

Napa County Groundwater Sustainability Agency

Annual Report – Water Year 2023

March 26, 2024

Presented by

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Outline

Napa Valley Subbasin Annual Report:
Groundwater Conditions

Sustainability Indicators & Metrics

Opportunities for Recharge and
Building Resiliency

GSP Projects and Management
Actions: 3 Workplans

Thank You!

- Napa County Staff
- Technical Advisory Group
- Luhdorff & Scalmanini, Consulting Engineers
- ERA Economics
- Stillwater Sciences
- Napa County RCD
- University of California
- City of St. Helena
- Industry organizations
- Public



SGMA 10 Year Anniversary!

Local Control



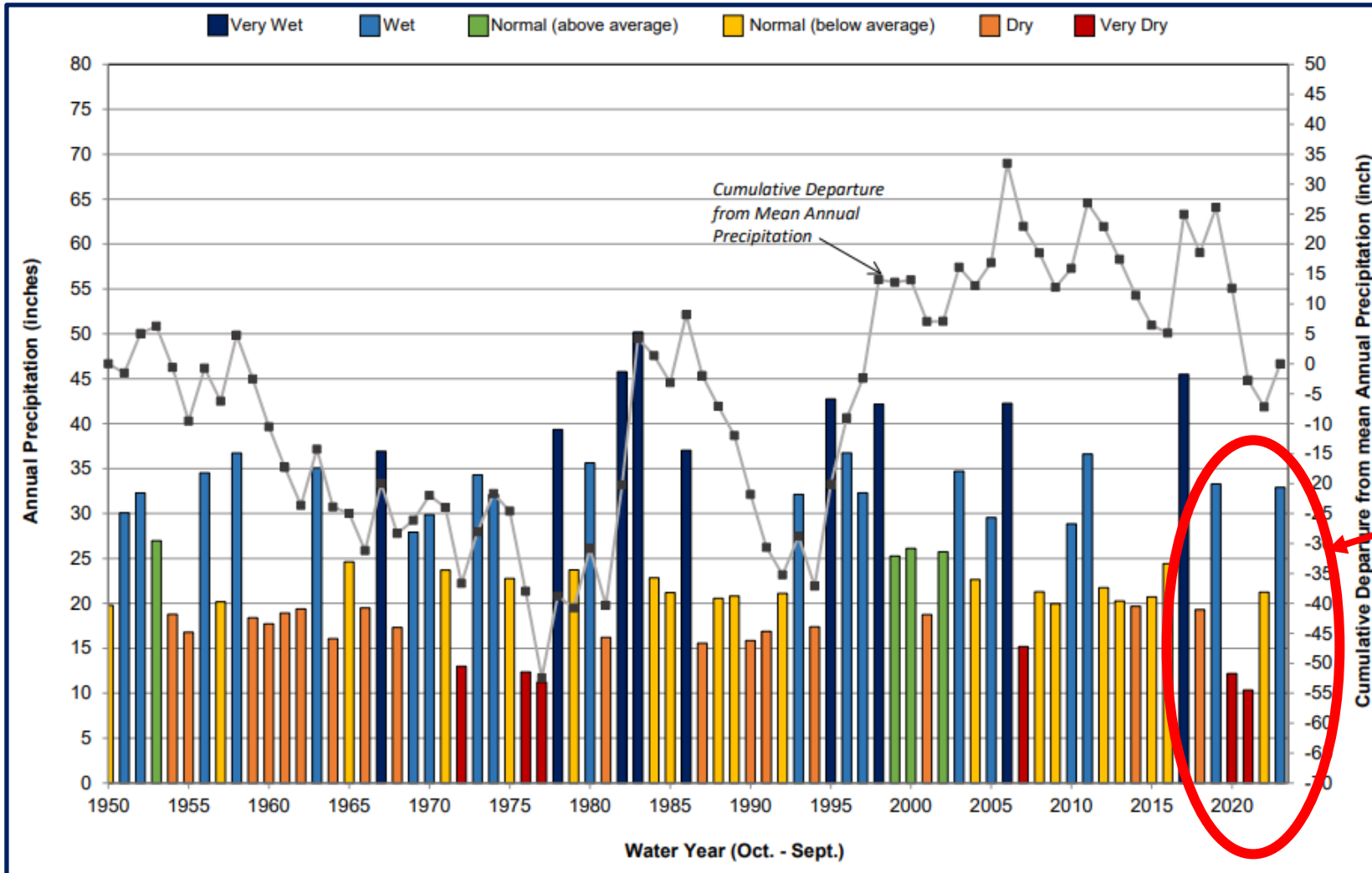
“A central feature of these bills is the recognition that groundwater management in California is best accomplished locally.”

Governor Jerry Brown, September 2014

The Cliff Notes....

- Much has been accomplished since January 2022 and GSP submittal
- DWR Approved Napa Valley Subbasin GSP January 26, 2023
- Many Workplans completed with implementation planned in Spring 2024
- Lots of opportunities for stewardship, innovation, and building climate resiliency
- Water Year 2023 was a wet year that resulted in significant groundwater replenishment!

Historical Precipitation at Napa State Hospital

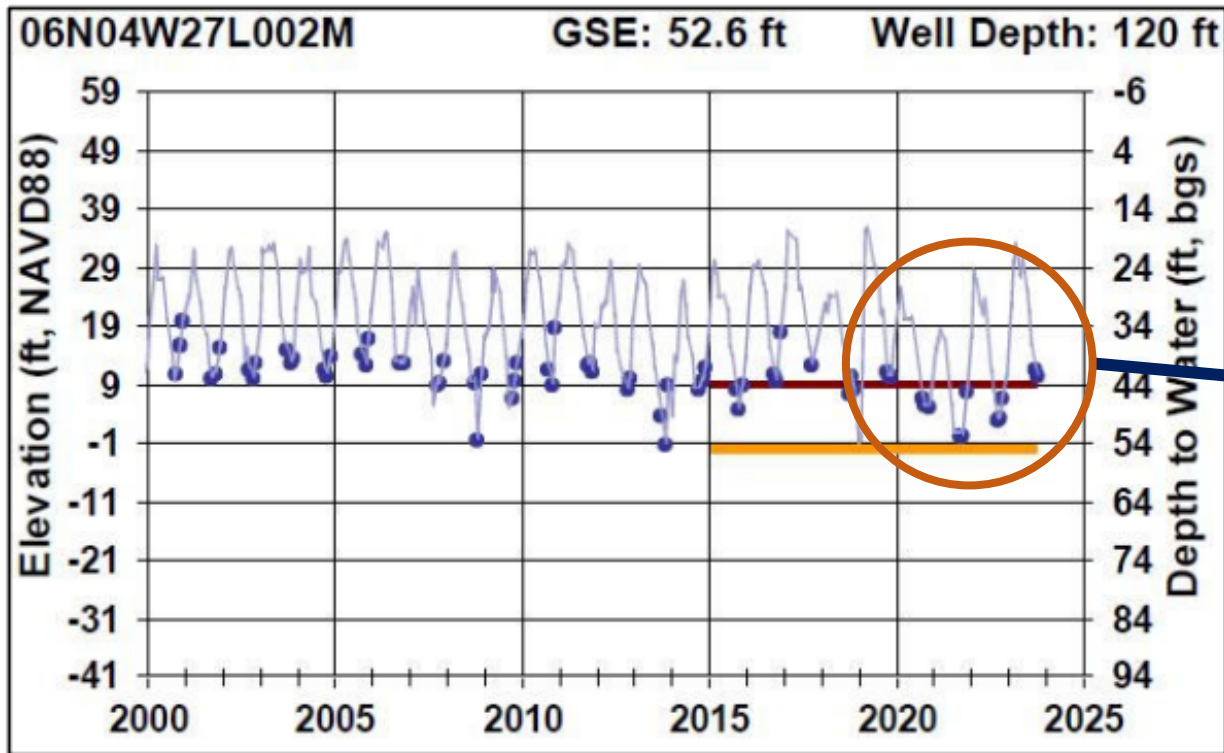


California's Climate Change Projections – warmer temperatures, “thirstier atmosphere”, flashier runoff and streamflow – overall uncertainty about the timing, duration, and magnitude of precipitation.

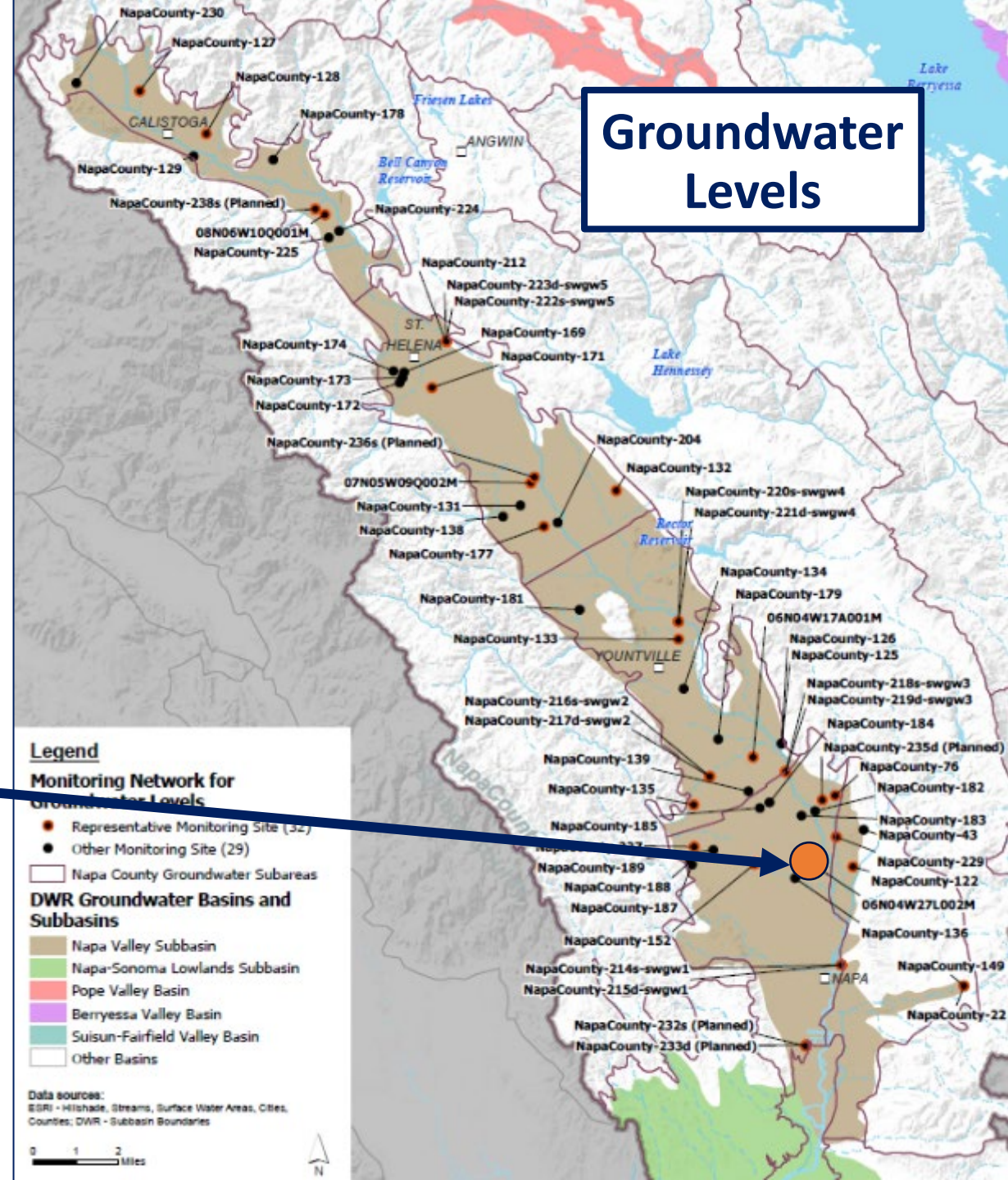
WYs 2020 & 2021
Very Dry;
WY 2022 Normal
(below average):
WY 2023 Wet

Napa Valley Subbasin Hydrograph

Recent Drought Effects, Overall Groundwater Level Recovery, Responsive Aquifer System



RMS Wells: Emphasis on Fall GW Levels



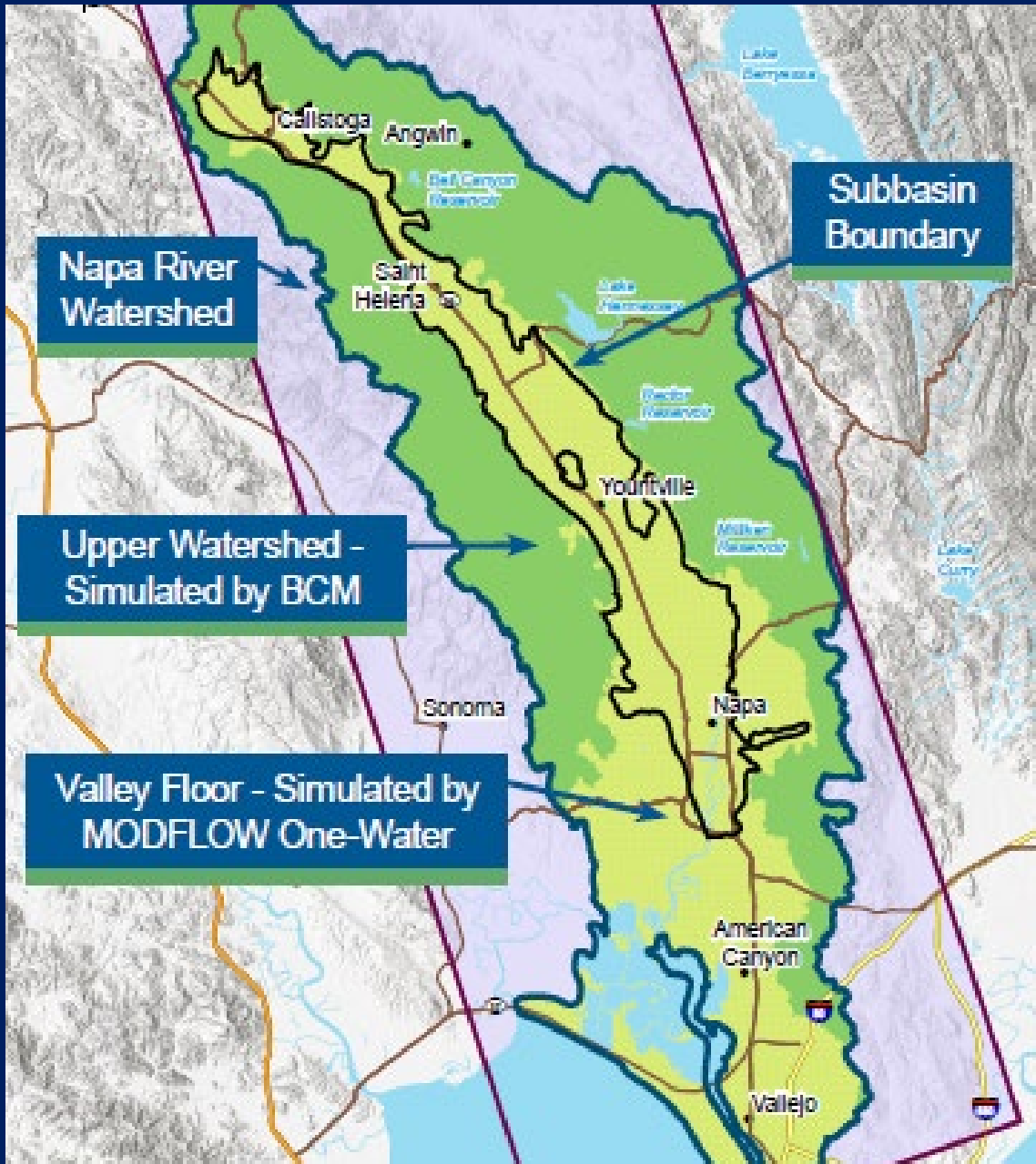
Monitoring Networks	Measurement Type	Total			GSP-Specific	
		County	Napa Valley Subbasin	RMS	Supplemental	Planned
Groundwater Level	GW Levels	116	81	33	40	--
Groundwater Storage	GW Levels	--	27	--	27	--
	NVIHM Model	--	1	1	--	--
Land Subsidence	GW Levels	--	15	15	--	--
	Benchmark Monitoring	--	8	5	3	--
	InSAR	--	1	--	--	--
Stream Stage and Stream Discharge	Stream Stage and Stream Discharge	--	5	--	5	8
	Stream Watch	39	32	--	--	Yes
	Flood Control	28	16	--	16	--
Interconnected Surface Water – Groundwater	GW Levels	--	32	8	24	--
	NVIHM Model	--	2	2	--	--
GDE Monitoring	GW Level	--	33	--	33	--
	Stream Habitat	--	1	--	--	6
	Remote Sensing	--	10	--	10	--
Groundwater Quality	GW Quality	1,532 ¹	37	21	16	--
Seawater Intrusion	Chloride testing	--	18	11	7	--
Surface Water Quality	SW Quality	--	6	--	6	--

9 Monitoring Networks

- Significant increase in total number of wells based on outreach, volunteer wells, and installation of new wells.
- Planned stream stage monitoring sites (8) will be co-located with dual-completion monitoring wells.
- **ISW and GDE monitoring increased with completion of 8 sites/16 shallow monitoring wells.**
- Stream habitat planned as part of the ISW and GDEs Workplan Implementation.

¹- Value is from GAMA database accessed through waterboards server: <https://gispublic.waterboards.ca.gov/portalservices/services>

Napa Valley Integrated Hydrologic Flow Model (NVIHM)



During GSP Development

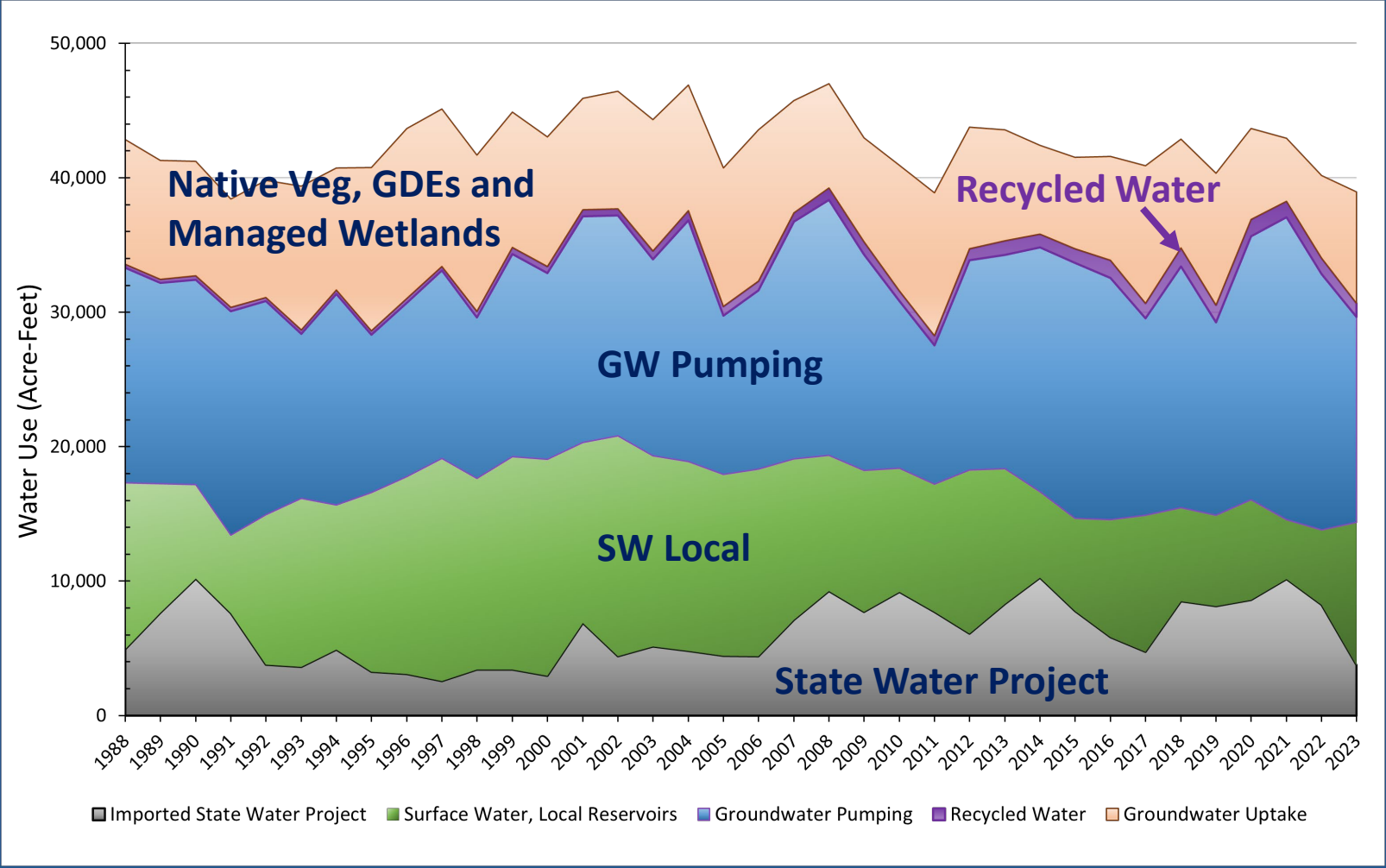
- Develop water budgets: historical, current and projected (50-Year)
- Simulate response to climate change and future land use
- Evaluate projects and management actions to maintain sustainability

Updates WY 2023 Annual Report

- Basin Characterization Model (BCM): Climate WY 2023
- MODFLOW: Land use (2019) and water budget components through WY 2023

Water Use: Water Year 2023 (acre-feet)

Water Use	2022	2023
Groundwater Pumping (all users)	18,790	15,270
Native Veg, GDEs & Managed Wetlands	6,440	8,290
Recycled Water Use	1,220	1,020
Local Surface Water Use (including reservoirs, diversions, etc.)	5,562	10,627
State Water Project Use	8,290	3,740
TOTAL	40,302	38,947

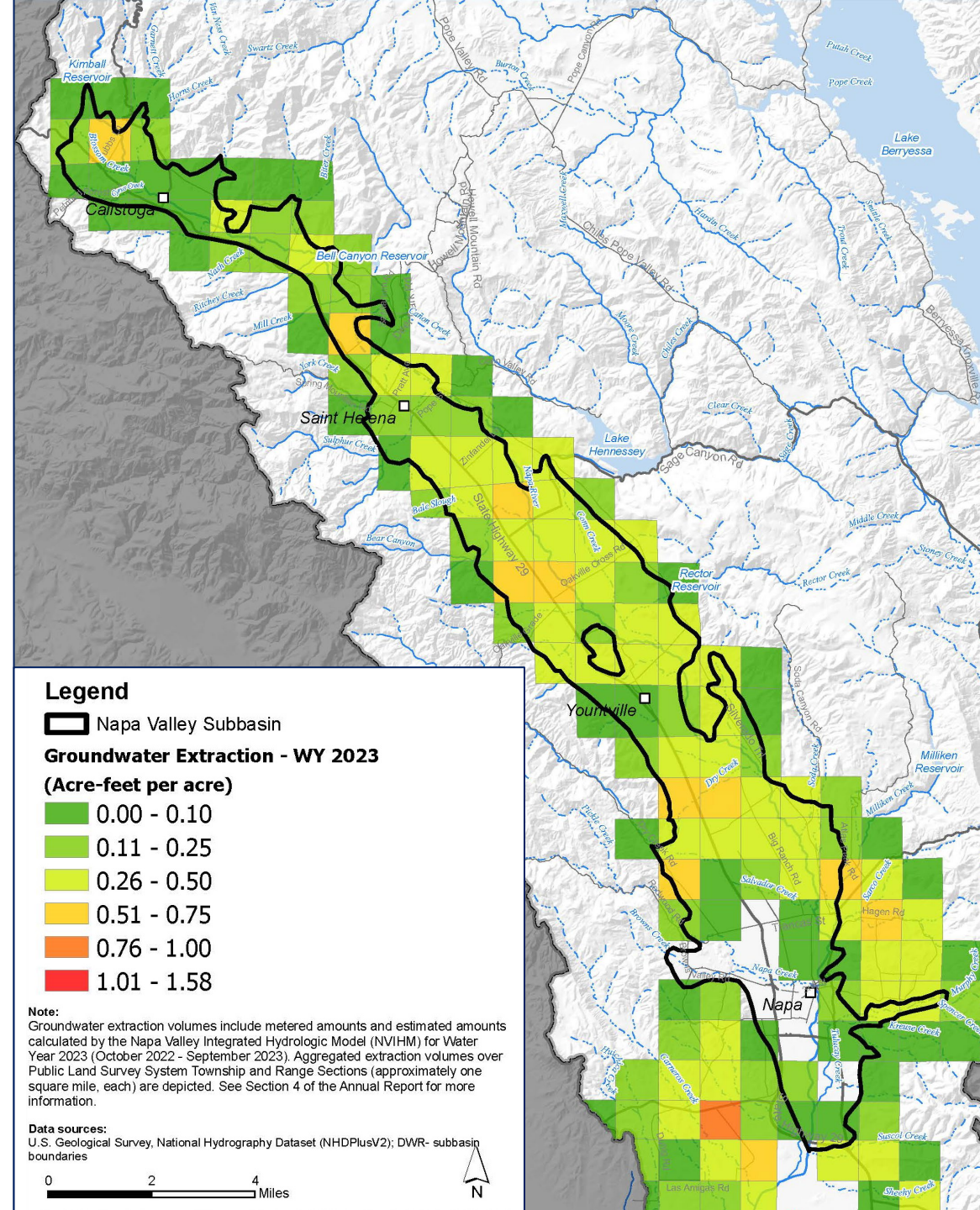


Groundwater Pumping, 2023 (Acre-feet)

Groundwater Pumping	Acre-feet	Percent Use*
Ag (i.e., vines)	11,330	74%
Municipal	330	2%
Self-Supplied Users Domestic (2,294 AF for outdoor use)	2,540	17%
Small Public Water Systems	1,070	7%

*Percentages comparable to historical averages.

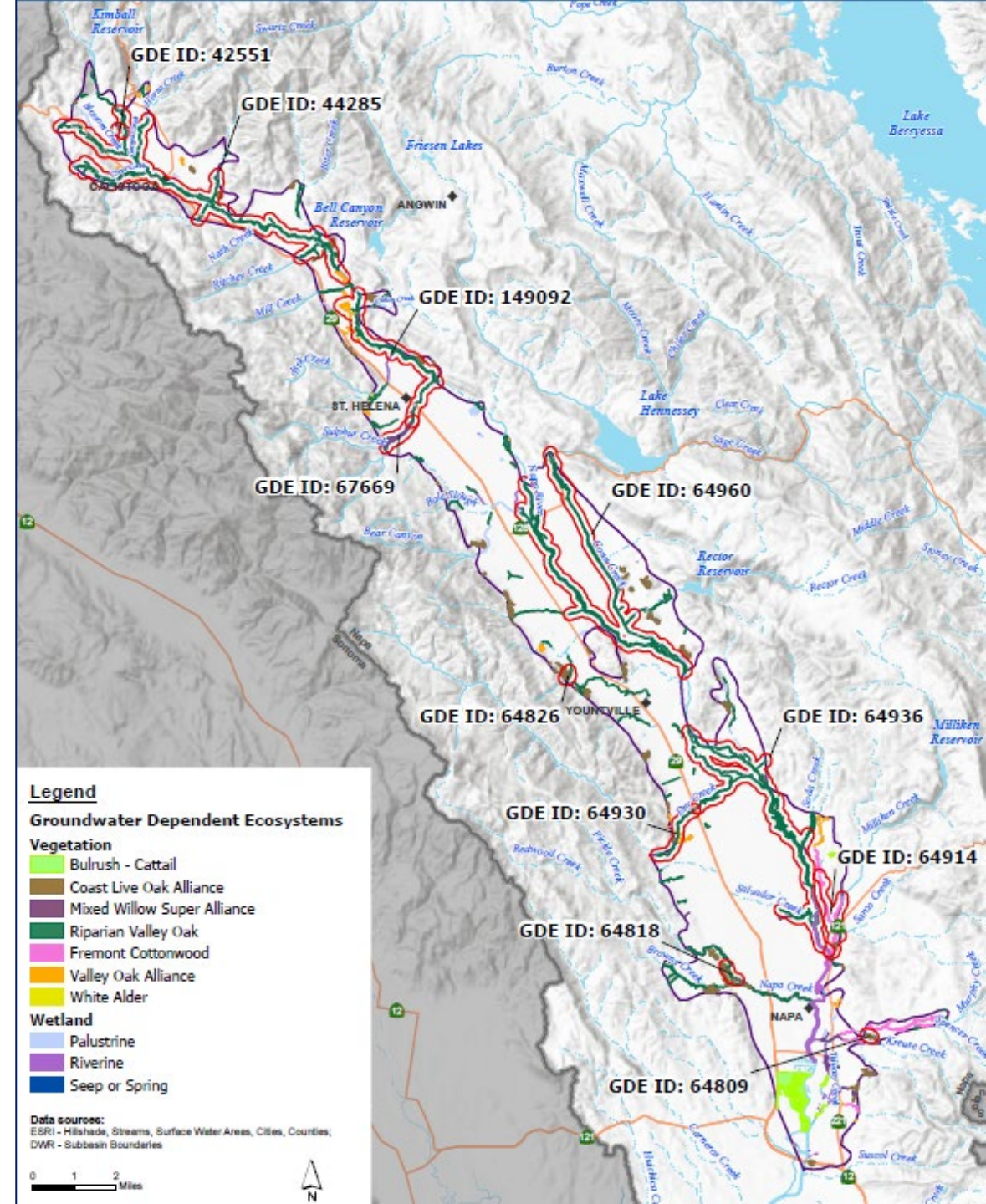
TOTAL = 15,270 Acre-feet



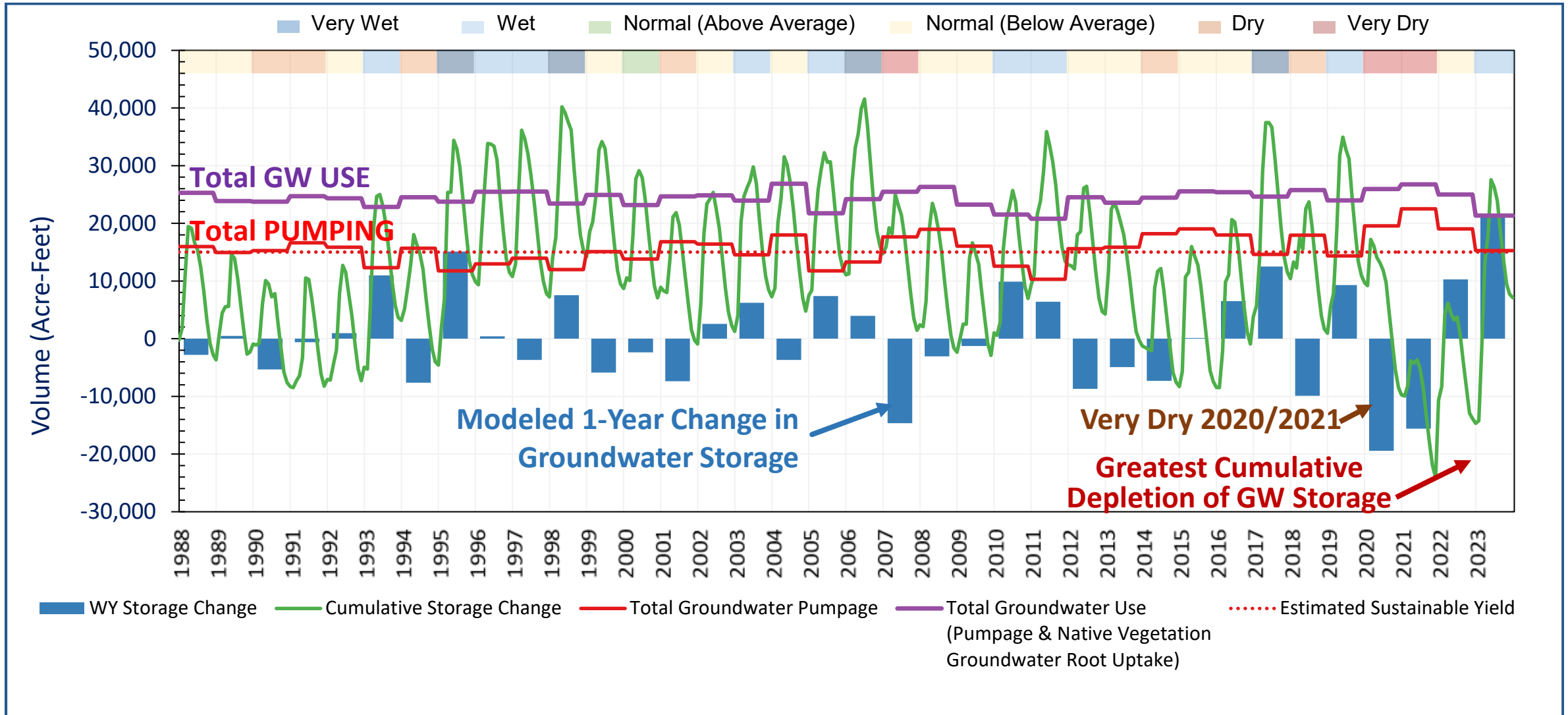
Groundwater Dependent Ecosystems Water Use: WY 2023

- GDEs are an important groundwater user and component of the water budget.
- GDE Acreage (Vegetation and Wetland Types): 2,893 acres

TOTAL= 4,570 Acre-feet

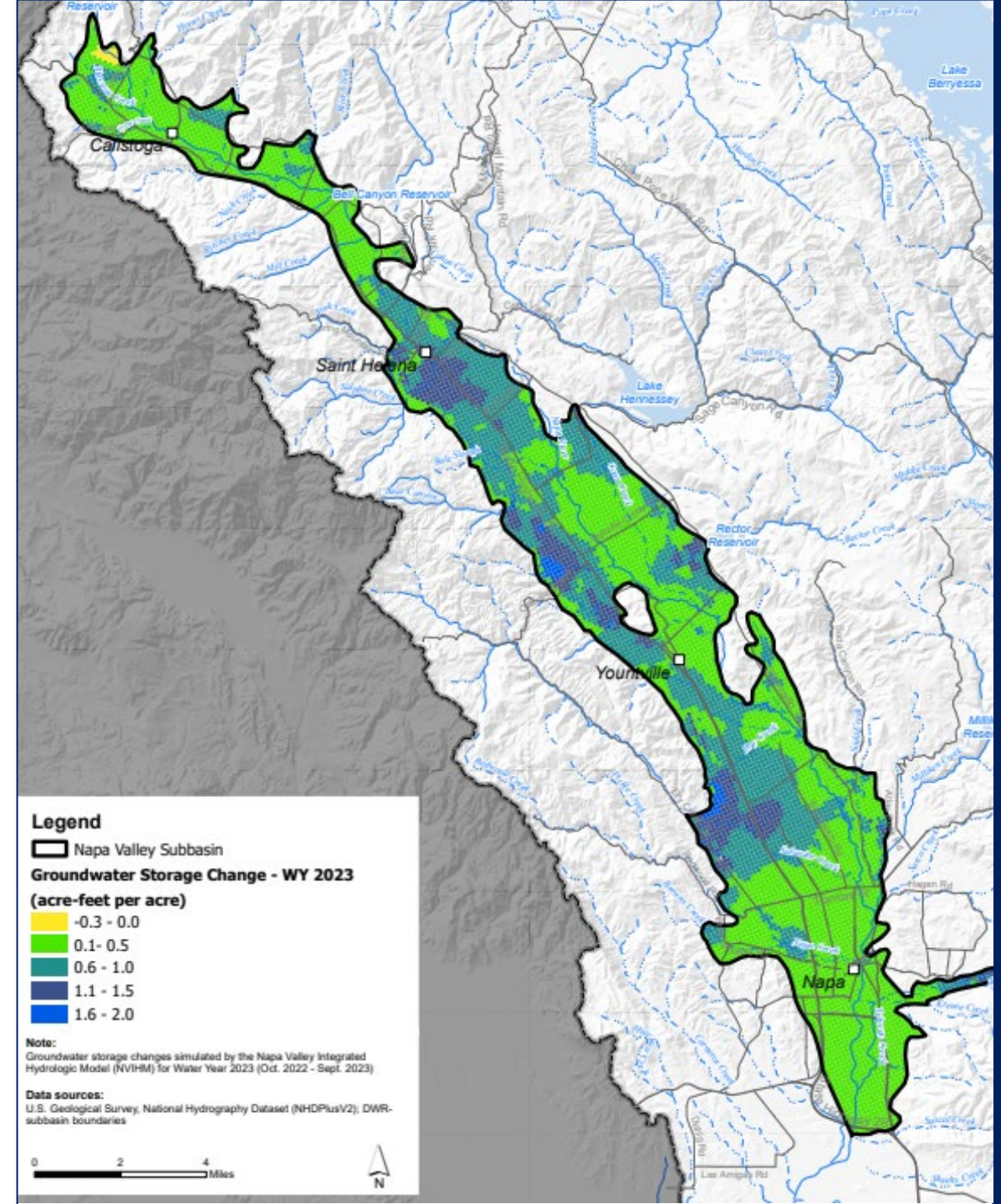


GW Pumping, Total Use, and GW Storage Change and Cumulative Change (1988-2023)



GW Storage Change Simulated NVIHM 10/2022-09/2023

- Increase in GW storage in WY 2023 across most of the Subbasin
- Increase in GW storage based on NVIHM (Oct. 2022 to Sept. 2023) = **+21,600 AF**





Sustainability Indicators & Metrics



Groundwater Sustainability Indicators

**Not Causing Undesirable Results:
Means Avoiding Significant and Unreasonable ...**

**Lowering of
GW Levels**

**Reduction of
GW Storage**

**Seawater
Intrusion**

**Water Quality
Degradation**

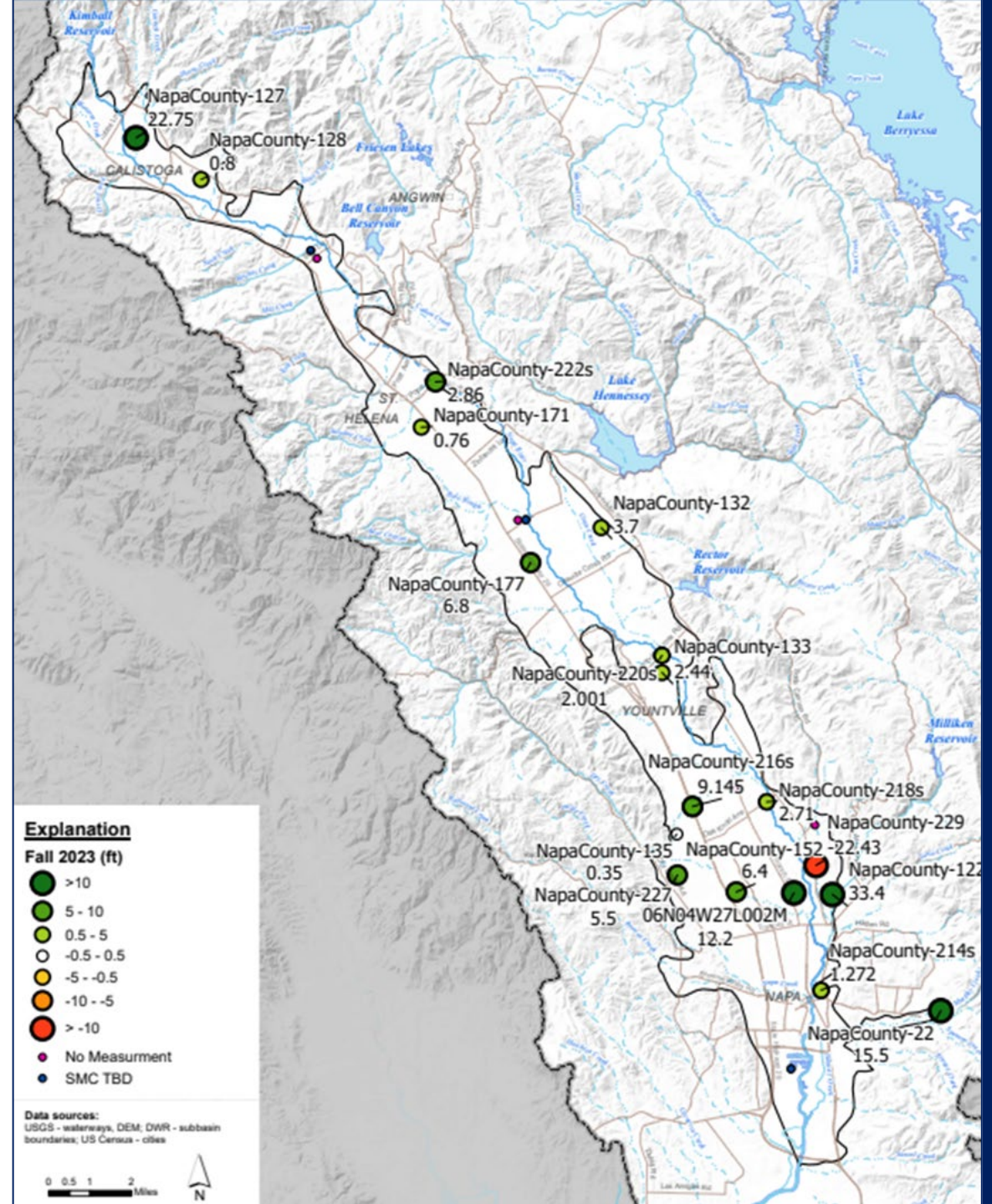
**Land
Subsidence**

**Depletion of
Surface Water**

**Napa Valley Hydrogeologically
Sensitive to this Indicator**

Groundwater Levels for Fall 2023: Subbasin Representative Monitoring Sites

- Climate in WY 2023 was wetter and cooler, leading to significant recharge and increased groundwater levels.
- Groundwater levels:
 - **1** of 23 wells exceeded their MT
 - NE Napa Management Area
- Sustainability Indicator for Depletion of Interconnected Surface Water (ISW): groundwater measurements
 - **0** of 5 wells exceeded their MT



Reduction of Groundwater Storage

Minimum Threshold

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

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)
2017	14,630
2018	17,950
2019	14,340
2020	19,560
2021	22,510
2022	19,050
2023	15,280
7 Year Avg.	17,620

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.

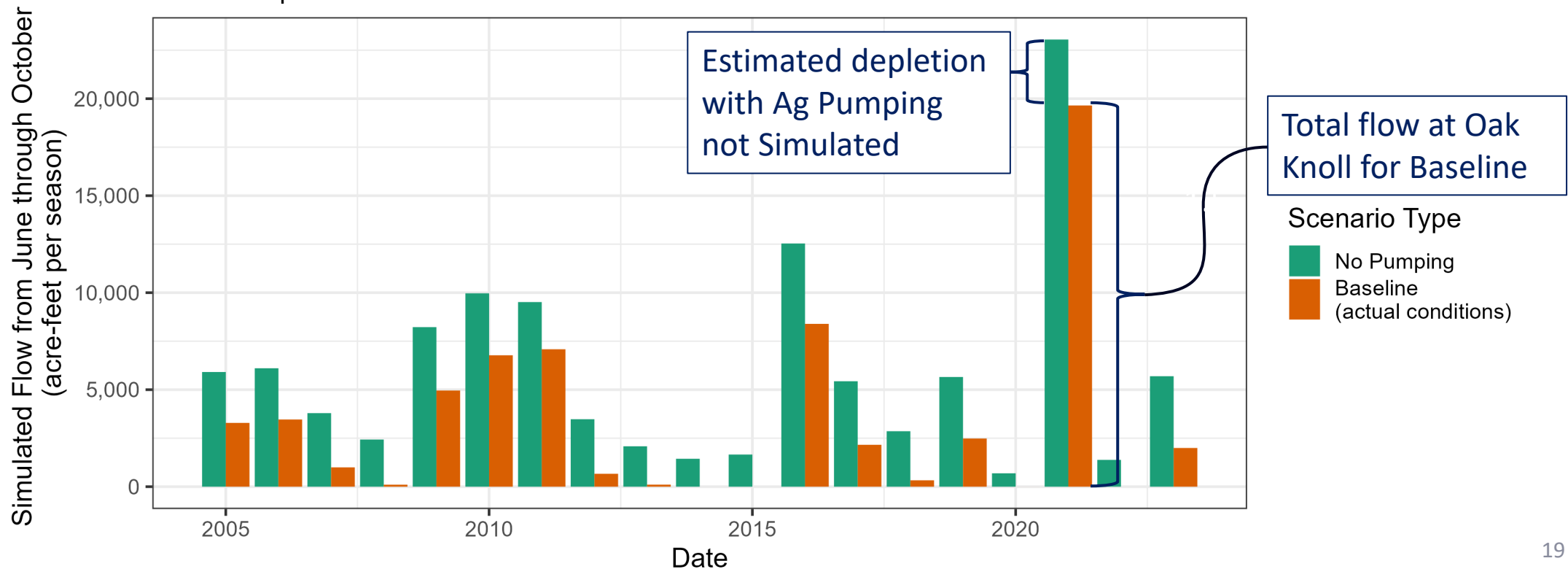
Trigger

- 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

NVIHM is simulated with no agricultural pumping, compared against model run developed for water budget (“Baseline”, i.e., actual conditions with best estimates of groundwater use).

NVIHM Model Results for Napa River at Oak Knoll
(June through October)
Annual Report 2023 Model Run



Interconnected Surface Water and Model Results

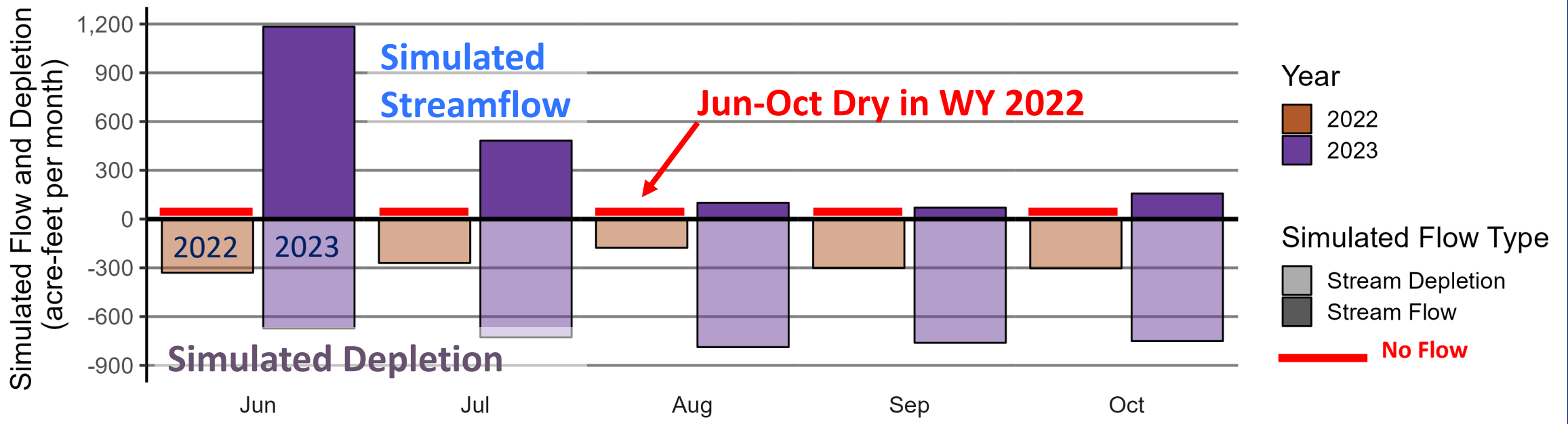
Recent Seasonal (June to October) Streamflow Depletion Volume
Estimated with NVIHM at RMS USGS Stream Sites

Stream Gage Location	Representative Site		Seasonal Depletion (AF)			WY 2023 MT Exceedance	Three Consecutive WY MT Exceedances
	Minimum Threshold (AF)	Measurable Objective (AF)	WY 2021	WY 2022	WY 2023		
Napa River at Oak Knoll	3,190	2,370	3,376	1,351	3,700	Yes	No
Napa River at Pope Street	1,400	1,120	995	815	1,389	No	-

- Seasonal streamflow depletion volume conditions **did not meet** the interim definition for an undesirable result.
- In WY 2023, groundwater elevations **did not** meet the definition for an undesirable result.

Why did the Seasonal Depletion of the River System Exceed the MT in 2023?

- Wet winter and recovery led to higher streamflow throughout Summer 2023 compared to previous dry years – changing the timing and magnitude of depletion.
- Additional stream depletion occurred in response to the 2020-2022 dry year impacts.
- The effect of WY 2023 on WY 2024 conditions will likely be less due to widespread recovery of the aquifer system.



RMS Groundwater Levels: Response Action Required

- 1 RMS/Chronic GW Level Lowering wells has three consecutive Fall MT exceedances
 - **No UR for Chronic GWL lowering since only 1 well has had three consecutive years**
- Avg. GW pumping over 7-year period exceeds Sustainable Yield
 - **UR has occurred for Reduction in Groundwater Storage since WY 2021**

Sustainability Indicator	WY 2021	WY 2022	WY 2023
	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)	No	Yes	No
GW Quality Degradation	No	No	No
Reduction of GW Storage	Yes	Yes	Yes
Land Subsidence	No	No	No
Seawater Intrusion	No	No*	No*

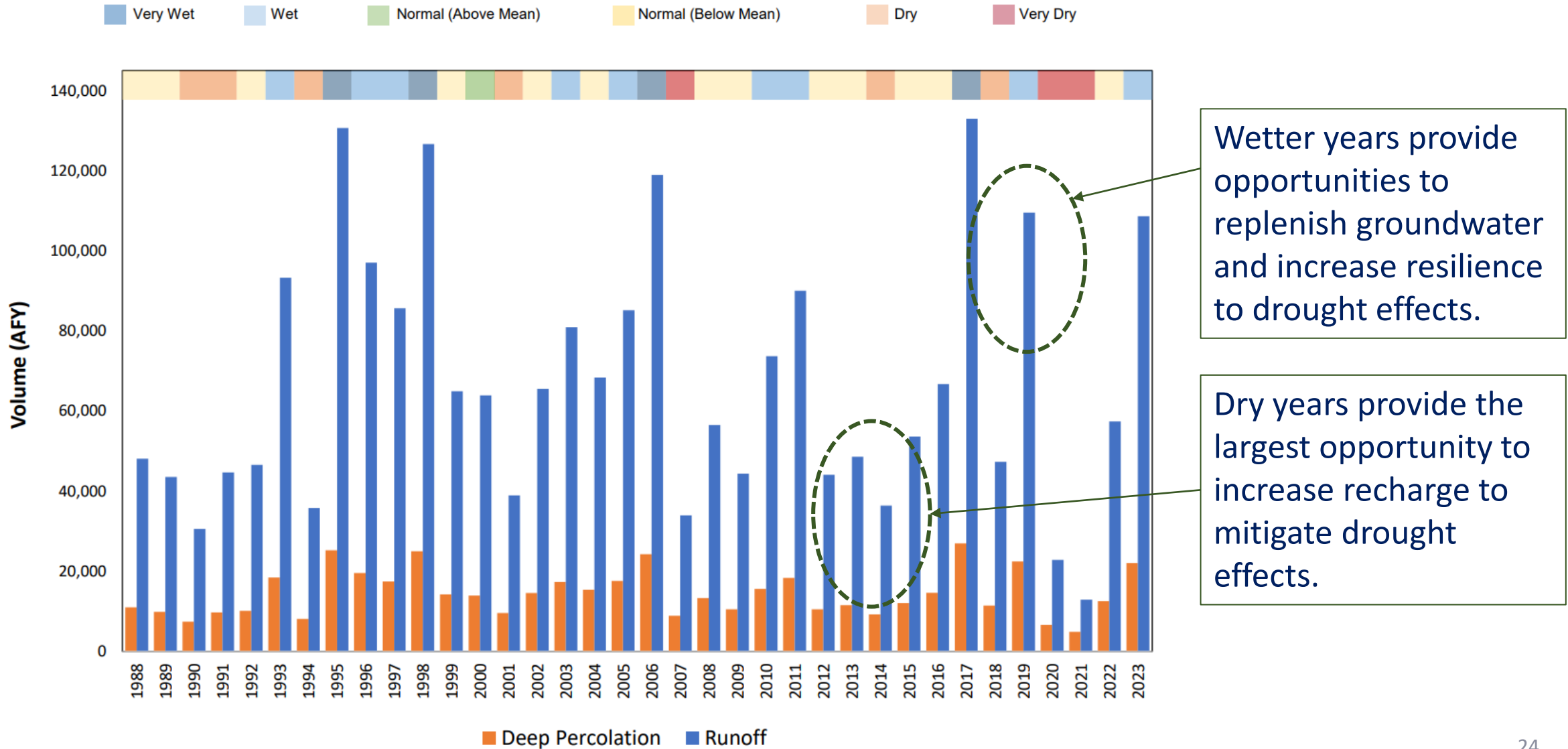
*New RMS wells are being evaluated for this SI.



Opportunities for Recharge and Building Resiliency



Opportunities for Recharge: Retaining Stormwater Runoff



Wetter years provide opportunities to replenish groundwater and increase resilience to drought effects.

Dry years provide the largest opportunity to increase recharge to mitigate drought effects.

Recharge Opportunities: On-Farm Approaches Scaled Up for Basin Benefits



Cover Crops and building
Soil Health



Vineyard-Specific BMPs:
Conservation/ Recharge



SW Right: Winter Recharge



Tile Drainage: Capture and
Store for In-Lieu Use



On-Site Ponds: Stormwater
Storage, In-Lieu Use,
Recharge

Adapting to Climate Change by Building Resiliency



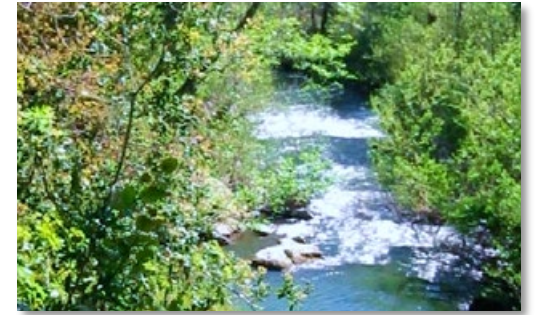
BMPs to Recharge
Groundwater



Maintain/Improve
Groundwater Discharge to
Streams



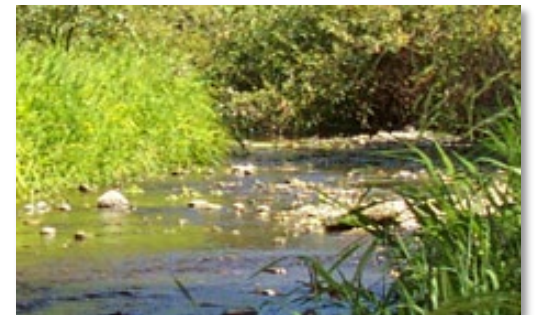
Maintain/Improve
Functional Flows



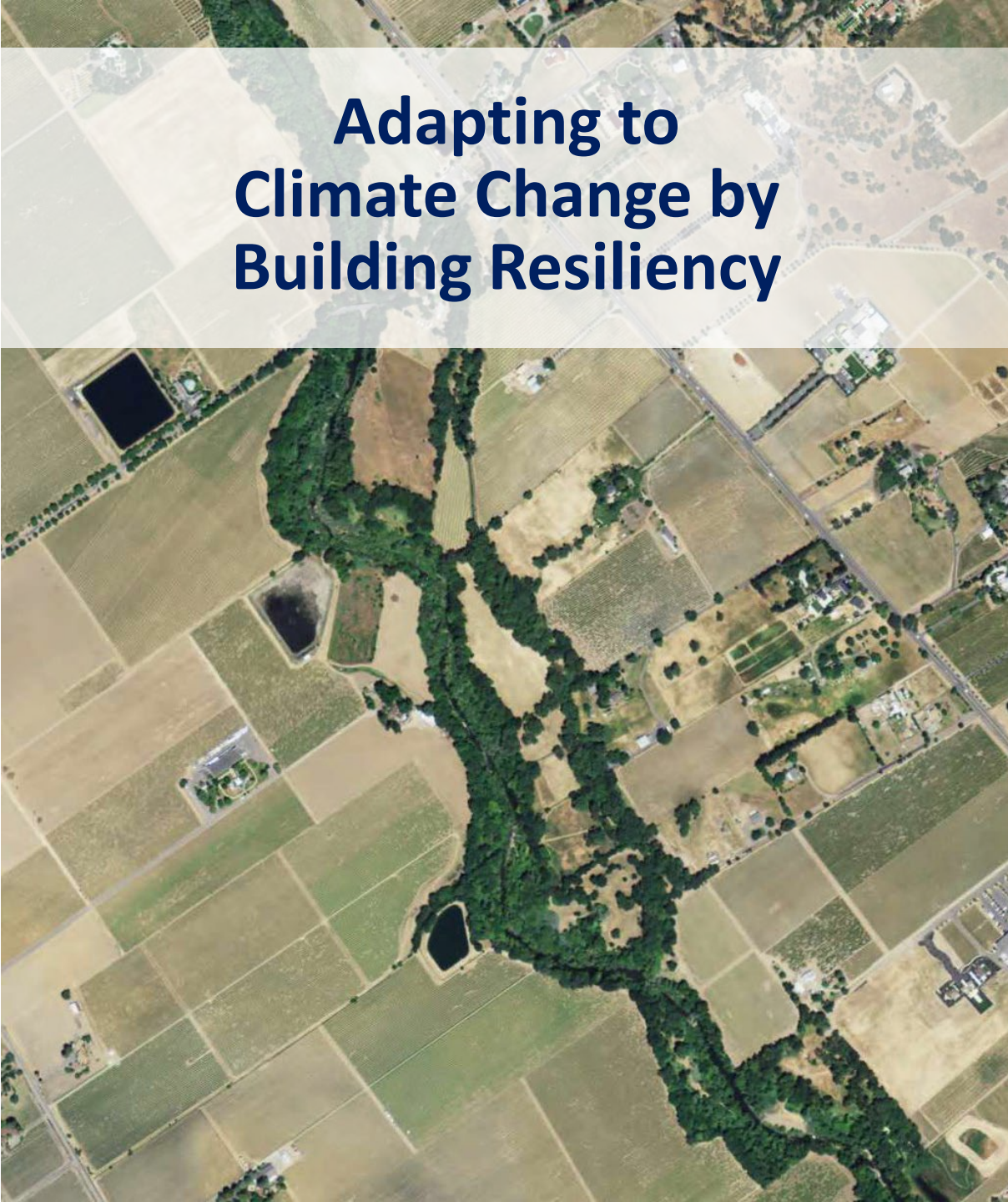
Capture/Store Surplus
Stormwater to Buffer
Drought Effects



Enhance Soil Moisture
Profile



Reduce GDE Drought Effects



DONE

- ✓ Annual Reports WY 2021, WY 2022, WY (March 2024)
- ✓ MW Installation (8 Sites/16 MWs; 2023)
- ✓ ISW and GDEs Workplan: Napa Valley Subbasin (March 2024)
- ✓ Napa County Water Conservation Workplan (March 2024)
- ✓ Groundwater Pumping Reduction Workplan (March 2024)
- ✓ Combined Program Overview (March 2024)

IN PROGRESS

- Stream Gages Installation at 8 Sites (Summer 2024)
- Pilot Sites: Vineyards' Participating in Communicating BMPs & Data
- Refining Water Use Data (ET: OpenET and Local Land-Based Sensors)
- Evaluate Potential Recharge Areas and Feasibility
- NVIHM: Model Updates
- Other Potential MW Sites
- Workplans: Implementation

ONGOING

- RCD and Stream Watch Monitoring
- Stakeholder Coordination and Outreach

GSP Implementation Jan 2022- March 2024



GSP: Early Implementation



GSP Projects and Management Actions



Water Conservation Workplan (GSP Management Action #1)

- “What water conservation options are available for Napa Subbasin water users?”
- Designed as a resource for stakeholders to learn about, consider, and expand upon voluntary water conservation measures

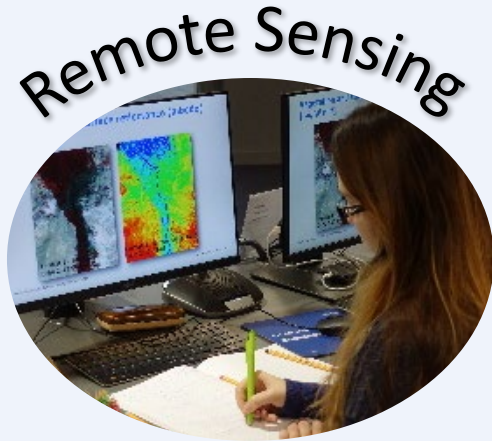
Groundwater Pumping Reduction Workplan (GSP Management Action #2)

- “How do we measure and achieve groundwater conservation in the Subbasin?”
- Develops a suite of voluntary programs that cost-effectively result in Subbasin benefits.
- Expand on voluntary actions that achieve groundwater benefits for the Subbasin with mandatory measures as needed.

Interconnected Surface Water and Groundwater Dependent Ecosystems Workplan (GSP Action - Section 6)

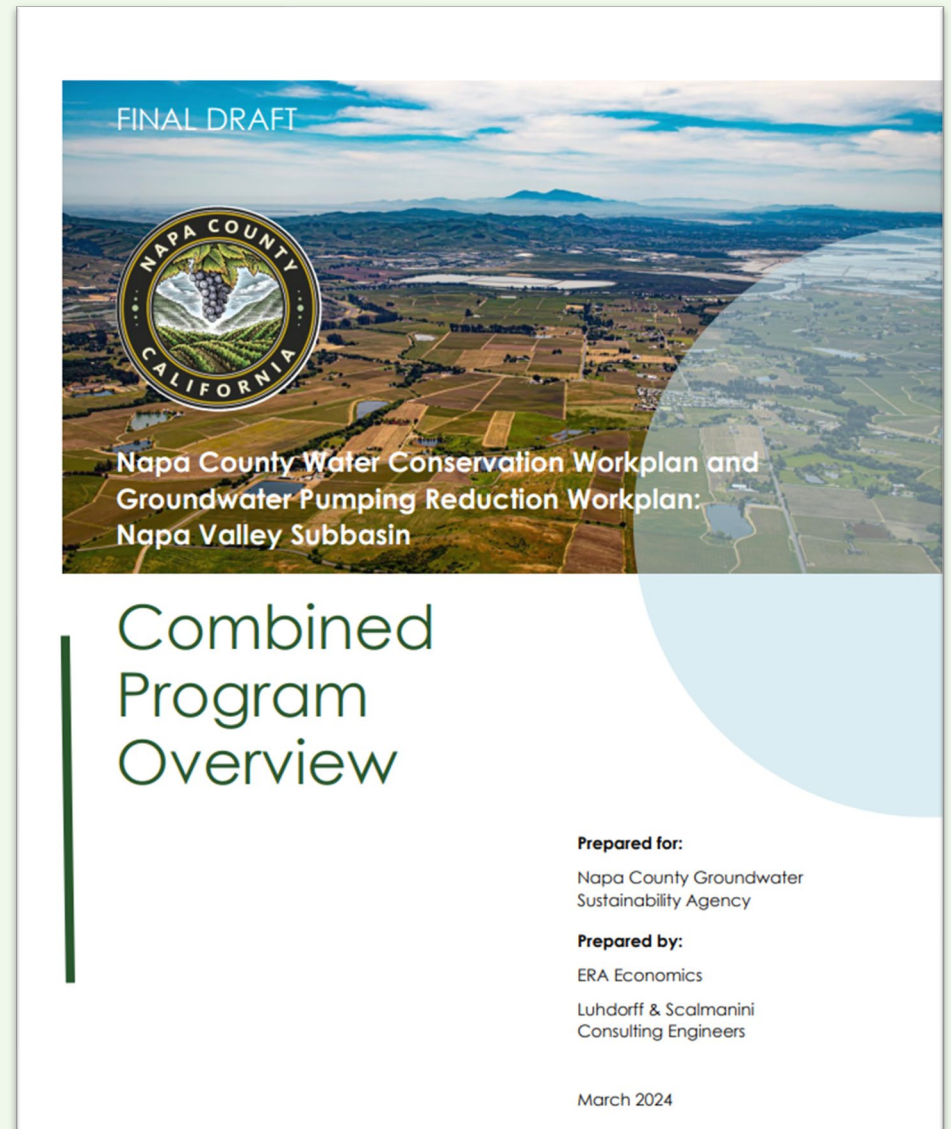
- GSP recognized data gaps on the relationship between ISW conditions and GDEs.
- Expands on types of monitoring needed to characterize ISW conditions and GDEs.

ISW and GDEs Workplan Implementation: Ongoing and New Types of Monitoring



Overview of the GPR & WC Workplans

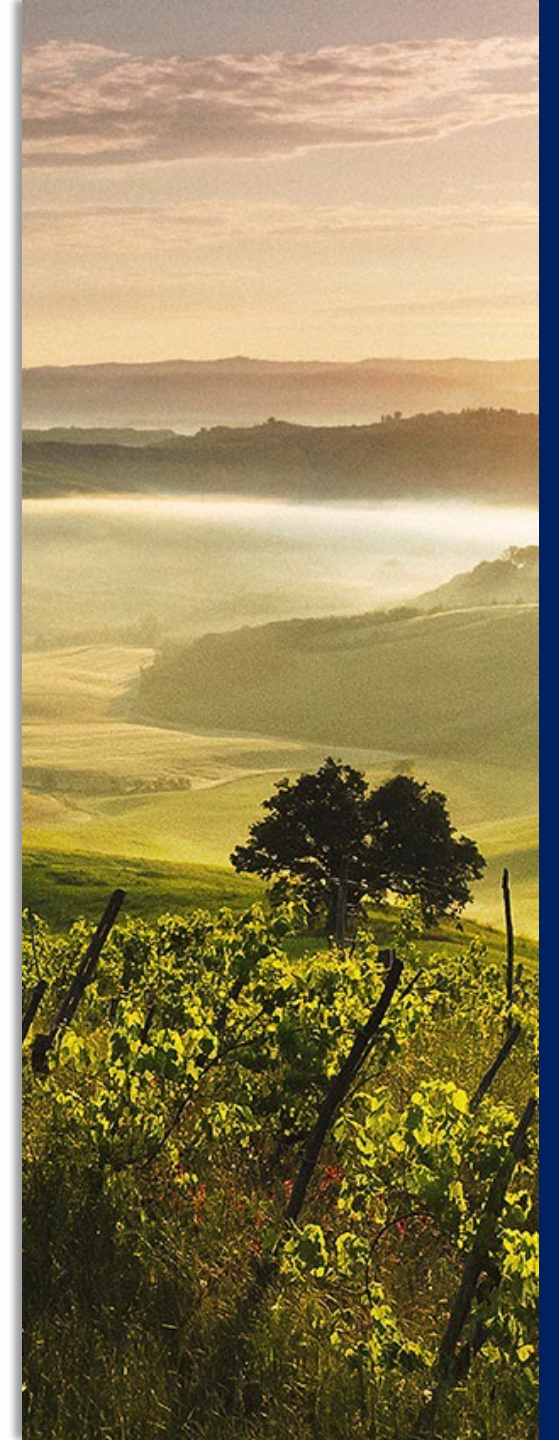
- Summarizes the WC and GPR Workplans and key findings
- Posted in English and Spanish
- 10 pages
- Available at:
<https://www.countyofnapa.org/3219/County-of-Napa-Plans-Reports-Documents>



Drought or Deluge: Conservation as a Napa Way of Life

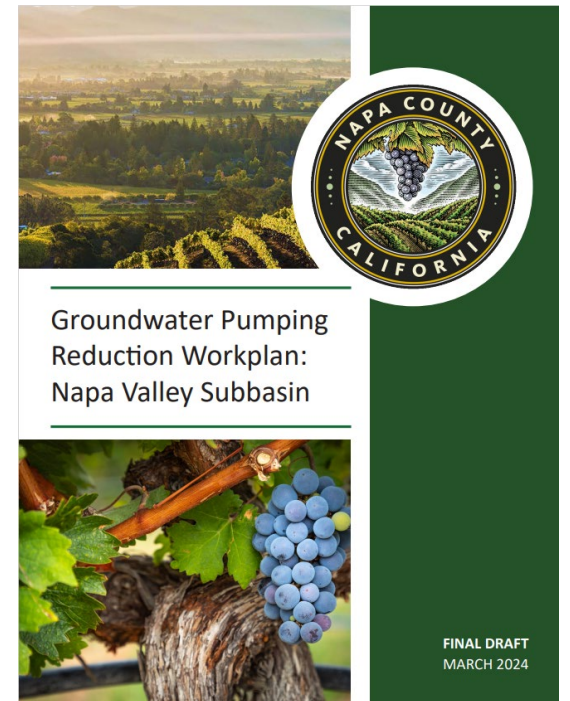
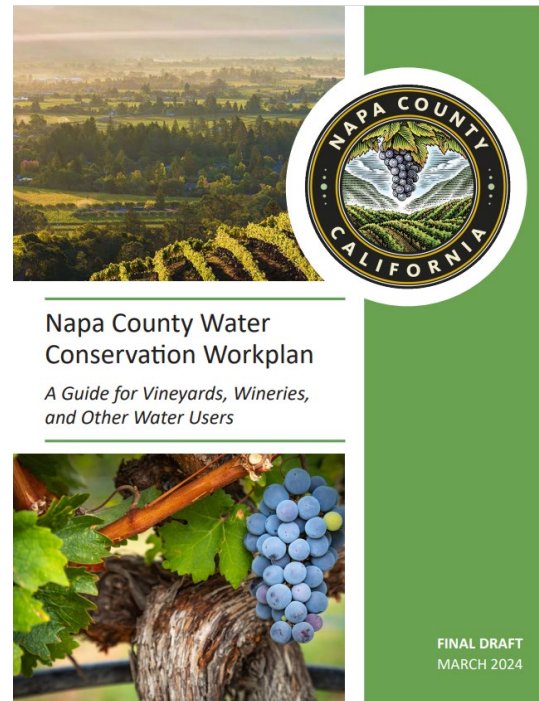
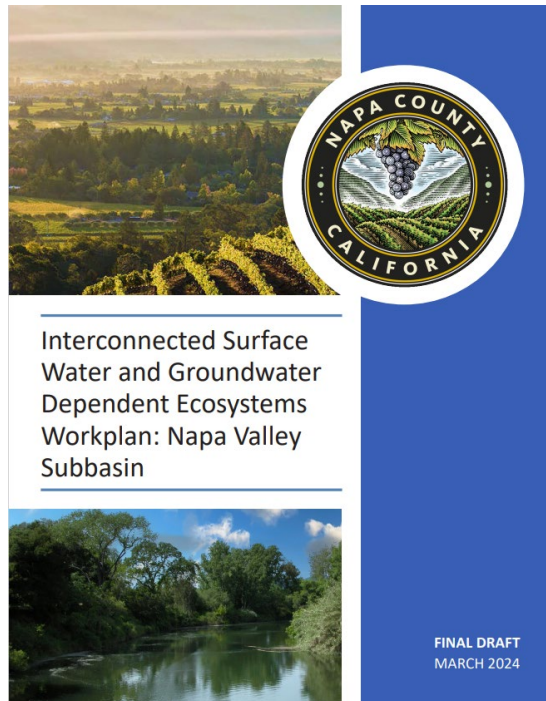
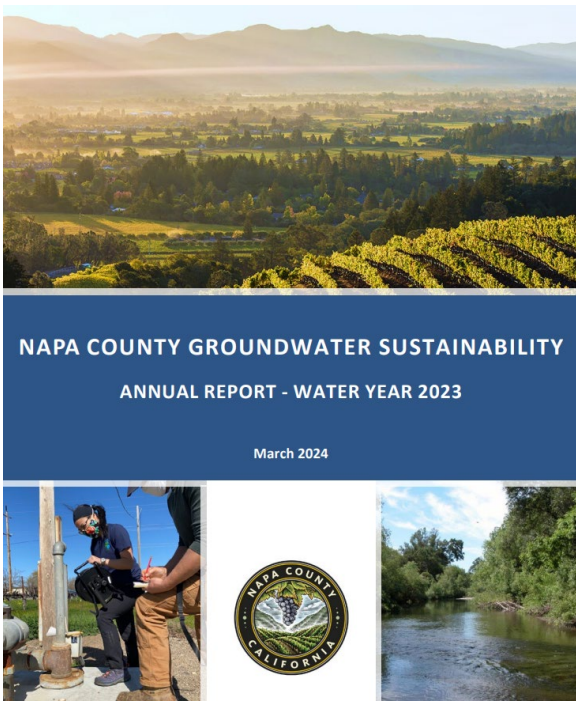
- California is experiencing hotter/drier conditions, including uncertain climate with more extreme events.
- Approaches are needed to adapt to climate change, build resiliency, and better protect interconnected surface water.
- Napa Valley vineyards and wineries are widely recognized for their resource stewardship and conservation practices.
- These uncertain times and changing climate call for *Conservation as a Napa Way of Life*.

4Rs: Retain – Replenish – Resilience – Reserves



Request for Approval

- Napa County Groundwater Sustainability Annual Report – Water Year 2023
- Napa County Water Conservation Workplan
- Groundwater Pumping Reduction Workplan (and Combined Program Overview)
- Interconnected Surface Water and Groundwater Dependent Ecosystems Workplan





THANK YOU!

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