

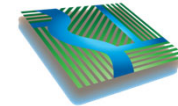
Vina Subbasin WY 2022 Annual Report Update

Eddy Teasdale, PG., CHG (LSCE)

May 10th, 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 | APRIL 2023



VINA SUBBASIN (5-021.57)
GROUNDWATER SUSTAINABILITY PLAN
ANNUAL REPORT – 2022

SUBMITTED BY

VINA AND ROCK CREEK RECLAMATION DISTRICT
GROUNDWATER SUSTAINABILITY AGENCIES
PREPARED UNDER CONTRACT WITH
BUTTE COUNTY DEPARTMENT OF
WATER AND RESOURCE CONSERVATION

PREPARED BY

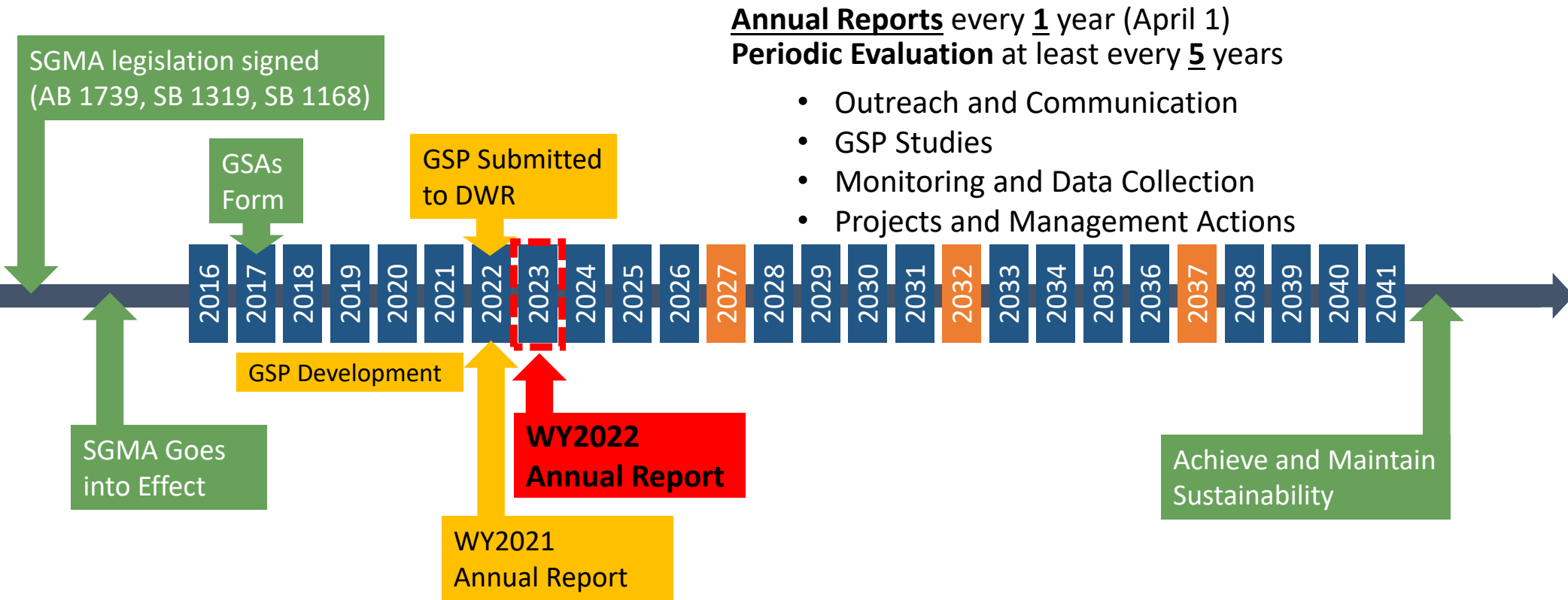
Prepared by Luhdorff and Scalmanini Consulting Engineers and Davids Engineering under contract with Butte County Department of Water and Resource Conservation on behalf of the GSAs in the Butte Subbasin.

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)

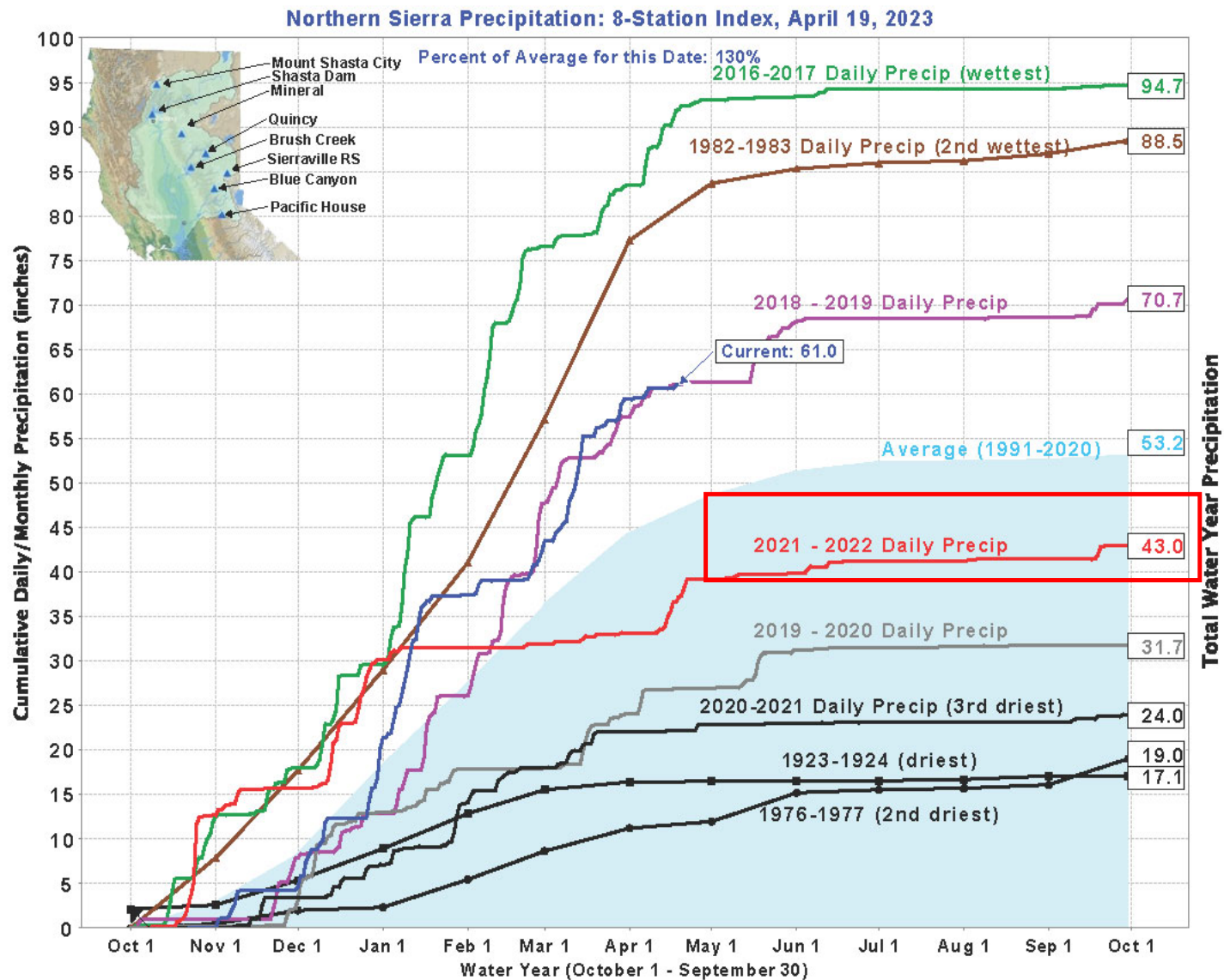
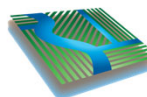


Overview – SGMA Implementation Timeline



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



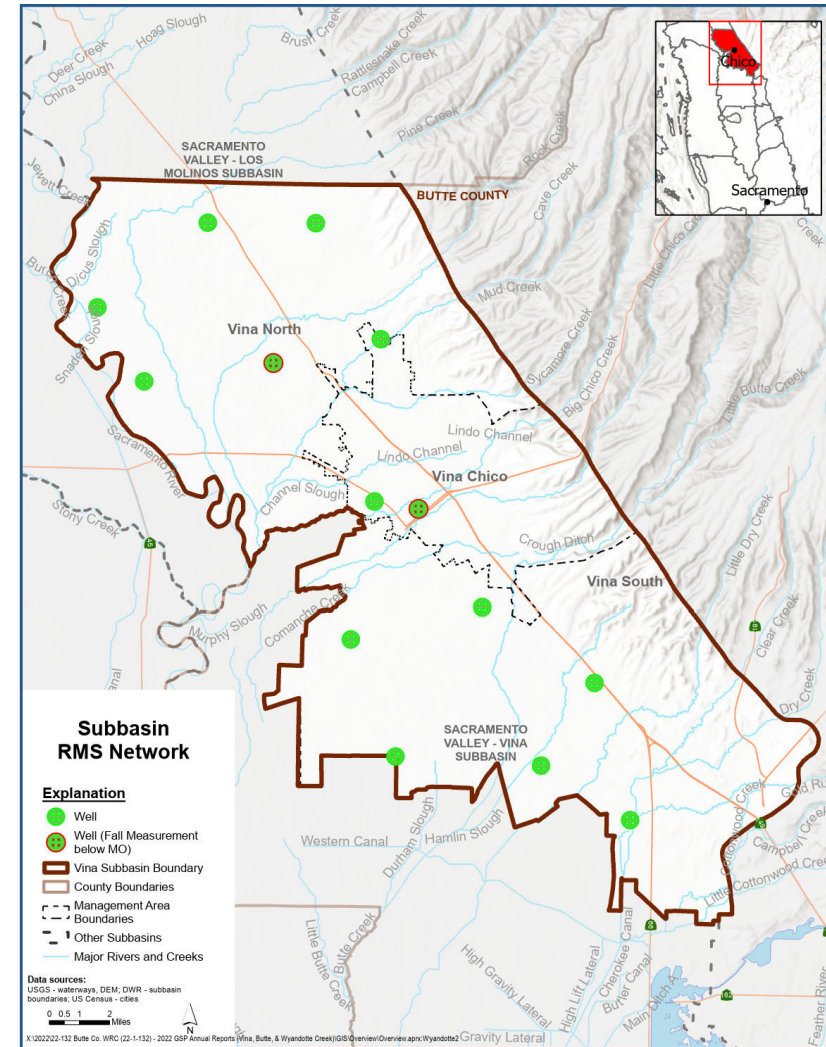
Reduction of Storage



Groundwater Conditions – Groundwater Elevations

Groundwater Elevations

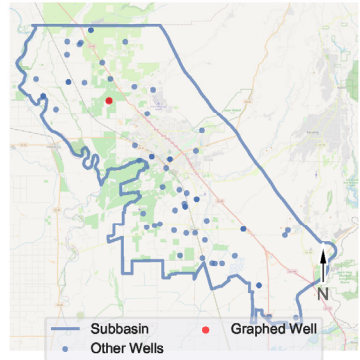
- **17 Representative Monitoring Sites (RMS) Wells**
 - **6 – Vina North Management Area**
 - **5 – Vina Chico Management Area**
 - **6 RMS wells in the South Management Area**
- **2 wells had fall measurements below the MO**



Groundwater Conditions – Groundwater Elevations

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

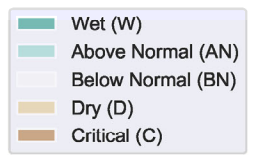
Well Location Map



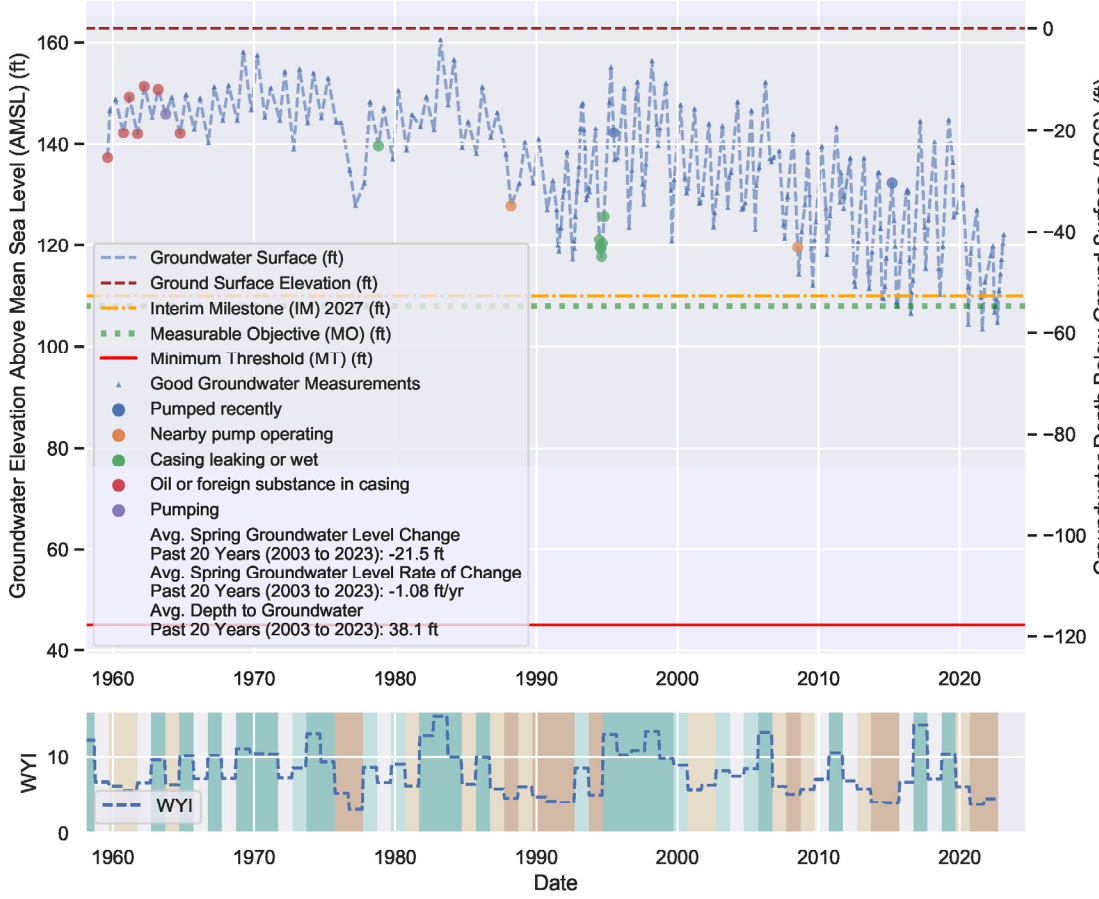
Sustainable Management Criteria:

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.

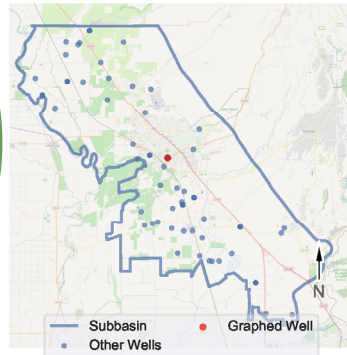


Perforation data not available.



Groundwater Conditions – Groundwater Elevations

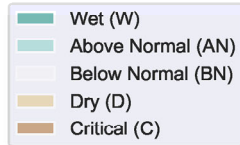
Well Location Map



Sustainable Management Criteria:

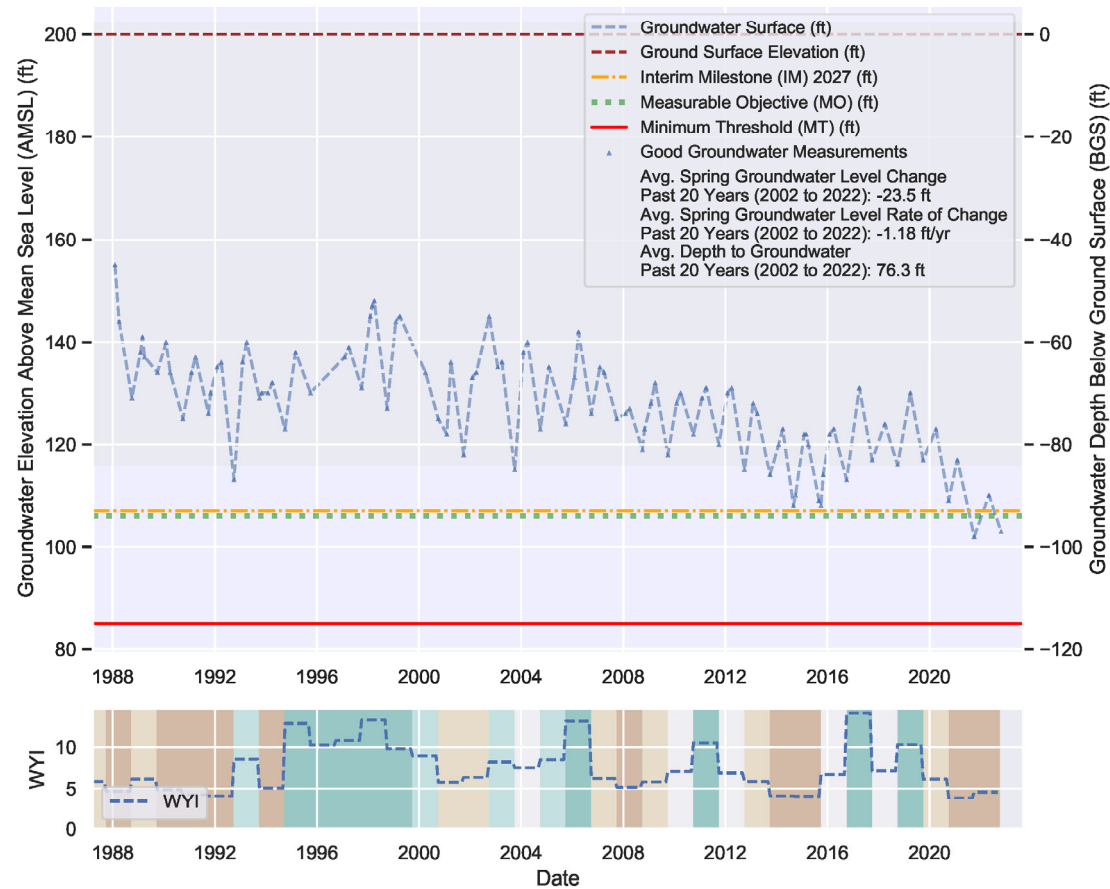
IM (2027) = 107.0 ft AMSL
 MO = 106.0 ft AMSL
 MT = 85.0 ft AMSL

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

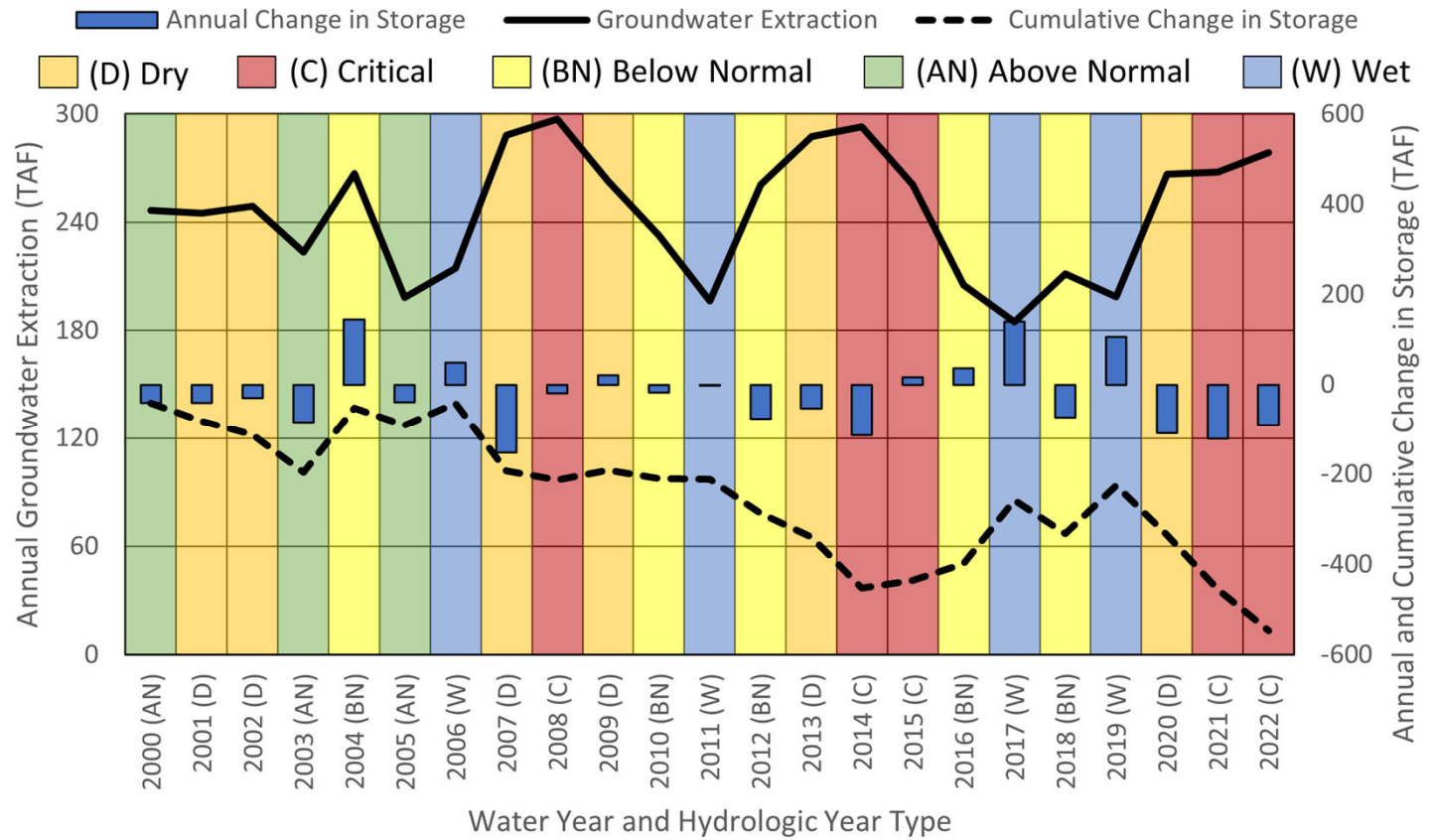


VINA Subbasin - State Well Number (SWN): CWSCH01b

Perforation data not available.

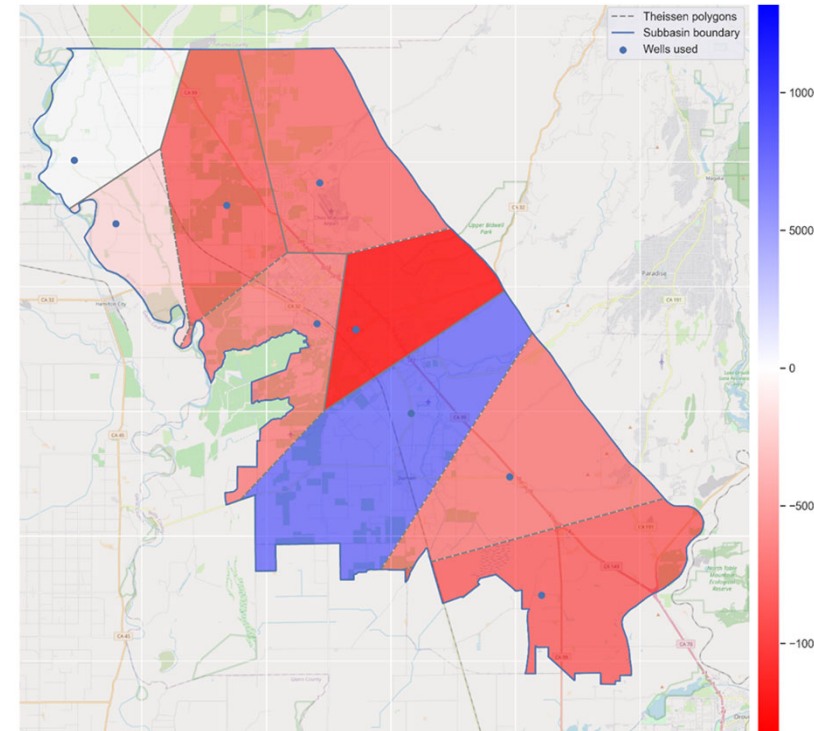


Groundwater Conditions – Groundwater Storage

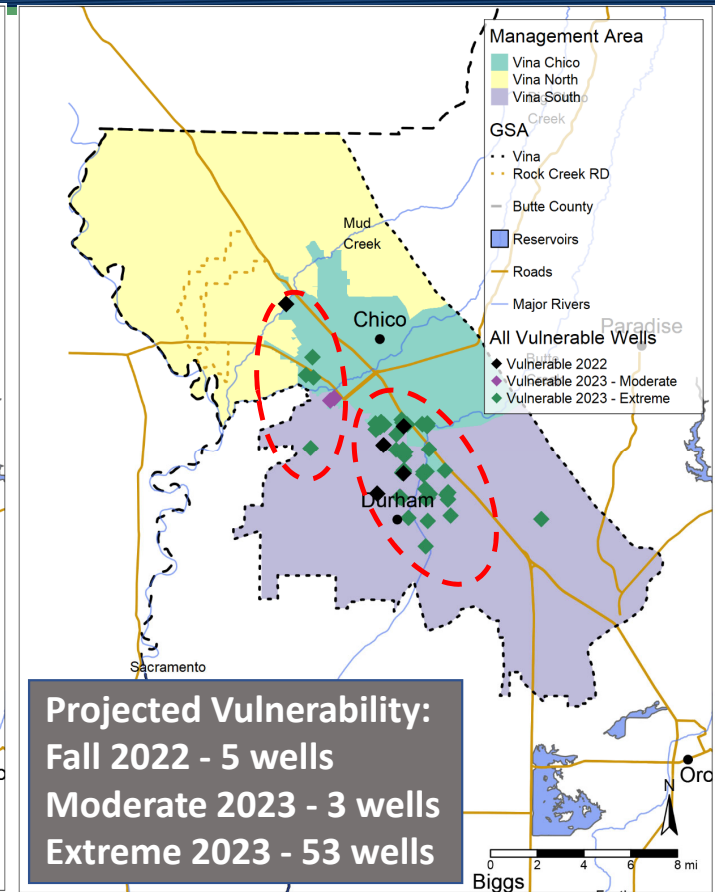
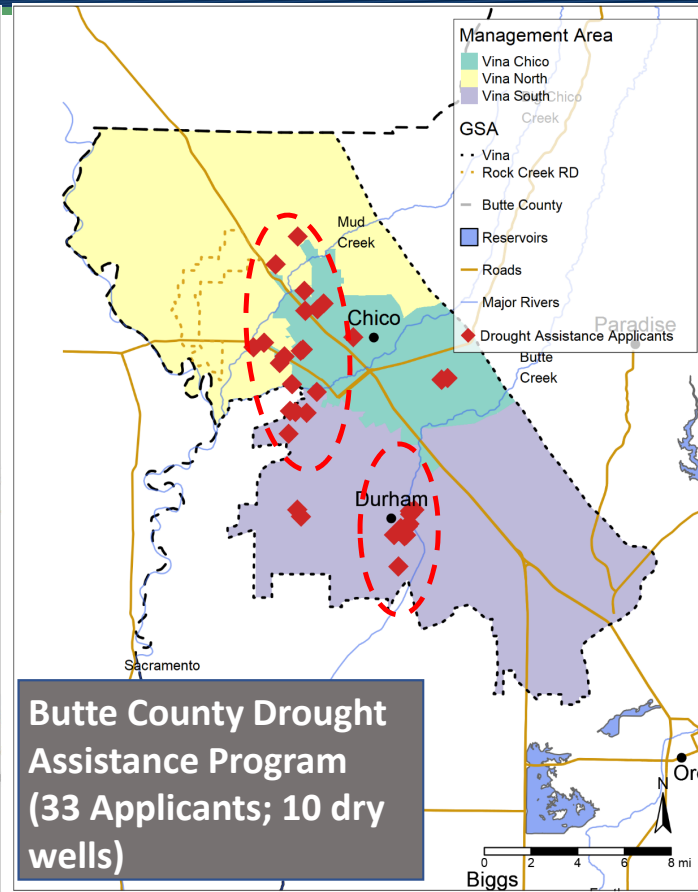
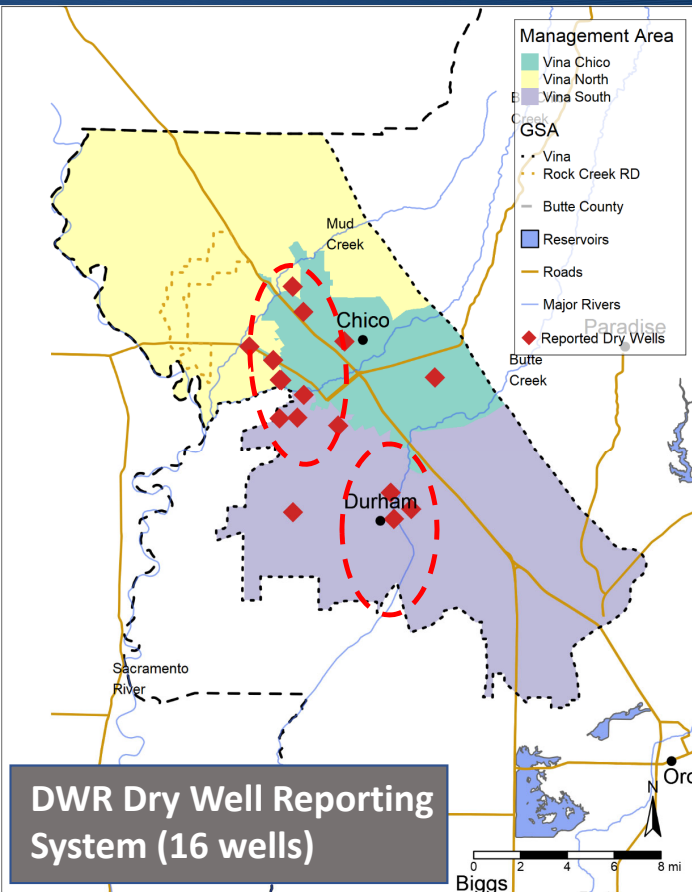


Groundwater Conditions & Change in Storage Summary

- **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?

