

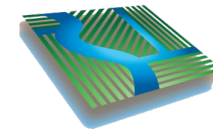
Vina Subbasin SHAC WY 2022 Annual Report Update

Cab Esposito (LSCE)

April 26th, 2023



**Luhdorff &
Scalmanini**
Consulting Engineers



DAVIDS
ENGINEERING, INC

Where are We Headed Today?



**Overview / Hydrological and Water Supply
Conditions**



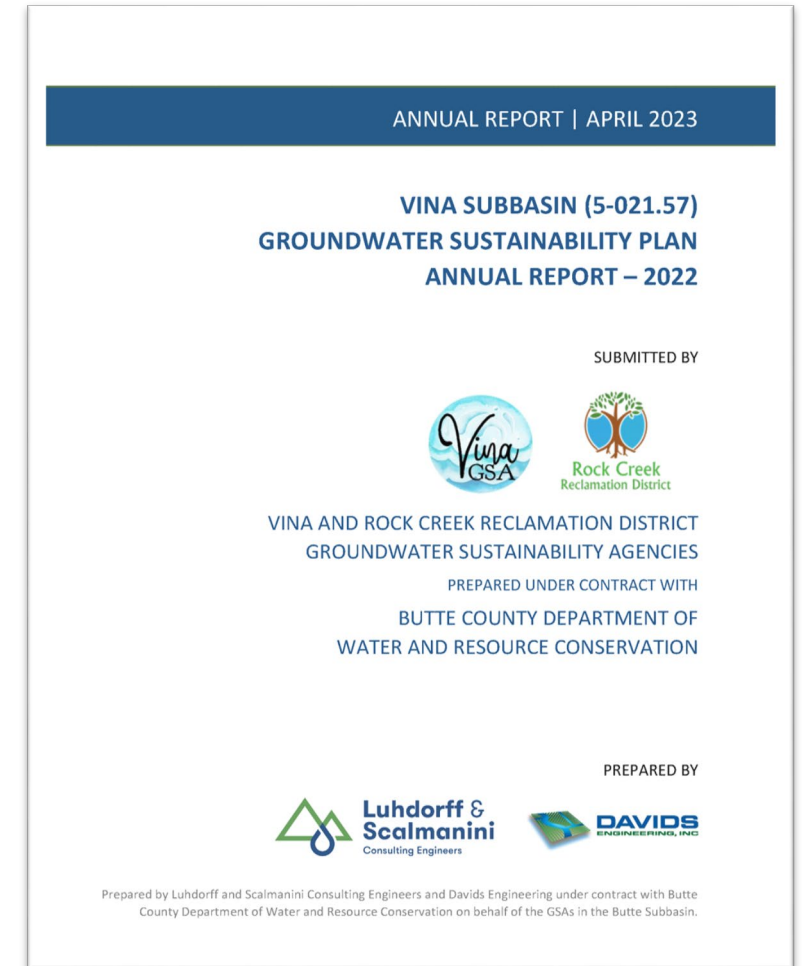
Groundwater Conditions



Water Supply and Water Use (Water Budget)



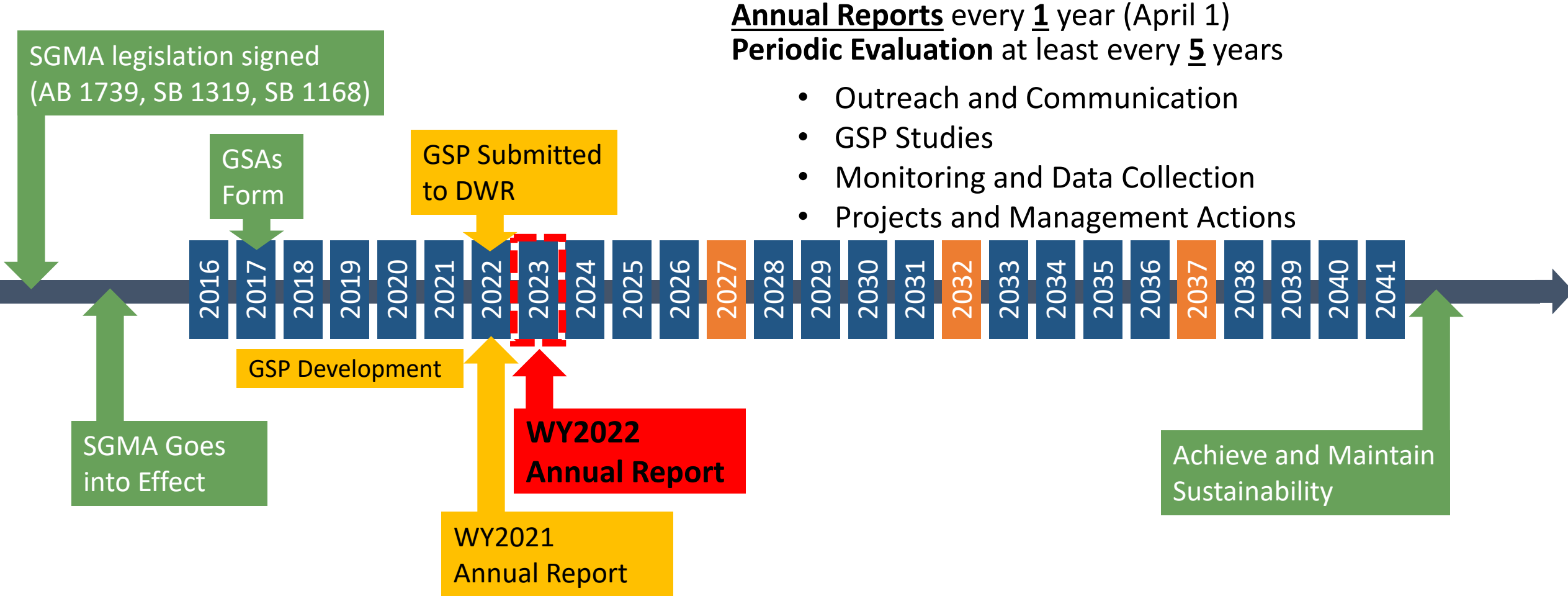
Progress Towards GSP Implementation



Annual Report Requirements

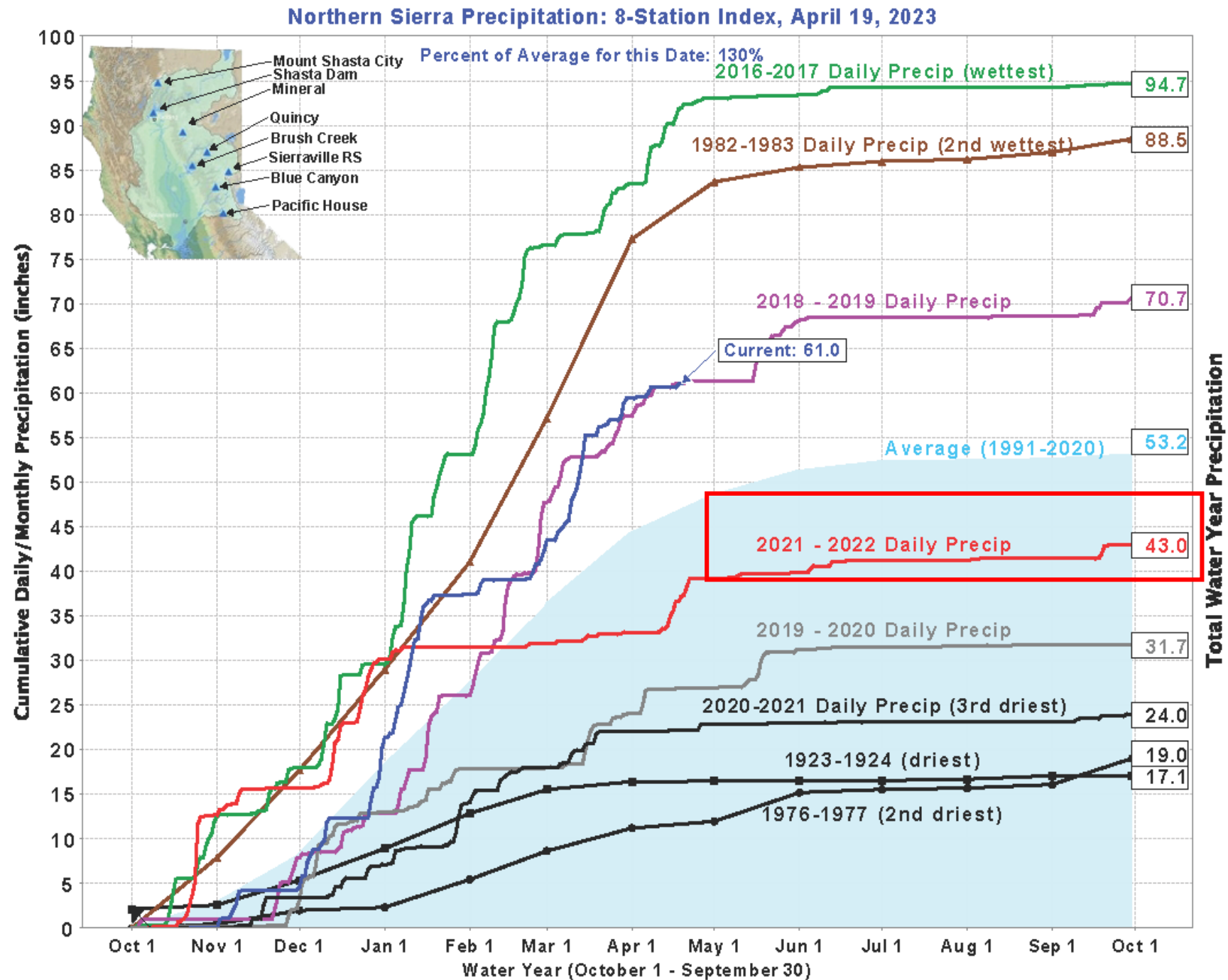
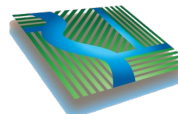
- **Updates on Groundwater Conditions**
 - **Groundwater Elevation (Hydrographs, Contour Maps)**
 - **Change in Groundwater Storage**
- **Water Supply and Water Use**
 - **Groundwater Extraction**
 - **Surface Water Supplies**
 - **Total Water Use**
- **Progress Toward Plan Implementation**
(e.g., implementation of planned projects and management actions)

Overview – SGMA Implementation Timeline



2022 WY Conditions

- Classified as a “Critical Dry Year”
 - Below average precipitation (CDEC, DWR graph)
- Statewide conditions at end of WY
 - Total Annual Precipitation: 17.9” or 76% of historical average.
 - Total Reservoir Storage: 14.7 MAF or 69% of historical average.
 - Snowpack at 64% historical average annual max
- Sacramento River Region unimpaired runoff, 64% of average (6.7 million acre-feet; DWR, 2022)



Overview of 2022 Regional Water Supplies

- **Sacramento River Settlement Contractors - 18% allocation from the Central Valley Project**
 - **Reports of Dry / Reduced Capacity Wells***
 - 16 to DWR Dry Well Reporting System (voluntary) within the Subbasin
 - 10 to Butte County EH (only from applications for new wells or deepening / repair)
 - 33 to the Butte County Drought Assistance Program (water tanks / water deliveries)
- * These do not sum up for a total, there is likely overlap, residents reporting to multiple programs

Groundwater Conditions

- **Groundwater Elevations**
 - 17 Representative Monitoring Site (RMS) Wells
 - Domestic, irrigation, and observation wells
- **Groundwater Storage**
 - Calculated utilizing RMS wells



Lowering
Groundwater Levels

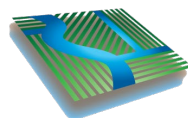


Reduction of Storage

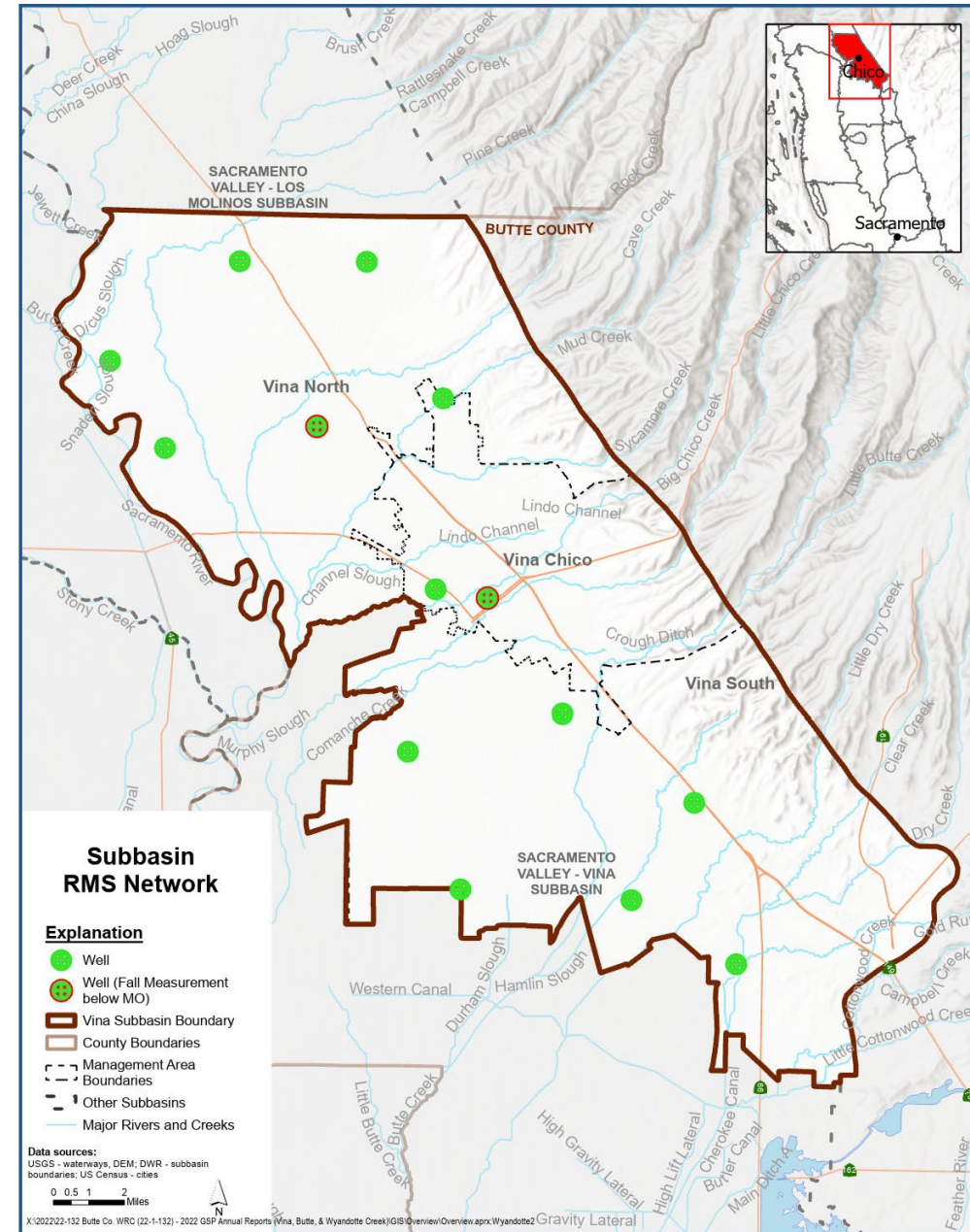
Groundwater Conditions – Groundwater Elevations

Groundwater Elevations

- **17 Representative Monitoring Sites (RMS) Wells**
 - **6 – Vina North Management Area**
 - **5 – Vina Chico Management Area**
 - **6 RMS wells in the South Management Area**
- **2 wells had fall measurements below the MO**

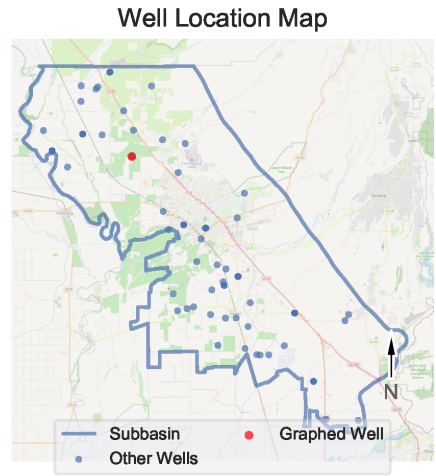


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Groundwater Conditions – Groundwater Elevations

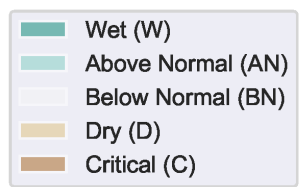
VINA Subbasin - State Well Number (SWN): 23N01W36P001M



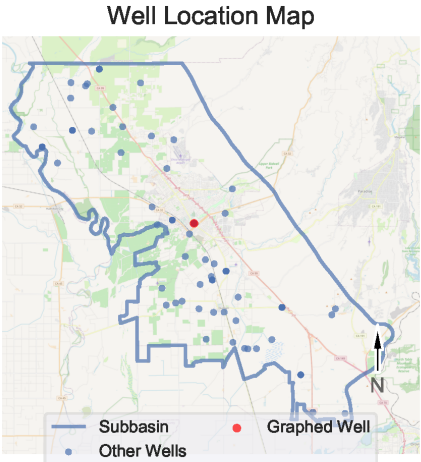
Sustainable Management Criteria:

IM (2027) = 110.0 ft AMSL
 MO = 108.0 ft AMSL
 MT = 45.0 ft AMSL

Sacramento Valley Water Year Index (WYI) shown on lower right. Meaning of colors defined below.



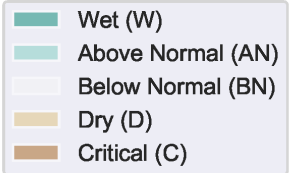
Groundwater Conditions – Groundwater Elevations



Sustainable Management Criteria:

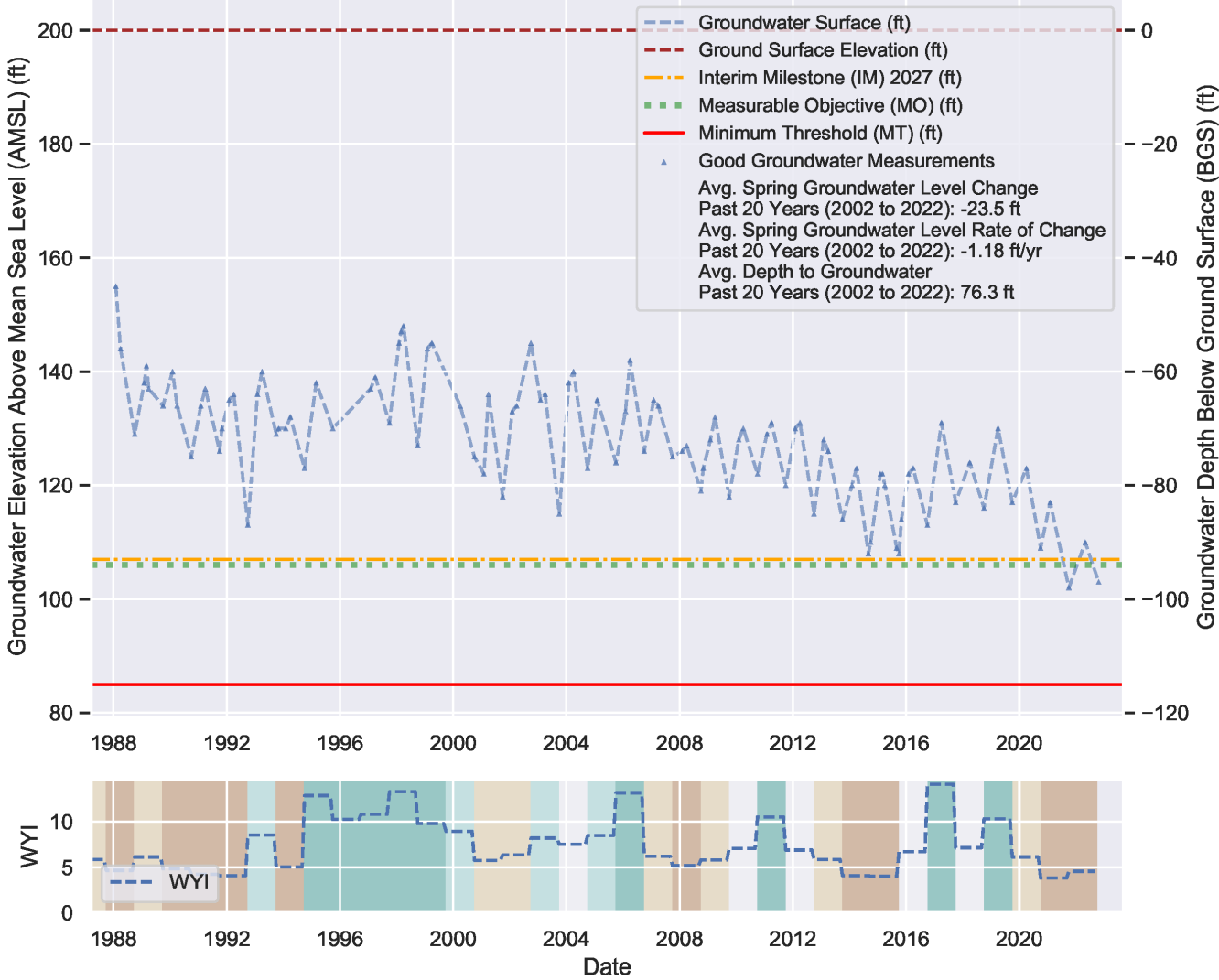
IM (2027) = 107.0 ft AMSL
 MO = 106.0 ft AMSL
 MT = 85.0 ft AMSL

Sacramento Valley Water Year Index (WYI) shown on lower right. Meaning of colors defined below.

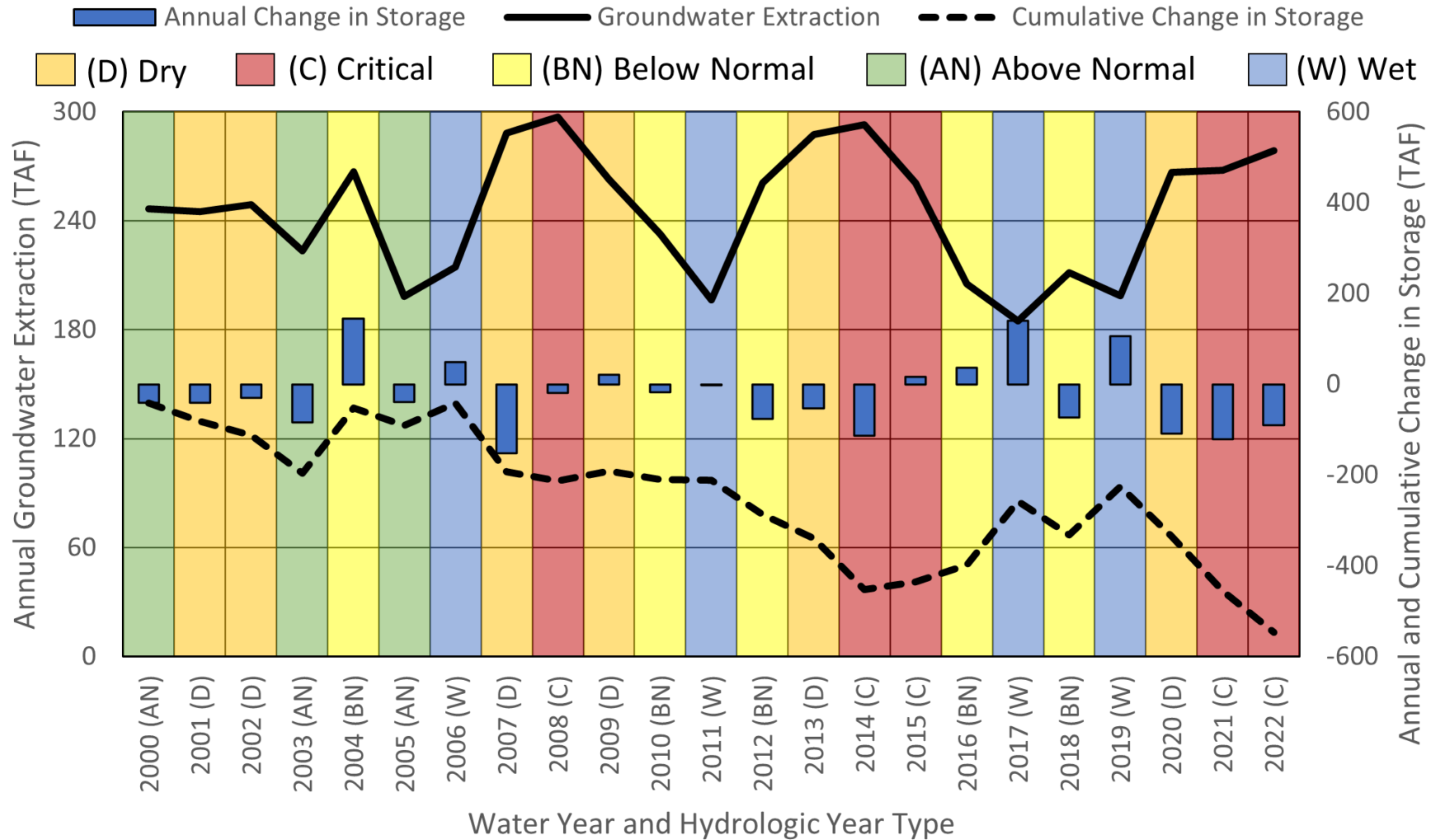


VINA Subbasin - State Well Number (SWN): CWSCH01b

Perforation data not available.

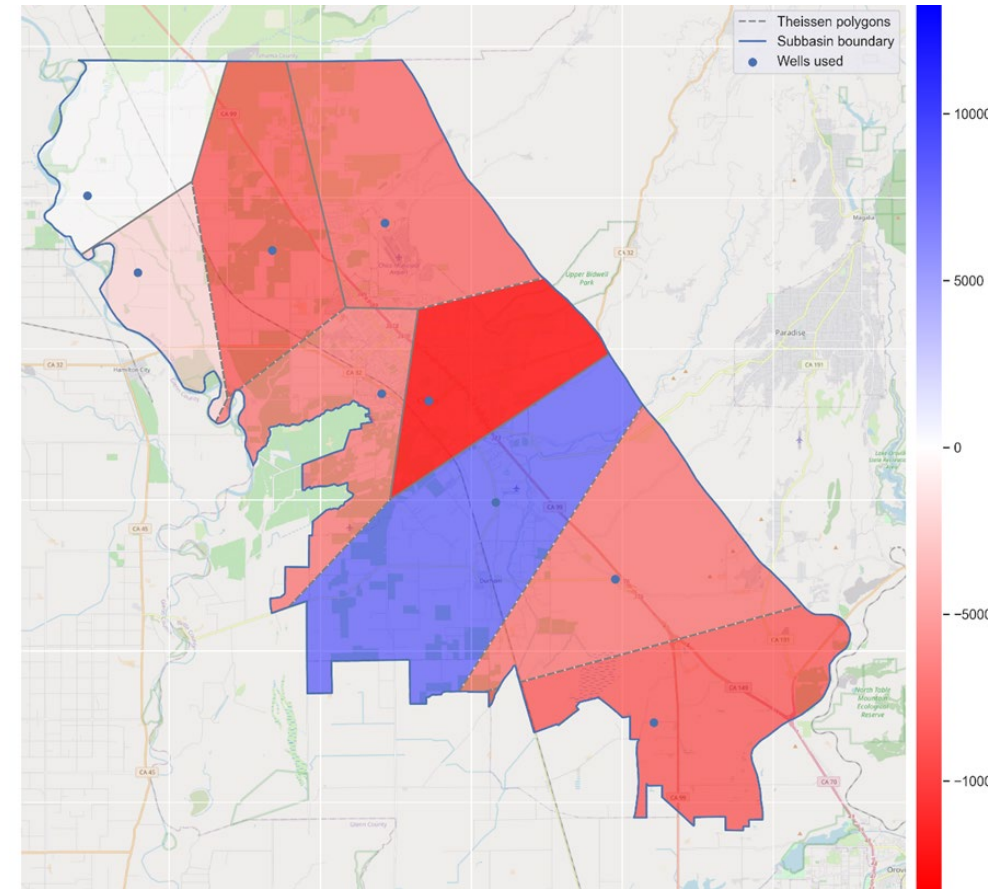


Groundwater Conditions – Groundwater Storage

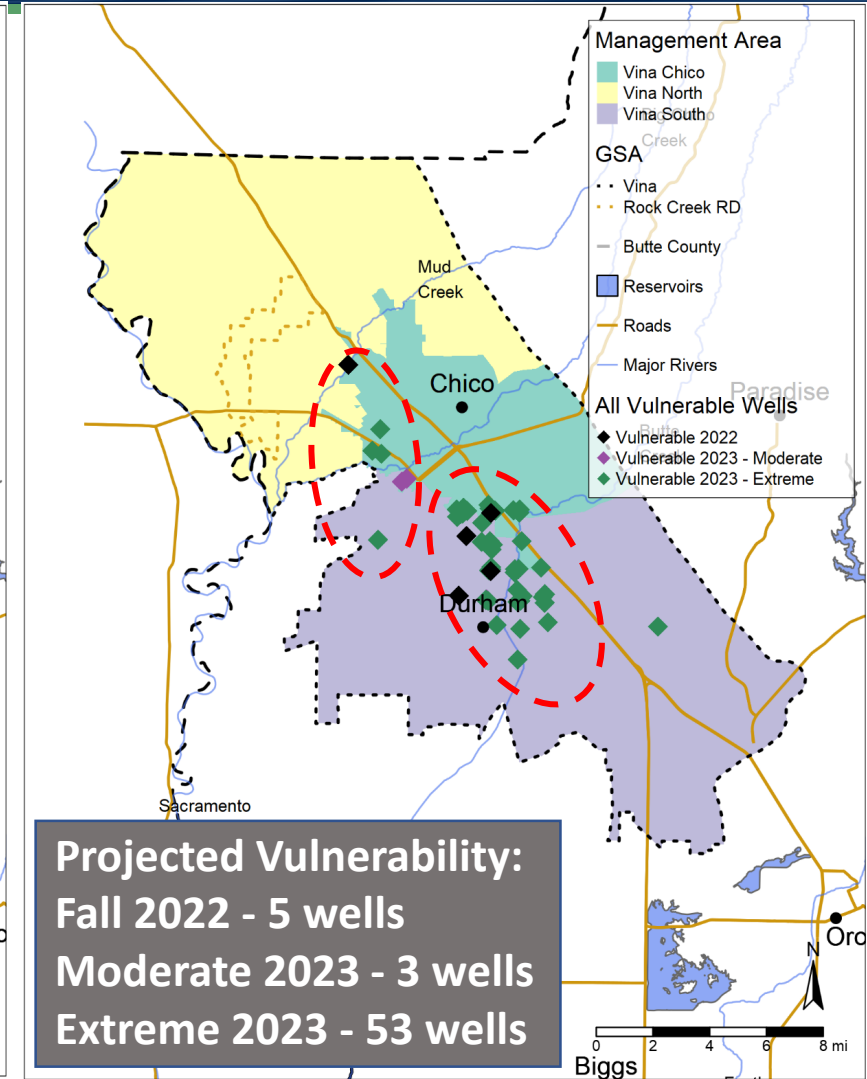
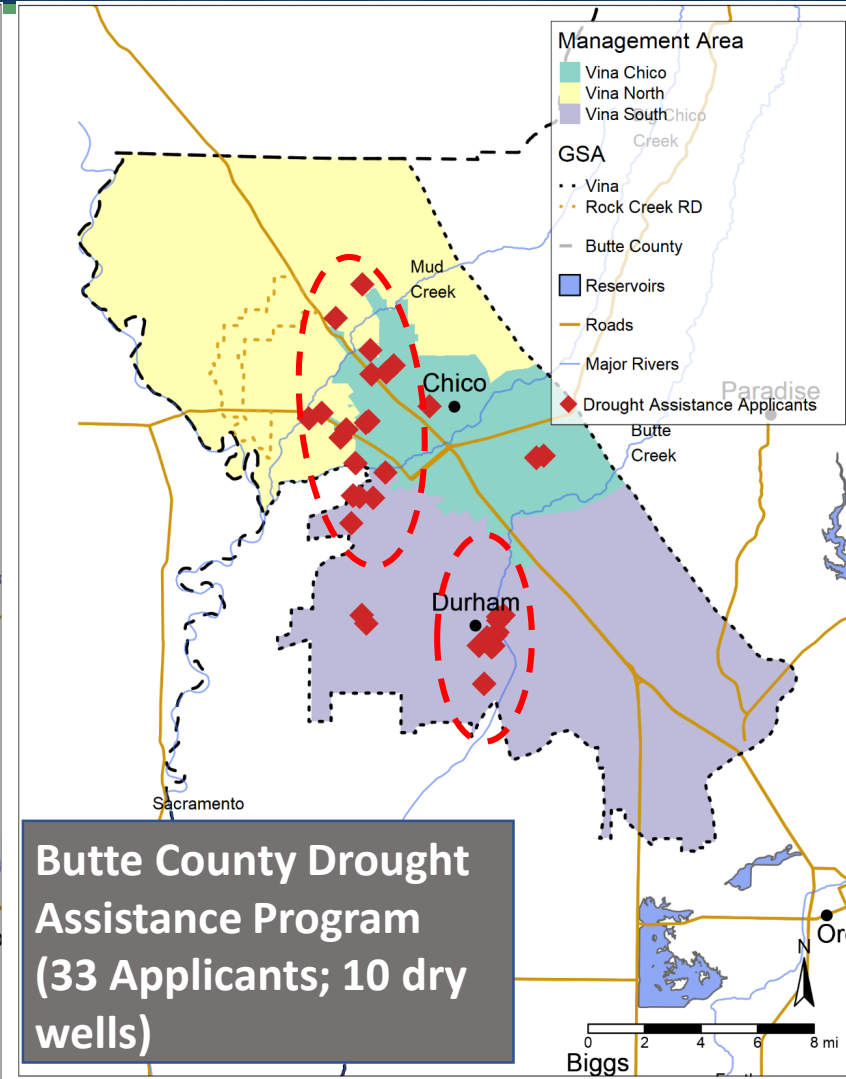
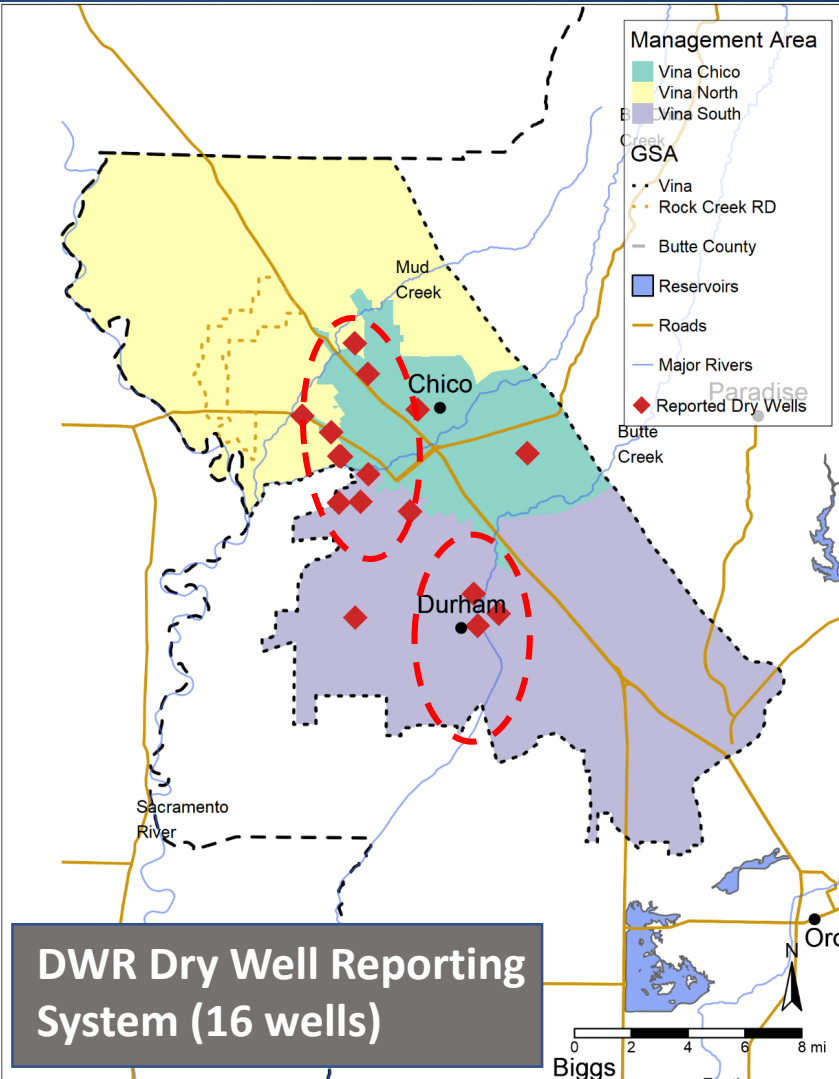


Groundwater Conditions & Change in Storage Summary

- **Total groundwater pumping in 2022 was slightly higher than historical average ~243 TAF but similar to average of last four critical years ~279 TAF**
- **Annual Groundwater Storage Change: ~ -90 TAF**
- **Cumulative Groundwater Storage Change: ~ -550 TAF**
- **Reports of Dry / reduced capacity wells were made in all 3 management areas**
- **2021 vs. 2022 groundwater elevations similar; Durham depression less prominent in WY 2022 due to slight decrease in pumping compared to WY 2021.**



Vulnerable Areas for Dry Wells



Groundwater Conditions – Surface Water Depletion

In 2022, vast majority groundwater elevations were above the established MO and the next IM of 2027

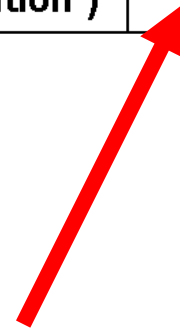
Table 2-1. Measurable Objectives, Minimum Thresholds and Seasonal Groundwater Elevations of Representative Monitoring Site Wells

State Well Number / Representative Monitoring Site (RMS) ID ¹	Management Area	Groundwater Elevation (feet above mean sea level)								
		MO ²	MT ²	Interim Milestone 2027	Seasonal High (Spring)			Seasonal Low (Fall)		
					2022	Difference (feet) from:		2022	Difference (feet) from:	
						2021	MO ²		2021	MO ²
<u>23N02W25C001M</u>	North	130	50	130	135.6	0.0	5.6	131.2	-0.6	1.2
<u>23N01W10E001M</u>	North	136	80	137	152.2	1.6	16.2	--	--	--
<u>23N01E07H001M</u>	North	136	72	140	163.9	-3.0	27.9	161.2	-1.2	25.2
<u>22N01W05M001M</u>	North	115	31	116	129.1	-2.9	14.1	122.6	3.0	7.6
<u>23N01W36P001M</u>	North	108	45	110	117.9	-9.2	9.8	107.9	-4.8	-0.1
<u>23N01E33A001M</u>	North	125	72	128	136.4	-5.0	11.4	132.2	-2.1	7.2
<u>CWSCH01b</u>	Chico	106	85	107	110.0	-7.0	4.0	103.0	1.0	-3.0
<u>CWSCH02</u>	Chico	105	85	108	112.0	-6.0	7.0	108.0	0.0	3.0
<u>CWSCH03</u>	Chico	108	85	109	117.0	-8.0	9.0	110.0	-1.0	2.0
<u>CWSCH07</u>	Chico	95	85	97	101.0	-8.0	6.0	100.0	5.0	5.0
<u>22N01E28J003M</u>	Chico	111	85	113	123.2	-6.9	12.2	114.7	-0.8	3.7
<u>21N01E21C001M</u>	South	64	10	67	86.9	--	22.9	80.0	-0.8	16.0
<u>21N02E18C003M</u>	South	130	65	132	153.7	3.6	23.7	150.6	-2.5	20.6
<u>20N01E10C002M</u>	South	92	20	93	--	--	--	--	--	--
<u>20N02E24C001M</u>	South	77	18	81	101.0	-5.8	24.0	91.4	-1.3	14.4
<u>20N02E09L001M</u>	South	91	30	93	110.8	-5.1	19.8	101.2	--	10.2
<u>21N02E26E005M</u>	South	95	36	97	109.9	-4.2	14.9	104.1	-2.7	9.1

Water Supply and Water Use (Water Budget)

Table 3-3. Vina Subbasin Total Water Use by Water Use Sector

Sector	WY 2022 (AF)		
	Groundwater	Surface Water	Total
Agricultural	253,800	20,500	274,300
Municipal	22,300	0	22,300
Rural Residential	2,600	0	2,600
Native Vegetation (Plant groundwater uptake)	76,000	0	76,000
Total	354,700	20,500	375,200
Total (excluding Native Vegetation¹)	278,700	20,500	299,200



93% Groundwater Dependent in 2022

Water Budget Results by Water Budget Region

Water Budget Region	Area (AC)	Estimated Agricultural Groundwater Extraction (AF)	Estimated Urban Groundwater Extraction (AF)	Total Estimated Groundwater Extraction ¹ (AF/AC)
Vina South Management Area	83,216	120,100	0	1.4
Vina North Management Area	71,895	136,200	0	1.9
Vina Chico Management Area	29,718	1,600	21,700	0.8
Durham Irrigation District	186	0	600	3.4
Totals	185,016	258,000	22,300	1.5

GSP Implementation

- Updates discussed in the annual report (Section 5)
- Highlights in 2022:
 - Submitted SGMA Implementation Round 2 grant application in December 2022
 - Monitoring Network Enhancements
 - Community Monitoring: Domestic Well Survey
 - GSP Implementation and Compliance Activities
 - Inter-basin Coordination Activities
 - Extend the Orchard Replacement Program
 - Lindo Channel Surface Water Supplies Feasibility Analysis
 - Agricultural Irrigation Efficiency Pilot Program and Education
 - Groundwater Recharge Feasibility Analysis and Site Evaluation



GSP Implementation (Continued)

Project	Progress in WY 2022 Annual Report
Residential Water Conservation	Conservation programs saved 18.3 million gallons of water
Agricultural Irrigation Efficiency	Recommendations report released June 2022
Community Water Education Initiative	Seeking funding
Paradise Irrigation District (PID) Intertie	Town of Paradise Opinions Study released in June 2022

GSP Implementation (Continued)

Project	Progress in WY 2022 Annual Report
Rangeland Management and Water Retention Project	Grant application submitted; CSUC and Chico State Enterprises are developing a management plan
Removal of Invasive Species	Initial data collection completed, identification and mapping initiated, grant application submitted

Annual Report Summary

- Hydrologic conditions in WY 2022 had below average precipitation, streamflow, and above average ET.
- Extreme drought conditions began in 2020 and went through 2022 leading to higher groundwater demands.
 - This is reflected in low groundwater levels in 2022.
- WY 2022 groundwater extraction was above the 22-year average pumping (2000-2021) but comparable to average of last four critical years.
- Cumulative groundwater storage is -550k acre-feet from 2000, approximately 2-years of average pumping.

Annual Report Summary

Work is needed in areas with groundwater level declines and impacts to shallow wells through:

- 1. Reducing groundwater demand and increasing conservation activities**
 - 2. Increasing groundwater recharge**
 - 3. Increasing surface water supplies**
 - 4. Land use management**
- Subbasin is on track to meet the 5-year Interim Milestones (2027).**
 - On average groundwater levels were at or above their MO's in spring and fall.**
 - GSA is proactive in GSP implementation (grants, outreach, funding)**

Acknowledgements

- **Participating Butte County Well Owners**
- **Technical support from Davids Engineering, Inc. and Luhdorff and Scalmanini Consulting Engineers**
- **Groundwater Sustainability Agency Managers**
- **Technical Advisory Committee to the Butte County Water Commission**

Thank you!



Discussions / Questions?

