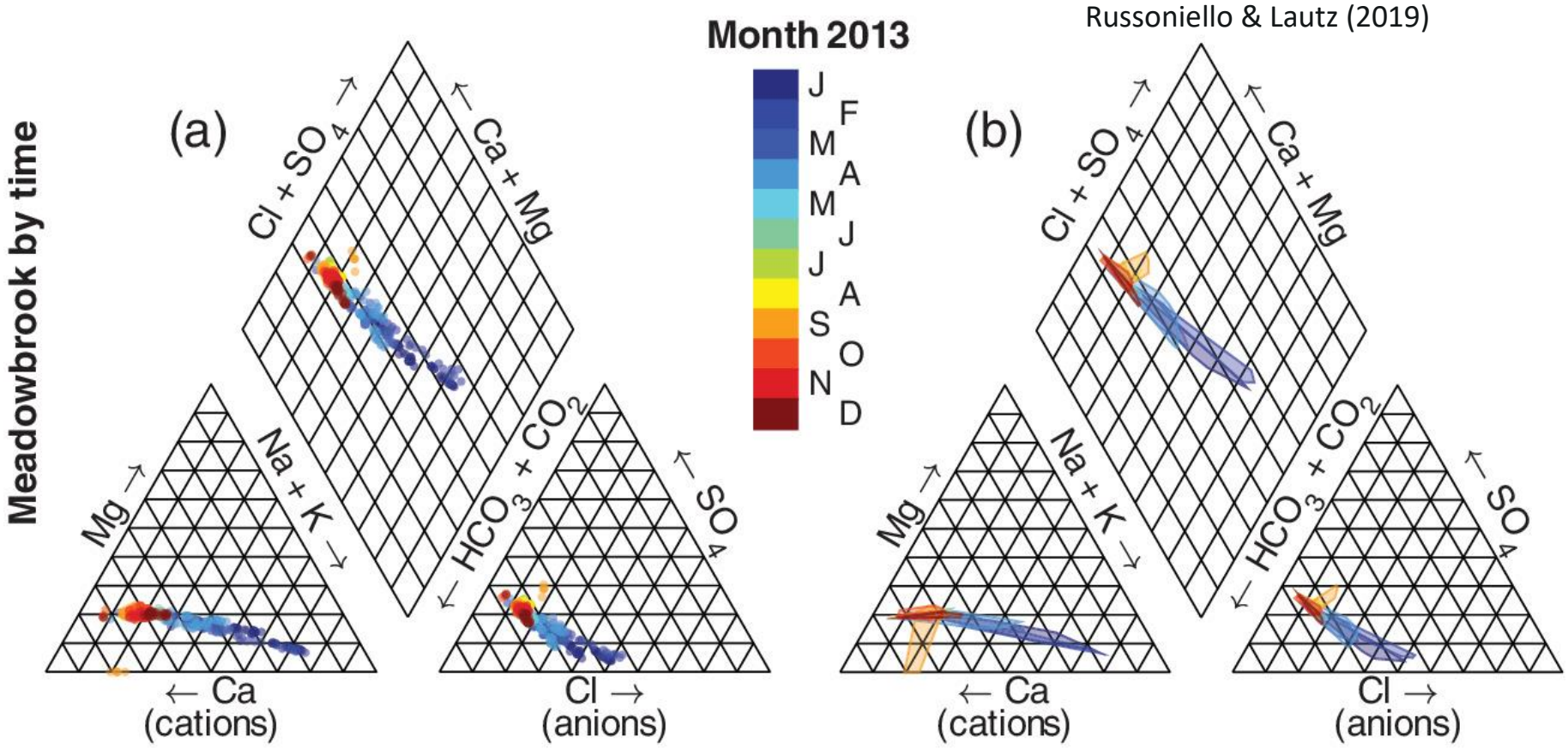
DMS has been leveraged to automate tasks for routine reporting which reduces costs.



Major Ions

- Water naturally acquires ions from rock weathering and aerosols
- Can be used to distinguish different water sources, and mixing among source

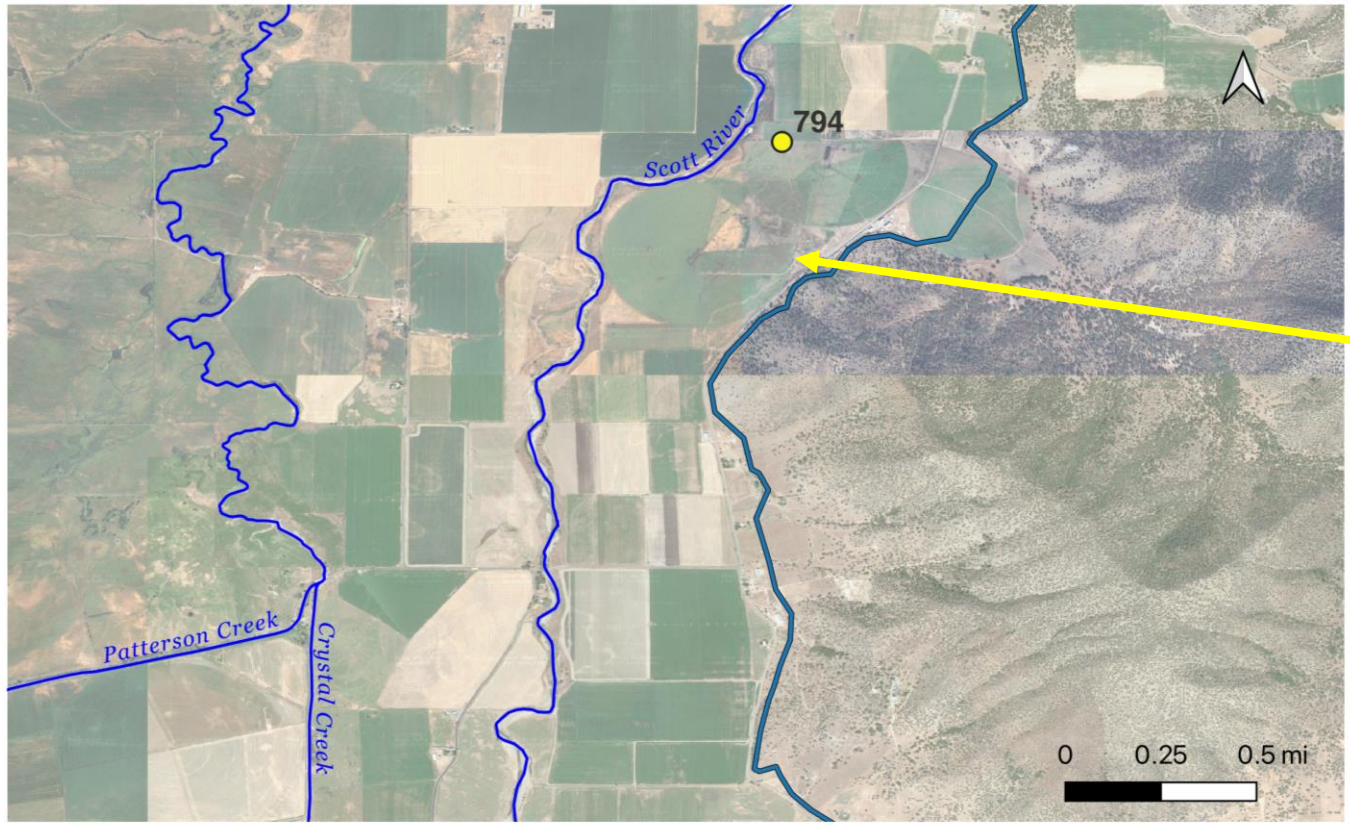
Russoniello & Lautz (2019)



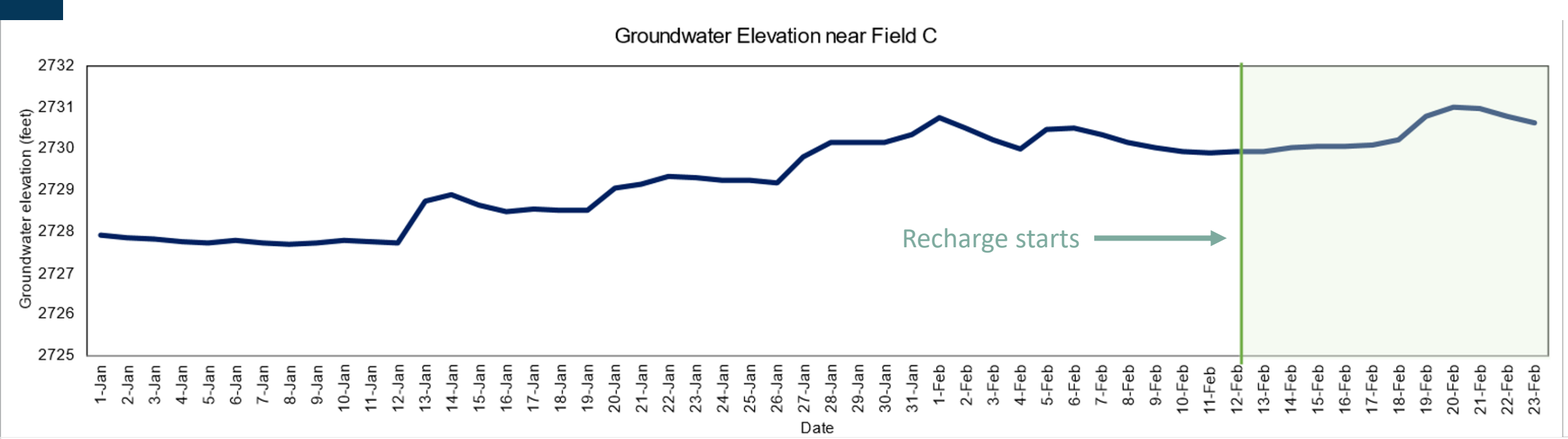
Example of major ions showing seasonal shifts in water source

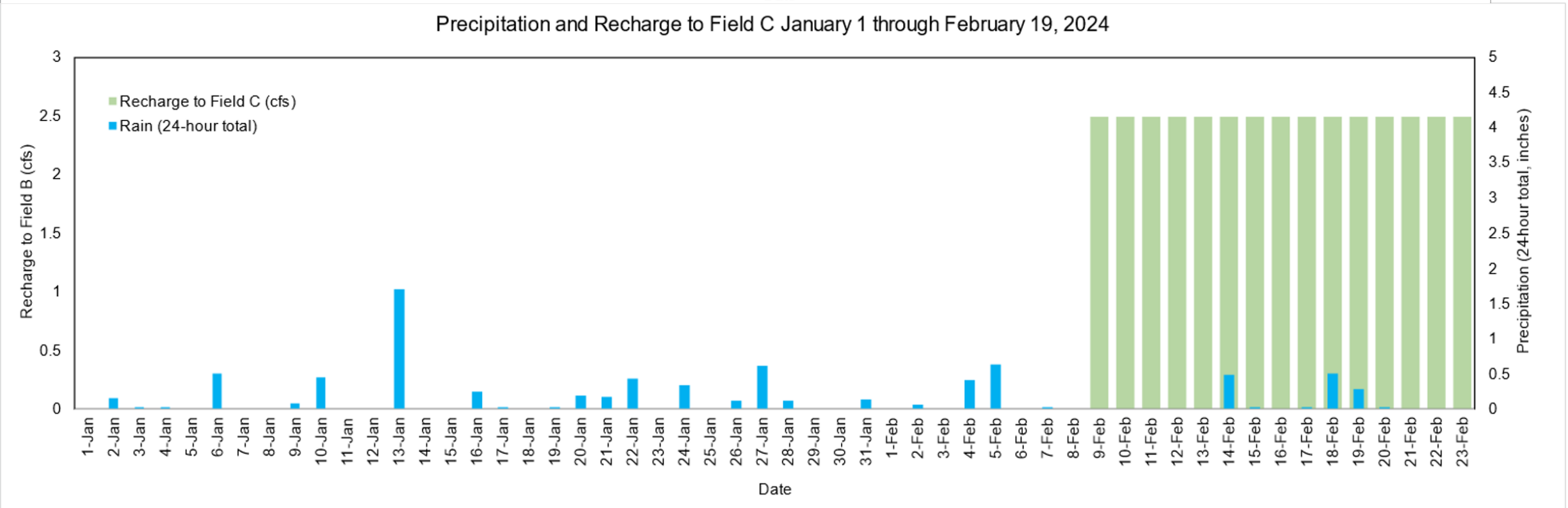
Additional Slides

Continuous Data Snapshot at Field C



Recharge started upstream of monitoring well


Groundwater Elevation near Field C
Groundwater elevation (feet)
2732
2731
2730
2729
2728
2727
2726
2725
Recharge starts
1-Jan
2-Jan
3-Jan
4-Jan
5-Jan
6-Jan
7-Jan
8-Jan
9-Jan
10-Jan
11-Jan
12-Jan
13-Jan
14-Jan
15-Jan
16-Jan
17-Jan
18-Jan
19-Jan
20-Jan
21-Jan
22-Jan
23-Jan
24-Jan
25-Jan
26-Jan
27-Jan
28-Jan
29-Jan
30-Jan
31-Jan
1-Feb
2-Feb
3-Feb
4-Feb
5-Feb
6-Feb
7-Feb
8-Feb
9-Feb
10-Feb
11-Feb
12-Feb
13-Feb
14-Feb
15-Feb
16-Feb
17-Feb
18-Feb
19-Feb
20-Feb
21-Feb
22-Feb
23-Feb
Date


Precipitation and Recharge to Field C January 1 through February 19, 2024
Recharge to Field C (cfs)
Rain (24-hour total)
Recharge to Field B (cfs)
3
2.5
2
1.5
1
0.5
0
Precipitation (24-hour total, inches)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1-Jan
2-Jan
3-Jan
4-Jan
5-Jan
6-Jan
7-Jan
8-Jan
9-Jan
10-Jan
11-Jan
12-Jan
13-Jan
14-Jan
15-Jan
16-Jan
17-Jan
18-Jan
19-Jan
20-Jan
21-Jan
22-Jan
23-Jan
24-Jan
25-Jan
26-Jan
27-Jan
28-Jan
29-Jan
30-Jan
31-Jan
1-Feb
2-Feb
3-Feb
4-Feb
5-Feb
6-Feb
7-Feb
8-Feb
9-Feb
10-Feb
11-Feb
12-Feb
13-Feb
14-Feb
15-Feb
16-Feb
17-Feb
18-Feb
19-Feb
20-Feb
21-Feb
22-Feb
23-Feb
Date