

Napa County Groundwater Sustainability Agency

Technical Advisory Group

*Annual Report
Water Year 2024*

March 13, 2025



**Luhdorff &
Scalmanini**
Consulting Engineers





Outline

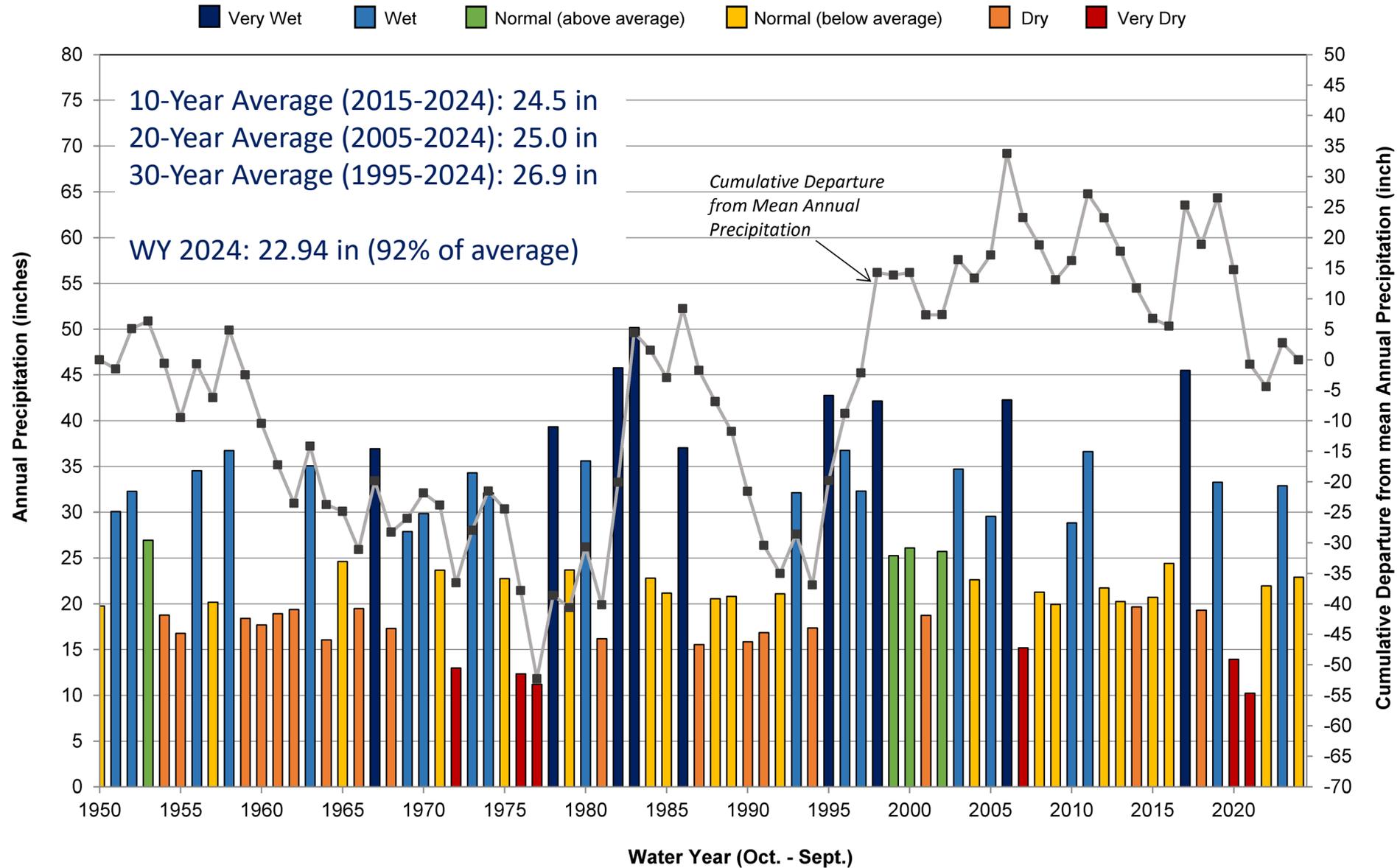
WY 2024 Conditions

Napa Valley Subbasin Water Budget

Sustainability Indicators

GSP Implementation

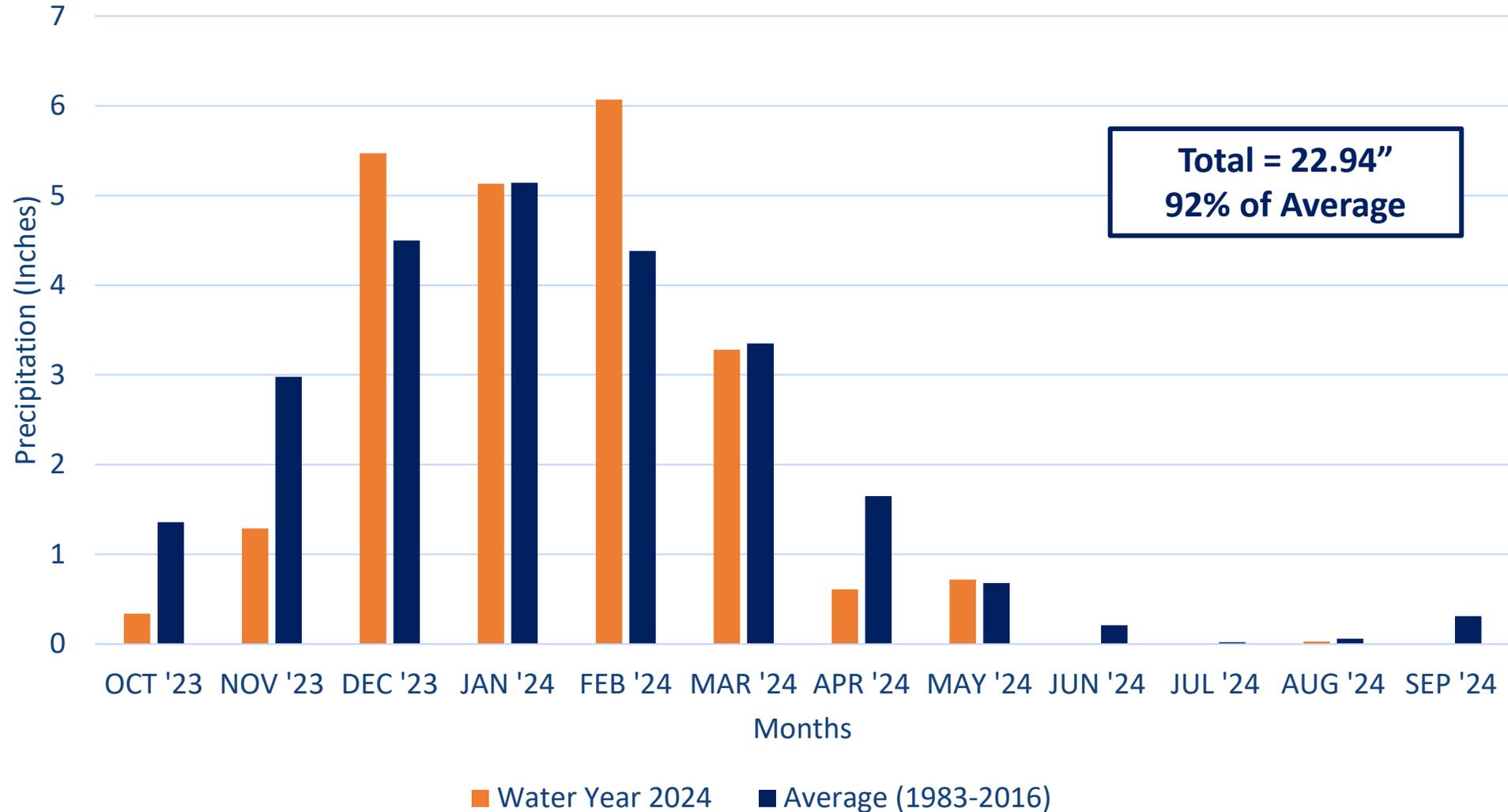
Historical Precipitation at Napa State Hospital





Precipitation: Water Year 2024

Napa State Hospital Station: Water Year 2024





Sustainable Management Criteria (SMC) for Chronic Lowering of Groundwater Levels (CGWL)

Minimum Threshold

Minimum static October groundwater elevation prior to 2015

Undesirable Result

20% of designated RMS well levels fall below the MT in fall (October) for 3 consecutive years of fall measurements in non-drought years

Trigger

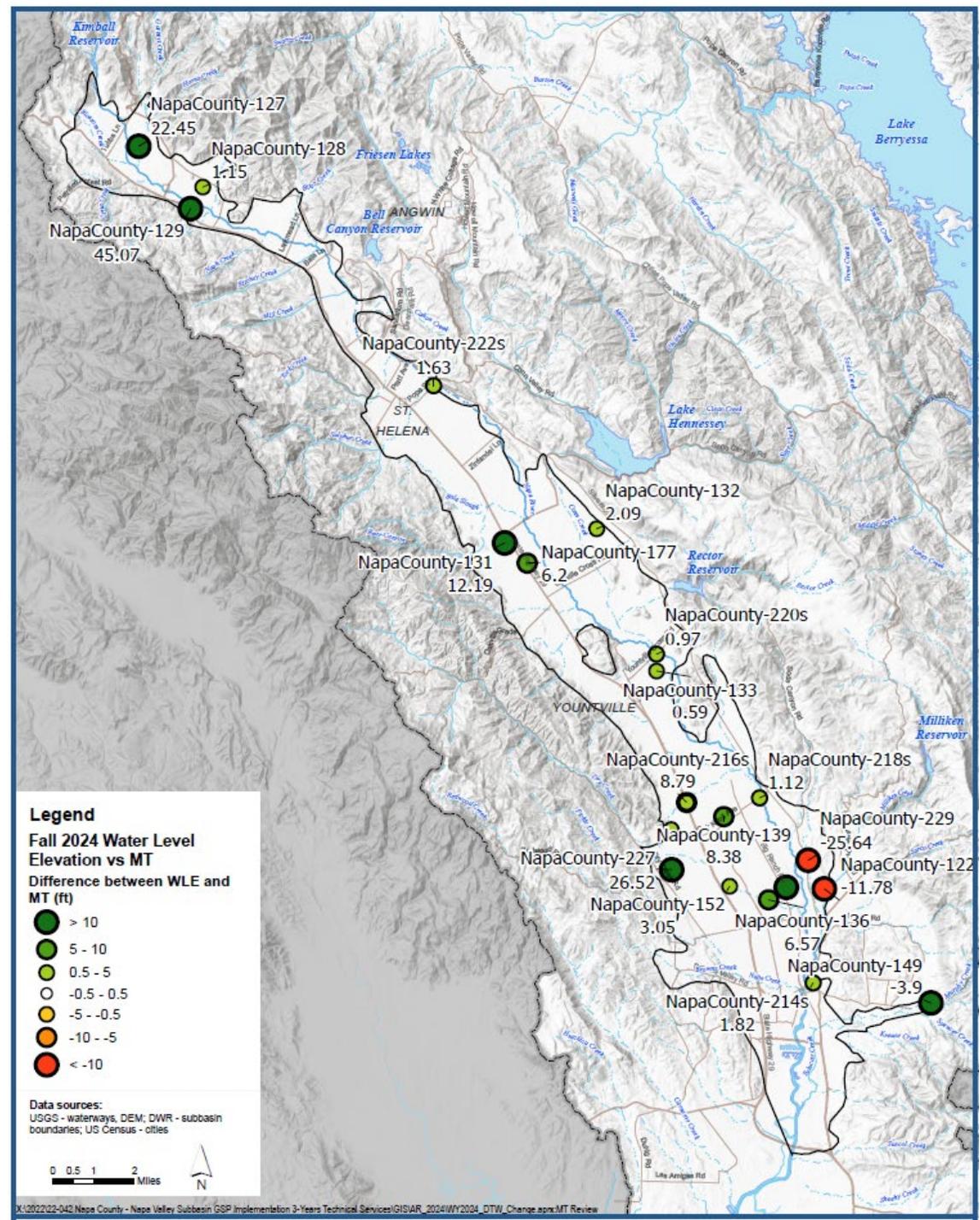
20% of designated RMS well levels are below the MT in the Fall during a single year

Measurable Objective

Average static October groundwater elevation from 2005 to 2014

Groundwater Levels for Fall 2024

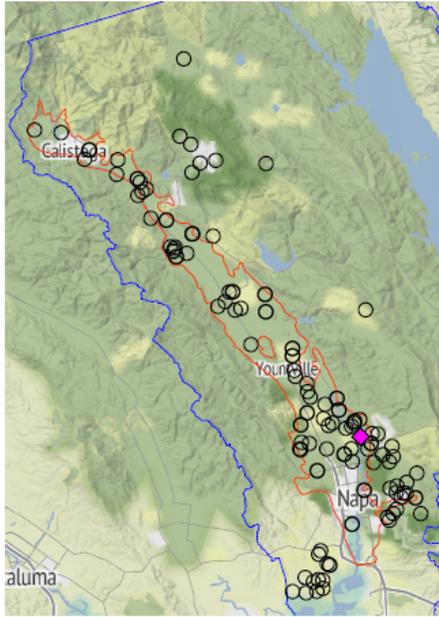
- Climate in WY 2024 was characterized by a wet, cool spring and an extremely hot dry summer.
- Groundwater SMC:
 - 2 of 22 wells exceeded the MT
 - 1 well has potentially exceeded the MT
 - 3 of 22 met their MO
- Depletion of ISW groundwater measurements:
 - 0 of 5 wells exceeded their MT
 - 0 of 5 wells met their MO



MT and MO Summary for Fall 2024 for GWL

- 2 of 22 wells exceeded the **MT**
- 3 of 22 wells met their **MO**
- NapaCounty-171 was unable to be measured in Fall 2024
 - The July 2024 measurement was below the MT.

Chronic Lowering of Groundwater RMS Wells	Minimum Thresholds (ft msl)	Measurable Objective (ft msl)	Fall Groundwater Elevations (ft, msl)				
			2020	2021	2022	2023	2024
			06N04W27L002M	-2	9	5.4	0.2
NapaCounty-122	-45	-37	-52.4	-54.1	-14.5	-11.6	-56.8
NapaCounty-127	351	374	370.0	380.9	373.9	373.8	373.4
NapaCounty-128	330	331	330.1	335.7	331.2	330.8	331.1
NapaCounty-132	109	115	106.3	100.8	97.3	112.9	111.1
NapaCounty-133	73	75	71.8	73.9	71.0	75.4	73.6
NapaCounty-135	33	62	52.7	17.9	20.9	33.4	37.5
NapaCounty-152	55	61	60.2	67.4	59.5	61.4	58.0
NapaCounty-171	165	173	158.3	208.4	167.3	180.2	--
NapaCounty-177	131	136	136.5	139.8	136.7	137.8	137.2
NapaCounty-214s	2	4	3.4	3.7	3.9	4.9	3.8
NapaCounty-215d	2	4	3.2	3.3	3.6	4.4	2.7
NapaCounty-216s	66	75	71.0	65.9	67.9	75.1	74.8
NapaCounty-217d	60	67	59.6	52.5	56.1	65.4	63.0
NapaCounty-218s	29	33	29.0	25.4	27.9	31.7	30.1
NapaCounty-219d	29	33	28.6	23.0	27.5	31.5	30.0
NapaCounty-22	150	170	163.6	162.4	163.3	165.5	165.3
NapaCounty-220s	75	79	74.9	70.6	74.5	77.0	76.0
NapaCounty-221d	75	79	74.2	70.0	74.0	76.8	75.6
NapaCounty-222s	185	191	185.5	182.3	187.1	187.9	186.6
NapaCounty-223d	164	171	156.1	155.8	172.4	169.3	166.9
NapaCounty-227	59	72	--	38.5	42.8	64.5	85.5
NapaCounty-229	-69	-42	-87.6	-82.3	-95.9	-91.4	-94.6



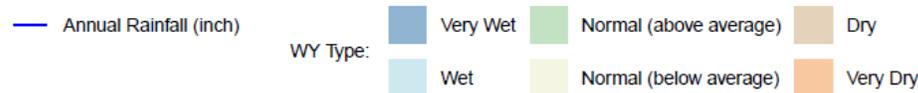
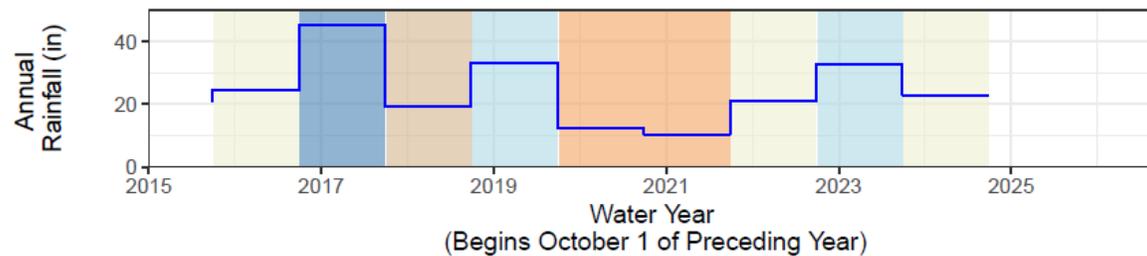
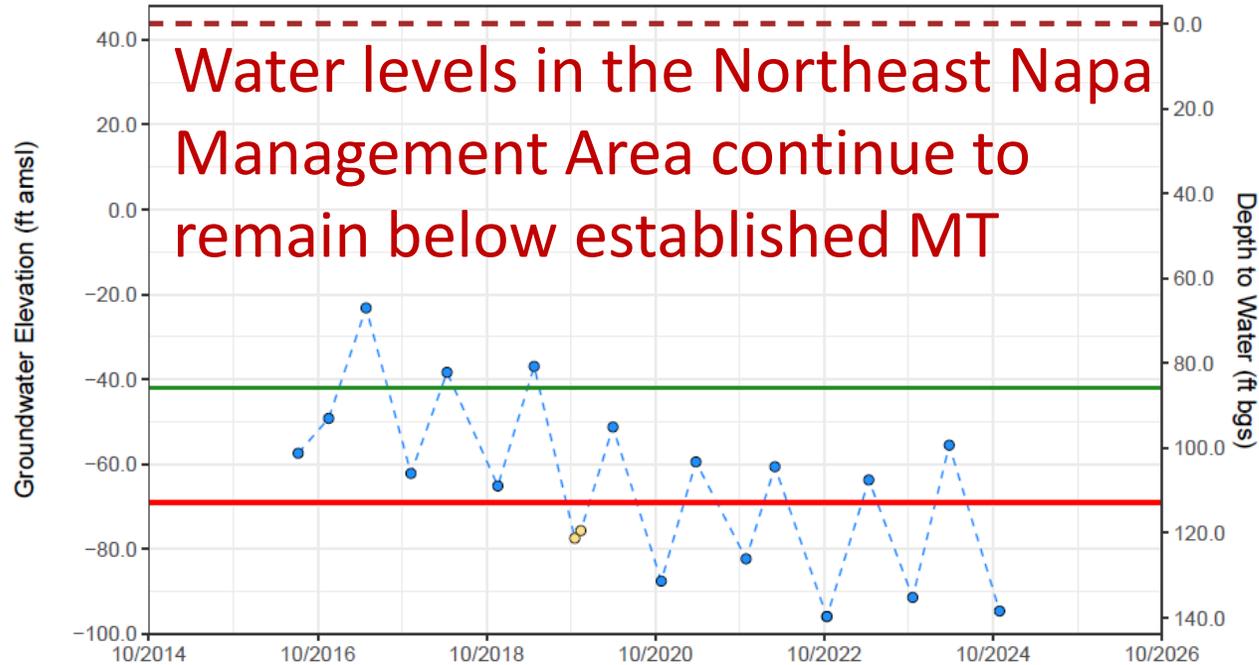
-94.64 ft amsl on 10/29/2024

Sustainable Management Criteria for
GWL

MO = -42.0 ft amsl

MT = -69.0 ft amsl

Well ID: NapaCounty-229
Well Depth: 350 ft. Perforation top & bottom: 180 – 350 ft bgs Subarea: Napa Valley Floor-MST



- Recovery spring-to-spring observed in WY 2024.
- NENMA is characterized by very thin alluvium bounded by faults.
- Groundwater production from low-permeability volcanic materials.
- Characterized by groundwater level decline.



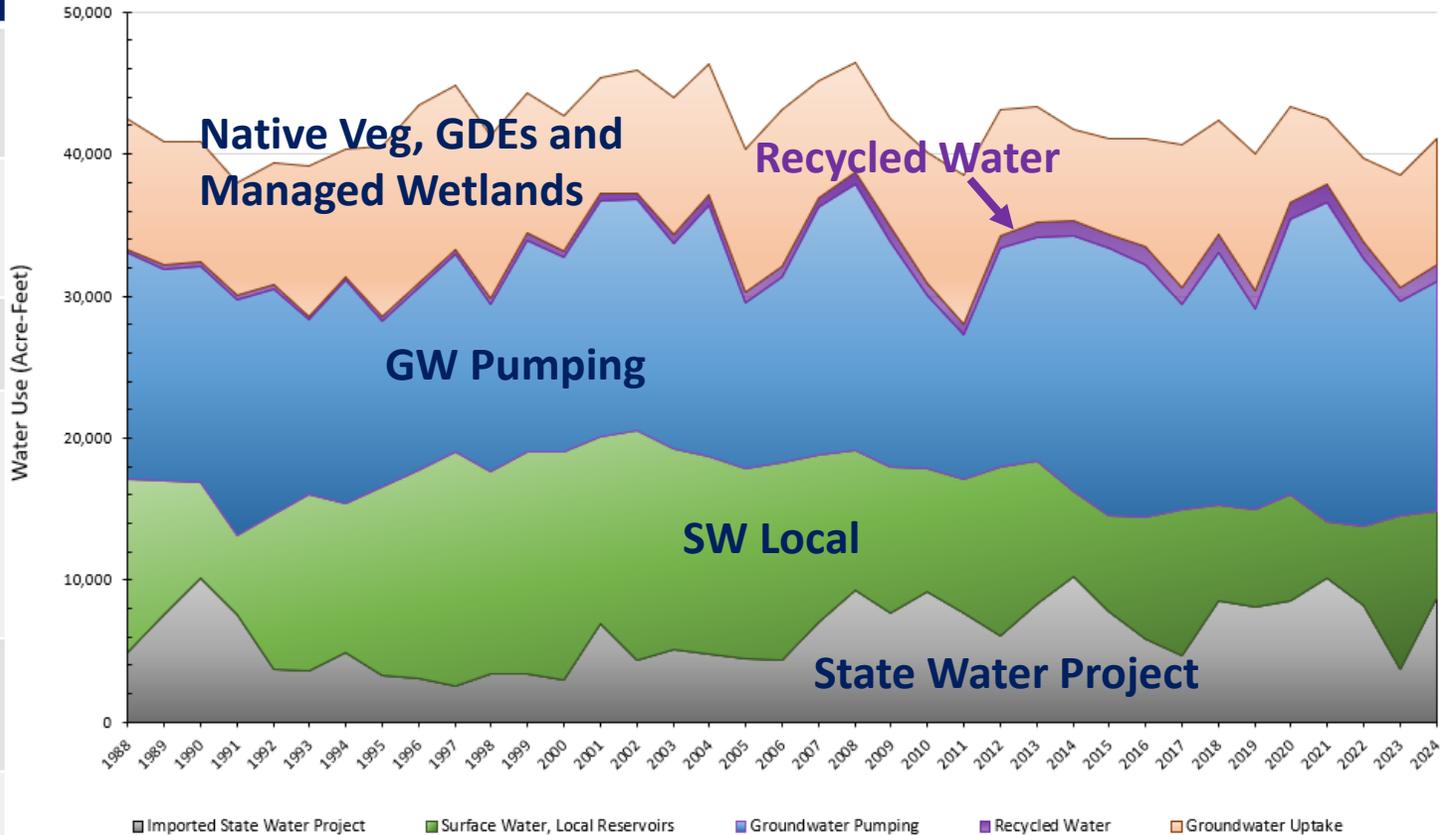
Napa Valley Subbasin Water Budget WY 2024



Water Use: WY 2024 (acre-feet)



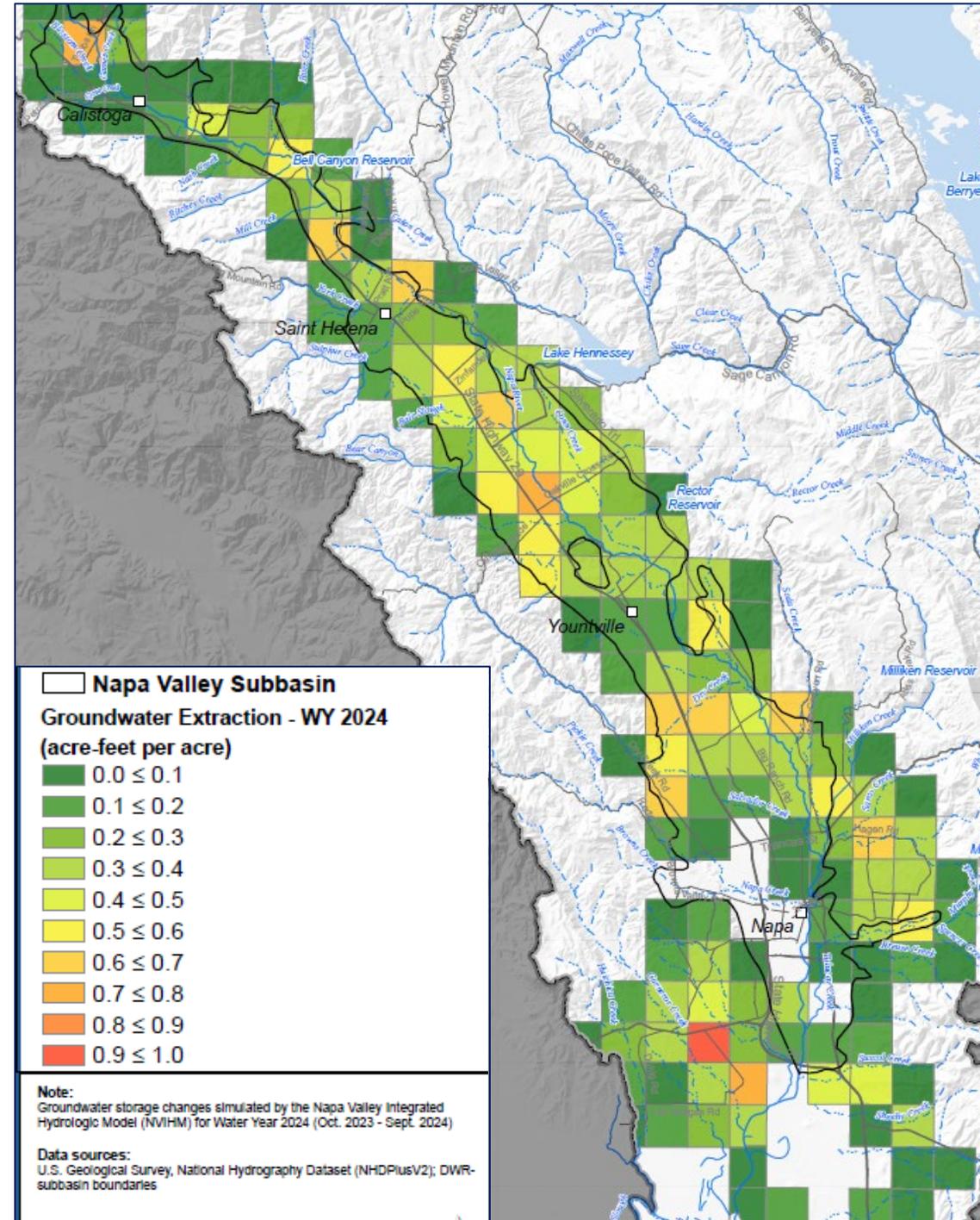
Water Use	2022 (BN)	2023 (W)	2024 (BN)
Groundwater Pumping	18,840	15,100	16,200
Native Veg, GDEs & Managed Wetlands	5,910	7,840	8,940
Recycled Water Use	1,190	1,020	1,140
Local Surface Water Use (including reservoirs, diversions, etc.)	5,560	10,780	6,090
State Water Project Use	8,230	3,750	8,760
TOTAL	39,730	38,490	41,550



Groundwater Pumping, 2024 (Acre-feet)

Groundwater Pumping	Acre-feet	Percent Use
Ag (vines and other)	11,780	73%
Municipal	480	3%
Self-Supplied Users Domestic (2,619 AF for outdoor use)	2,870	18%
Small Public Water Systems	1,070	7%

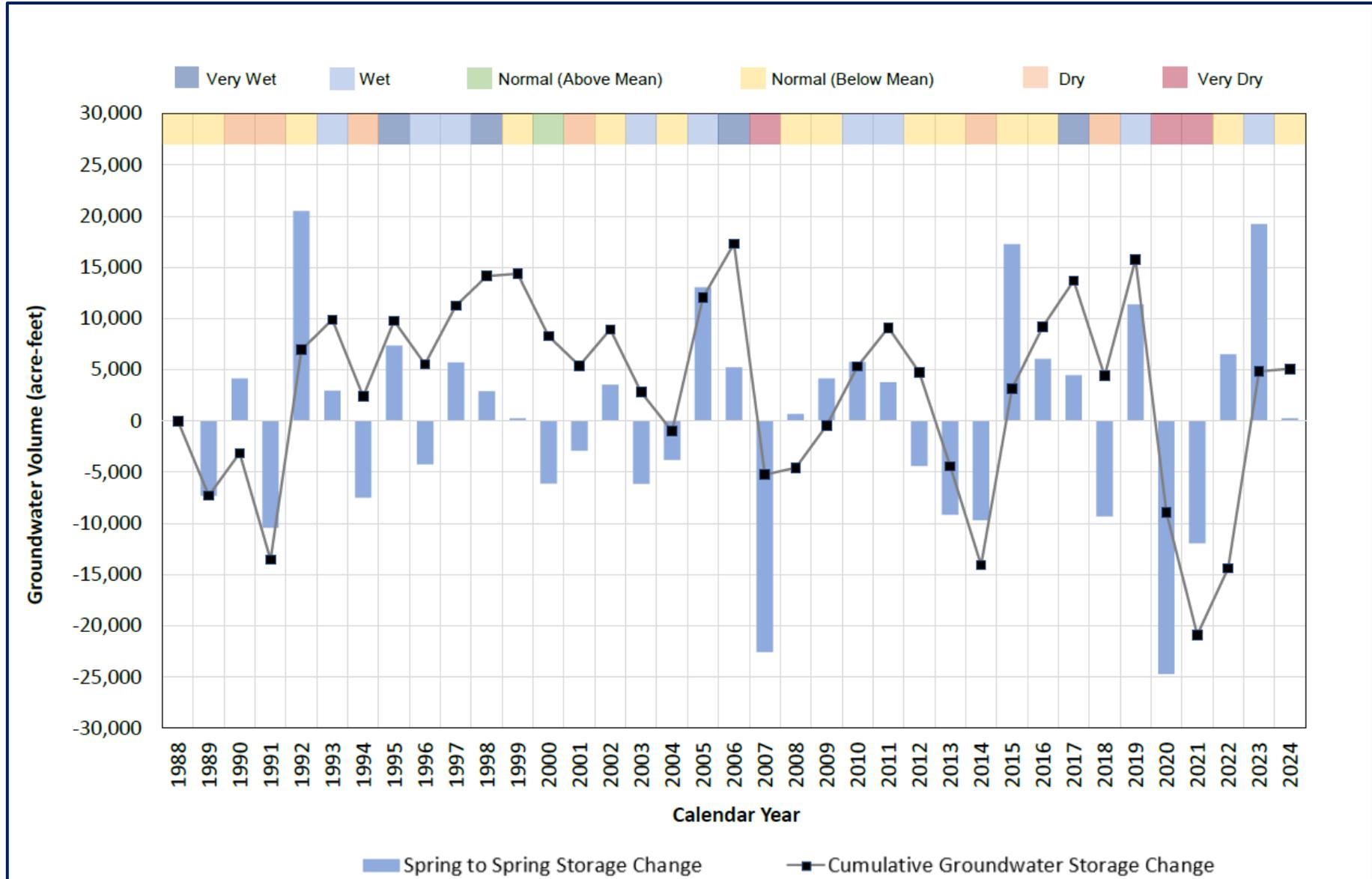
TOTAL = 16,200 Acre-feet



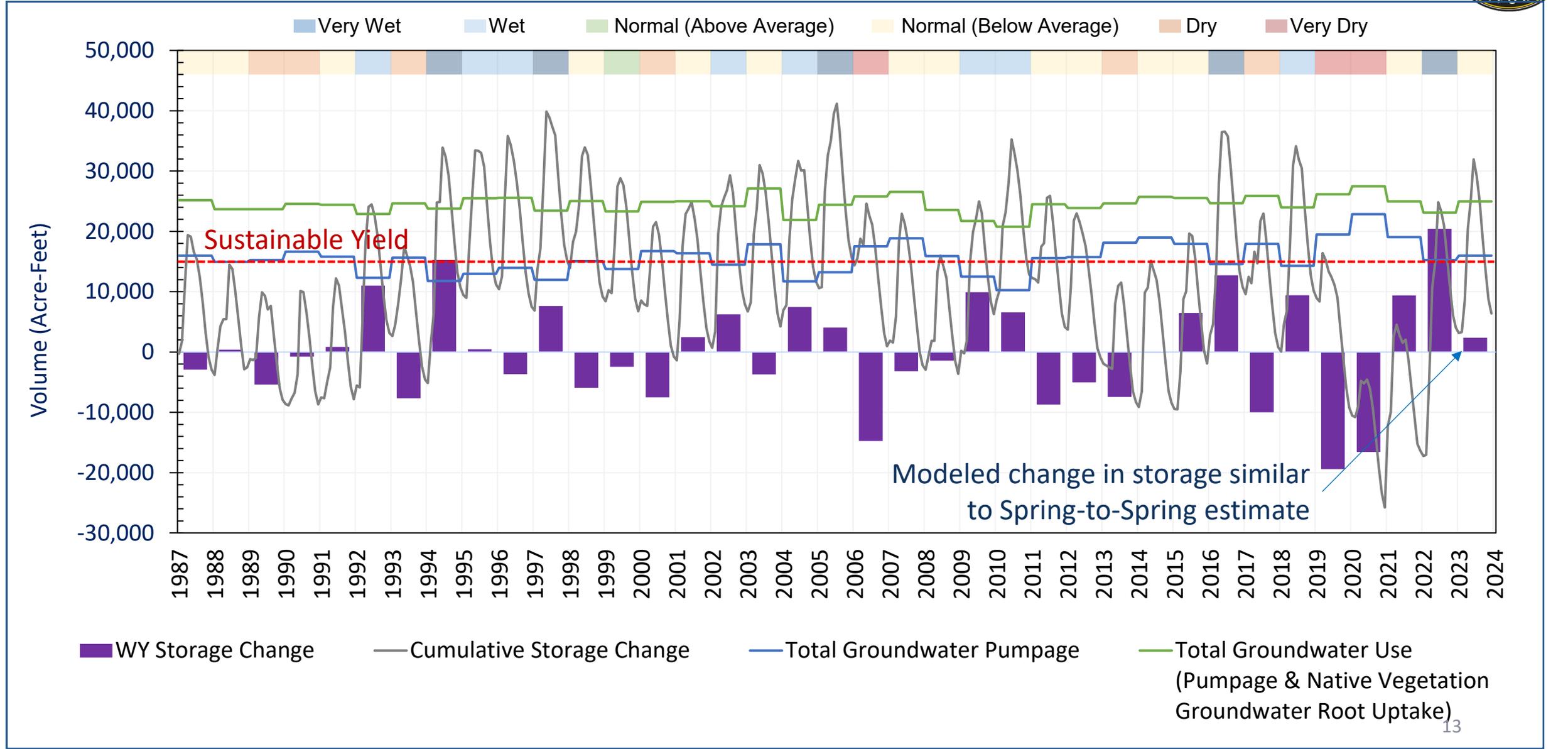
Change in Groundwater Storage: Spring 2023 to Spring 2024



- Change in groundwater storage influenced by water year, pumping and recharge.
- No change in storage in WY 2024.
- From 1988 to 2024, cumulative storage changes show increase of supply.



GW Pumping, Total Use, and GW Storage Change and Cumulative Change (1988-2024)





Sustainability Indicators & Metrics





Land Subsidence

Monitoring Network

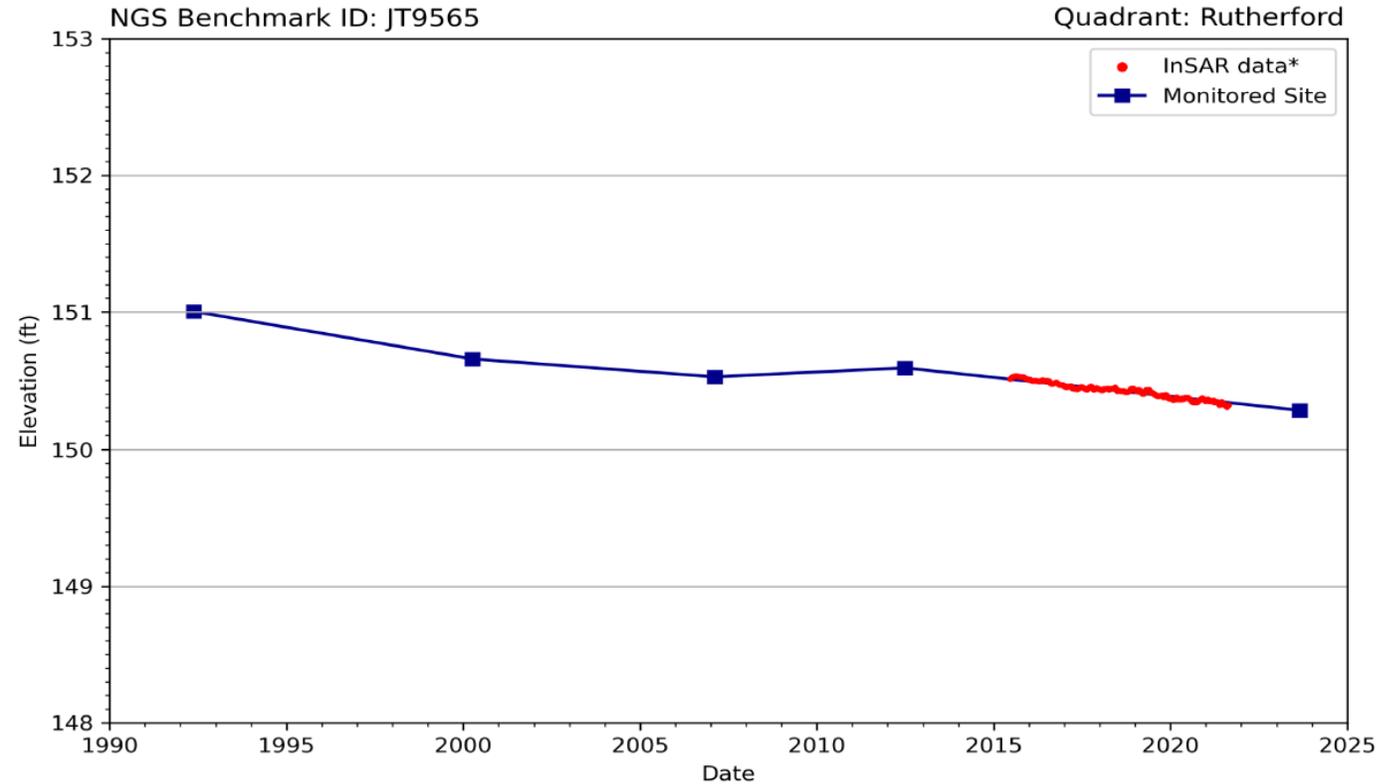
Use of InSAR data to measure vertical displacement began in 2024 to replace benchmarks.

Minimum Threshold

Land subsidence induced by groundwater pumping has not been observed in the Subbasin.

Undesirable Result

Inelastic subsidence rate of greater than 0.2 feet per year.



No MT or UR observed



SMC for Depletion of Interconnected Surface Water: Depletion Volume



Interim Minimum Threshold

- Summer/early Fall (June to October) streamflow depletion volumes exceeding the second highest seasonal volume of streamflow depletion that occurred from 2005-2014 at 2 RMS on Napa River at Pope St. and Oak Knoll Ave. Based on modelled input and output.

Interim Undesirable Result

- Exceedance of MT for volume of streamflow depletion occurring 3 consecutive years at either of above stations. Based on modelled results.

Trigger

Occurs when there is an exceedance of the MT in the Fall for Streamflow Depletion Volume in a single year.

Interconnected Surface Water and Model Results



Recent Seasonal (June to October) Streamflow Depletion Volume Estimated with NVIHM at RMS USGS Stream Sites

Well ID	Representative Site		Seasonal Depletion (AF)			WY 2024 MT Exceedance	Three Consecutive WY MT Exceedances
	Minimum Threshold (AF)	Measurable Objective (AF)	WY 2022	WY 2023	WY 2024		
11458000 (Napa River at Oak Knoll Avenue, Napa) ¹	3,210	2,370	1,160	3,690	3,250	Yes	No
11456000 (Napa River at Pope Street, St. Helena) ¹	1,390	1,120	690	1,370	1,490	Yes	No

1. Site name represents the location of a U.S. Geological Survey stream site where the NCGSA monitors stream depletion, calculated by the NVIHM.

- Seasonal streamflow depletion volume conditions **did not meet** the interim definition for an undesirable result.
- In WY 2024, groundwater elevations **did not** meet the definition for an undesirable result.



Why did the seasonal depletion of the river system exceed the MT in 2024?

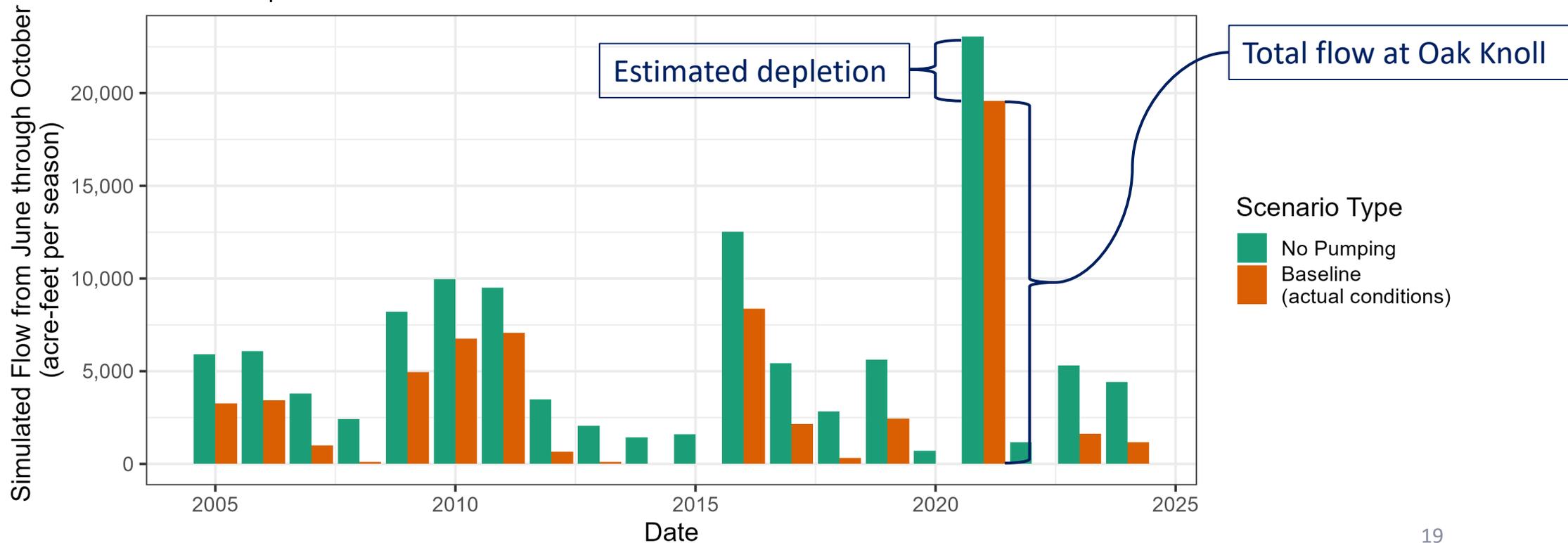
- The extreme hot summer increased the total consumptive use of all vegetation.
- High Spring groundwater elevations supported direct groundwater uptake of plants (both vines and native vegetation).
- Pumping was above the Sustainable Yield of 15,000 acre-feet.
- While fall groundwater elevations were above the MTs, all ISW groundwater elevations were below the MO.

Interconnected Surface Water and Model Results



NVIHM is run with all agricultural & landscape pumping removed, compared against model run developed for water budget (“Baseline”).

NVIHM Model Results for Napa River at Oak Knoll
(June through October)
Annual Report 2024 Model Run



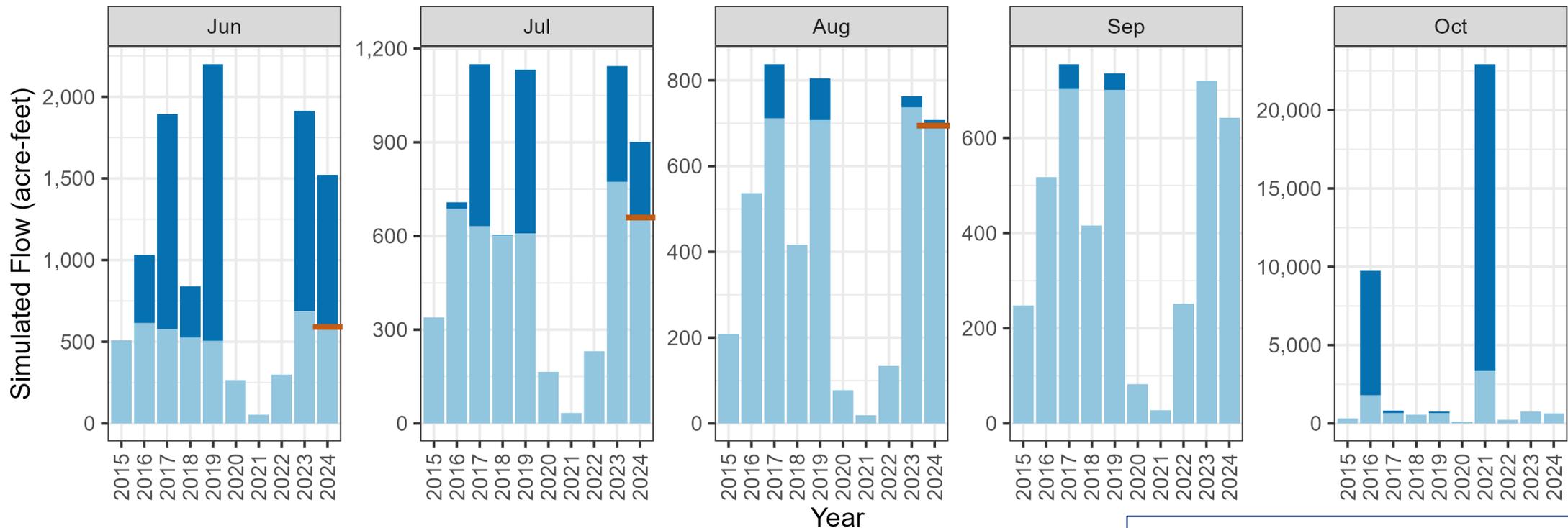


Interconnected Surface Water and Model Results

Highest percent of streamflow depletion in July – September
(50% to 100%)

Napa River at Oak Knoll Simluated Stream Flow (June - Oct)
Annual Report 2024 Model Run

October flow/depletion largely based on fall storms occurring



— Large proportion of flow going to depletion in 2024

Flow Type ■ River Flow ■ River Depletion

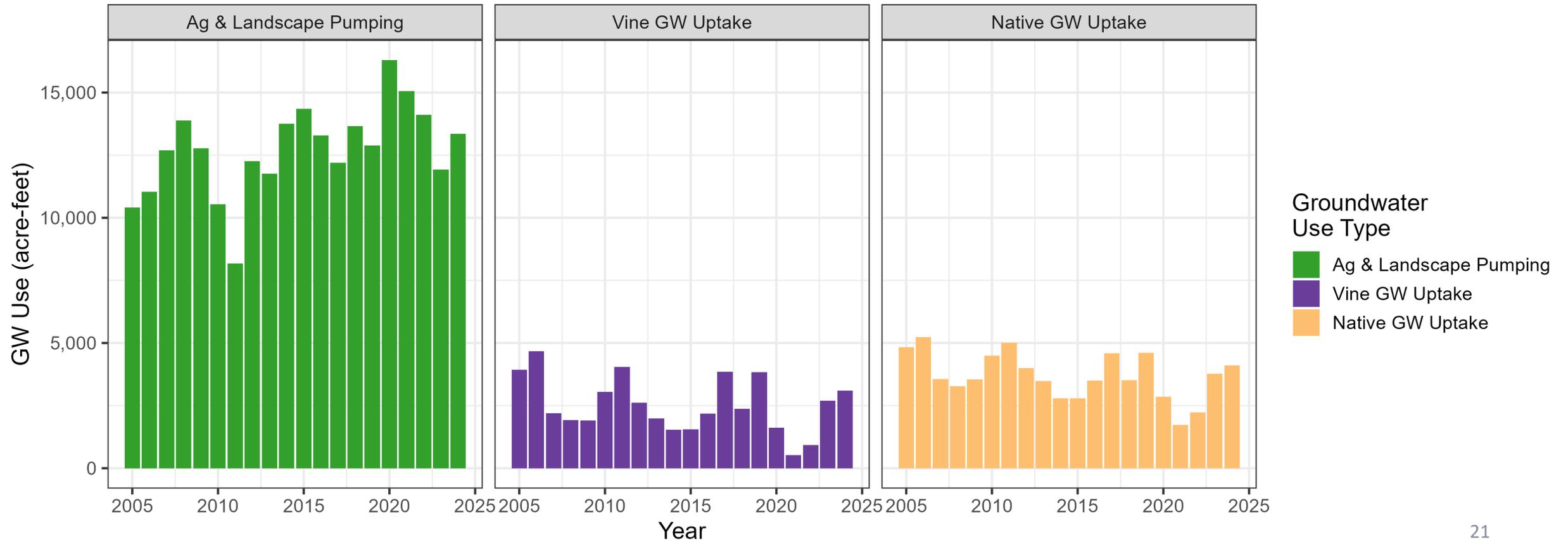
USGS gage measured less than 2 CFS in August with the river going dry September 10.

Interconnected Surface Water and Model Results



While Ag Pumping was greater in 2024, direct uptake by crops and native vegetation also increased – largely based on hotter, drier conditions.

Napa Valley Subbasin Groundwater Use
Water Year 2024 - June through October

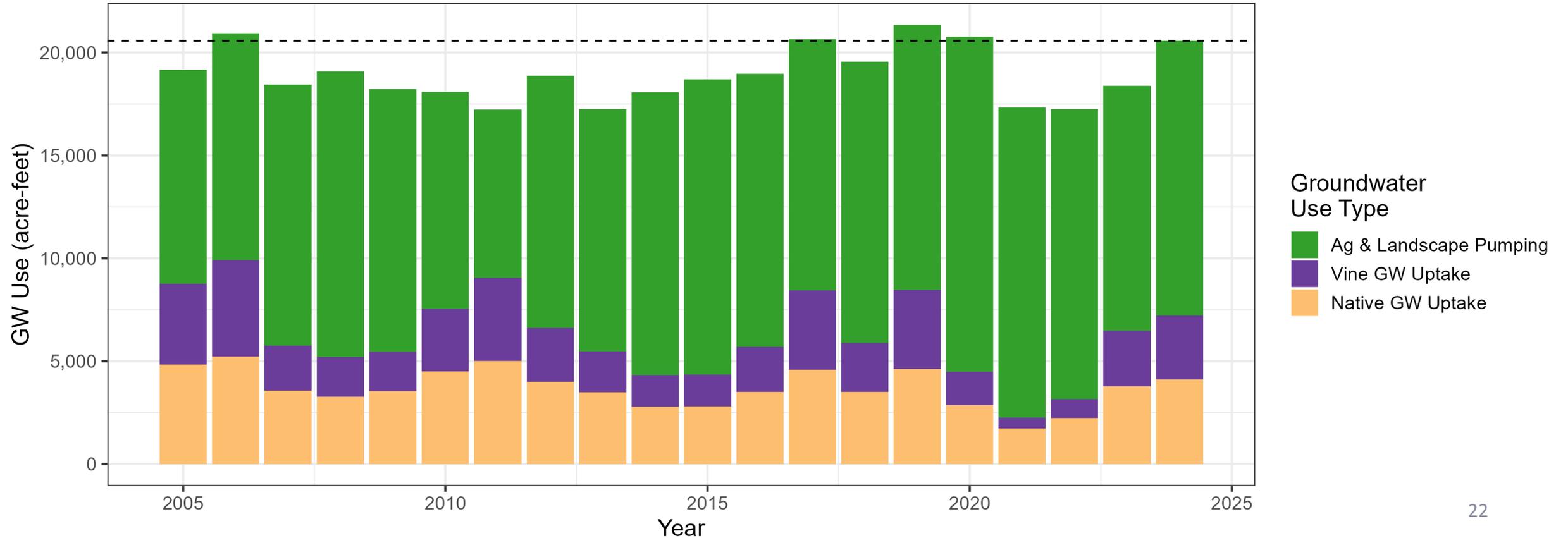


Interconnected Surface Water and Model Results



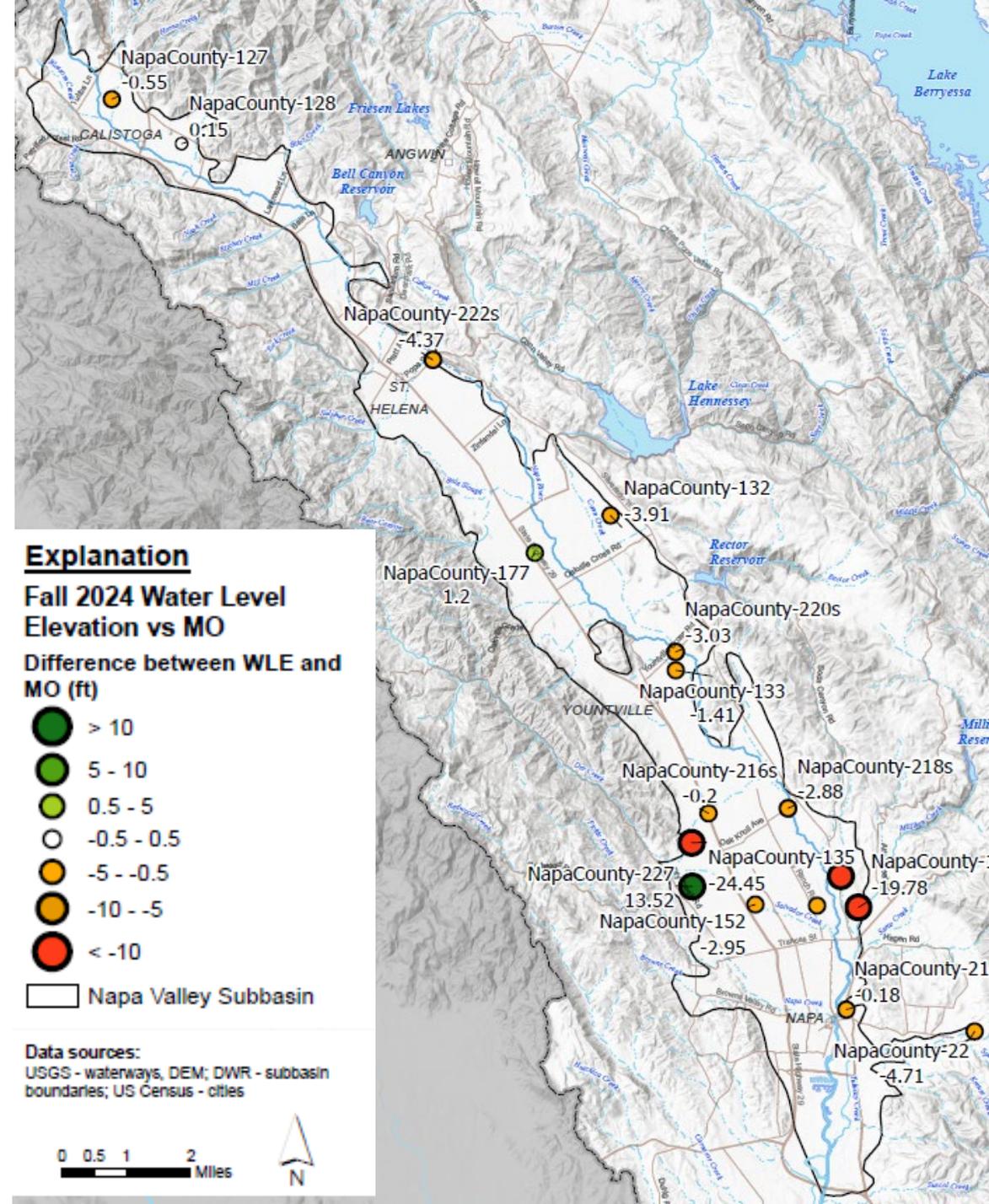
WY 2024, during the critical June through October, had one of the highest total groundwater uses.

Napa Valley Subbasin Groundwater Use
Water Year 2024 - June through October



Water Levels Compared to MO Fall 2024

- Many RMS wells had slightly lower groundwater elevations in the fall measurements in WY 2024 as compared to fall WY 2023.
- Negative values correspond to how far from the Measurable Objective.





Stream Depletion in WY 2024

Start of WY 2024

- Started the WY with high water levels from a Wet Water Year.
- Cool winter and spring temperatures led to low demand.
- Consistent precipitation throughout the winter maintained high groundwater levels.
- Increased stream flows produced by multiple factors going into Summer 2024.

High stream flows and low demand preceding the 2024 irrigation season.

June/July - WY 2024

- Extreme hot temperatures increased overall demand.
- High groundwater levels allowed for additional direct root uptake throughout the Subbasin (both native and vines).
- Increased pumping to meet demand.

Overall groundwater use (pumping and direct uptake) was much higher during this time than pumping only. More stream flow was available for depletion.

August/October - WY 2024

- Groundwater levels fall below root zone for majority of native and vines.
- Increased pumping to meet demand.
- No significant storm in October to increase streamflow and begin aquifer recharge.

Cumulative effect of pumping and direct uptake concluded in 100% depletion.

Reduction of Groundwater Storage



Minimum Threshold

Net GW extraction by pumping exceeding the SY for the Subbasin, where net GW extraction is the volume extracted less any volume of augmented recharge achieved by implemented projects.

Undesirable Result

Seven (7) year average annual net GW extraction in the Subbasin exceeds the sustainable yield.

➤ UR occurred since 7-year average exceeds the sustainable yield for the Subbasin.

**Sustainable Yield (Est.) =
~15,000 AFY**

Year	Total Groundwater Extraction (AF)
2018	17,750
2019	14,140
2020	19,310
2021	22,550
2022	18,840
2023	15,100
2024	16,200
7 Year Avg.	17,700

Six of seven years exceeded the SY. Many GW levels were between the MT and MO in WY 2024. To achieve the Sustainability Goal by 2042, of protecting and enhancing, as well as preparing for more extreme climate, requires augmented recharge and less pumping.



Water Quality and Seawater Intrusion

- Monitoring network was evaluated in WY 2024.
- No exceedances for nitrate or TDS within RMS wells.
- Two RMS wells exceeded the MT for Arsenic, which has historically been detected in the Napa Valley Subbasin.
- Monitoring will continue as part of SGMA implementation.



RMS Groundwater Levels: Response Action Required

- 2 RMS/Chronic GW Level Lowering wells have Fall 2024 MT exceedances
 - 1 RMS/Chronic GW Level Lowering wells have three consecutive Fall MT exceedances
- 2 RMS exceedances of the arsenic MT.
- 2 RMS/ISW Depletion of ISW volumes occurred
 - 0 RMS/ISW wells have Fall 2024 MT exceedances
- Average GW pumping over 7-year period exceeds Sustainable Yield
 - **UR occurred for Reduction of GW Storage**

Sustainability Indicator	WY 2022	WY 2023	WY 2024
	UR: Yes or No	UR: Yes or No	UR: Yes or No
Chronic GWL Lowering (CGWL)	No	No	No
Depletion of Interconnected Surface Water (ISW)	Yes	No	No
GW Quality Degradation	No	No	No
Reduction of GW Storage	Yes	Yes	Yes
Land Subsidence	No	No	No
Seawater Intrusion	No*	No*	No*

*New RMS wells are being evaluated for this SI.



GSP Implementation

GSP Implementation



- ISW and GDEs Workplan (Spring 2024)
 - Additional monitoring occurring
- Napa County Water Conservation Workplan (Spring 2024)
 - Implementation ongoing
- Groundwater Pumping Reduction Workplan (Spring 2024)
 - Implementation ongoing
- Refining Water Use Data, Benchmarking, NVIHM Model Updates (ET: OpenET and Local Land-Based Sensors; in Progress)
- Stream Gage Monitoring
 - CalSIP funding awarded for 5 new stream gages.
 - Napa County implemented stage monitoring at additional sites
- Other MW Sites Feasibility (Calistoga)
- RCD and Stream Watch Monitoring (in Progress)
- Evaluate Augmented Recharge Feasibility & Benefits (in Progress)
- Stakeholder Coordination and Outreach (Ongoing)

*DWR Approved Napa Valley Subbasin GSP
January 26, 2023*



Thank You

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