OCTOBER ADVISORY COMMITTEE MEETINGS

Butte Valley Groundwater Advisory Committee Meeting

LARRY WALKER ASSOCIATES
science | policy | solutions

Stantec

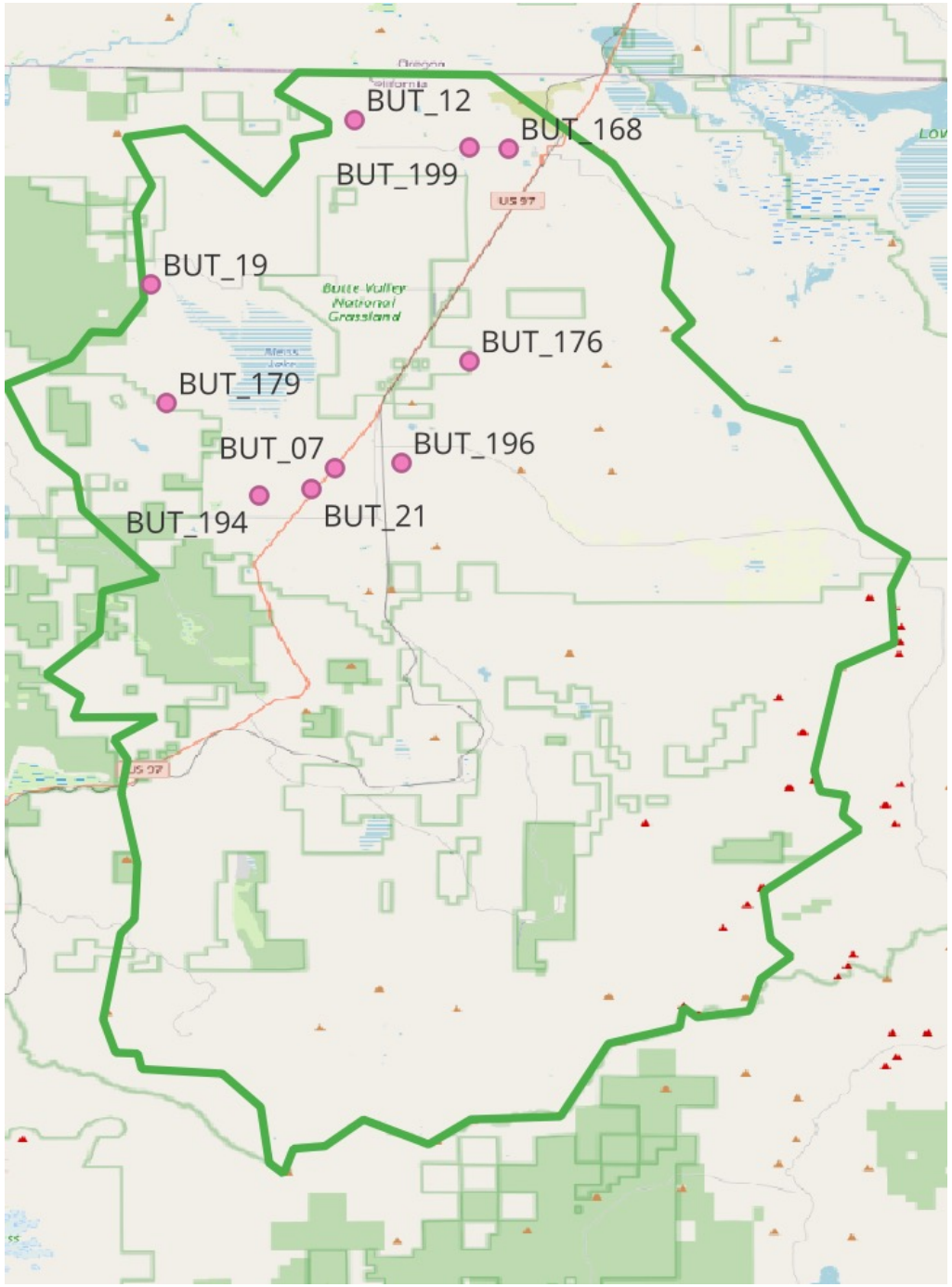
Topics

- 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 Update

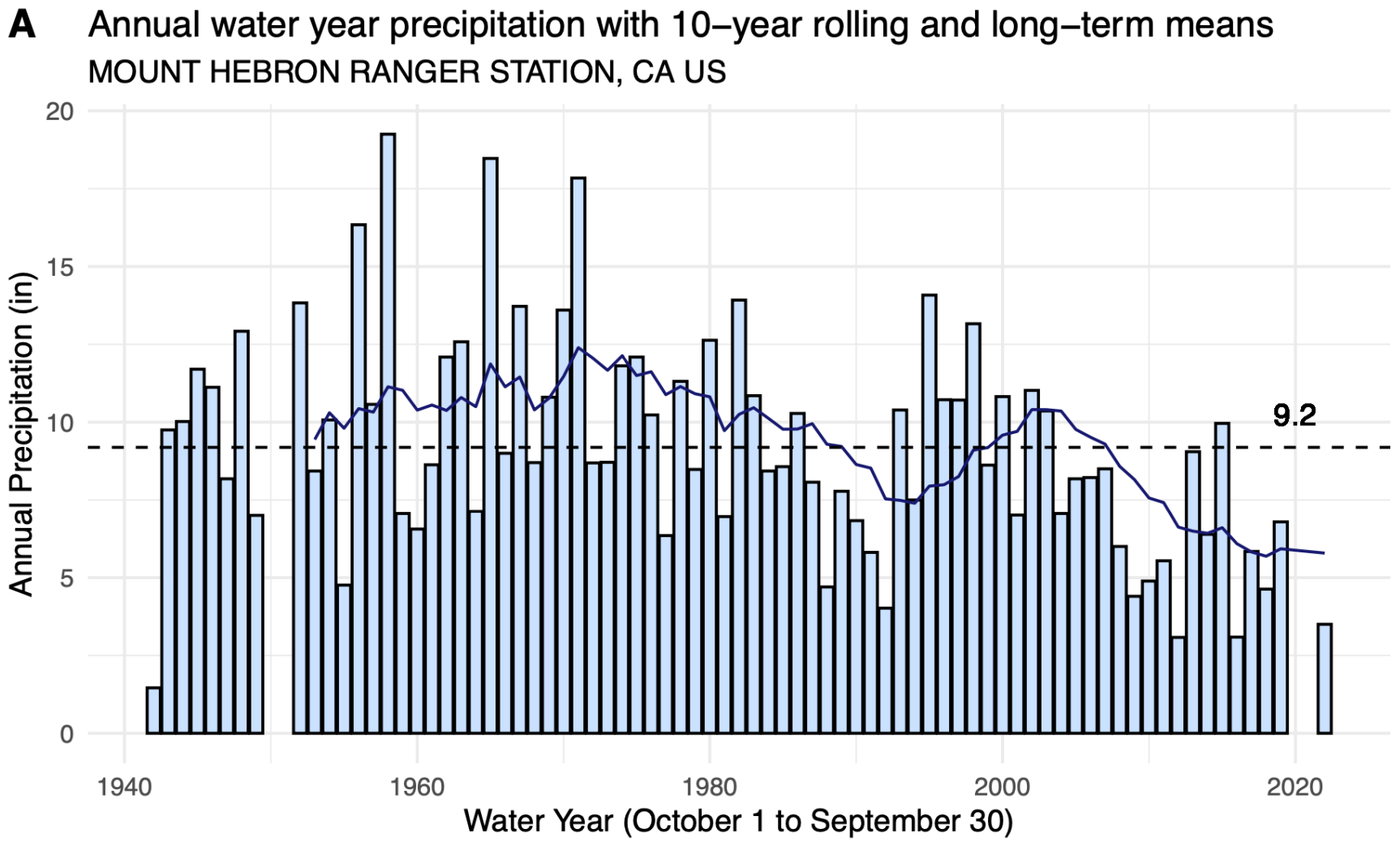
Ongoing Data Collection

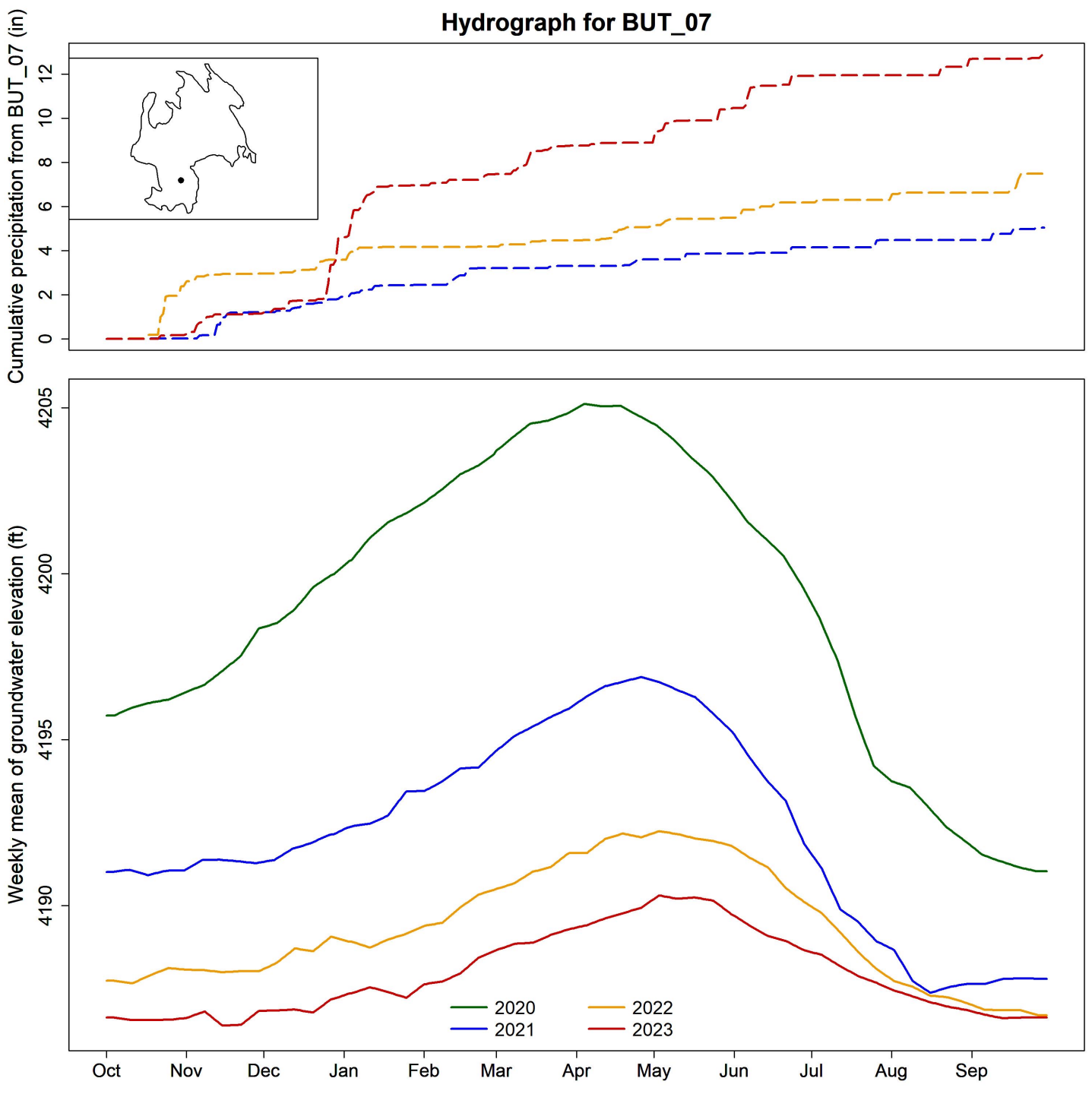
- 10 wells measured continuously
  - 15 minute intervals
  - Telemetered
- 14 CASGEM Wells
  - Measured twice per year

Continuous wells



Precipitation




Hydrograph for BUT_07
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4190
4195
4200
4205
2020
2021
2022
2023
Oct
Nov
Dec
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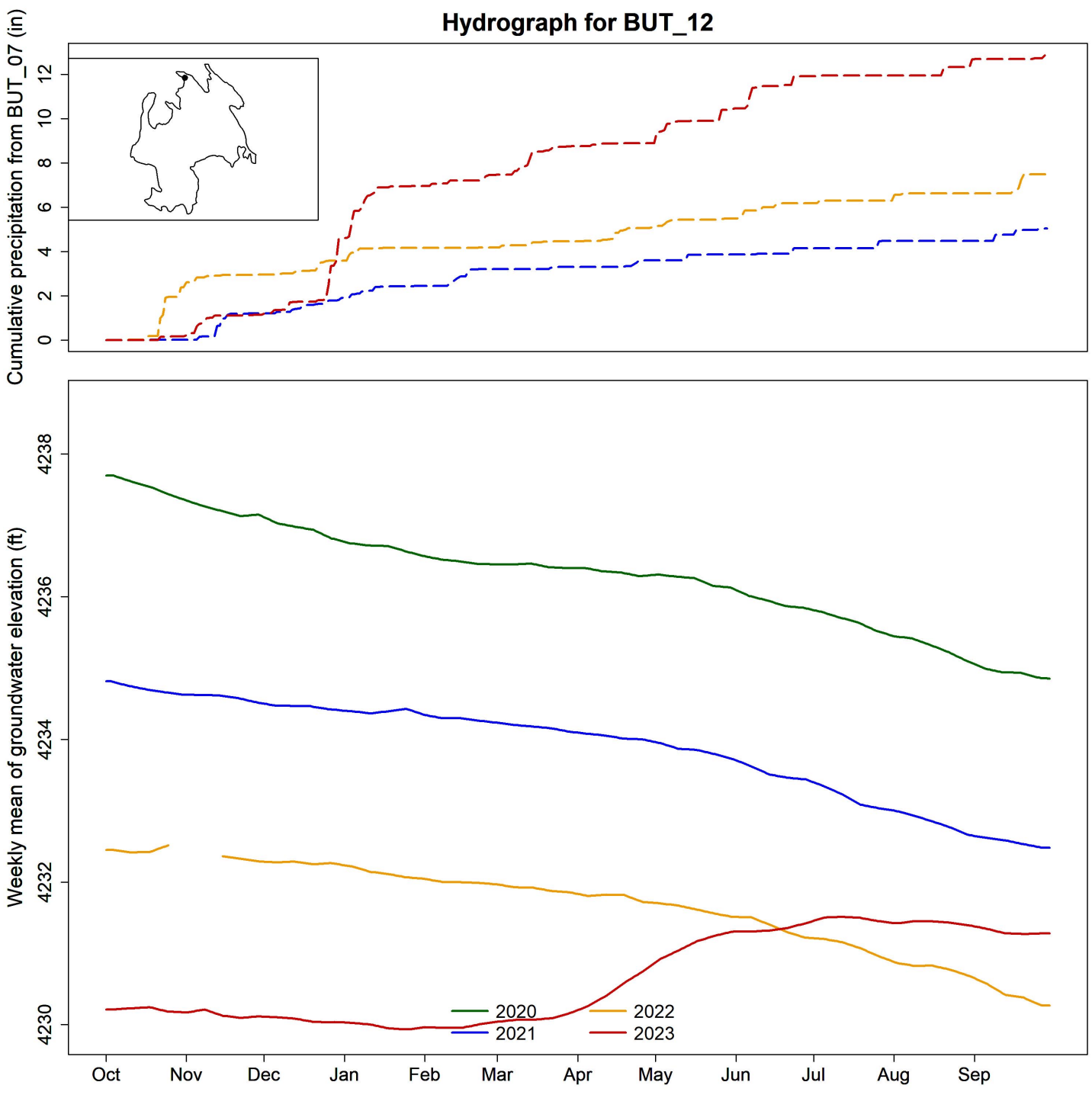
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep


Hydrograph for BUT_12
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4230
4232
4234
4236
4238
Oct
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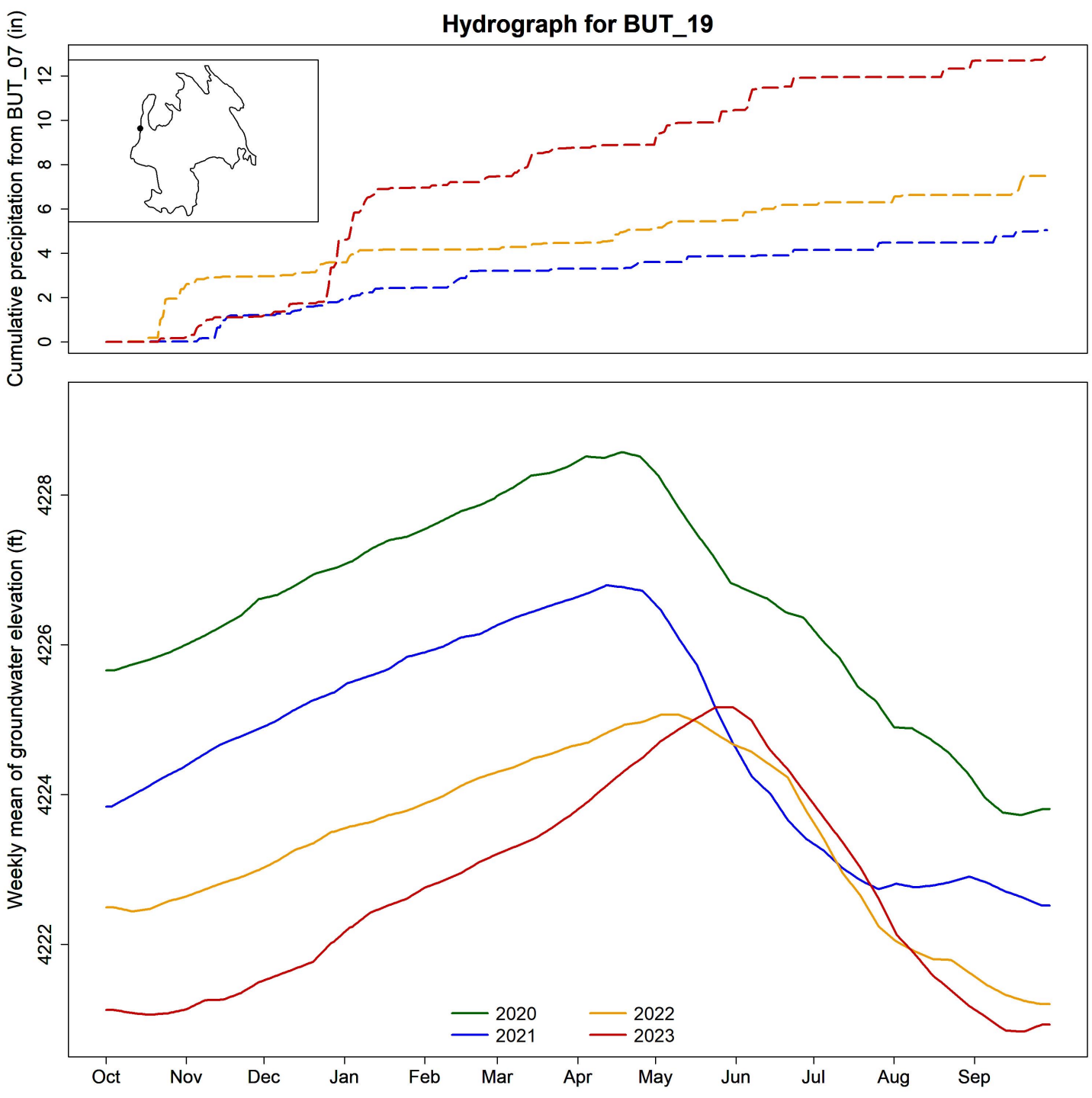
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
2022
2023


Hydrograph for BUT_19
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4222
4224
4226
4228
2020
2021
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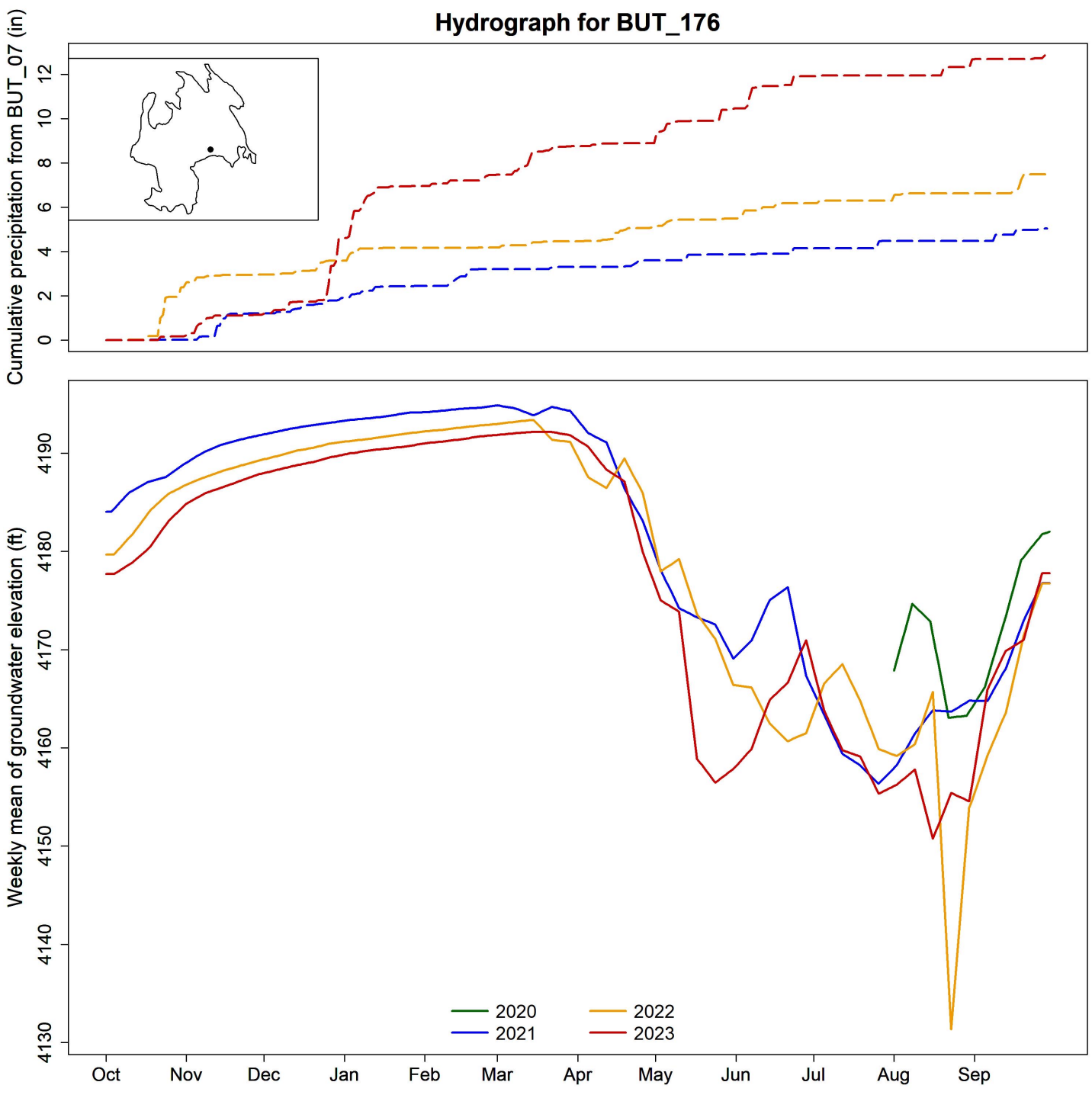
Hydrograph for BUT_176
Cumulative precipitation from BUT_07 (in)
0
2
4
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10
12
Weekly mean of groundwater elevation (ft)
4130
4140
4150
4160
4170
4180
4190
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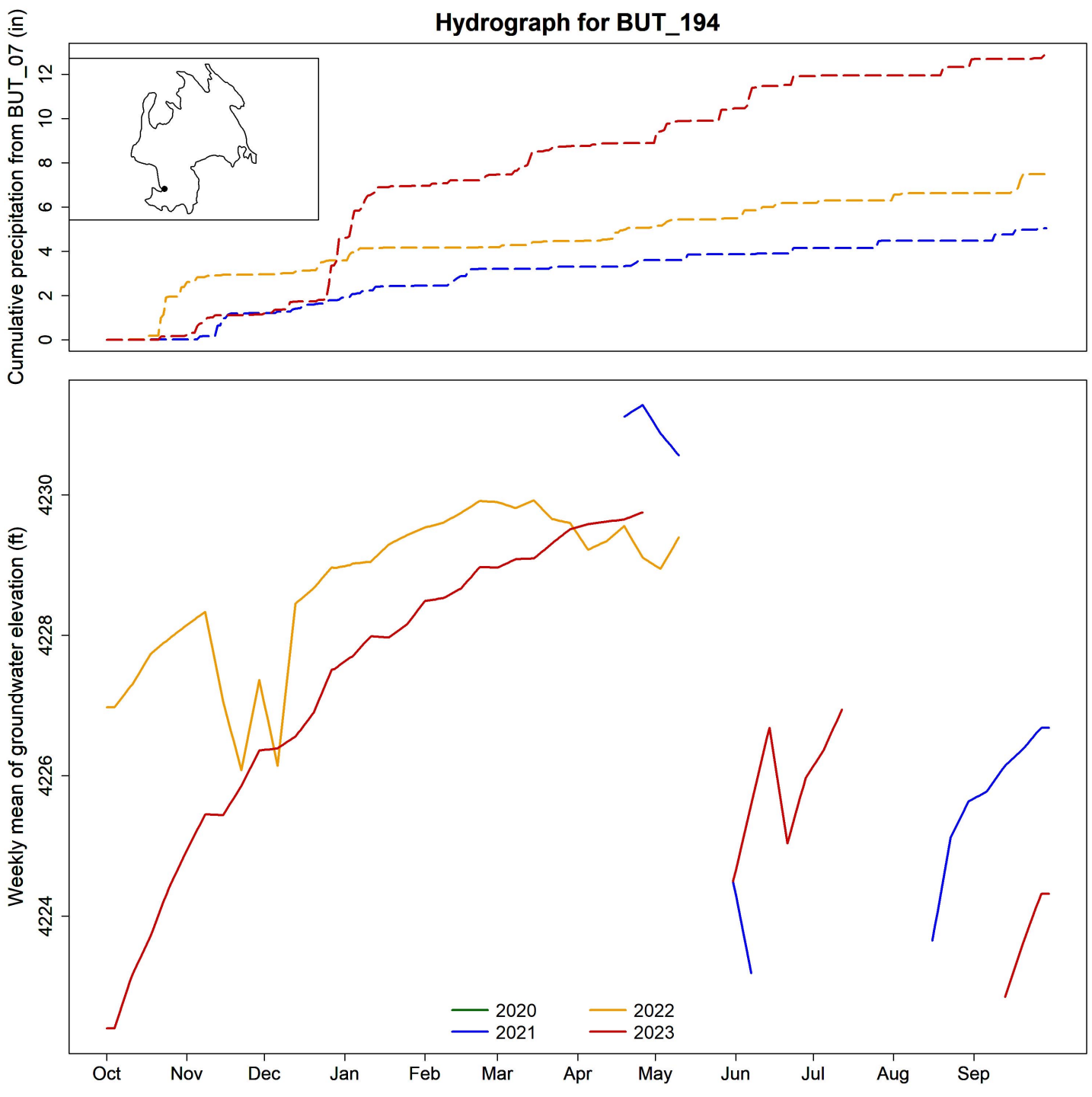
Hydrograph for BUT_194
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4224
4226
4228
4230
Oct
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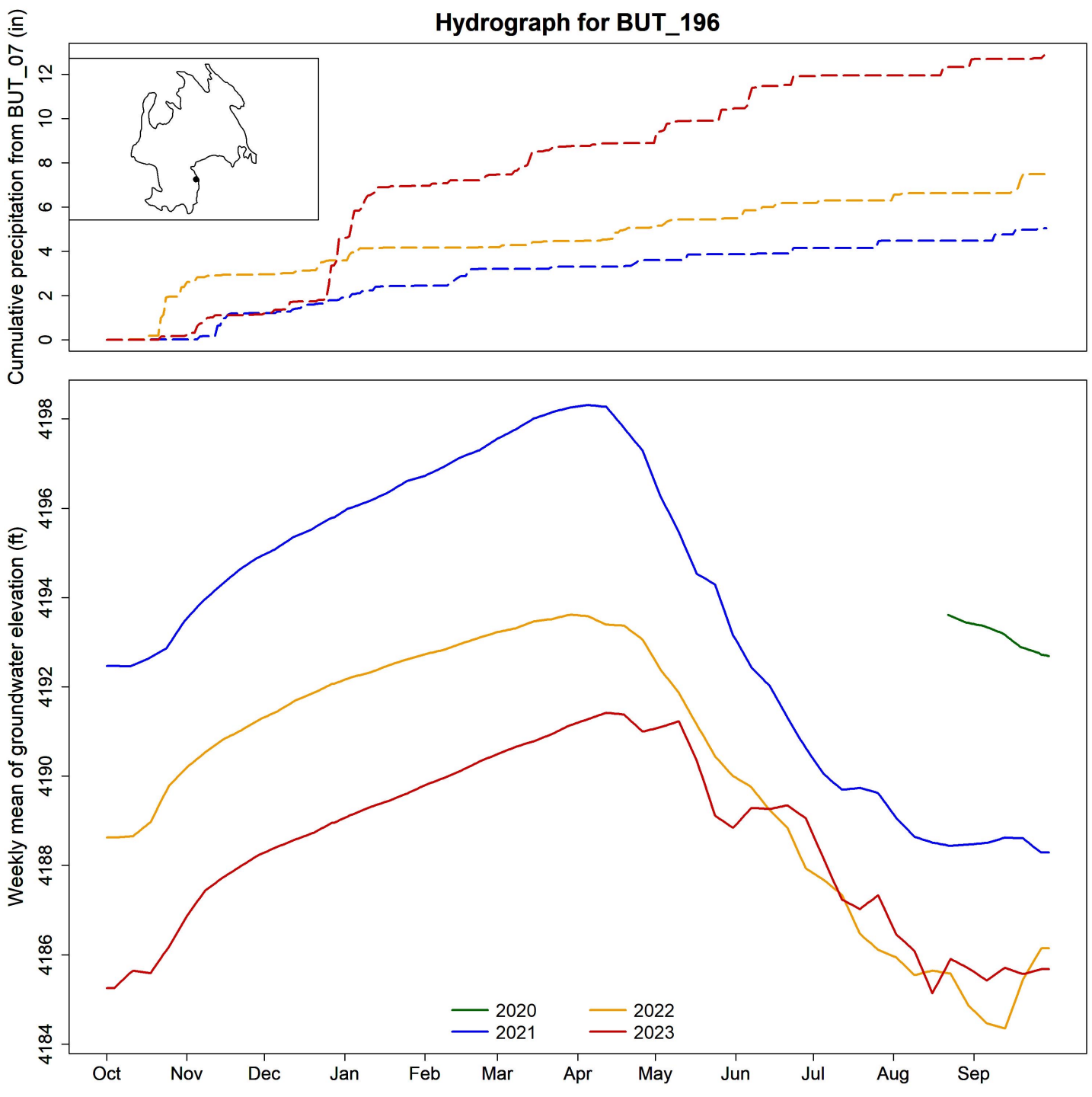
Hydrograph for BUT_196
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4184
4186
4188
4190
4192
4194
4196
4198
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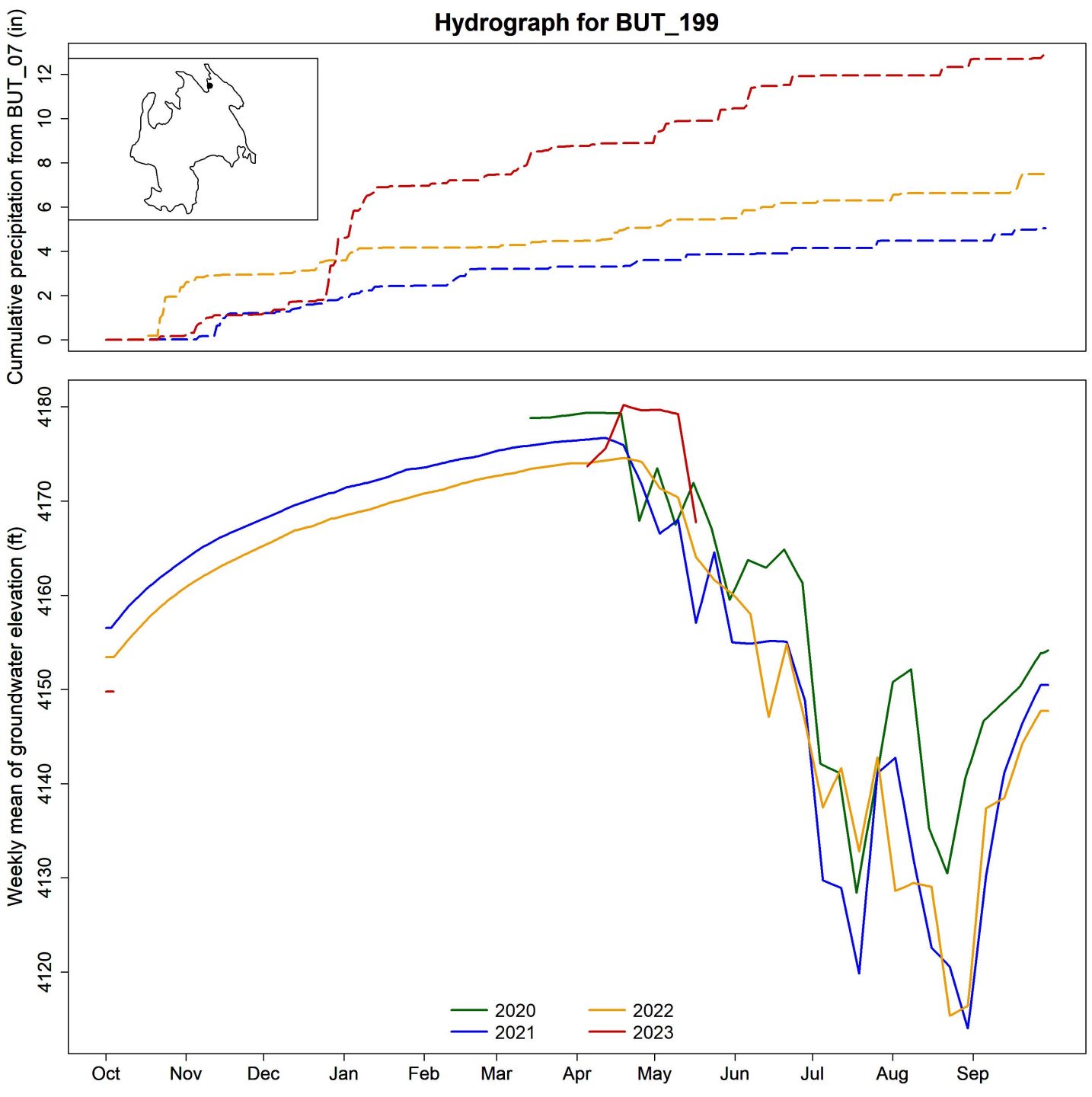
Hydrograph for BUT_199
Cumulative precipitation from BUT_07 (in)
0
2
4
6
8
10
12
Weekly mean of groundwater elevation (ft)
4120
4130
4140
4150
4160
4170
4180
2020
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2022
2023
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Sep

[PLACEHOLDER] Snowpack-Groundwater Correlation

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	$1,478,000
Fee Study and Economic Analysis • Evaluation of fee/rate options • Parcel specific groundwater use and supply • Fee/rate schedule development • Economic analysis	$280,000

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
Monitoring Network • Identify sites and collect baseline data • Conduct projects at identified sites • Monitoring and data collection	$954,000

Project Schedule

	Not started yet
	Ongoing
	Completed

		October 2023	February 2024	May 2024	August 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**	Some work through the city of Dorris project			
4	**Monitoring network**				

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

	Not started yet
	Ongoing
	Completed

MODEL UPDATES	October 2023	February 2024	May 2023	August2023
Evaluate current GW/SW model	Started, list of improvements	Completed		
Update geology based AEM surveys				
Update PRMS watershed model (including snow updates)				
Water budget and estimate for applied water use				
Coupling of PRMS and GW model				
Model recalibration using current data				
Sensitivity analysis of model boundaries → better understanding of FLOWS IN&OUT				
Simulations through 2023 (GSP model was 1991-2018)				

Data Gap Work Group Meeting Outcomes

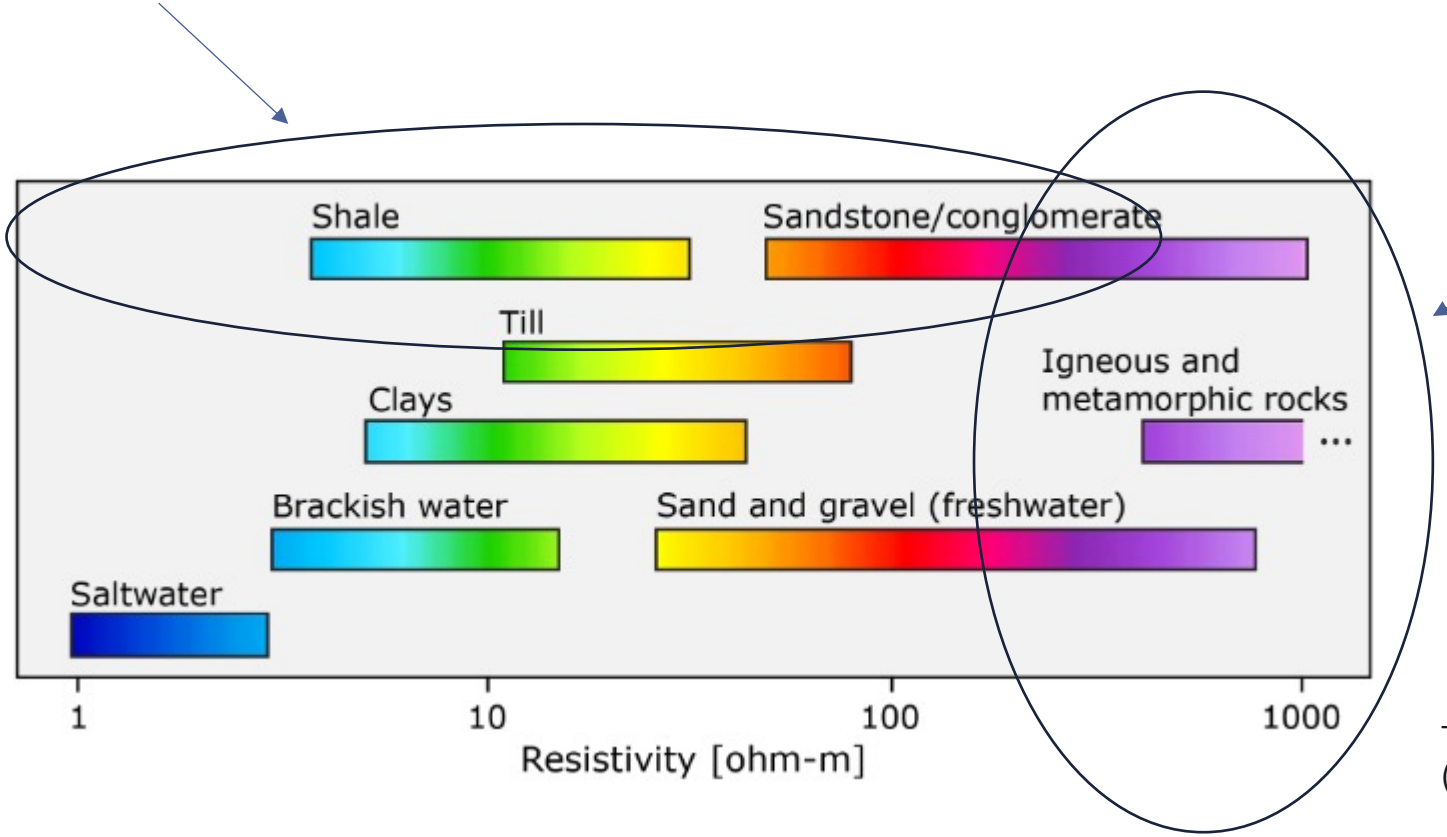
- High Priority
  - Snow station
  - Stream gage additions
- Medium
  - Expanded isotope and noble gas sampling
- Low
  - GDE identification and ground truth evaluation

Butte Model Update

- Butte Valley Integrated Hydrologic Model (BVIHM)
  - Updates to geologic model from the DWR AEM survey
  - Extending the Upper Klamath Precipitation Runoff Modeling System (PRMS) to present water year
    - Recharge
  - Incorporating automatic updates to extend model to new water year
  - Updates to Soil Water Budget

Interpreting AEM resistivity: Overlapping Data

Consolidated sedimentary rocks take on a large range of resistivity.



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

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

AEM and Butte Valley

- **AEM was designed for range of coarse to fine sediment** and basalt and volcanic deposits may have been removed
- Butte 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 Butte Valley

- Notes about Ramboll's analysis

The High Cascade Volcanics was blanked from the map

The report says that lava flows were also blanked but the prominent Butte Valley Basalt Flow is shown here as yellow, a high coarse fraction. This was not blanked, although similar to the High Cascade Volcanics.

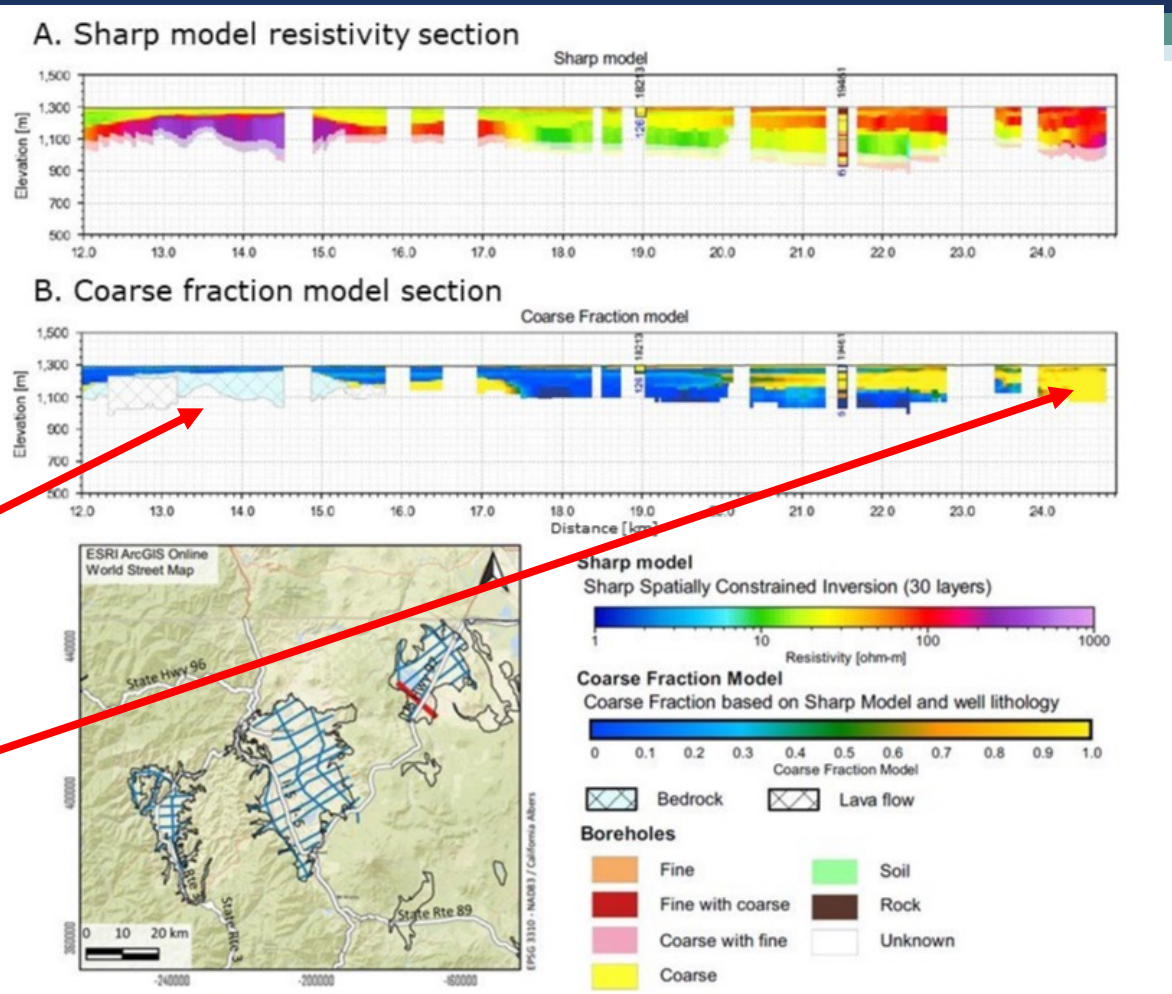


Figure 5-3 Lithology model resulting from the resistivity-to-lithology transform along Profile 600100 in Butte Valley. Profile A shows the sharp model resistivity. Profile B shows the calculated coarse fraction, where the yellow colors show the sediments/materials with high coarse content (scale value 1.0) transitioning to the dark blue colors showing sediments with the highest clay content (scale value 0.0). The vertical columns show the accumulated coarse thickness as calculated in the individual lithology logs. The red line on the map shows the location of the profile. The areas with bedrock and lava flows have been blanked from the map.

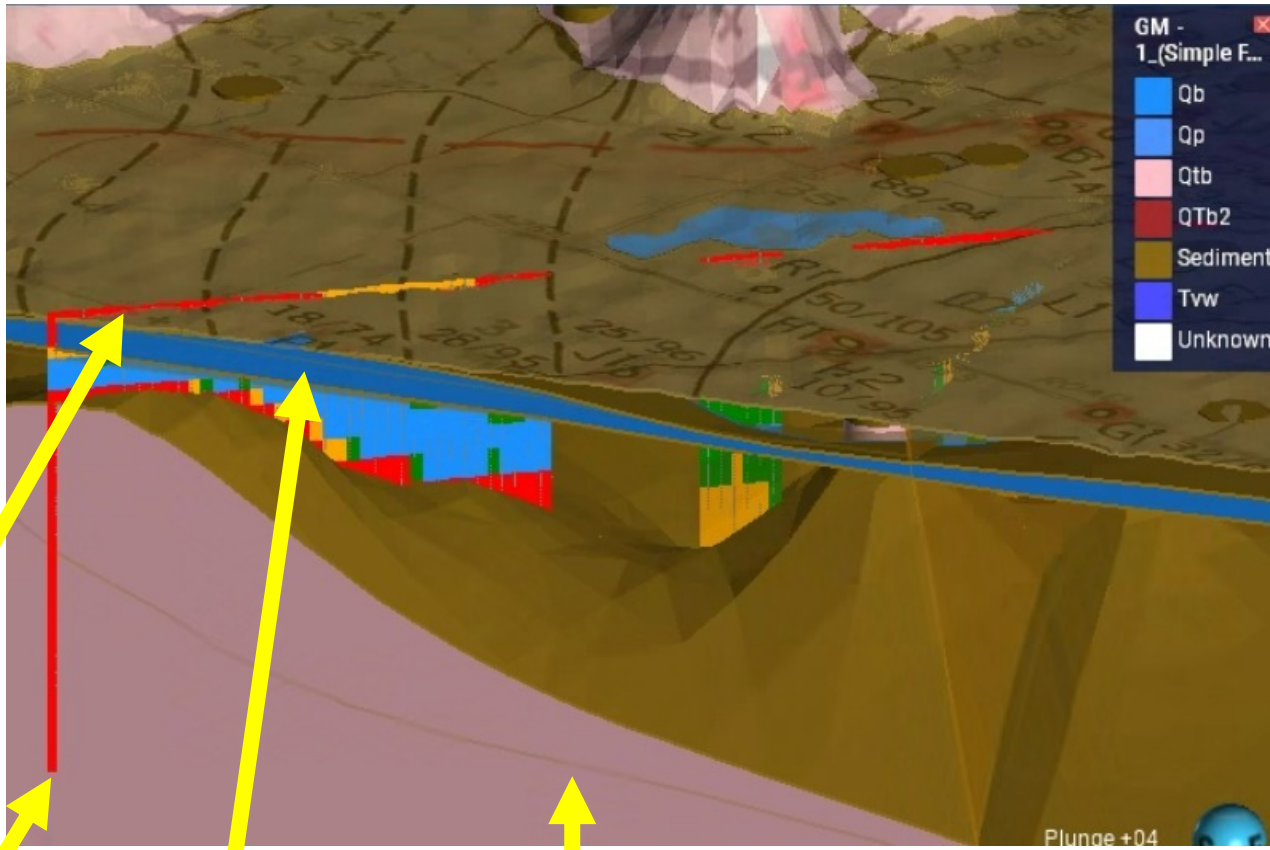
AEM Applicability to Butte Geological Model

- 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 better defining thickness of geologic units, shapes of alluvial deposits, and fault blocks

Butte Valley Geologic Model Updates

Better defining basin boundaries

- Prather Ranch Area
- Extent of Butte Valley Basalt (shown in thin blue wedge under Macdoel)



Volcanic deposit

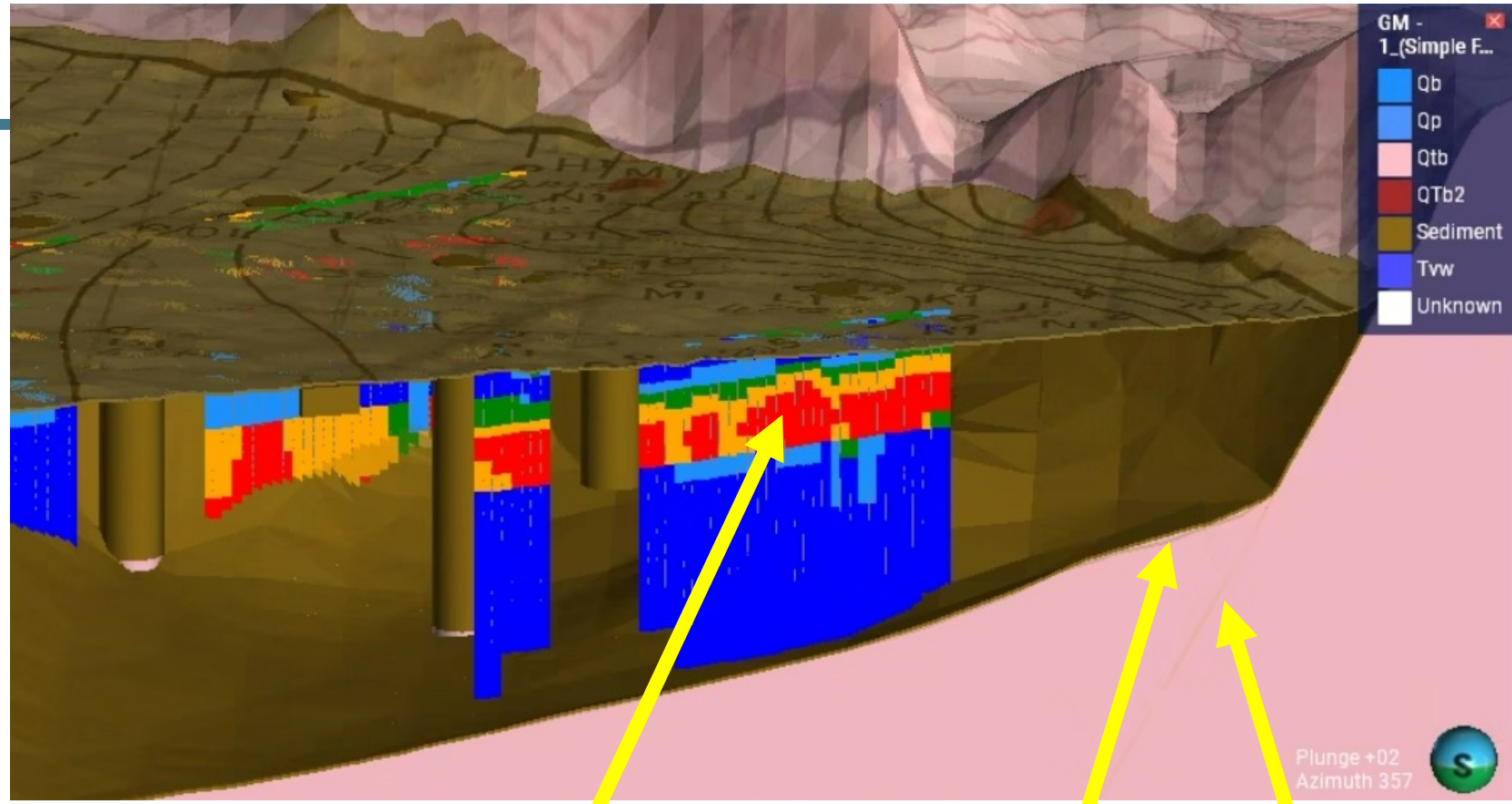
Thin layer of basalt (qb)

New AEM

Previous bottom of lake deposits used in old MODFLOW

Showing previously unidentified layer

- South west of Dorris a distinct layer (either by lithology or water chemistry) exists
- Thickness did not change much in this area



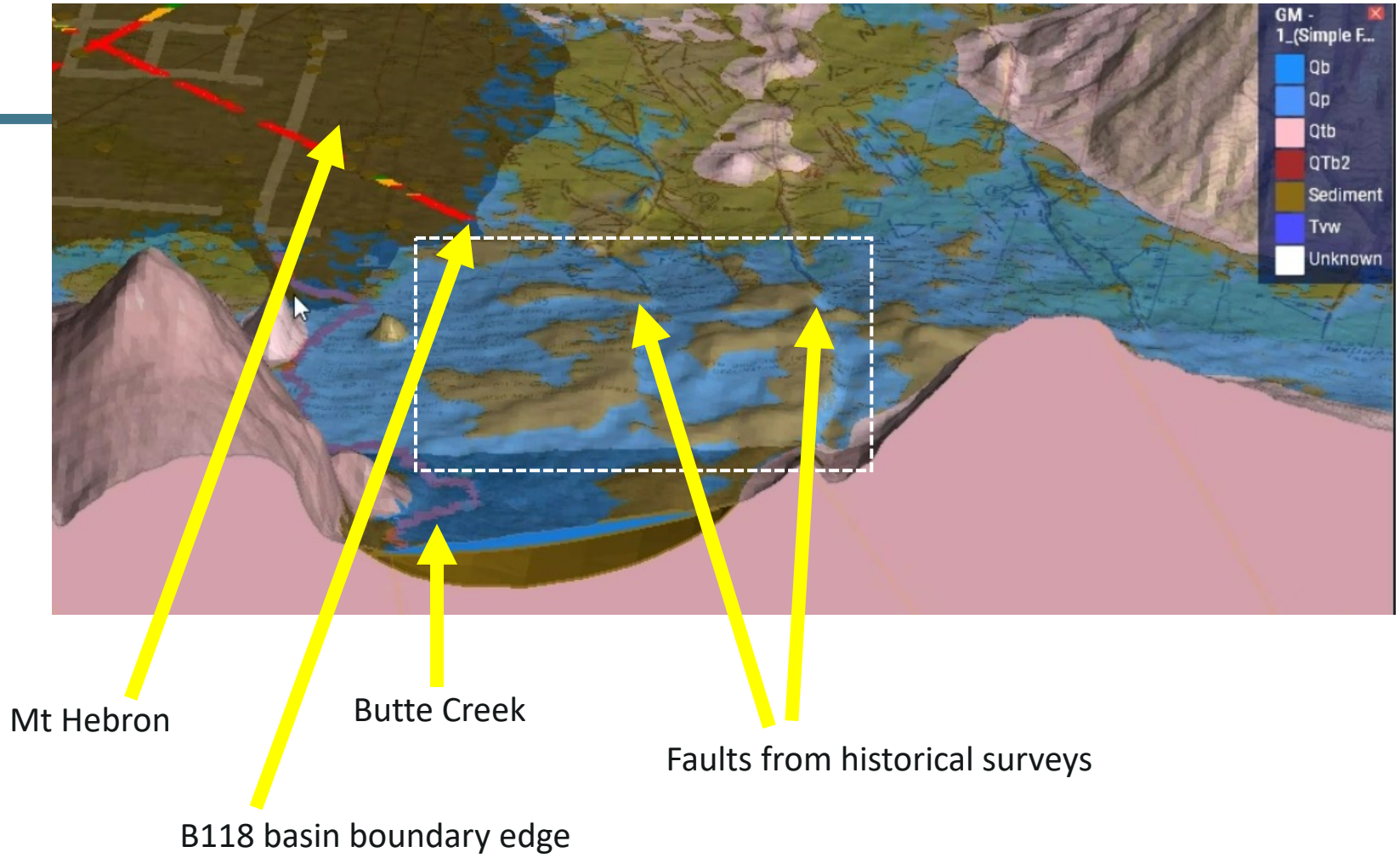
Potential volcanic deposit. Will have drastically different hydraulic properties above and below.

Fault

Minimal change in thickness

South of Mount Hebron

- AEM Survey extended to the south east near Mount Hebron.
- Significant geologic features and groundwater flow features exist near the South East near Mount Hebron which are areas of future refinement.
- AEM stopped at the B118 basin boundary.



Butte Valley Precipitation Runoff Modeling System (PRMS)

- Extension to WY 2023
  - Upper Klamath PRMS from the USGS
    - 1980 to 2015
  - Add data up to WY 2023
    - Precipitation
    - Temperature
- Provides groundwater recharge from precipitation to the groundwater model

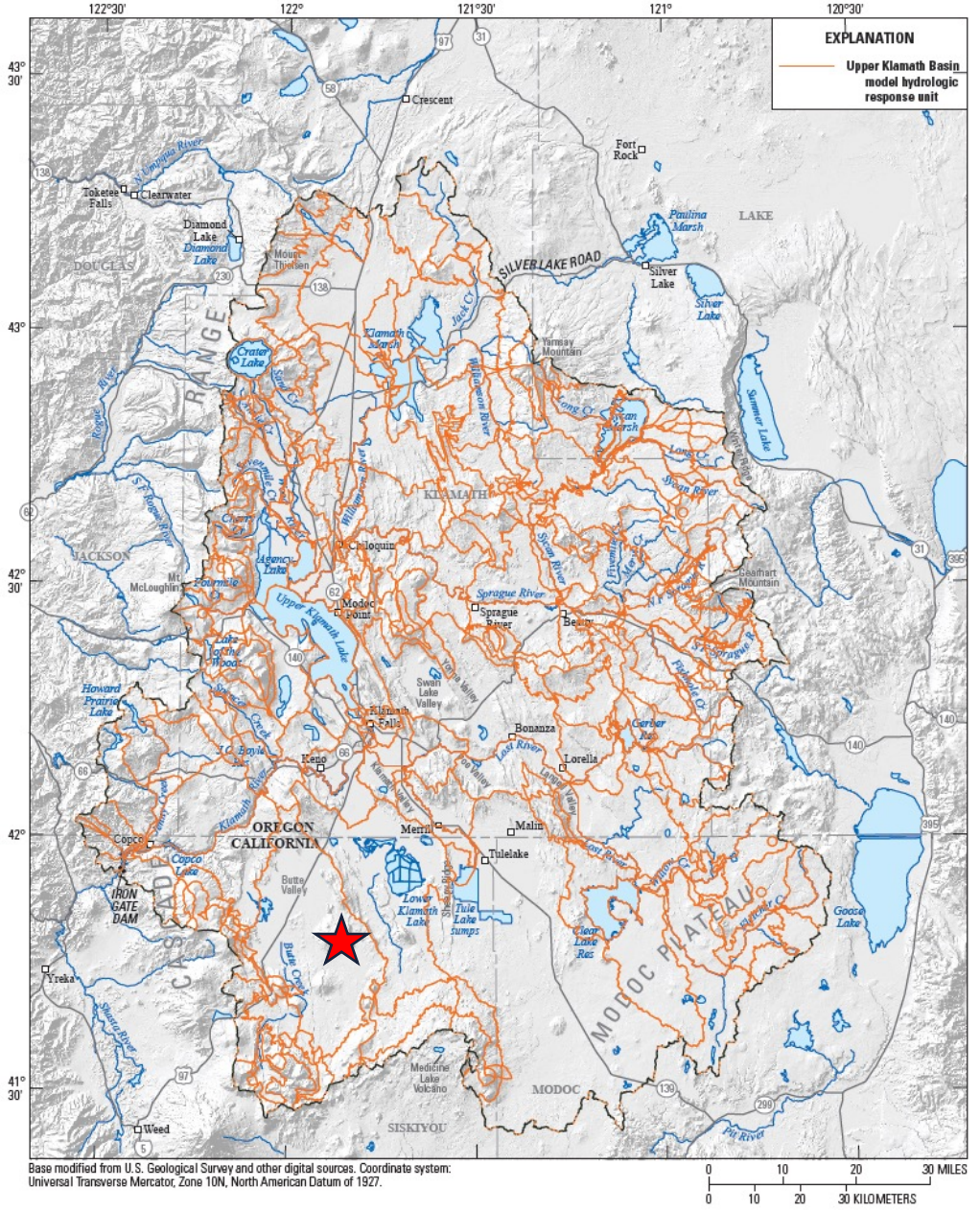


Figure 5. Upper Klamath Basin model hydrologic response units.

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


LWA
Thank You