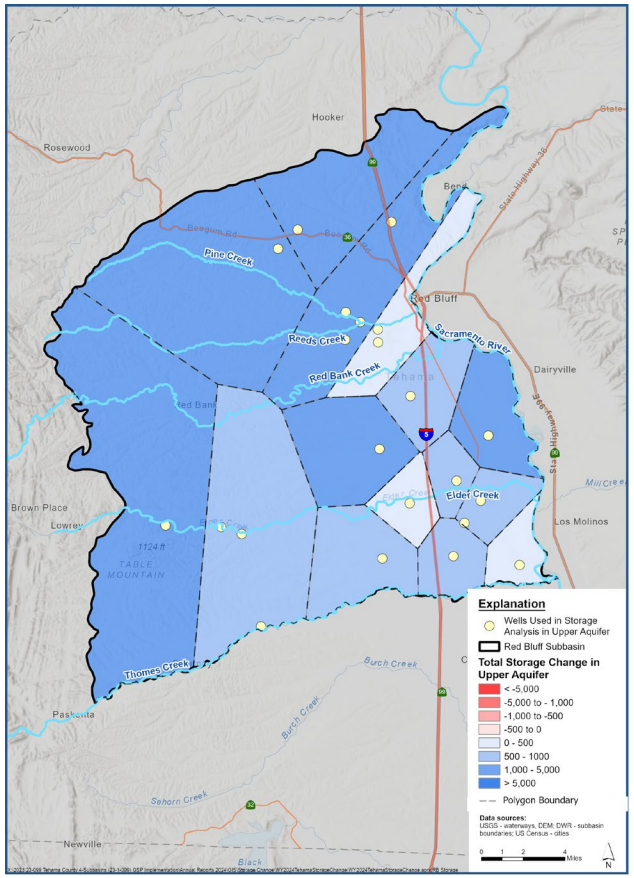
Groundwater Conditions – Annual Groundwater Storage Red Bluff Subbasin

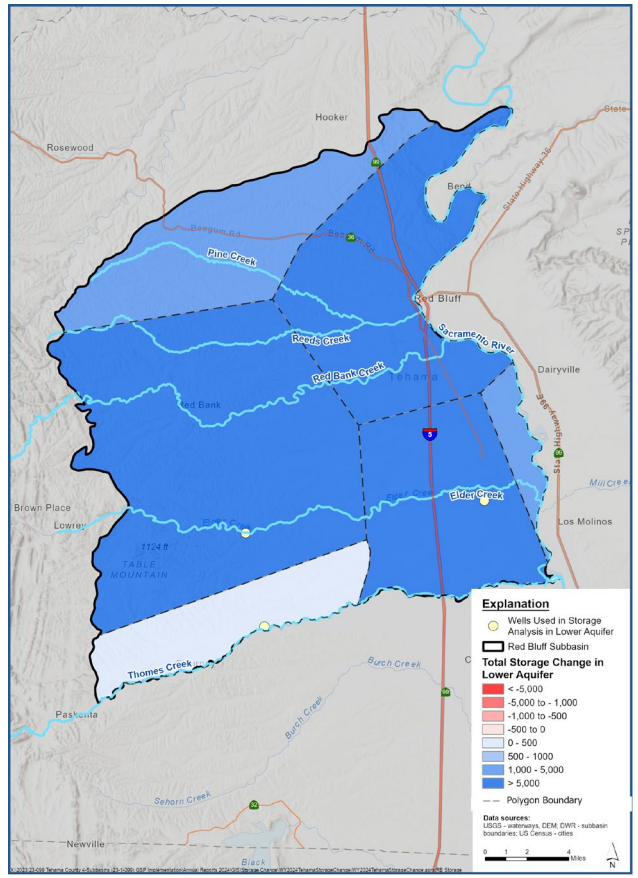
Groundwater Storage

- Estimated from water level changes between Spring 2023 and Spring 2024
- Change in storage was approximately **44,800** AF total Spring 2023 to Spring 2024.

Table 4-1. Change in Groundwater Storage Based on Seasonal High Groundwater Levels

Aquifer	2024 (af)
Upper Aquifer	14,100
Lower Aquifer	30,700
Total	**44,800**





LSCE

DAVIDS ENGINEERING, INC

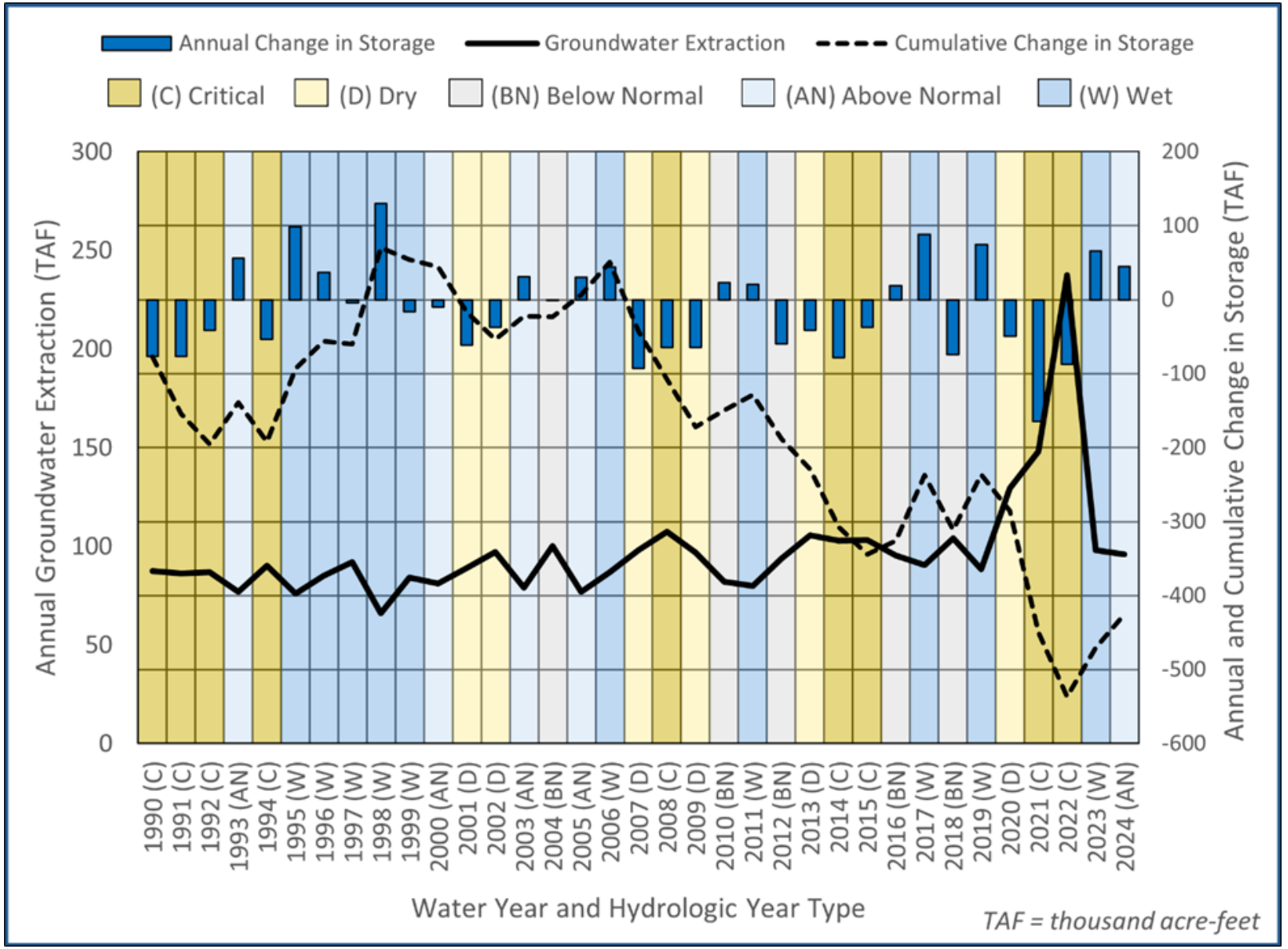
Groundwater Conditions – Annual Groundwater Storage Red Bluff Subbasin

Table 4-1. Red Bluff Subbasin Annual Groundwater Extraction and Change in Storage			
Water Year (Hydrologic Year Type)	**Groundwater Extraction[1] (AF)**	**Annual Change in Storage (AF)**	**Cumulative Change in Storage (AF)**
2021 (C)[2]	148,100	-164,000	-450,000
2022 (C)[2]	237,300	-87,000	-537,000
2023 (W)	98,000	66,000	-471,000
2024 (AN)	95,800	44,800	-425,600
Historic Averages (1990-2023)[3]			
1990-2023 (33 years)	97,100	-13,800	
W (9 years)	84,700	54,000	
AN (4 years)	78,500	26,900	
BN (5 years)	95,000	-18,600	
D (6 years)	102,600	-57,700	
C (9 years)	116,600	-75,400	

LSCE

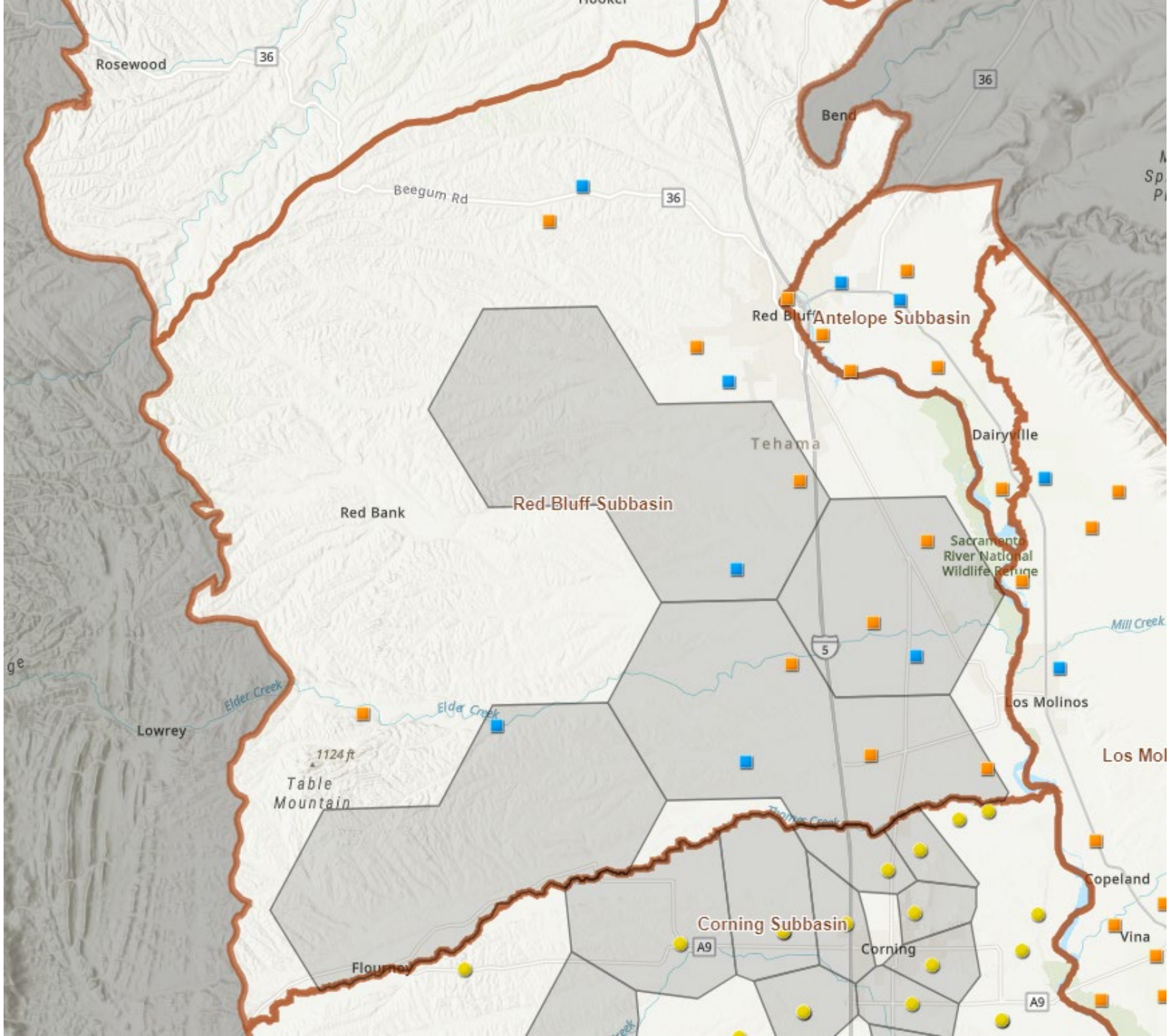
DAVIDS ENGINEERING, INC

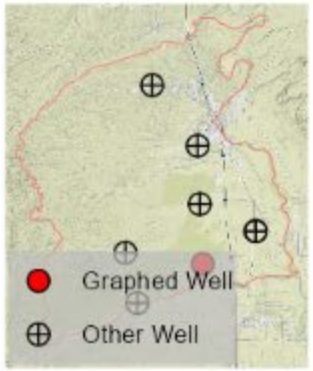
Groundwater Conditions – Cumulative Groundwater Storage Red Bluff Subbasin



LSCE

DAVIDS ENGINEERING, INC


Rosewood
36
Beegum Rd
Bend
Red Bluff
Antelope Subbasin
Tehama
Dairyville
Red Bank
Red-Bluff-Subbasin
Sacramento River National Wildlife Refuge
Mill Creek
5
Elder Creek
Lowrey
1124 ft
Table Mountain
Los Molinos
Corning Subbasin
A9
Corning
Copeland
Vina
Flournoy



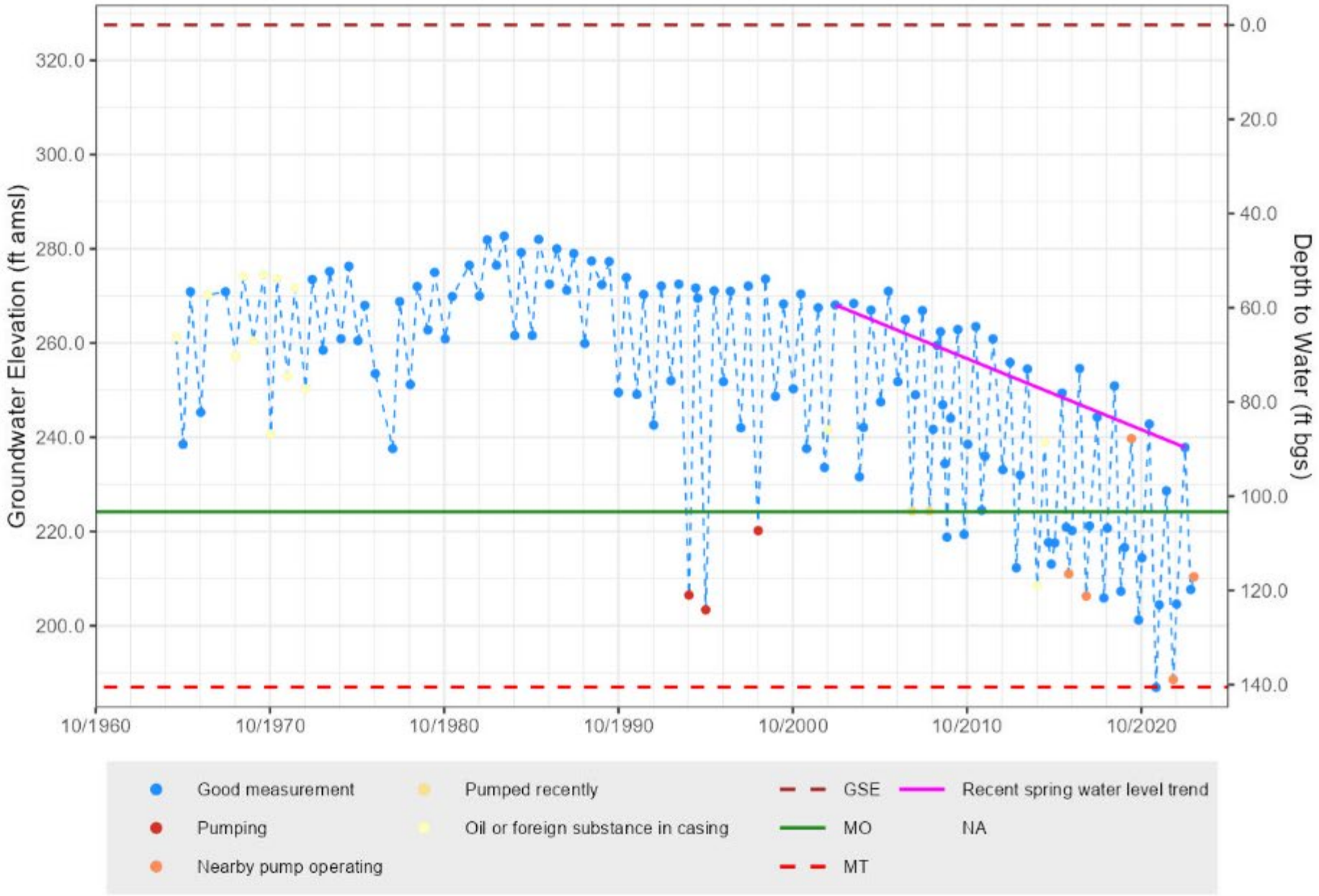
MO GWE: 224.2 ft amsl
MO DTW: 103.29 ft bgs

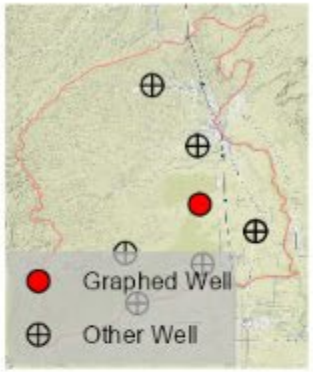
MT GWE: 187 ft amsl
MT DTW: 141 ft bgs

Statistics of spring water levels for past 20 years (2003 to 2023):
Change = -30.25 ft
Average rate of change = -1.51 ft/year
Average water level = 267.17 ft amsl

Red Bluff Subbasin - State Well Number (SWN) 25N03W19N001M (RB-5U)

Upper Aquifer Well Depth: 370 ft. Perforation top & bottom: 135 - 358 ft bgs





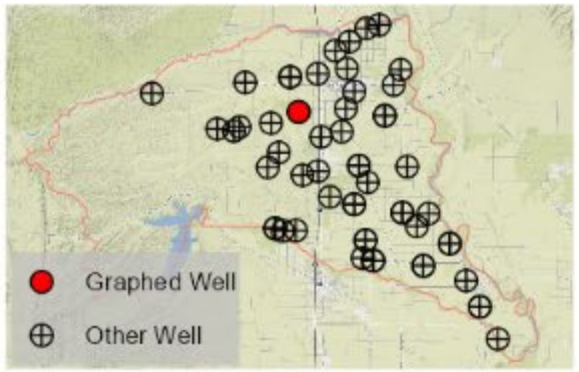
MO GWE: 257.1 ft amsl
MO DTW: 76.36 ft bgs

MT GWE: 255 ft amsl
MT DTW: 78 ft bgs

Statistics of spring water levels for past 20 years (2003 to 2023):
Change = -31.5 ft
Average rate of change = -1.58 ft/year
Average water level = 281.42 ft amsl

Red Bluff Subbasin - State Well Number (SWN) 26N04W25J001M (RB-3U)

Upper Aquifer Well Depth: 128 ft. Perforation top & bottom: 116 - 124 ft bgs



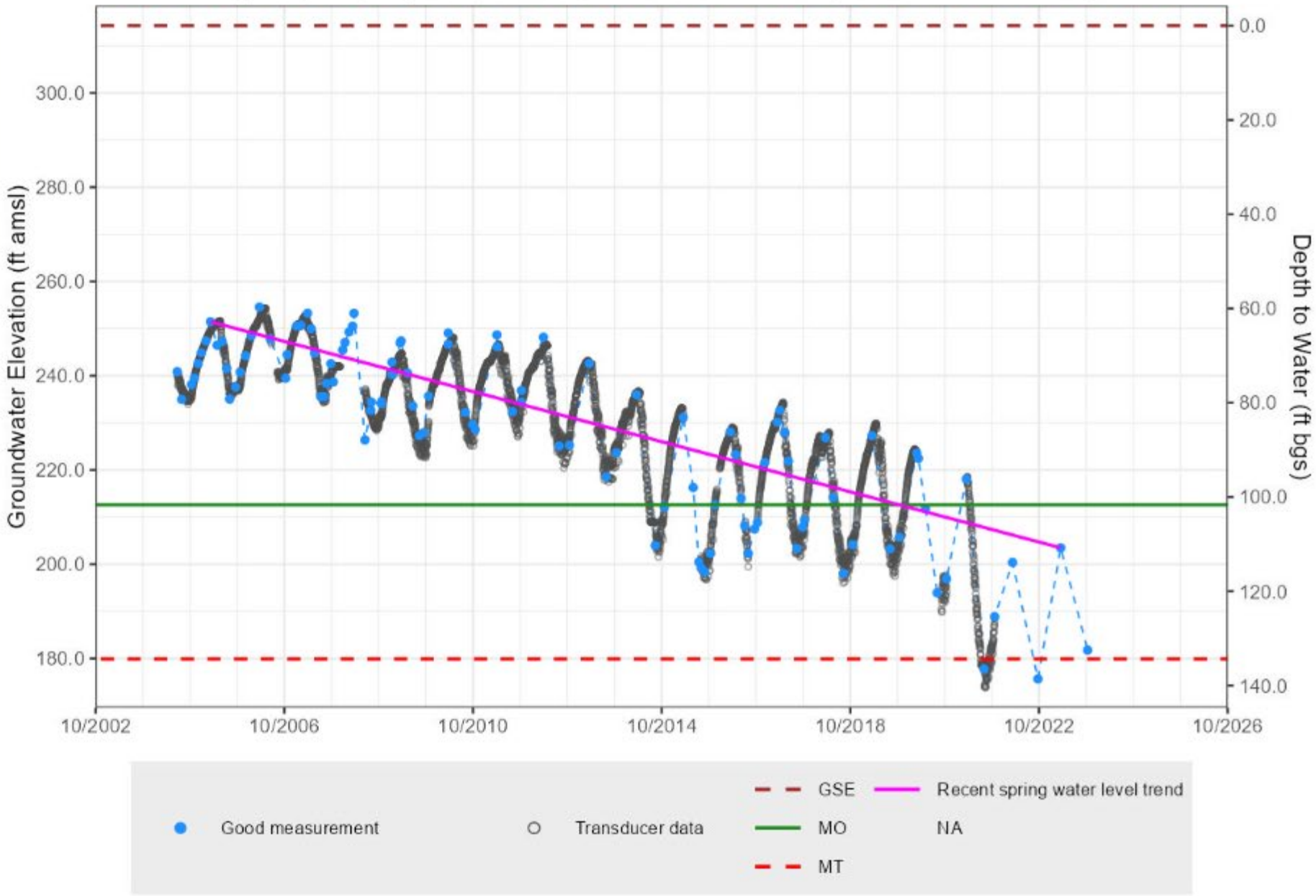
MO GWE: 212.6 ft amsl
MO DTW: 101.66 ft bgs

MT GWE: 179.9 ft amsl
MT DTW: 134.36 ft bgs

Statistics of spring water levels for past 18 years (2005 to 2023):
Change = -47.97 ft
Average rate of change = -2.66 ft/year
Average water level = 235.56 ft amsl

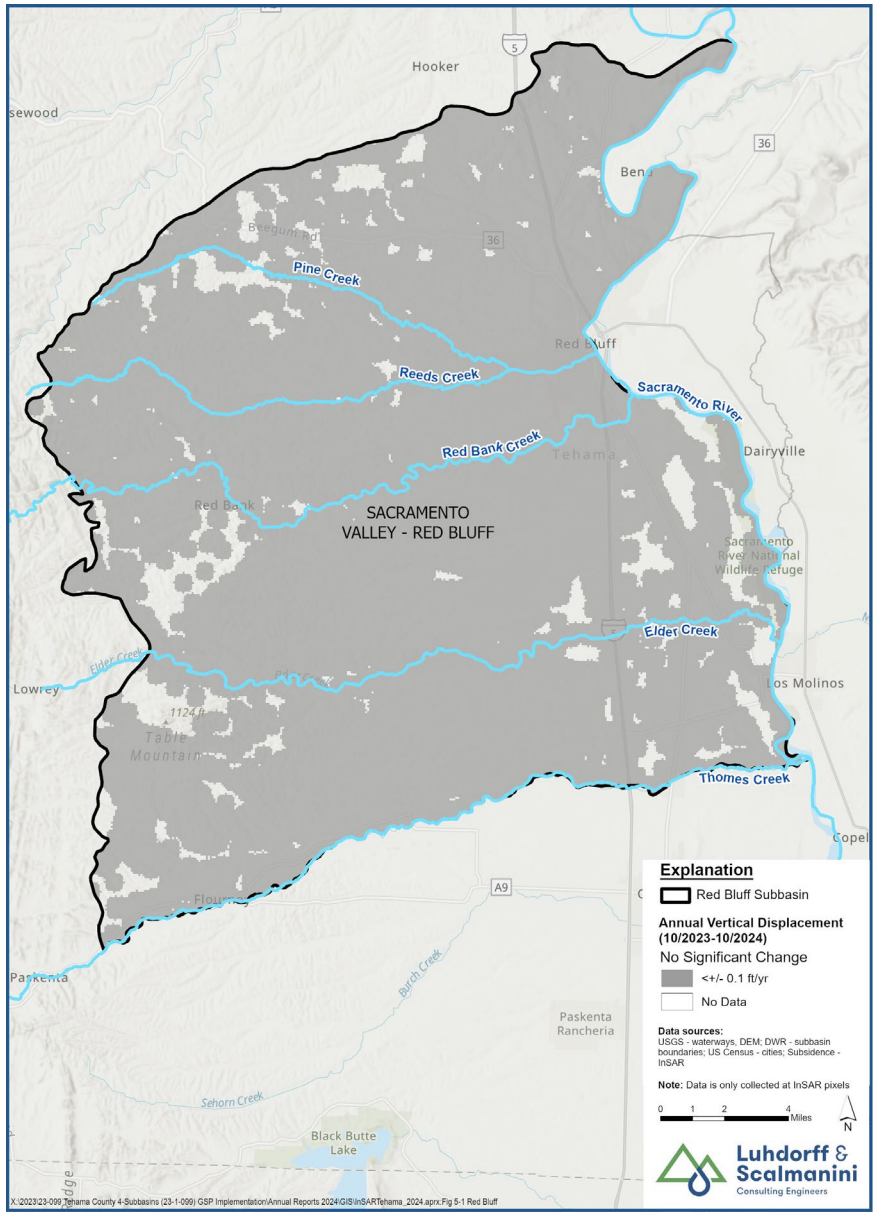
Corning Subbasin - State Well Number (SWN) 24N03W29Q002M

Upper Aquifer (Deep Zone) Well Depth: 575 ft. Perforation top & bottom: 490 - 550 ft bgs



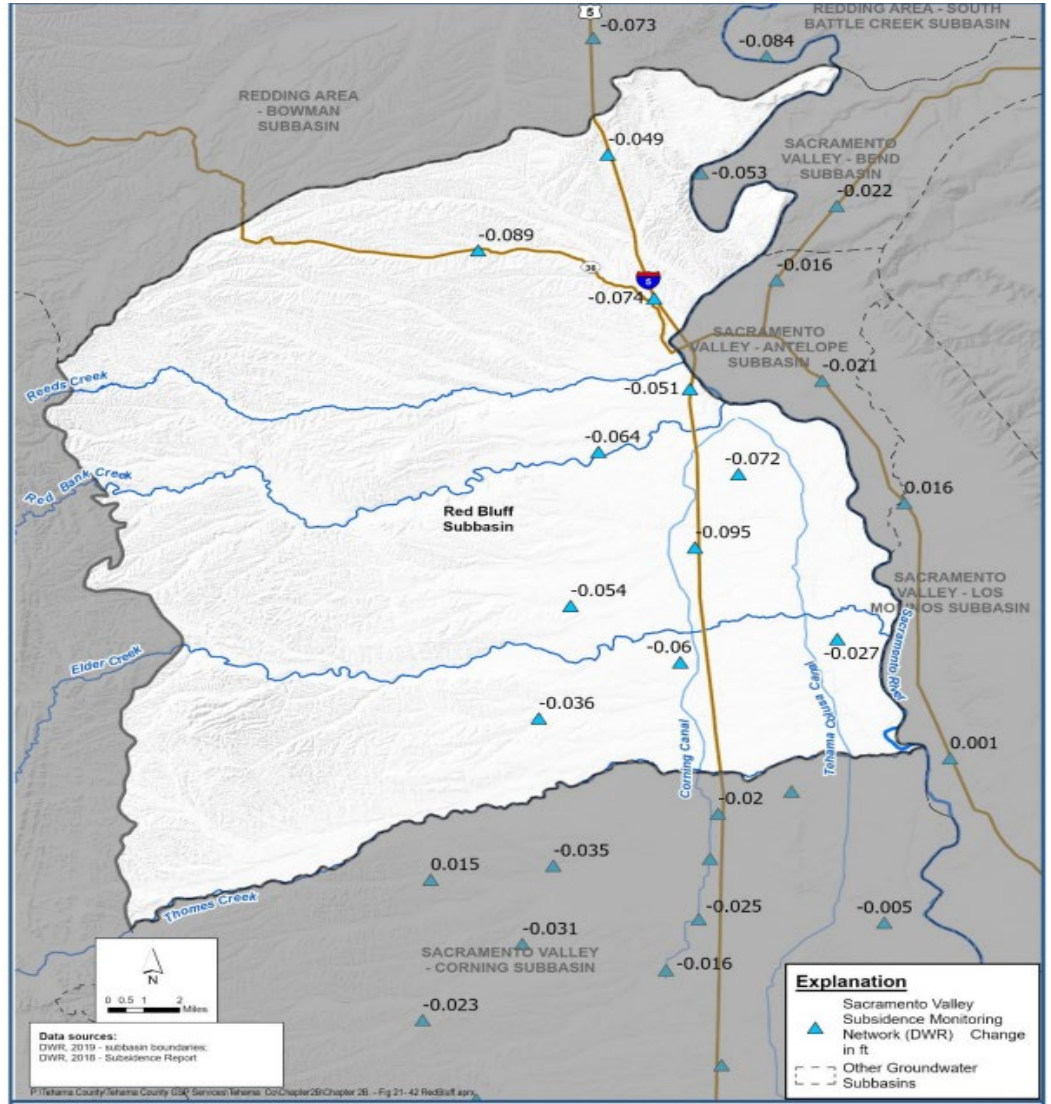
Groundwater Conditions – Land Subsidence Red Bluff Subbasin

- WY 2023 (InSAR) = -0.04 to -0.035 ft
- Fell within <+/- 0.01 ft/yr (No significant change)



LSCE

DAVIDS ENGINEERING, INC



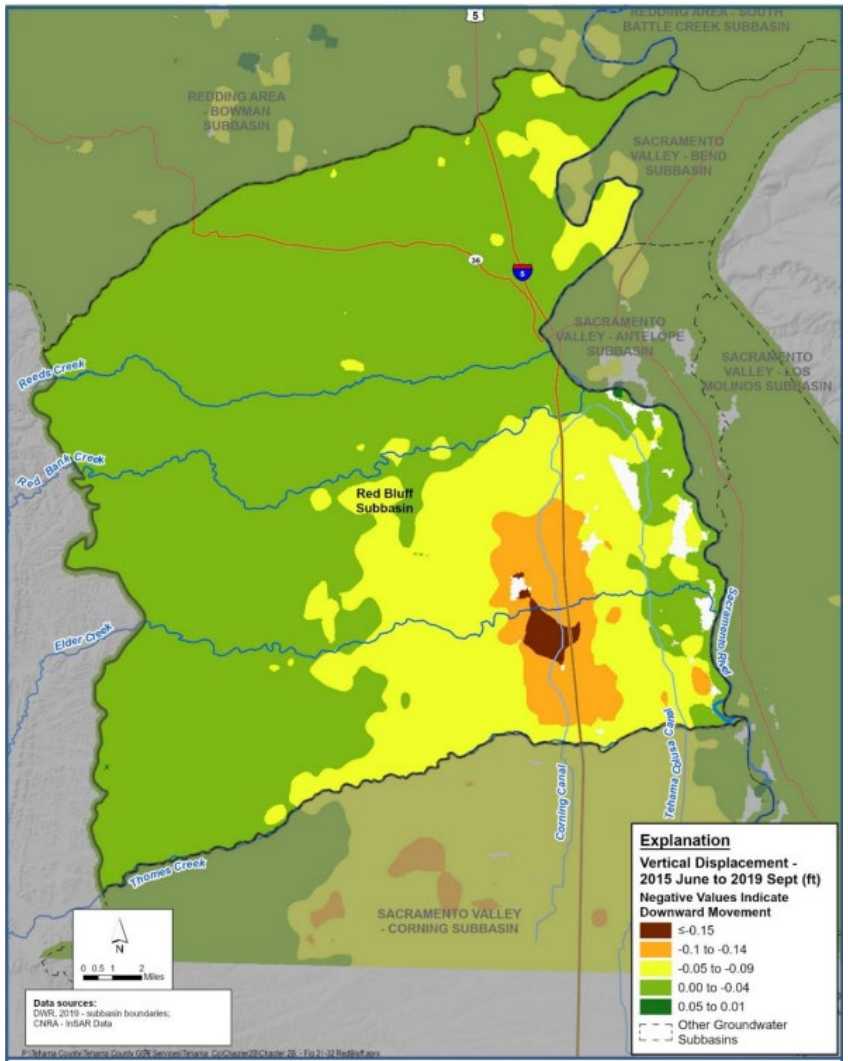
TEHAMA COUNTY

LSCE Team

Subsidence Measurements Between 2008 and 2017

Groundwater Sustainability Plan
Red Bluff Subbasin

Figure 2-53



TEHAMA COUNTY

LSCE Team

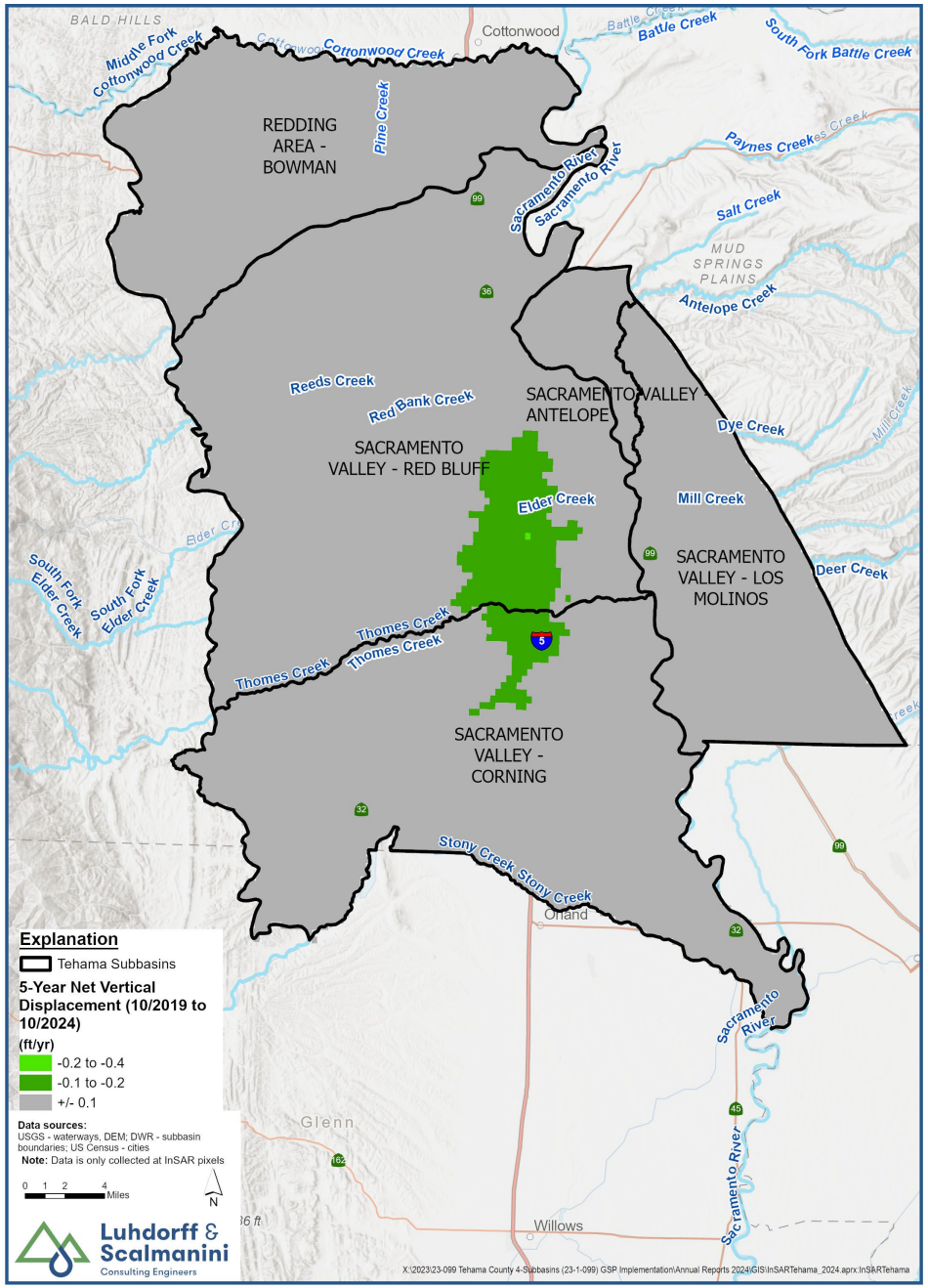
DWR InSAR Subsidence Map

Groundwater Sustainability Plan
Red Bluff Subbasin

Figure 2-54

Groundwater Conditions – Land Subsidence

- Land Subsidence
  - Utilizing Interferometric Synthetic Aperture Radar (InSAR)
- Minimum Threshold (MT) = 0.5 feet per five years (0.1 foot per year)
- Measurable Objective = Zero Inelastic Subsidence



LSCE

DAVIDS ENGINEERING, INC

InSAR Data Accuracy for California Groundwater Basins CGPS Data Comparative Analysis January 2015 to October 2023

- 4.0 Accuracy Statement The National Standard for Spatial Data Accuracy (NSSDA), developed by the Federal Geographic Data Committee (Document Number FGDC-STD-007.3-1998), offers a well-defined statistic and testing methodology for positional accuracy of geospatial data derived from various surveying methods, including satellite remote sensing. The NSSDA is based on comparison of data from the tested dataset to values from an independent source of higher accuracy. For this study, variation in vertical displacement of California's ground surface over time, as measured from interferometric synthetic aperture radar (InSAR) satellites, was statistically compared to available ground-based continuous global positioning systems (CGPS) data. Tested: 20mm vertical accuracy at 95% confidence level. As tested by the processes described, this analysis provides statistical evidence that InSAR data accurately measured vertical displacement in California's ground surface to within 20mm (value conservatively rounded up from 18.85mm) for the period January 1, 2015 through October 1, 2023. This statement of accuracy is based on the assumptions that the number, distribution, and characteristics of CGPS check point locations provide a representative sample of the entire study area and of the entire InSAR dataset, and that the CGPS data constitutes an independent source of higher accuracy. This statement of accuracy applies to the state-wide dataset and may vary for regional or localized area subsets.