OCTOBER ADVISORY COMMITTEE MEETINGS

Shasta Valley Groundwater Advisory Committee Meeting

LARRY WALKER ASSOCIATES
science | policy | solutions

Stantec

Topics

- Groundwater Levels- Existing Monitoring and Data Collection
- Sustainable Groundwater Management (SGM) Grant Program's SGMA Implementation Round 2 Funding- Review of Final Funding
- Data Gap Work Group- outcomes from initial meeting
- Model Updates

Precipitation

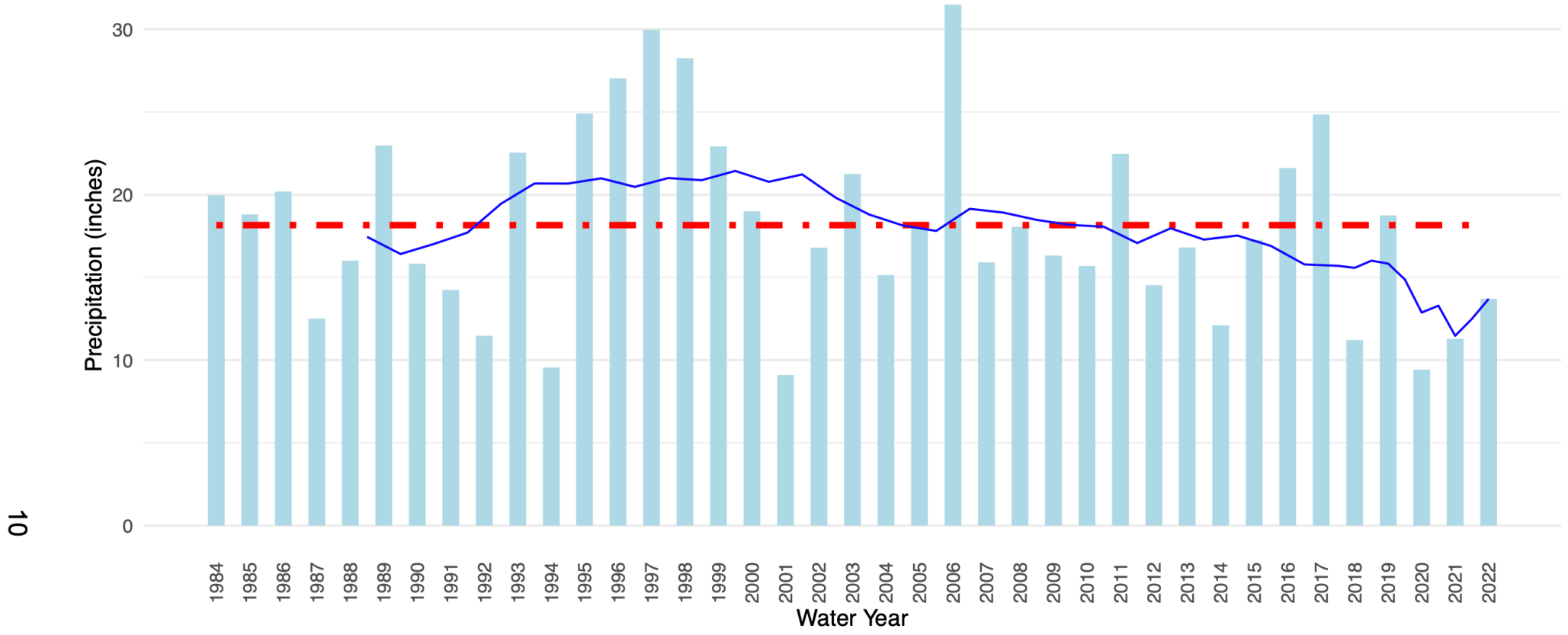

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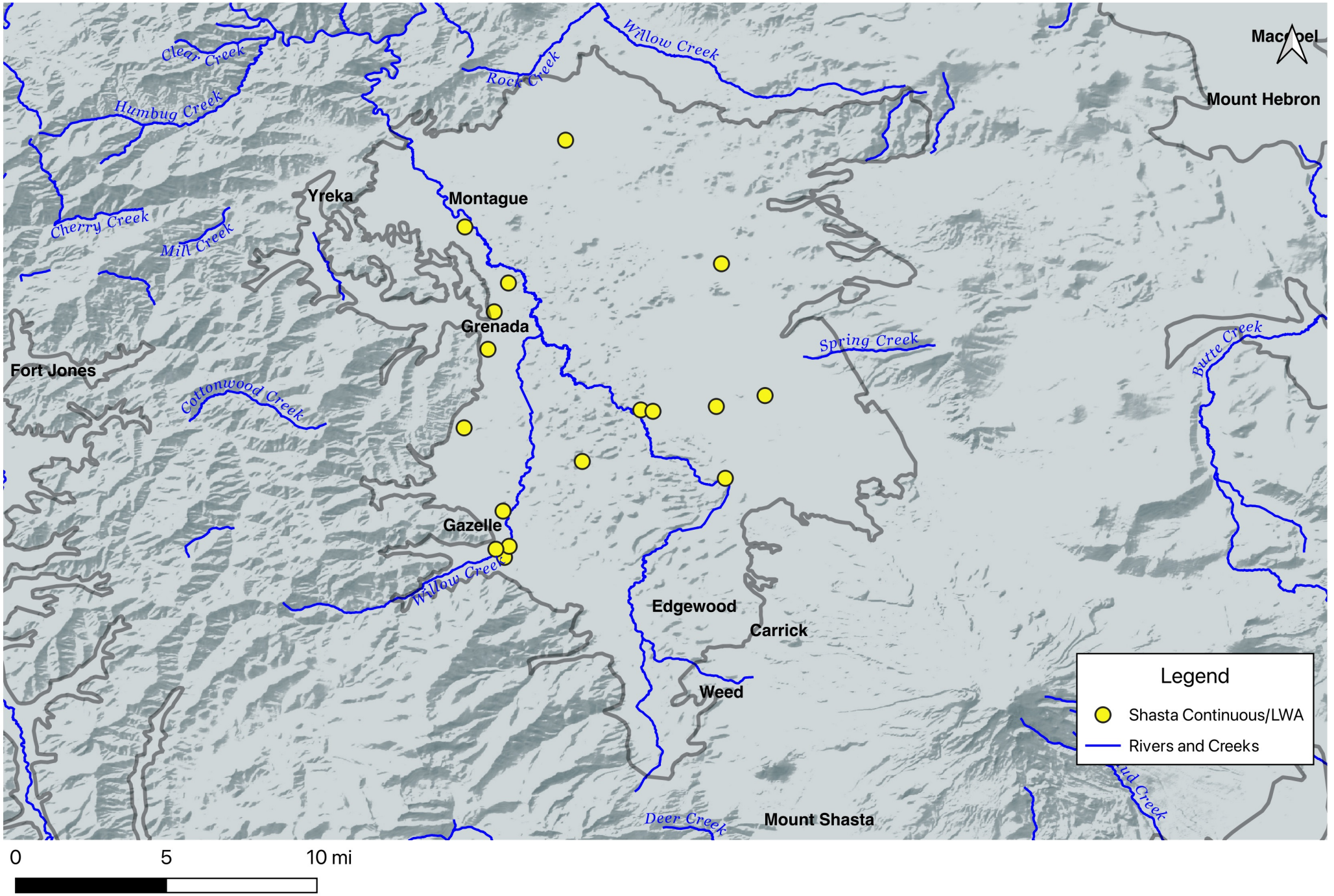
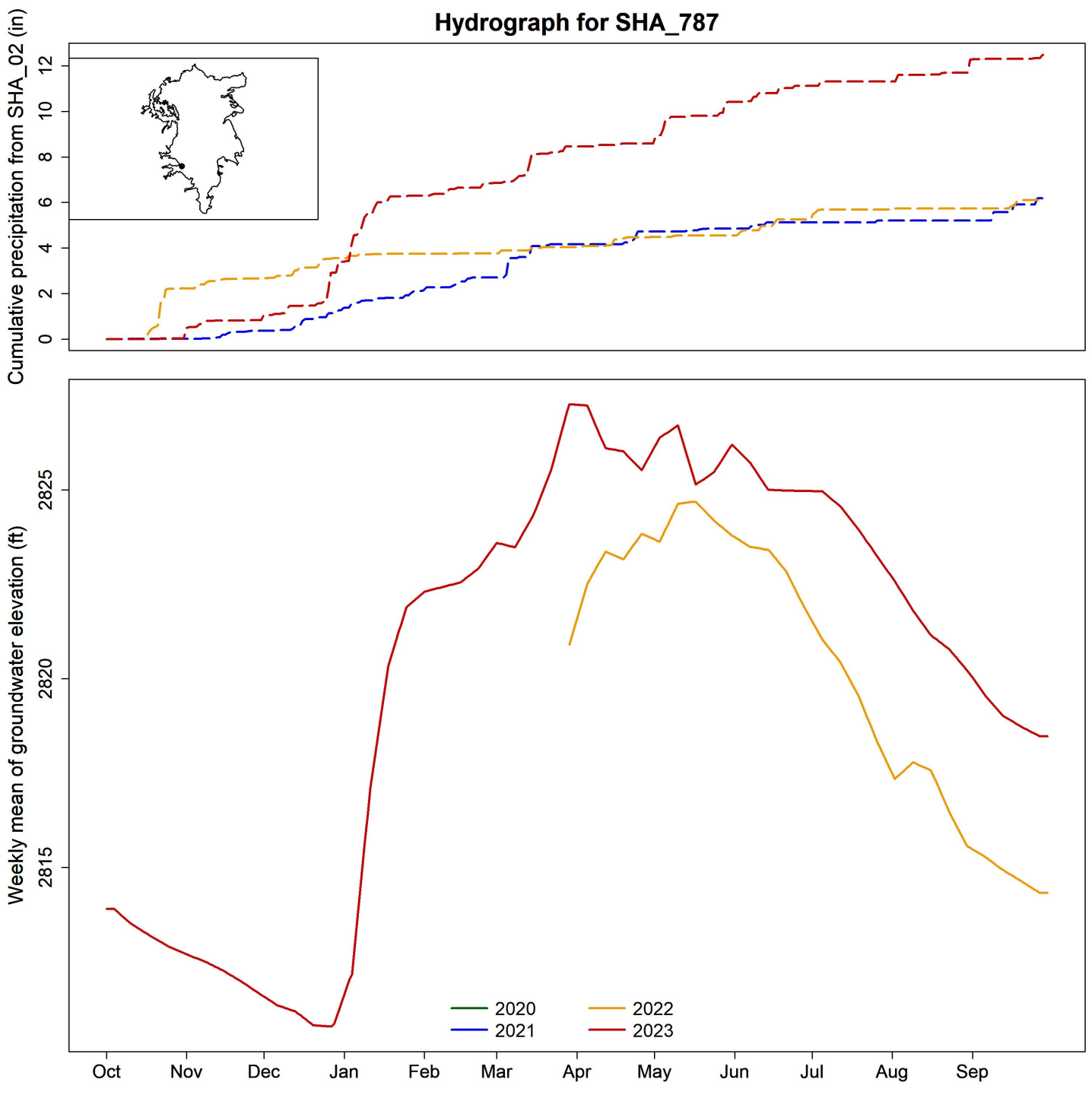
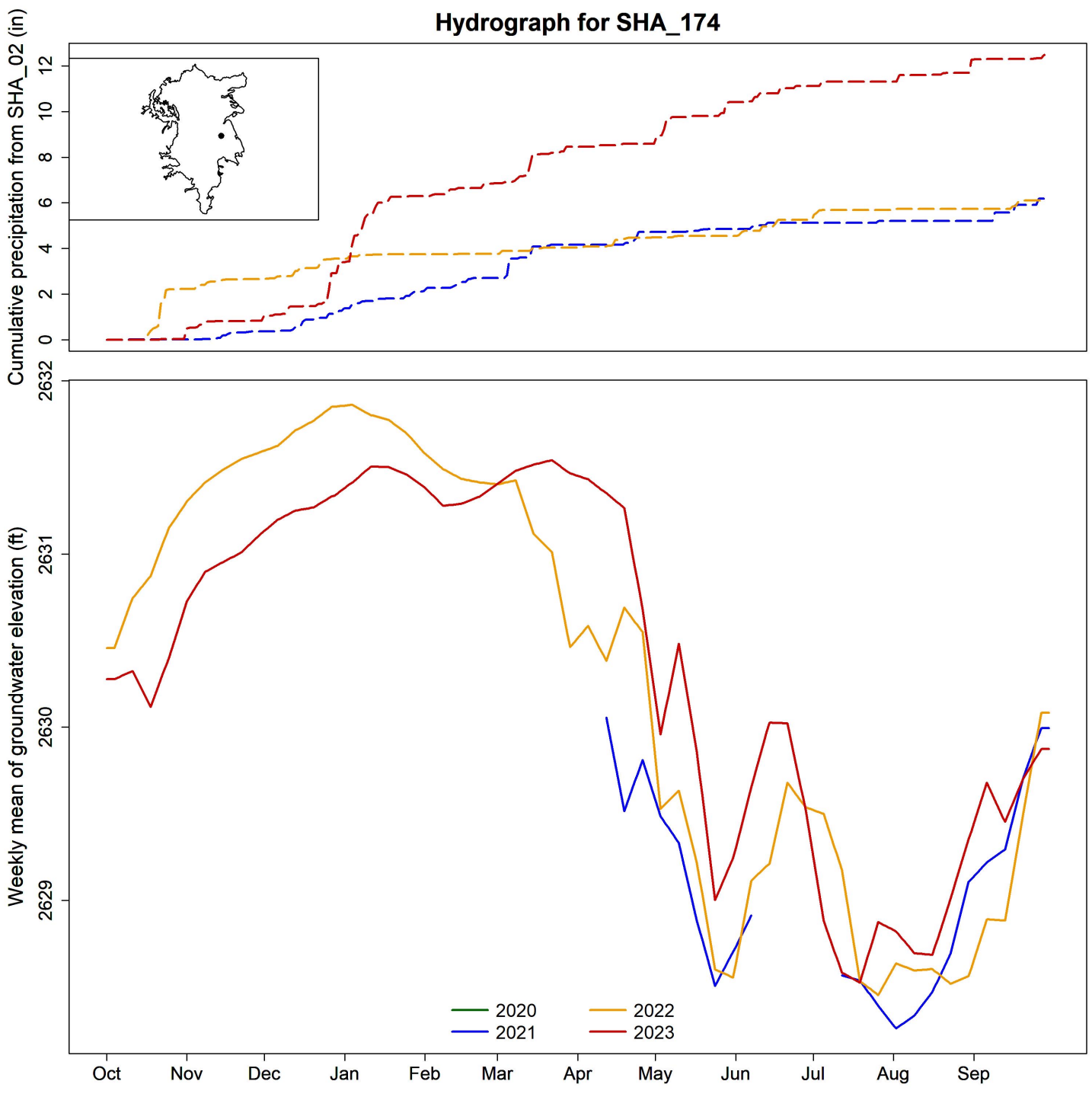
Figure 2: Yreka annual precipitation from 1983 to 2022, according to CDEC data. The long term mean (18 in) shown as a red dashed line, and the ten year rolling mean is the blue trendline.

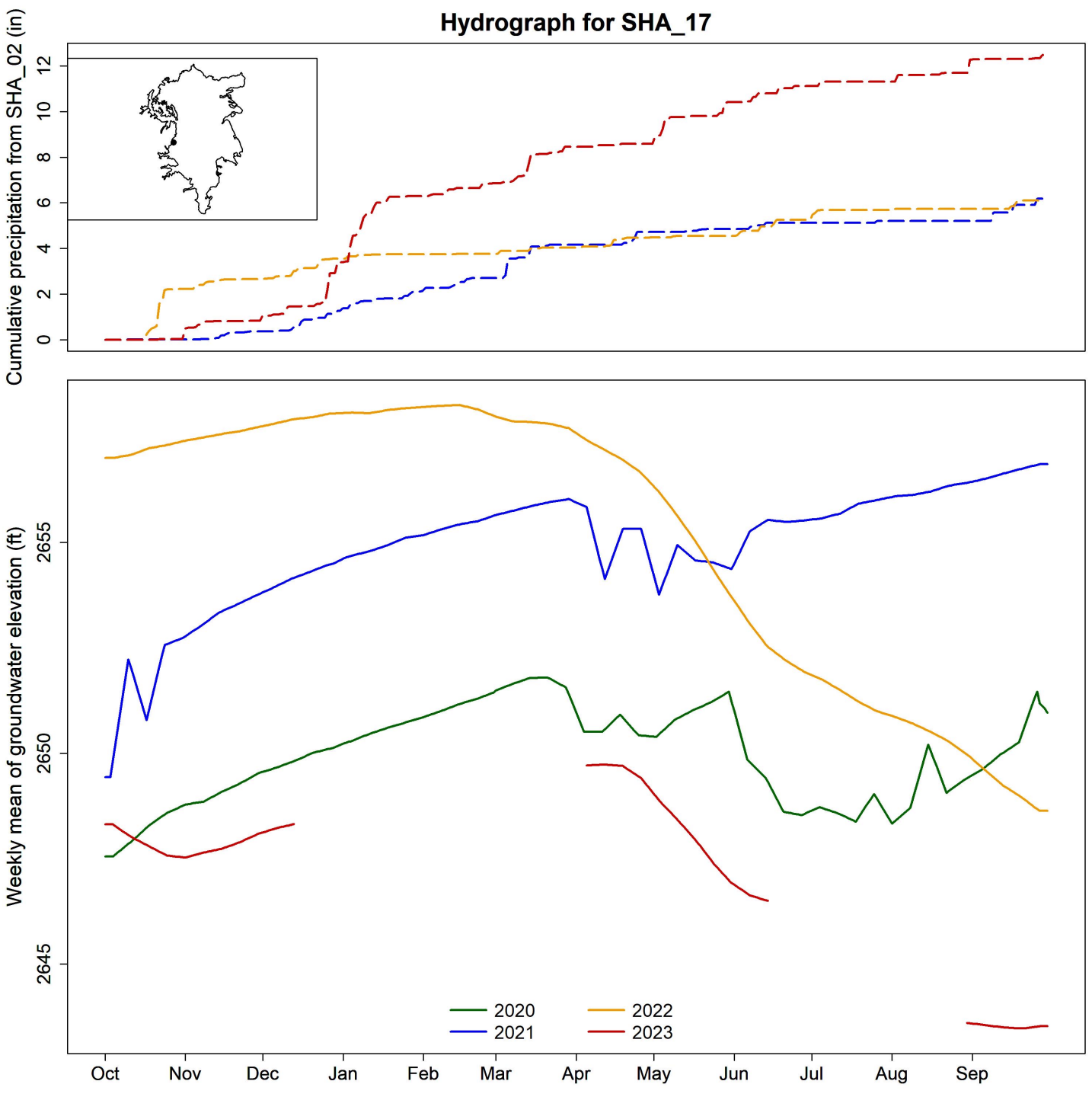
Ongoing Data Collection

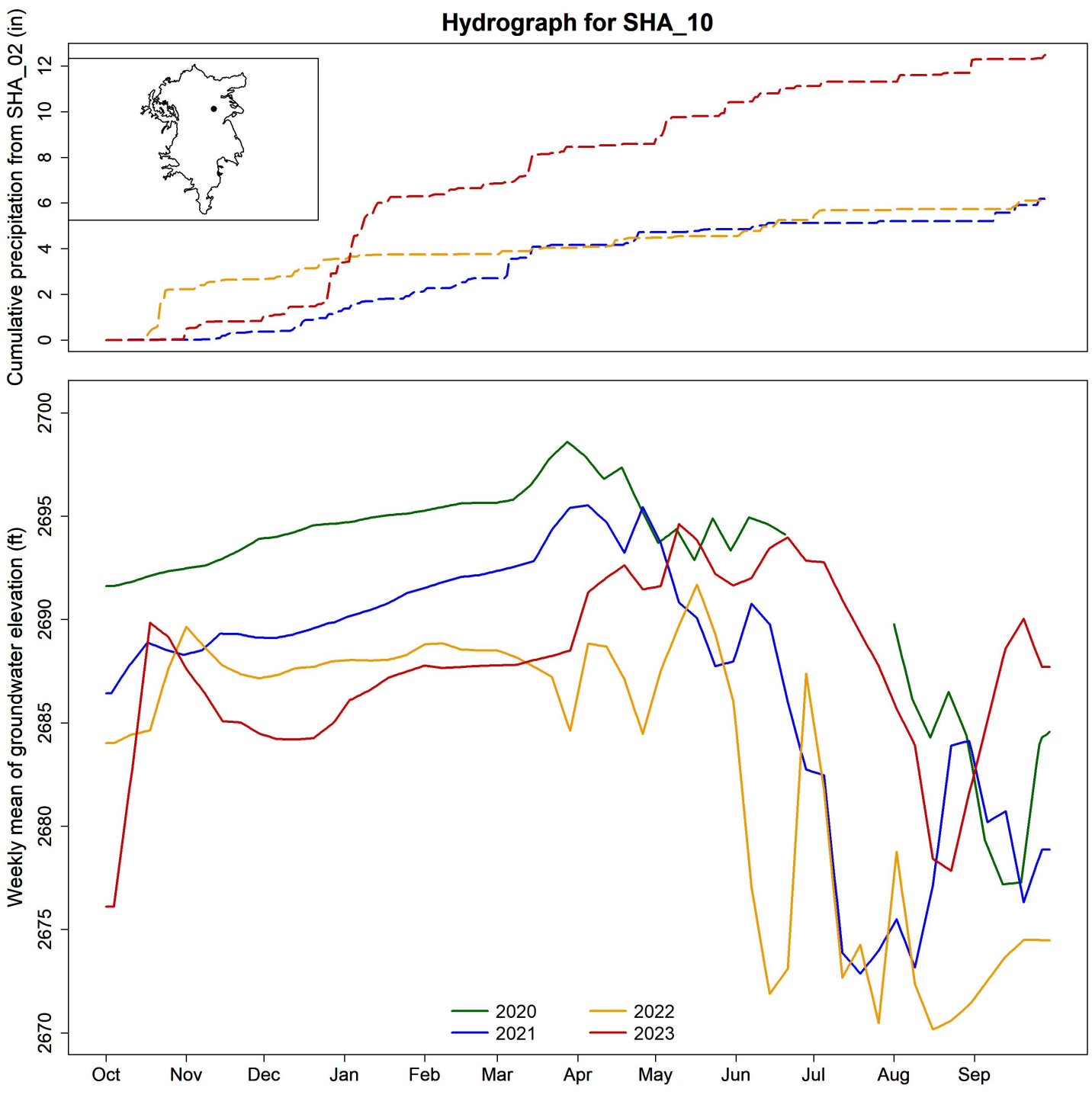
- 19 wells measured continuously
  - 15 minute intervals
  - Telemetered
- 18 CASGEM Wells
  - Measured twice per year

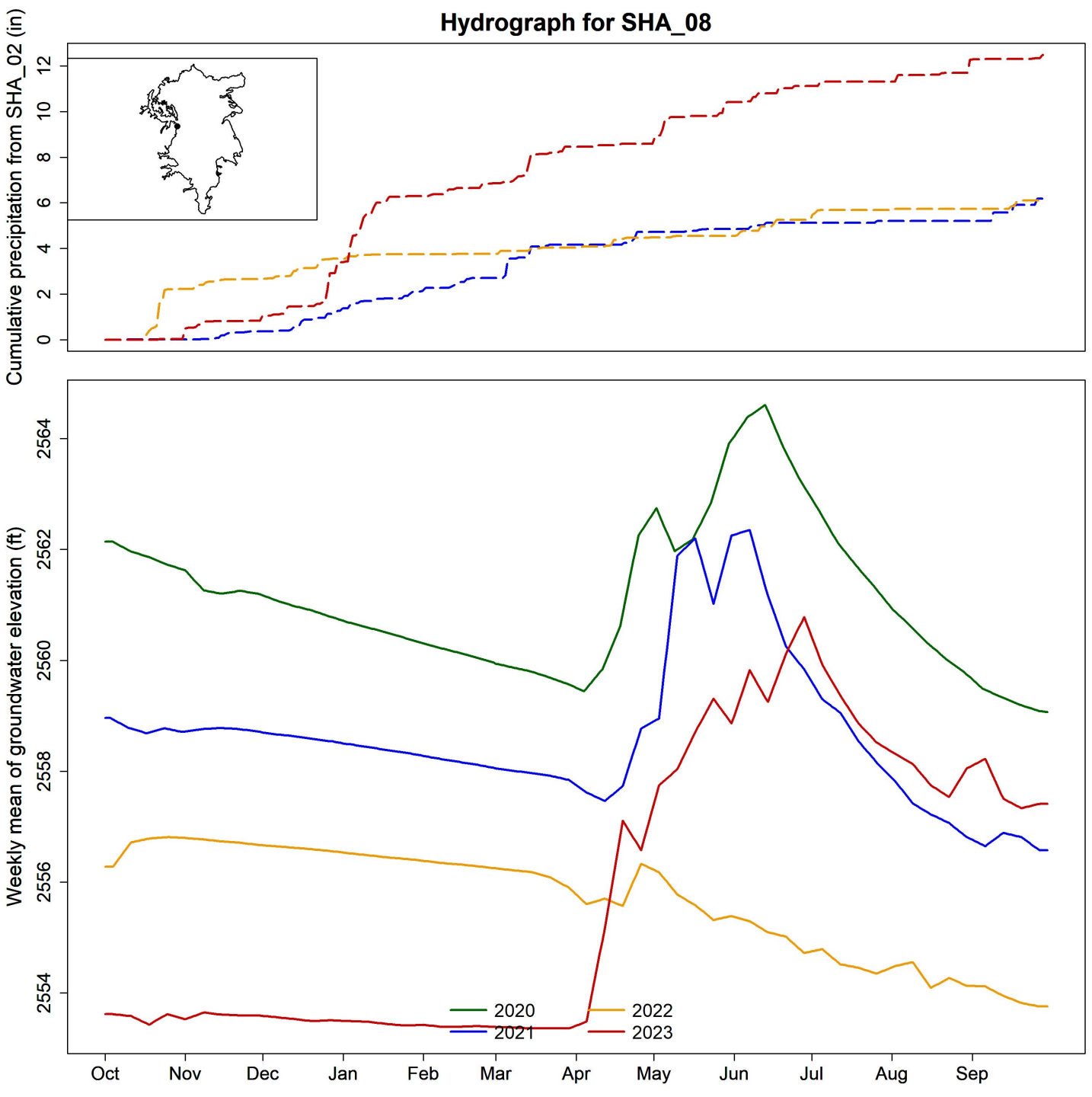

Clear Creek
Humbug Creek
Cherry Creek
Mill Creek
Yreka
Montague
Rock Creek
Willow Creek
Mount Hebron
Grenada
Fort Jones
Cottonwood Creek
Spring Creek
Butte Creek
Gazelle
Willow Creek
Edgewood
Carrick
Weed
Deer Creek
Mount Shasta
Legend
Shasta Continuous/LWA
Rivers and Creeks
0
5
10 mi


Hydrograph for SHA_787
Cumulative precipitation from SHA_02 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
2815
2820
2825
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
2022
2023


Hydrograph for SHA_174
Cumulative precipitation from SHA_02 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
2629
2630
2631
2632
2020
2021
2022
2023
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep


Hydrograph for SHA_17
Cumulative precipitation from SHA_02 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
2645
2650
2655
2020
2021
2022
2023
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep


Hydrograph for SHA_10
Cumulative precipitation from SHA_02 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
2670
2675
2680
2685
2690
2695
2700
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
2022
2023


Hydrograph for SHA_08
Cumulative precipitation from SHA_02 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
2554
2556
2558
2560
2562
2564
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
2022
2023

Implementation Round 2 Funding Final Awards

COMPONENT	FUNDING AWARDED
SGMA Compliance and GSP Updates • Database Management • GSP Revisions • Reporting • Model Updates and Scenario Evaluation • Data Gaps and Monitoring Expansion • Outreach	$1,628,000
Fee Study and Economic Analysis • Evaluation of fee/rate options • Parcel specific groundwater use and supply • Fee/rate schedule development • Economic analysis	$220,000

Implementation Round 2 Funding Final Awards

COMPONENT	FUNDING AWARDED
Well Inventory • Well inventory • Well Risk Assessment and Mitigation Program Development • Database Development • Well Construction and/ or Instrumentation	$320,000
Groundwater-Surface Water Connectivity Study • Design, Planning, Permitting • Monitoring Instrumentation • Monitoring and Data Analysis	$570,000
Upland Management • Project Planning and Design • Data Collection • Data Analysis and Reporting	$410,000

Project Schedule

	Not started yet
	Ongoing
	Completed

		October 2023	January 2024	April 2024	July 2024
1	**SGMA Compliance and GSP Updates**				
	• GSP Revisions				
	• Reporting (Data reporting and Annual report)				
	• ***Model Updates and Scenario Evaluation***				
	• Data Gaps and Monitoring Expansion	Data gap subcommittee met in October 2023			
	• Database Management				
	• Outreach				
2	**Fee Study and Economic Analysis**				
3	**Well Inventory**				
4	**GW/SW connectivity study**				
5	**Upland management**				

Model updates: Why? How? What does success look like?

	Not started yet
	Ongoing
	Completed

MODEL UPDATES	October 2023	February 2024	May 2024	August 2024
Evaluation of current GW/SW model	Started, list of improvements, discussion with USGS	Completed		
Update geology based AEM surveys				
Update PRMS watershed model (with snow updates)				
Water budget/estimate for applied water use				
Coupling of PRMS and GW model				
Model recalibration using current data				
Improved ditch representation				
Sensitivity analysis of model boundaries → better understanding of FLOWS IN&OUT				
Simulations through 2023 (GSP --> 1991-2018)				

Monitoring Network Work Group- Outcomes

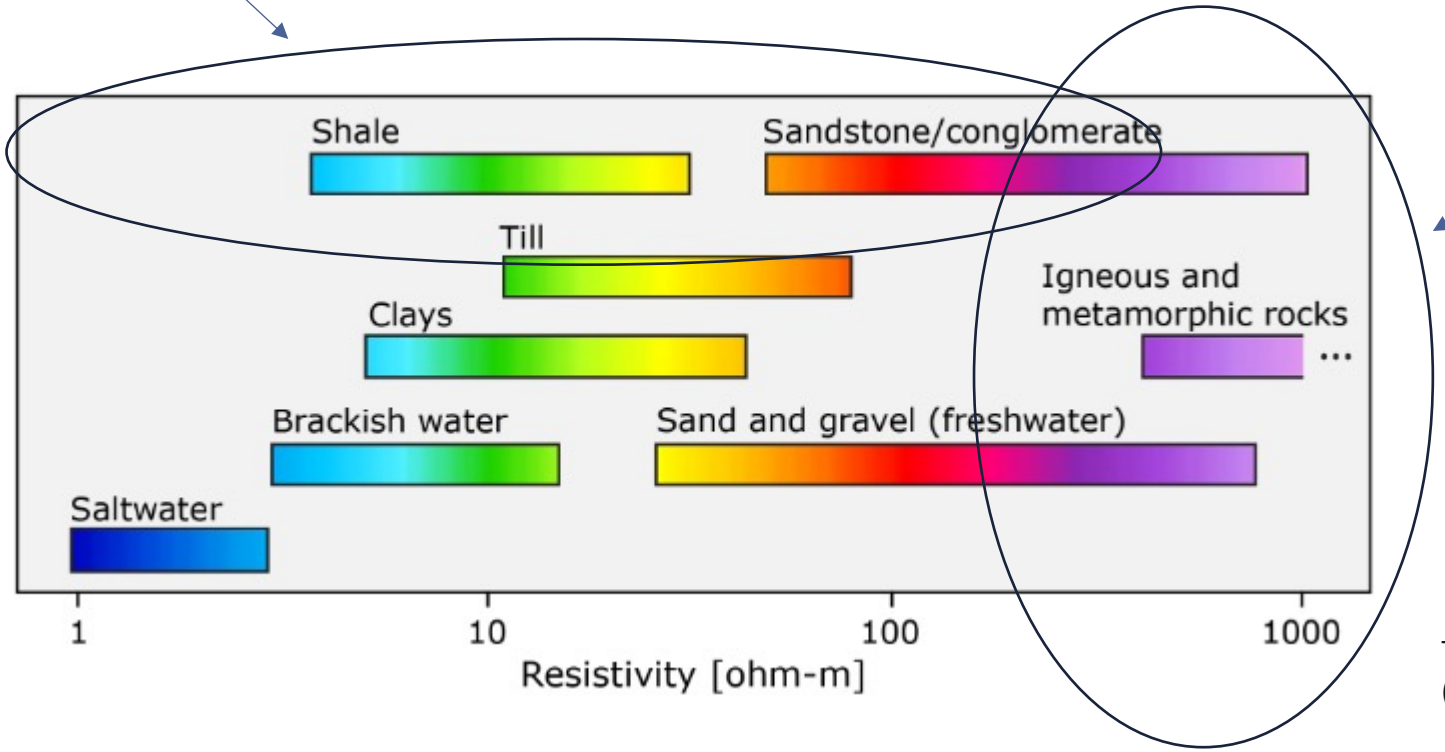
- High priority on sources of groundwater recharge
  - Springs
  - Ditch infiltration
- Groundwater quality
  - Pesticide data testing to evaluate current conditions

Shasta Model Update

- Shasta Watershed Groundwater Model (SWGM)
  - Updates to geologic model from the DWR AEM survey
  - Updates to Shasta Valley Precipitation Runoff Modeling System (PRMS)
    - Streamflow
    - Recharge
  - Incorporating automatic updates to extend model to new water year

Interpreting AEM resistivity: Overlapping Data

Consolidated sedimentary rocks take on a high range of resistivity. Southern Scott Valley is mapped with the Abrams and Salmon Shists consisting of *"generally eastward-dipping alternating beds of chert, sandstone, shale, slate, chlorite-sericite schist, and limestone"*



In Shasta and Butte, granite and basalt could be confused with gravel

Typical relationship between resistivity, lithology, and salinity (after Palacky, 1987)

AEM and Shasta Valley

- **AEM was designed for range of coarse to fine sediment** and basalt and volcanic deposits may have been removed
- Shasta can be **highly variable** over short distances and the lithology logs from wells were less than 800m of (2,625 ft) of flight path
- **Grid spacing too large** to extrapolate data to area between grid lines
- AEM **interpretation could be confused** due to driller log definitions (i.e., fractured volcanic rock listed as cobbles and boulders)

AEM transect for Shasta Valley

- Notes about this analysis

The purple (high resistivity) is in an area that has previously been mapped as the Pluto Cave Basalt Flow.

This was blanked later from analysis

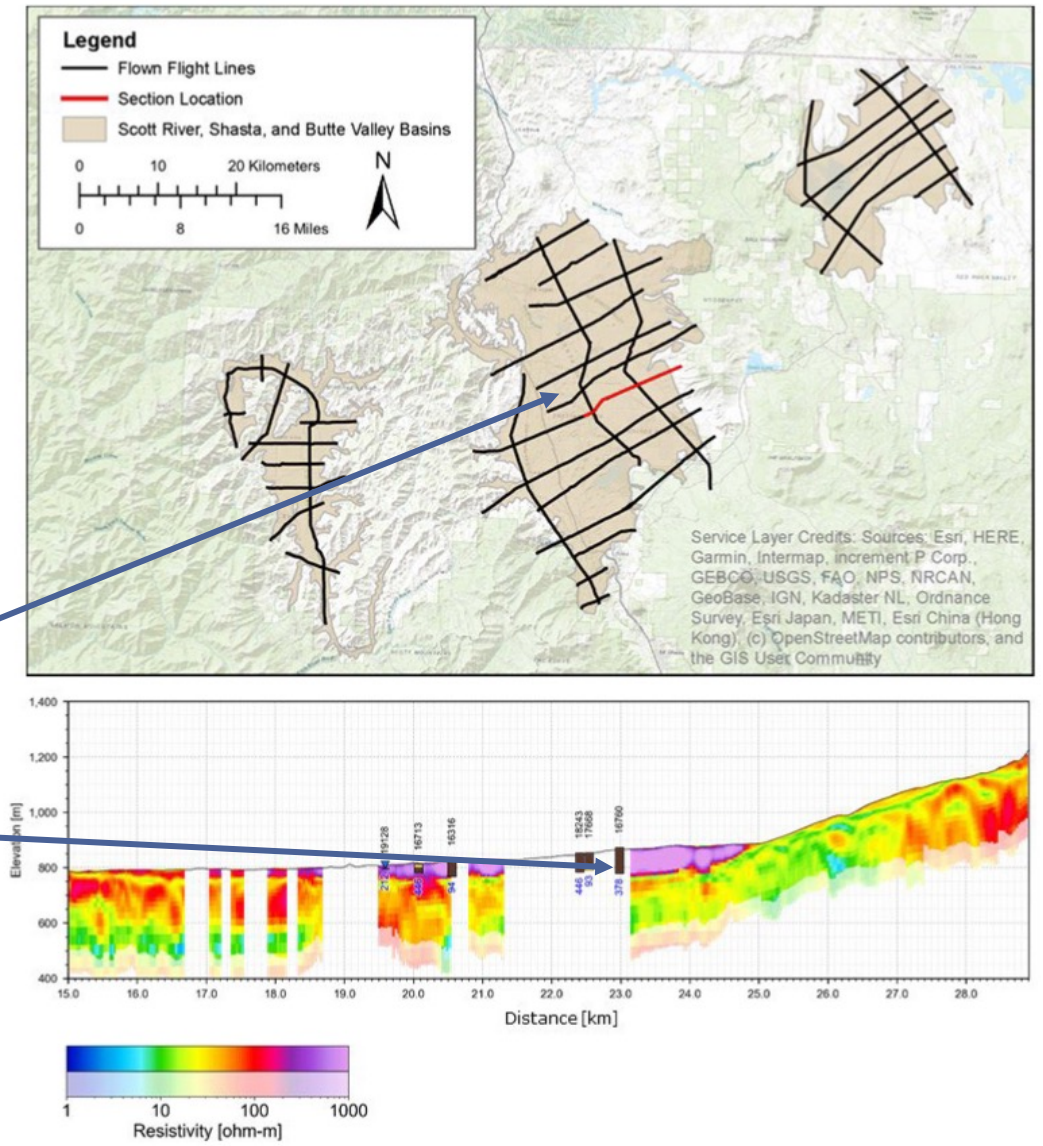


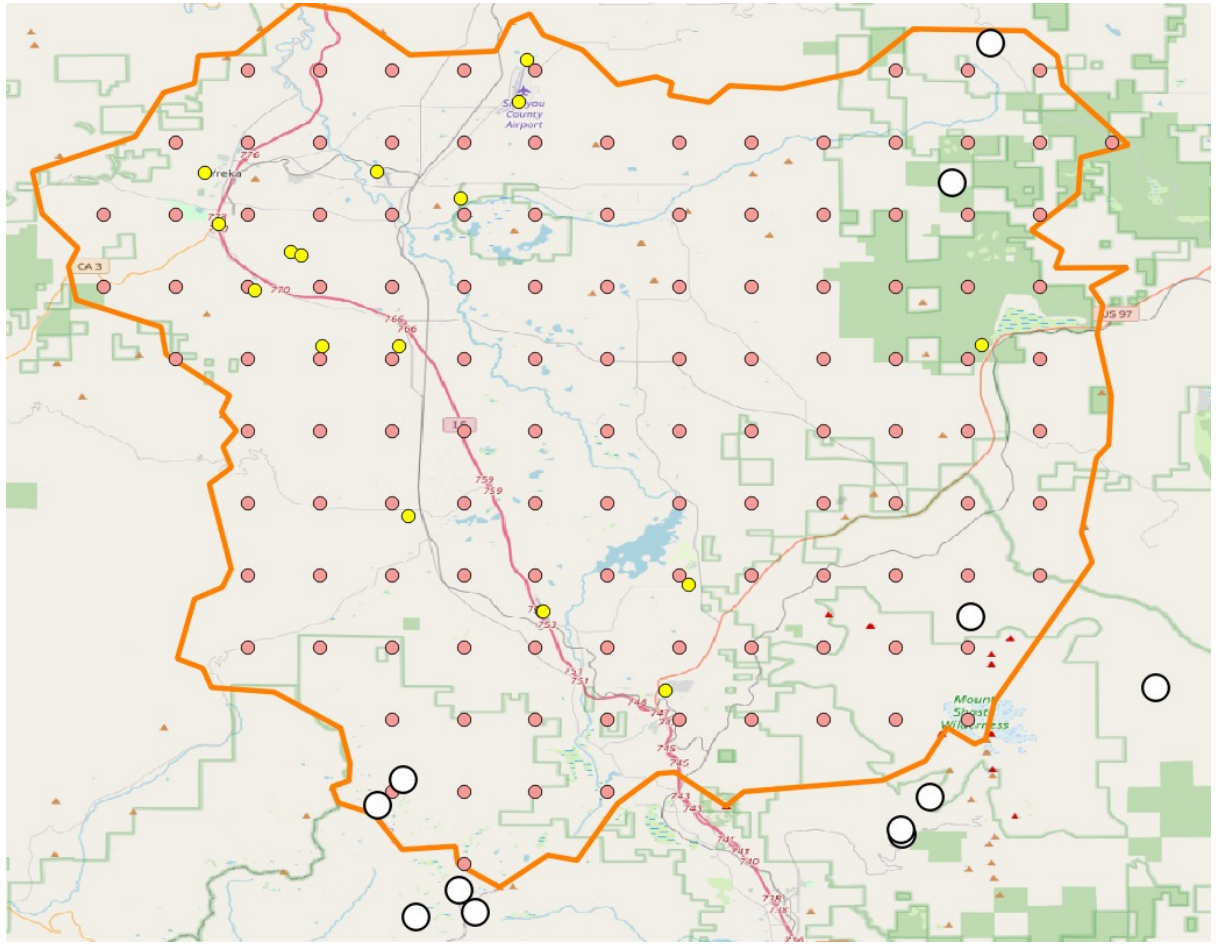
Figure 4-2 Resistivity along Section 300700, distance interval 15-29 km. The location of the section is shown as the red line in the top panel, while the vertical resistivity section from west to east is shown in the bottom panel. Lithology data (colored rectangles) and water level measurements (blue triangles) measured from nearby boreholes are projected onto the section, with the well IDs shown above and the projection distance shown below the borehole.

AEM Applicability to Shasta Geological Model

- AEM will result in localized changes to the geologic model, but the overall impact of the changes is uncertain until further modelling is complete.
- May be useful in separating the Pluto Cave Basalt flow, currently not included in the model as a separate geologic unit.
- May be useful in better defining thickness of geologic units, shapes of alluvial deposits, and fault blocks.

Shasta Valley Precipitation Runoff Modeling System (PRMS)

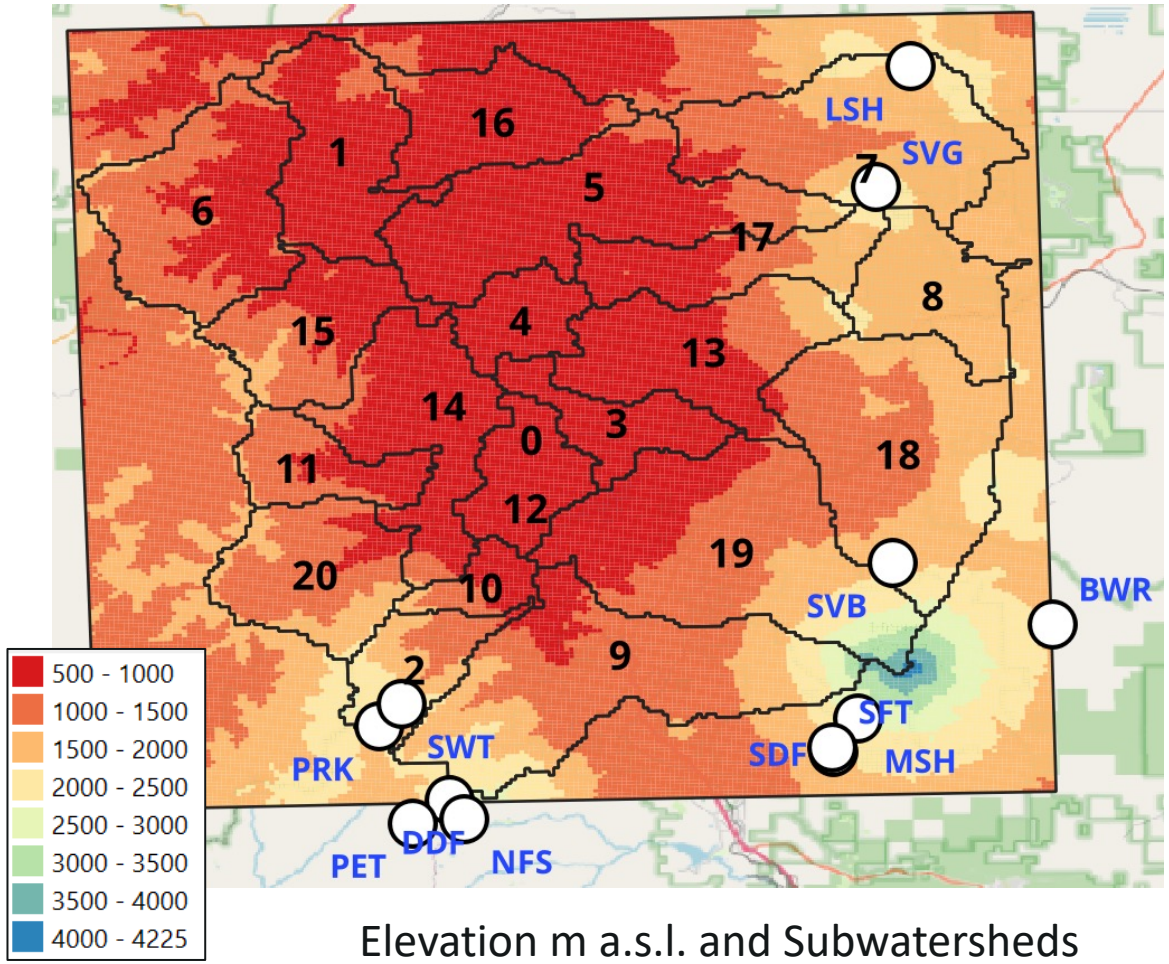
- Updates and extension
  - Incorporating local monitoring stations from CDEC and NOAA with PRISM
    - Precipitation
    - Temperature
    - Snowpack
  - Extending model to WY 2023



White = snowpack. Red = PRISM. Yellow = Observed Data

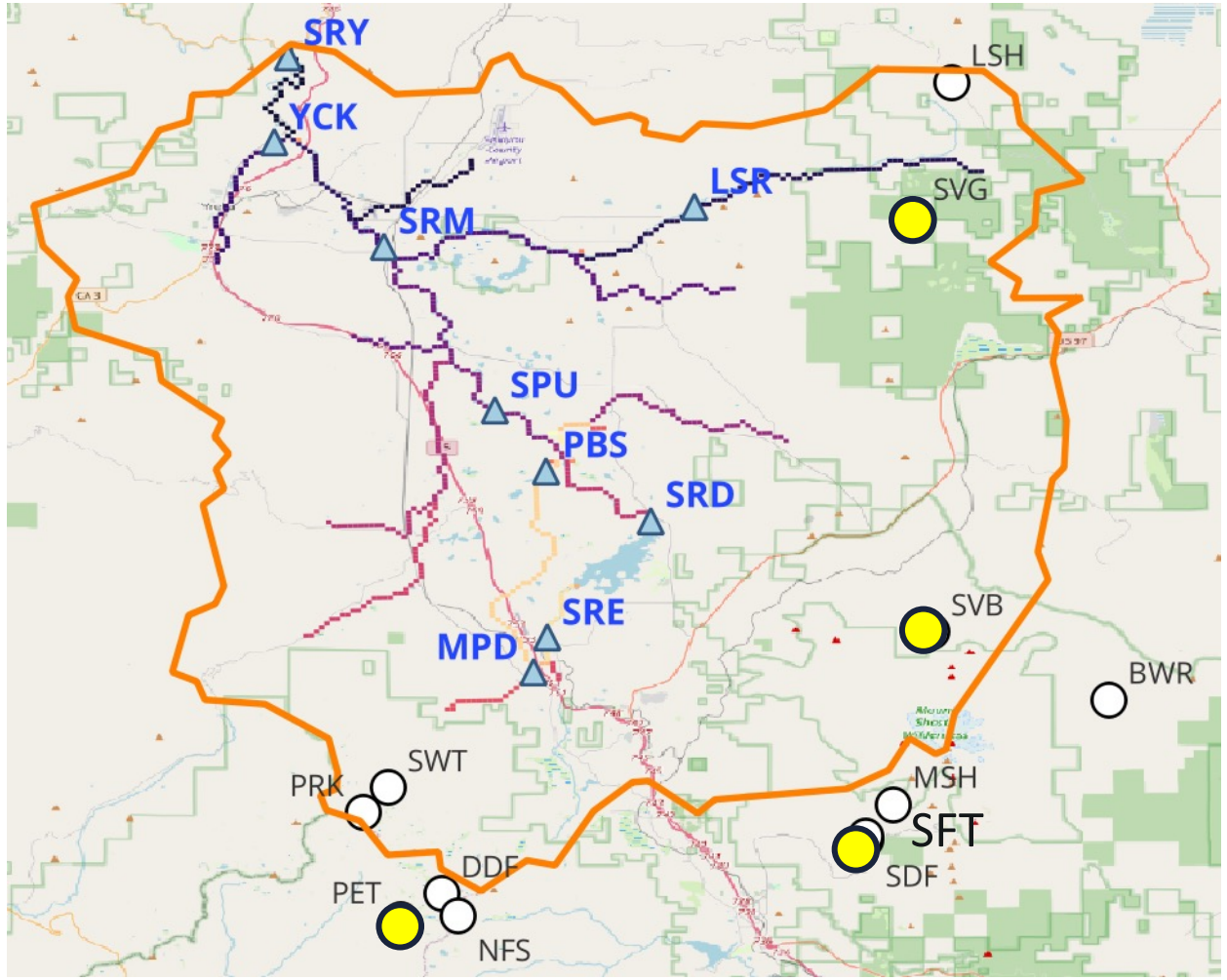
Shasta Valley Precipitation Runoff Modeling System (PRMS)

- Calibration
  - Incorporate additional stream gage stations on the Shasta River tributaries
    - Calibrate at subwatershed scale
  - Re-calibrating up to WY 2023



Elevation m a.s.l. and Subwatersheds

Shasta Valley Precipitation Runoff Modeling System (PRMS)



- Previous calibration focused on the outlet station, SRY

Streamflow

Snow pillow

Snow course

Land Efficiency Study Opportunity

Mobile Irrigation Lab

- **Mobile Irrigation Lab-** free on-site evaluation of agricultural irrigation systems
- More information can be found here: https://www.tehamacountyrcd.org/mobile-irrigation-lab

Thank You