Agenda

Upper San Luis Rey Groundwater Subbasin G.S.A
Executive Team

Wednesday, September 15, 2021 3:00 P.M.
34928 Valley Center Road, Pauma Valley, California

This meeting will be held via Zoom.

AGENDA TOPICS

I. Call to Order

Roll Call - Executive Team

II. ACTION DISCUSSION

1. GSP Development Update

A. Review / Discussion of the Sustainable Management Criteria Chapter. The Team will review the sustainability goals for the six sustainability indicators

Background: The GSP Development Staff met weekly over the last several months with the consultant to aide in the development of the Sustainable Management Criteria. This will be reviewed and discussed with the entire team.

B. Review and Discussion: Review of draft calendar for required Draft GSP posting and public comment period.

Background: The Executive Team will discussion and coordinate the timing of the approval of the draft GSP, Public Notice for 45 day review and public comment period, subsequent public comment response and final submission to DWR. The posting of the GSP for review and public comment needs to allow a reasonable amount of time for the consultant to draft responses to the public comments.

DRAFT GSP 45 Day Public Comment, Response and Approval Calendar

OCTOBER 2021

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Yuima / CSD Board Mtng. Need to approve posting of public notice for 45 day Comment Period. – Not necessarily required

November 2021

	m	t	w	t	f	s
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

11/5/21 – 45 days before 30-day public Comment response period

DECEMBER 2021

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

12/21/21 – 30 days prior to GSP Board Approval Reply to Pubic Comments?

JANUARY 2021

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Yuima / CSD Board Mtng. – GSP Approval (Joint Mtng. With RCD?) GSP ready for Board Packet
Holidays GSP Due to DWR


Groundwater Sustainability Plan
Upper San Luis Rey Groundwater Subbasin
GEOSCIENCE
The First Name in Groundwater
GSA Meeting
September 15, 2021

Sustainable Management Criteria Chapter

Sustainable Groundwater Management is defined as the *"…management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results…"* (Water Code Section 10721 (v))

Goal

- Develop sustainability goals based on findings from the Basin Setting chapter and desired basin operations. This includes the establishment of Undesirable Results, Measurable Objectives (or sustainability indicators), and Minimum Thresholds.

Sustainability Goals

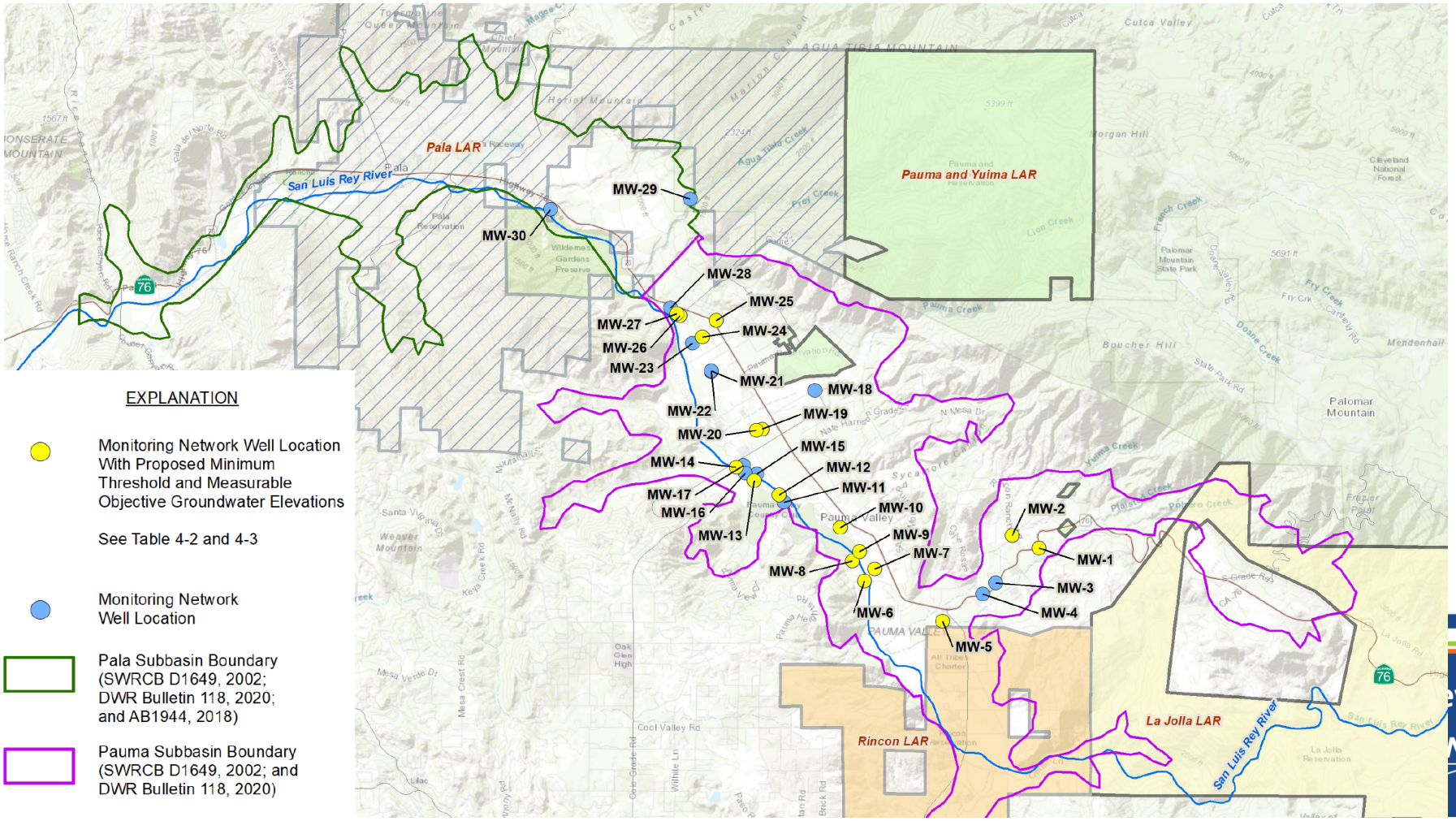
The goal of SGMA is groundwater sustainability, which includes:

SUSTAINABILITY INDICATOR	CHRONIC LOWERING OF GROUNDWATER LEVELS	REDUCTION OF GROUNDWATER STORAGE	INTER-CONNECTED SURFACE WATER DEPLETIONS	WATER QUALITY DEGRADATION	LAND SUBSIDENCE	SEAWATER INTRUSION
METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

SGMA Terminology

- **Sustainability Goal:** a succinct big-picture statement of the GSA's objectives and desired conditions and how they will be reached.
- **Undesirable Result:** significant and unreasonable conditions for any of the six sustainability indicators.
- **Measurable Objective:** specific, quantifiable goal to track the performance of sustainable management.
- **Minimum Threshold:** numeric value used to define undesirable results for each sustainability indicator.
- **Interim Milestone:** target value representing measurable groundwater conditions, in increments of five years, set by the GSA as part of the GSP.

Representative Monitoring Points



Sustainability Goals: Groundwater Levels

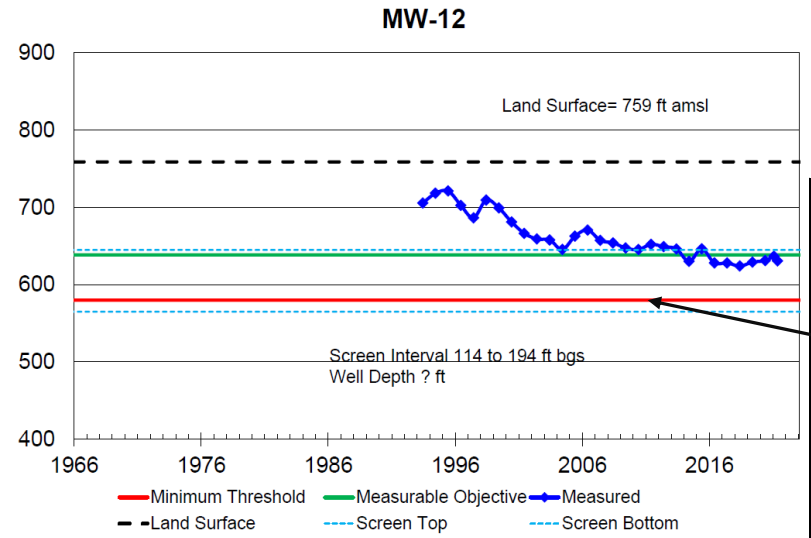
The goal of SGMA is groundwater sustainability, which includes:

SUSTAINABILITY INDICATOR	CHRONIC LOWERING OF GROUNDWATER LEVELS	REDUCTION OF GROUNDWATER STORAGE	INTER-CONNECTED SURFACE WATER DEPLETIONS	WATER QUALITY DEGRADATION	LAND SUBSIDENCE	SEAWATER INTRUSION
METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

Sustainability Goals: Groundwater Levels

- **Undesirable Result:** Groundwater levels at the elevation of current pump settings
- **Minimum Threshold (MT):** Set at wells by operators as lowest operational level
- **Measurable Objective (MO):** Elevation representing 3-yrs of groundwater in storage (approximately 50 ft above MT elevations)
- **Interim Milestone (IM):** ½ of representative pumping wells with current elevations at or above MO. IMs for wells with water levels below the MO will be determined at 5-yr reporting after consistent data collection and on refinement of groundwater model and updated analysis of basin storage to evaluate, if appropriate, the quantity of water needed to reach the MO elevations.

Setting Minimum Thresholds for Groundwater Level



Example of Provided Data

ID	Well Depth	Current Pump Setting Depth	Minimum Operational Groudwater Level
MW-10	229		180' static
MW-11	200	No pump	
MW-12	204		165' static
MW-13	230		185' static
MW-14	210	180	150' static
MW-23	229	210	205' pumping
MW-24	364	340	335' pumping
MW-25	1016	609	604' pumping

Example from Table of Minimum Thresholds

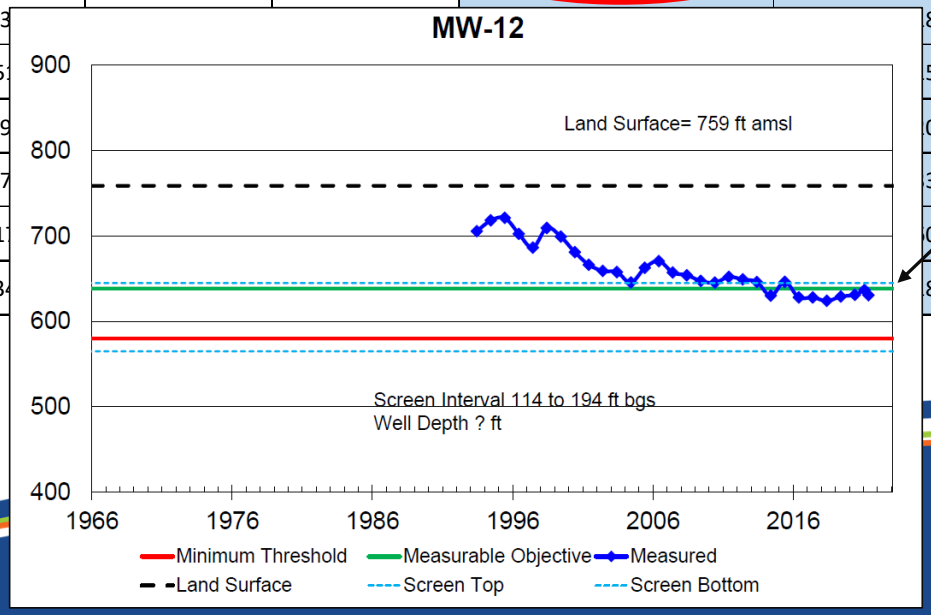
Well ID	March 2021 (Depth below RP)	June 2021 Depth to Water (below RP)	June 2021 Groundwater Elevation	Minimum Threshold (elevation in ft amsl)	Depth to Water at Minimum Threshold Elevation (ft bgs)
MW-10*	141.48	145.18	663.48	629	180
MW-11	158.88	164.48	603.02	NA	NA
MW-12*	123.73	130.00	630.65	596	165
MW-13*	143.85	148.13	602.54	566	185
MW-14*	151.4	154.10	590.72	595	150
MW-23**	109.13	133.54	577.03	506	205
MW-24**	137.35	244.65	475.01	385	335
MW-25*	217.1	516.91	243.86	157	604
MW-26*	134.6	142.70	544.48	502	185

Setting Measurable Objectives for Groundwater Level

Example from Table of Minimum Thresholds and Measurable Objectives

Well ID	March 2021 (Depth below RP)	June 2021 Depth to Water (below RP)	June 2021 Groundwater Elevation	Minimum Threshold (elevation in ft amsl)	Depth to Water at Minimum Threshold Elevation (ft bgs)	Measureable Objective Elevation (Threshold for 54,000 Acre-ft Operational Storage)	Depth to Water at Measureable Objective (ft bgs)
MW-10*	141.48	145.18	663.48	629	180	688	121
MW-11	158.88	164.48	603.02	NA	NA	NA	NA
MW-12*	123.73	130.00	630.65	596	165	655	106
MW-13*	143				85	625	126
MW-14*	15				50	654	91
MW-23**	109				05	565	146
MW-24**	137				35	444	276
MW-25*	21				04	216	545
MW-26*	13				85	561	126

Model-Calculated

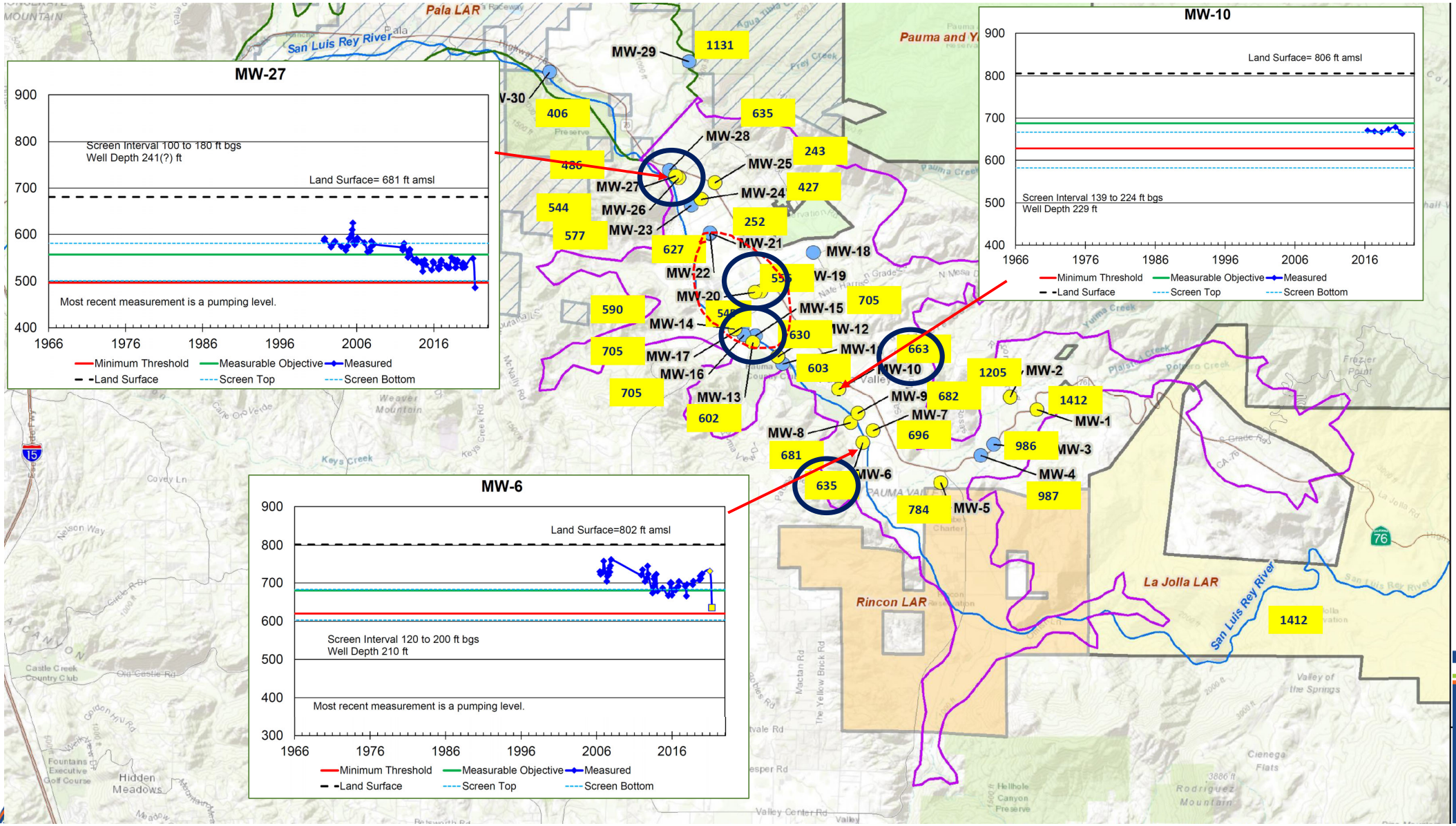


Wells with Current Water Levels Below Measurable Objectives

Well ID	March 2021 (Depth below RP)	June 2021 Depth to Water (below RP)	June 2021 Groundwater Elevation	Minimum Threshold (elevation in ft amsl)	Depth to Water at Minimum Threshold Elevation (ft bgs)	Measureable Objective Elevation (Threshold for 54,000 Acre-ft Operational Storage)	Depth to Water at Measureable Objective (ft bgs)
MW-1*	138.51	178.45	1412.46	1291	300	1350	241
MW-2*	265.52	328.21	1205.24	1108	425	1168	366
MW-3	262.17	291.97	986.23	NA	NA	NA	NA
MW-4	207.25	212.10	987.56	NA	NA	NA	NA
MW-5*	195.05	215.88	784.36	730	270	789	211
MW-6***	74.65	170.00	635.36	620	185	680	126
MW-7***	80.19	105.10	696.80	NA	NA	NA	NA
MW-8***	95.52	118.35	681.35	NA	NA	NA	NA
MW-9*	98.2	115.88	682.36	623	175	682	116
MW-10*	141.48	145.18	663.48	629	180	688	121
MW-11	158.88	164.48	603.02	NA	NA	NA	NA
MW-12*	123.73	130.00	630.65	596	165	655	106
MW-13*	143.85	148.13	602.54	566	185	625	126
MW-14*	151.4	154.10	590.72	595	150	654	91
MW-15	47.9	48.27	708.42	NA	NA	NA	NA
MW-16	41.46	42.70	705.89	NA	NA	NA	NA
MW-17	40.46	41.43	705.88	NA	NA	NA	NA
MW-18	319.55	316.77	639.23	141	NA	NA	NA
MW-19*	222.2	255.01	556.46	549	262	609	203
MW-20*	218.51	258.82	545.36	545	259	604	200
MW-21	216.58	488.10	252.94	--		NA	NA
MW-22	100.2	120.12	621.22	--		NA	NA
MW-23**	109.13	133.54	577.03	506	205	565	146
MW-24**	137.35	244.65	475.01	385	335	444	276
MW-25*	217.1	516.91	243.86	157	604	216	545
MW-26*	134.6	142.70	544.48	502	185	561	126
MW-27*	133.55	196.09	486.28	497	185	557	126
MW-28	114.17	114.85	635.07	NA	NA	NA	NA
MW-29	124.69	117.55	1131.43	NA	NA	NA	NA
MW-30***	45.19	94.98	406.07	NA	NA	NA	NA

Pauma Valley GSA

GEOSCIENCE


MW-27
Screen Interval 100 to 180 ft bgs
Well Depth 241(?) ft
Land Surface= 681 ft amsl
Most recent measurement is a pumping level.
Minimum Threshold
Measurable Objective
Measured
Land Surface
Screen Top
Screen Bottom
MW-10
Land Surface= 806 ft amsl
Screen Interval 139 to 224 ft bgs
Well Depth 229 ft
MW-6
Land Surface=802 ft amsl
Screen Interval 120 to 200 ft bgs
Well Depth 210 ft
Most recent measurement is a pumping level.
Pala LAR
San Luis Rey River
Pauma and Y
Rincon LAR
La Jolla LAR
MW-29
MW-28
MW-25
MW-27
MW-24
MW-26
MW-23
MW-21
MW-18
MW-22
MW-19
MW-20
MW-15
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MW-6
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MW-5
1131
406
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243
427
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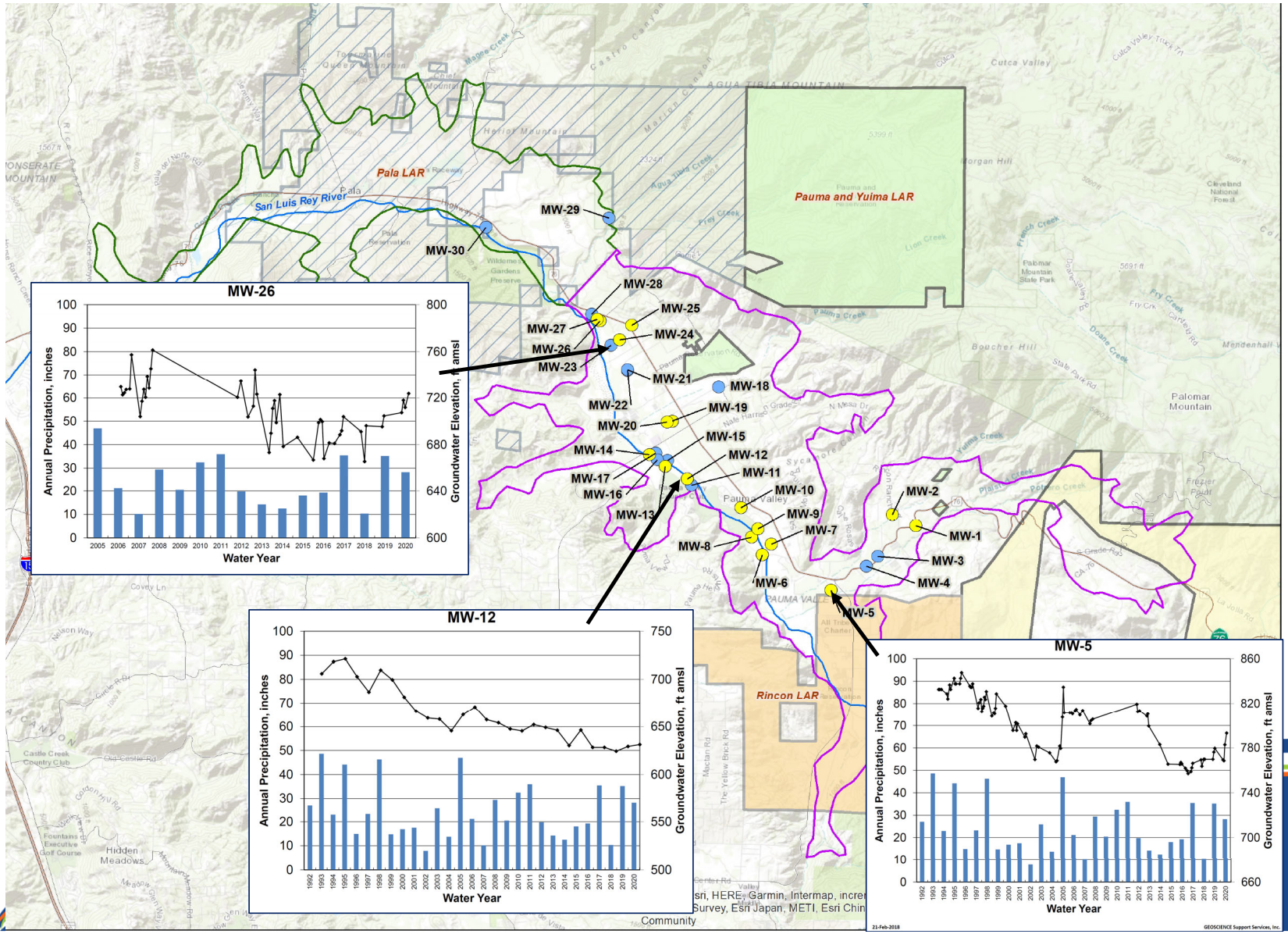
784
987
1412

Rainfall and Groundwater Level Recovery



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GEOSCIENCE

Sustainability Goals: Groundwater Storage

The goal of SGMA is groundwater sustainability, which includes:

SUSTAINABILITY INDICATOR	CHRONIC LOWERING OF GROUNDWATER LEVELS	REDUCTION OF GROUNDWATER STORAGE	INTER-CONNECTED SURFACE WATER DEPLETIONS	WATER QUALITY DEGRADATION	LAND SUBSIDENCE	SEAWATER INTRUSION
METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

Sustainability Goals: Groundwater Storage

- **Undesirable Result:** Groundwater in storage when water levels are at the elevation of current pump settings
- **Minimum Threshold (MT):** Groundwater in storage at groundwater level MTs
- **Measurable Objective (MO):** 3-years of groundwater in storage (approximately 54,000 acre-ft)
- **Interim Milestone (IM):** To Be Determined at 5-year reporting period based on refinement of groundwater model and analysis of basin storage from expanded data collection

Sustainability Goals: Interconnected Surface Water

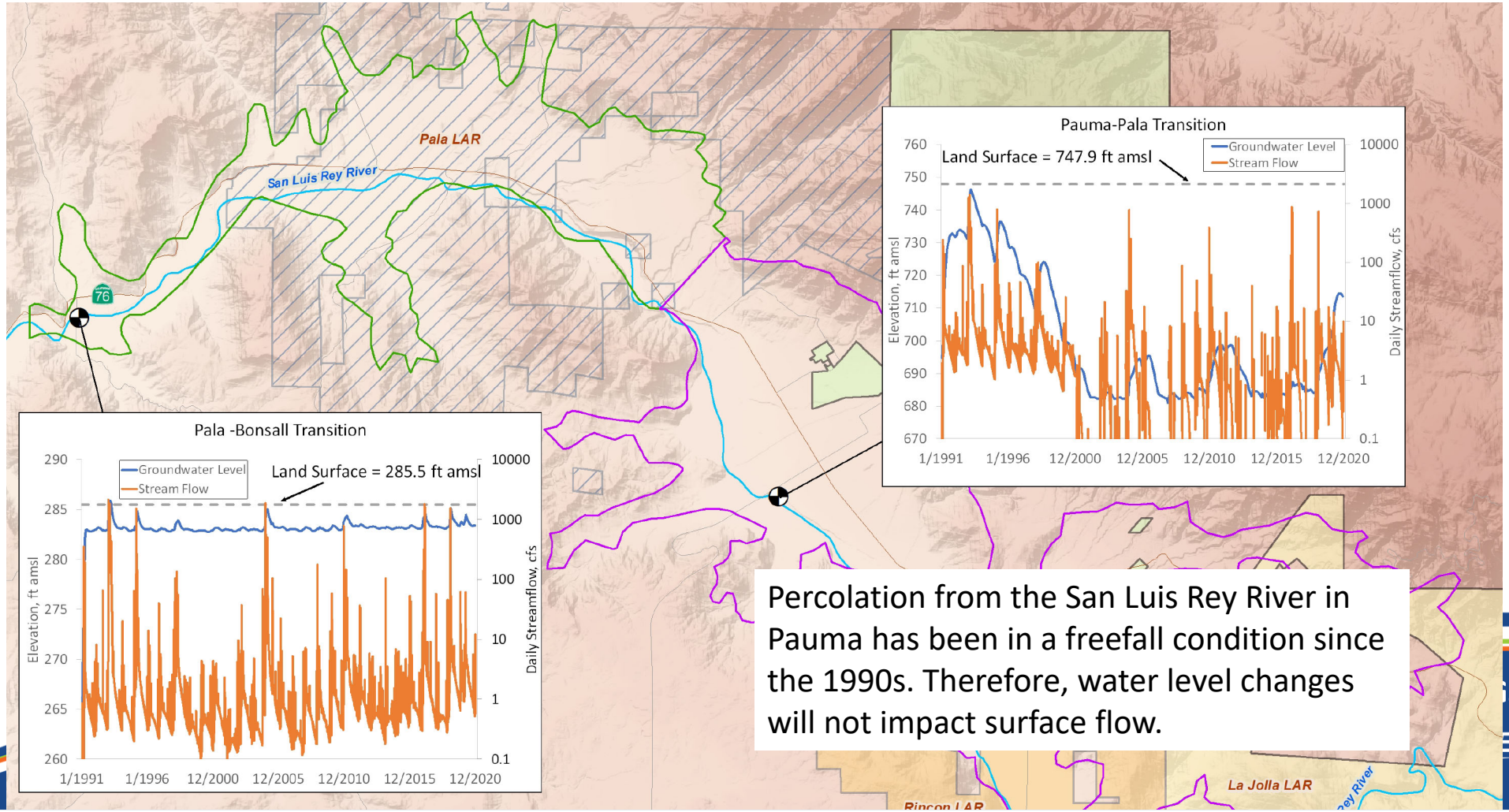
The goal of SGMA is groundwater sustainability, which includes:

SUSTAINABILITY INDICATOR	CHRONIC LOWERING OF GROUNDWATER LEVELS	REDUCTION OF GROUNDWATER STORAGE	INTER-CONNECTED SURFACE WATER DEPLETIONS	WATER QUALITY DEGRADATION	LAND SUBSIDENCE	SEAWATER INTRUSION
METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

Sustainability Goals: Interconnected Surface Water

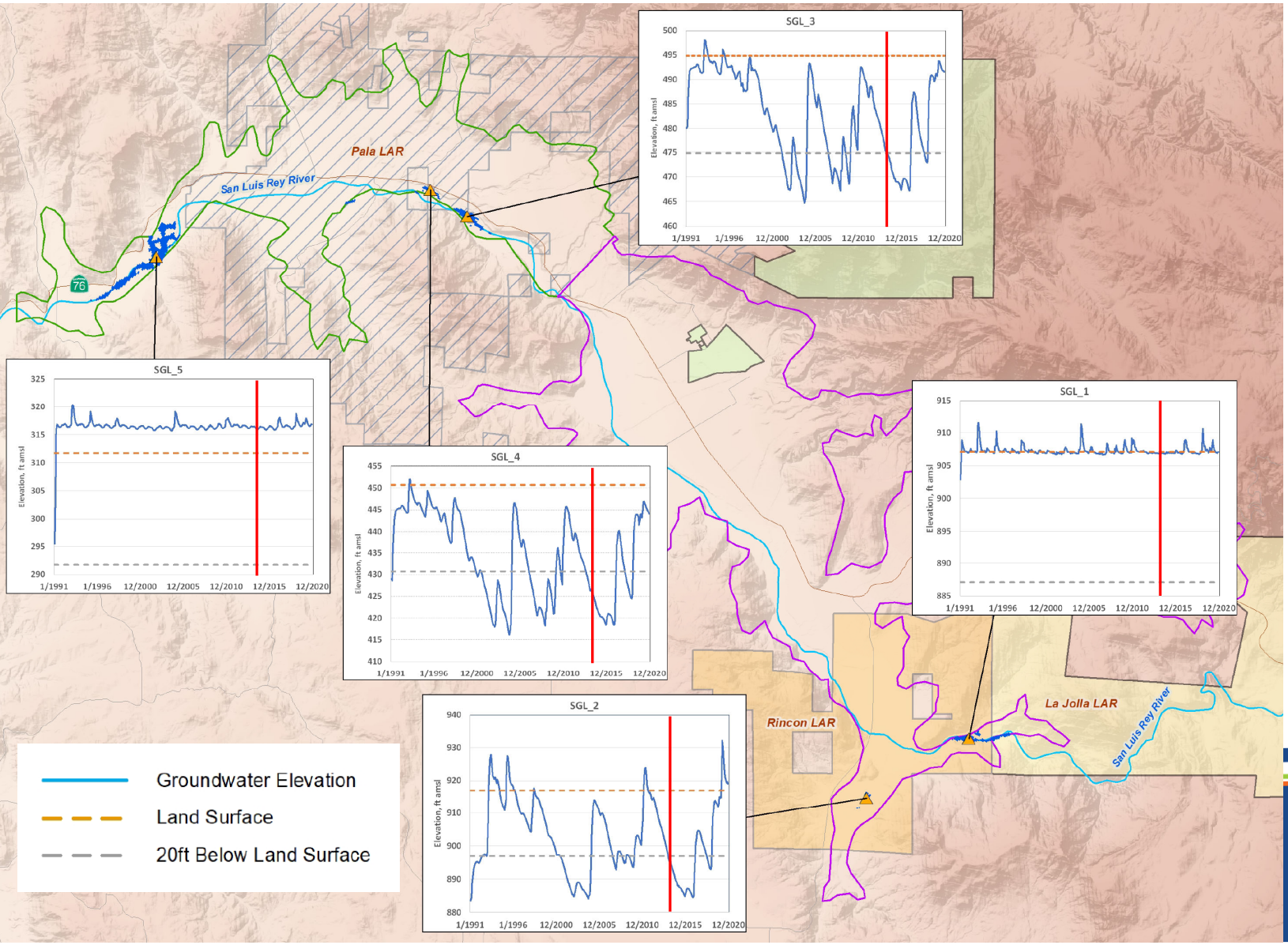
- **Undesirable Result:** Groundwater levels falling below the lowest groundwater level during the 2015 through current time period
- **Minimum Threshold (MT):** MTs for groundwater levels
- **Measurable Objective (MO):** Highest groundwater elevations since 2015 in five areas with potential surface water interaction
- **Interim Milestone (IM):** None needed; groundwater levels in shallow areas are within three feet, at, or above ground surface

Surface Water Flow and Groundwater Elevations



Percolation from the San Luis Rey River in Pauma has been in a freefall condition since the 1990s. Therefore, water level changes will not impact surface flow.

Areas with Historical Depth to Groundwater Less Than or Equal to 20 ft



EXPLANATION

- Modeled Areas of Shallow Groundwater ≤ 20ft (extinction depth of most deep-rooted riparian vegetation)
- SGL-1 ▲ Simulated Groundwater Levels Hydrograph in Relation to Land Surface in the Area of Shallow Groundwater
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

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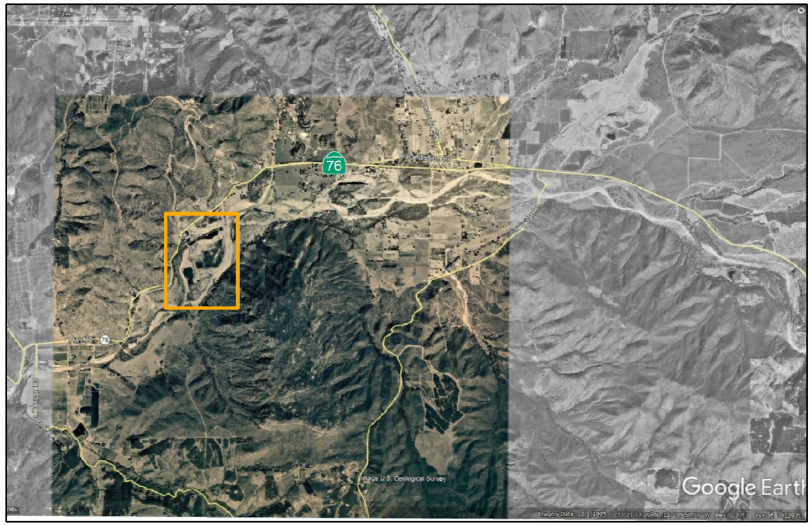
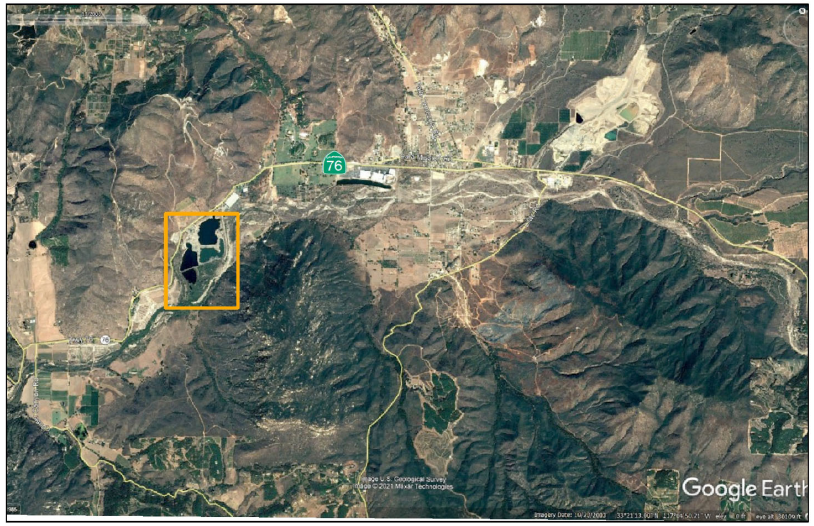
GEOSCIENCE

Historical Air Photos Showing Shallow Groundwater In Pala Subbasin

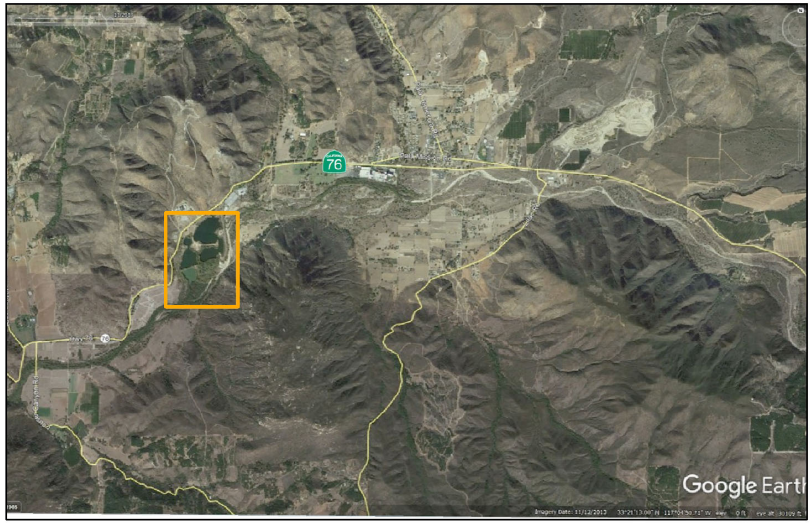
1991



2002



2010



2020

EXPLANATION

Area of Shallow Groundwater

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Sustainability Goals: Water Quality

The goal of SGMA is groundwater sustainability, which includes:

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METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

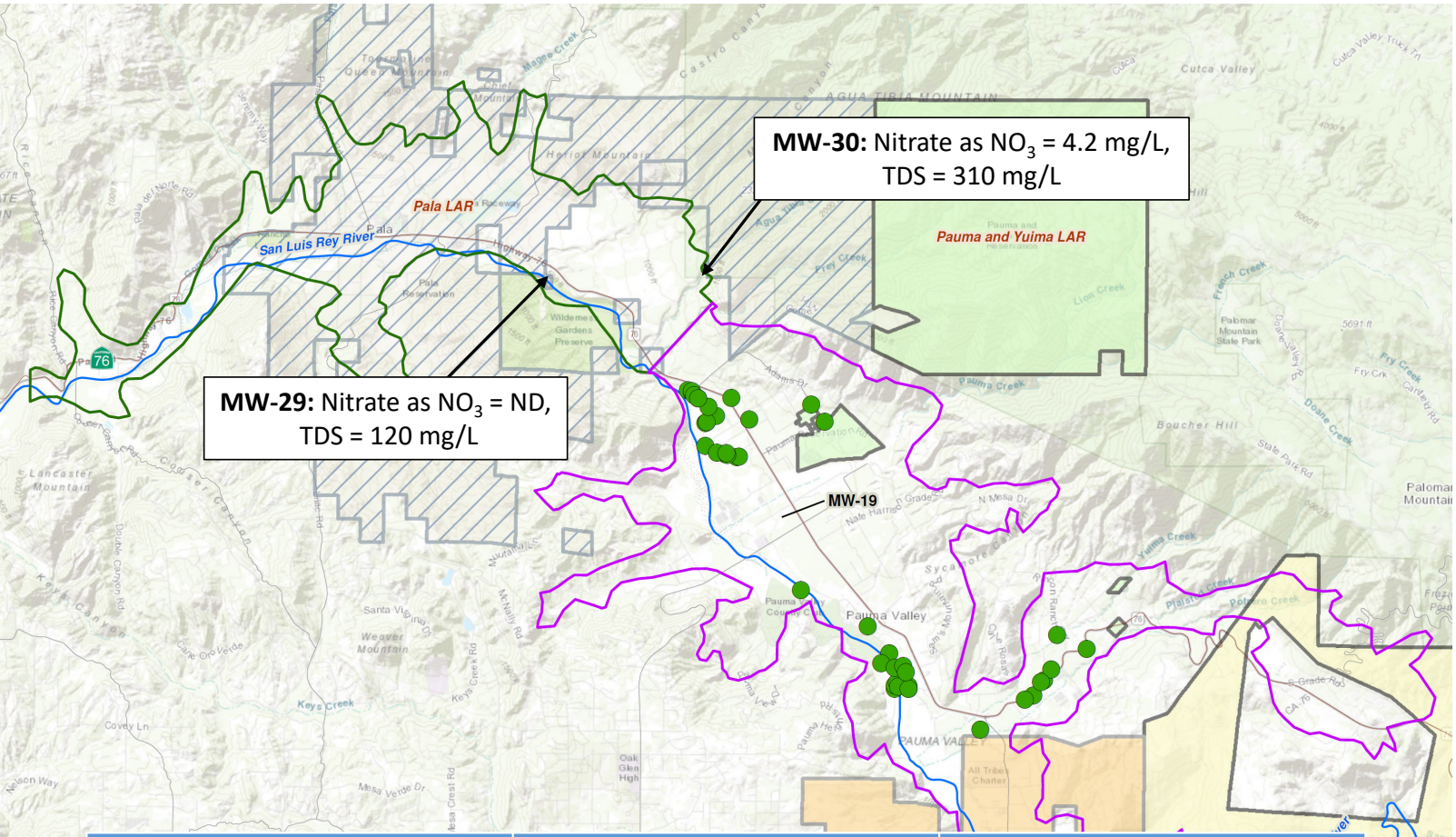
Sustainability Goals: Groundwater Quality

- **Undesirable Result:** Total Dissolved Solids (TDS) and Nitrate above Basin Objectives (800 mg/L for TDS, 45 mg/L for Nitrate as NO_3)
- **Minimum Threshold (MT):** Basin Objectives for TDS and Nitrate
- **Measurable Objective (MO):** Current groundwater quality for TDS and Nitrate as NO_3 at current ambient concentrations (ambient concentrations assumed to be the median of available basin wide concentrations: 607 mg/L for TDS, 25.7 mg/L for Nitrate as NO_3)
- **Interim Milestone (IM):** Current TDS and Nitrate concentrations are at the measurable objectives

Determining Ambient Groundwater Quality

- **Identify wells in groundwater basin with 3 or more water quality datasets (USGS Methodology)**
  - 44 Wells in Pauma Subbasin with 3 or more datasets between 2015-2021
- **Calculate average water quality for each well**
- **Ambient water quality for the subbasin assumed to be median concentration**
  - Medians were used instead of arithmetic averages because:
    1) Well medians can be reliably calculated for datasets with mixed censored and non-censored data (detects and non-detects) and
    2) Well medians allow for the use of an entire water quality dataset while minimizing the skewing effect of potential data outliers and do not rely on parametric statistical methods that assume normal data distribution to remove potential outliers.

Wells with 3 or More Data Sets (2015 – 2020)



Pauma Subbasin	Nitrate as NO_3	TDS
Average [mg/L]	34.4	649
Median [mg/L]	**25.8**	**607**
Objective [mg/L]	45.0	800

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Sustainability Goals: Land Subsidence

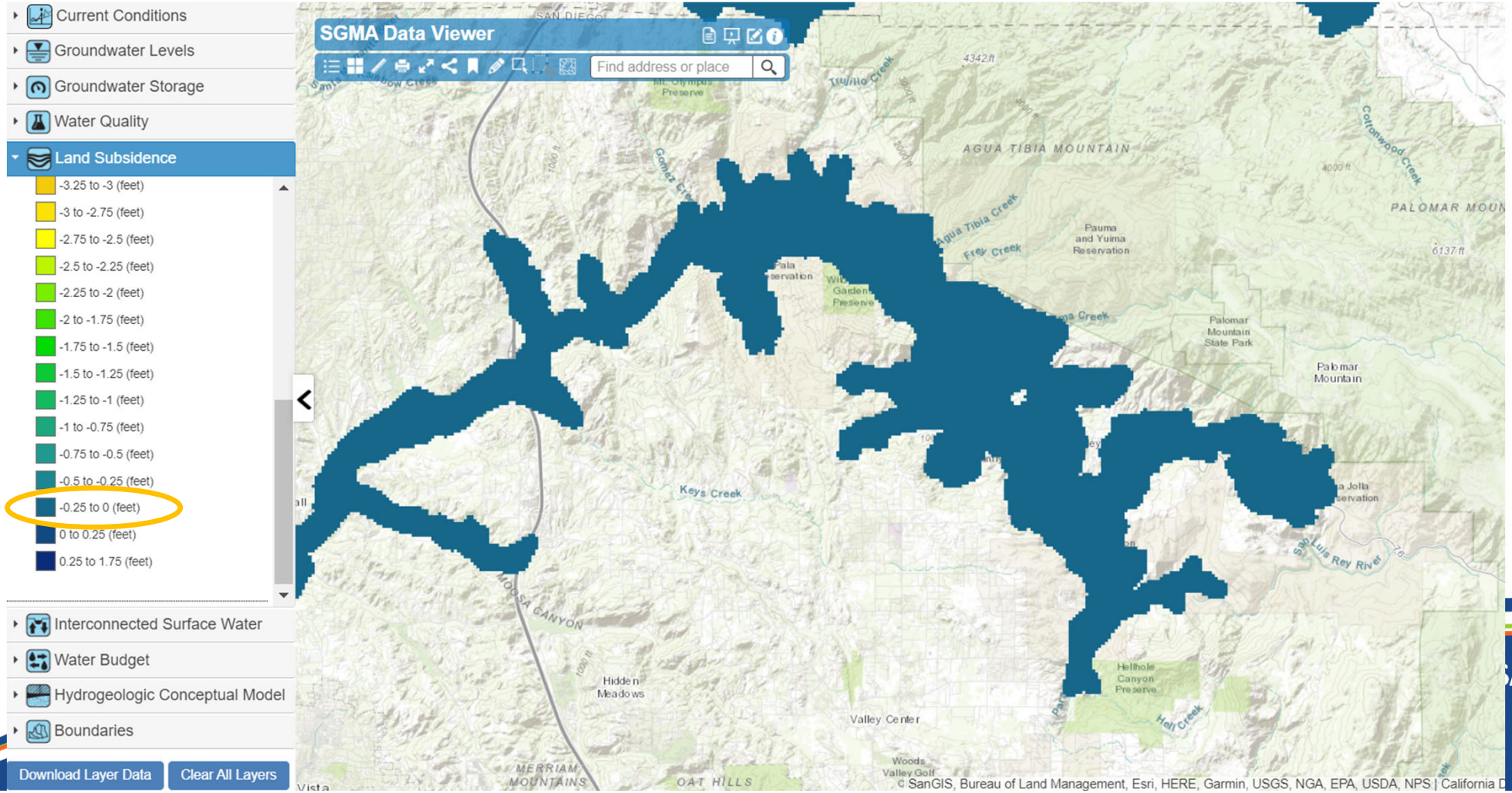
The goal of SGMA is groundwater sustainability, which includes:

SUSTAINABILITY INDICATOR	CHRONIC LOWERING OF GROUNDWATER LEVELS	REDUCTION OF GROUNDWATER STORAGE	INTER-CONNECTED SURFACE WATER DEPLETIONS	WATER QUALITY DEGRADATION	LAND SUBSIDENCE	SEAWATER INTRUSION
METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

Sustainability Goals: Land Subsidence

- Not applicable based on current information
- The GSP will include sections describing the indicator and note that there is no current reports/evidence of this issue occurring in the basin, but stipulate that 5-year reports will include a review of potential data to confirm or address whether these issues show new evidence during the five-year reporting period.

TRE Altamira InSAR Dataset (June 2015 – September 2020)



Sustainability Goals: Seawater Intrusion

The goal of SGMA is groundwater sustainability, which includes:

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METRIC(S) USED	Groundwater elevation	Total volume	Volume or rate of surface water depletion	- Migration of plumes - # of Supply wells - Volume - Location of Isocontour	Rate and extent of land subsidence	Chloride Concentration Isocontour

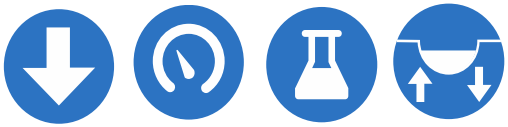
Sustainability Goals: Seawater Intrusion

- Not applicable based on current information
- The GSP will include sections describing the indicator and note that there is no current evidence of this issue occurring in the basin, but stipulate that 5-year reports will include a review of potential data to confirm or address whether these issues show new evidence during the five-year reporting period.

Achieving Sustainability

Basin-Wide Sustainability Goal

Set Minimum Thresholds and Measurable Objectives for all Sustainable Management Criteria



SUSTAINABLE MANAGEMENT CRITERIA

Measure and monitor at each representative monitoring well

REPRESENTATIVE MONITORING WELLS

Achieve goals using projects and management actions, if necessary

PROJECTS & MANAGEMENT ACTIONS

Basin-Wide Sustainability Goal

Projects and Management Actions

- **A predictive scenario was run with the calibrated groundwater flow model to evaluate whether historical hydrology would provide enough natural recharge to meet measurable objectives without additional management actions.**
  - Current estimated pumping relationship based on hydrology
  - Run for 30 years
  - Hydrologic period from 1991 through 2020
    - *Represents average hydrologic conditions, including wet and dry periods*

Precipitation at Henshaw Dam

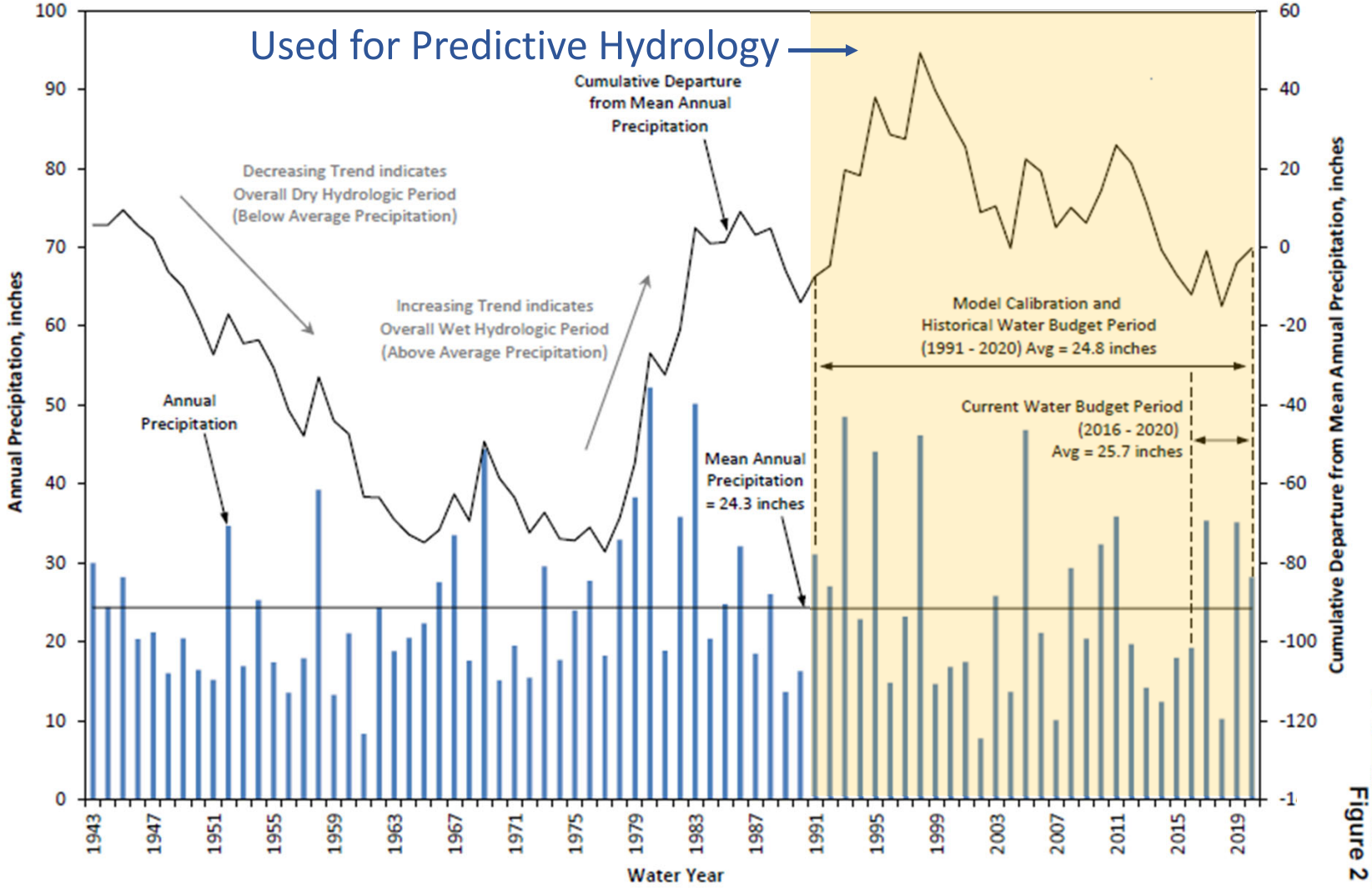
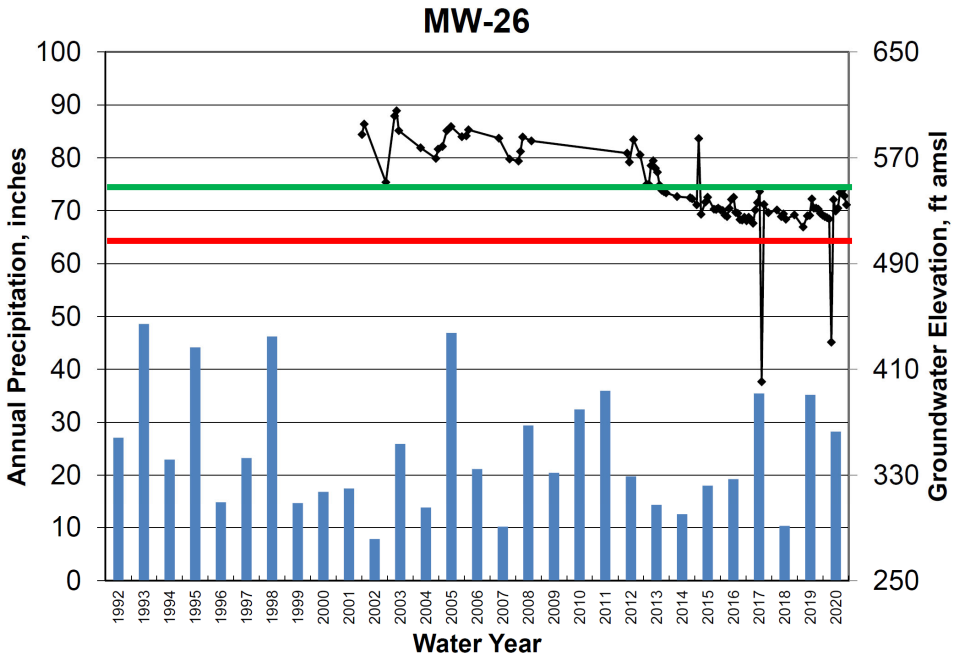


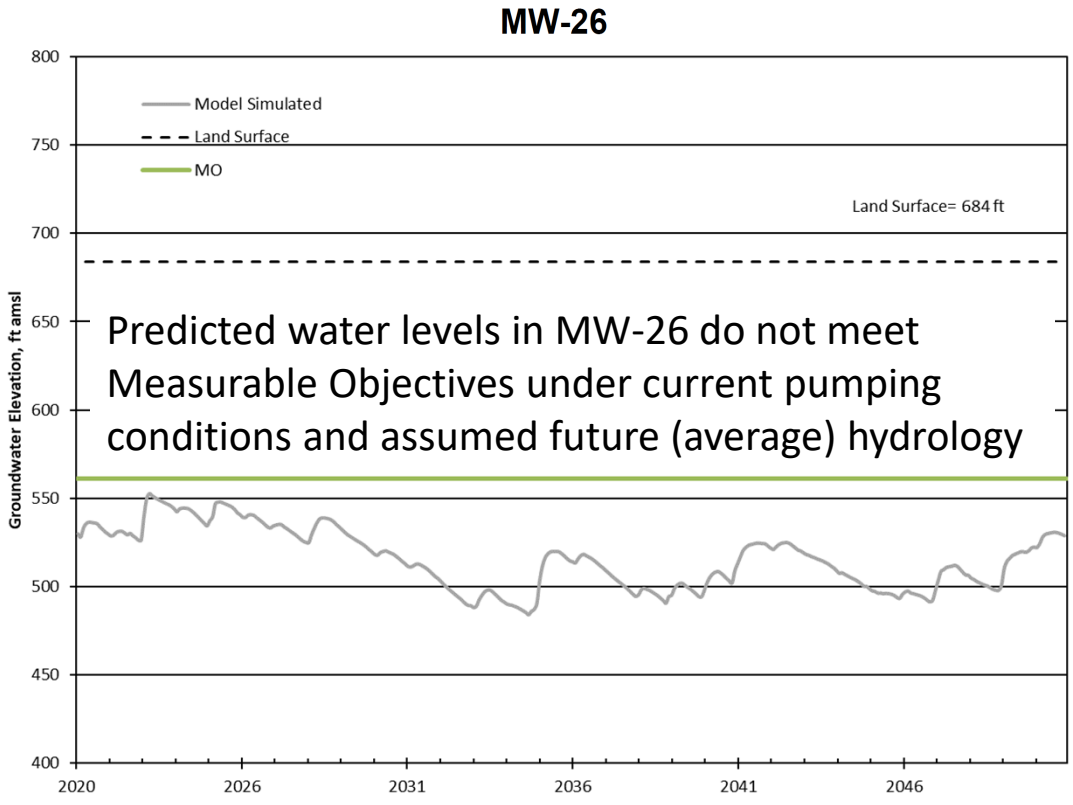
Figure 2

Example of Scenario Results

Observed



Model-Predicted



Predicted water levels in MW-26 do not meet Measurable Objectives under current pumping conditions and assumed future (average) hydrology

Calendar Year	Total Inflow	Groundwater Pumping	Underflow Outflow to Bonsall Basin	Total Outflow	Change in Storage
	acre-ft		acre-ft		acre-ft
2021	18,324	14,154	4,822	21,564	-3,240
2022	15,953	13,946	4,760	20,946	-4,993
2023	42,937	14,808	5,448	24,019	18,919
2024	11,429	14,388	4,754	21,990	-10,561
2025	30,314	14,599	5,099	23,059	7,255
2026	13,135	14,266	4,728	21,558	-8,422
2027	12,178	13,972	4,733	20,920	-8,741
2028	32,970	14,294	5,010	22,001	10,969
2029	5,881	13,935	4,690	20,707	-14,826
2030	11,938	13,517	4,661	20,016	-8,079
2031	12,618	13,350	4,737	19,829	-7,211
2032	5,584	12,971	4,626	19,057	-13,473
2033	22,816	13,027	4,731	19,384	3,432
2034	17,675	12,723	4,665	18,810	-1,135
2035	49,016	14,250	5,311	22,009	27,007
2036	14,170	13,751	4,757	20,500	-6,330
2037	2,999	13,314	4,663	19,564	-16,565
2038	19,592	13,154	4,728	19,410	182
2039	20,420	13,251	4,701	19,605	815
2040	33,677	13,457	4,849	20,223	13,455
2041	34,951	13,953	5,181	21,662	13,289
2042	15,257	13,763	4,845	20,773	-5,516
2043	9,567	13,483	4,762	20,108	-10,541
2044	9,500	13,202	4,722	19,568	-10,068
2045	13,242	13,009	4,746	19,301	-6,059
2046	18,989	12,974	4,792	19,318	-329
2047	36,227	13,466	5,113	20,748	15,480
2048	10,578	13,207	4,753	19,653	-9,075
2049	44,356	13,686	5,251	21,348	23,007
2050	28,812	13,983	5,118	21,741	7,071
Average 2021 to 2050	**20,504**	**13,662**	**4,858**	**20,646**	**-143**

Upper San Luis Rey Valley Groundwater Balance – Predictive Model Scenario

- Small amount of change in storage (approximately -143 acre-ft/yr) manageable through potential projects and management actions
- **NEXT STEPS:** Evaluate potential projects/management actions

Questions

Please feel free to contact us!

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