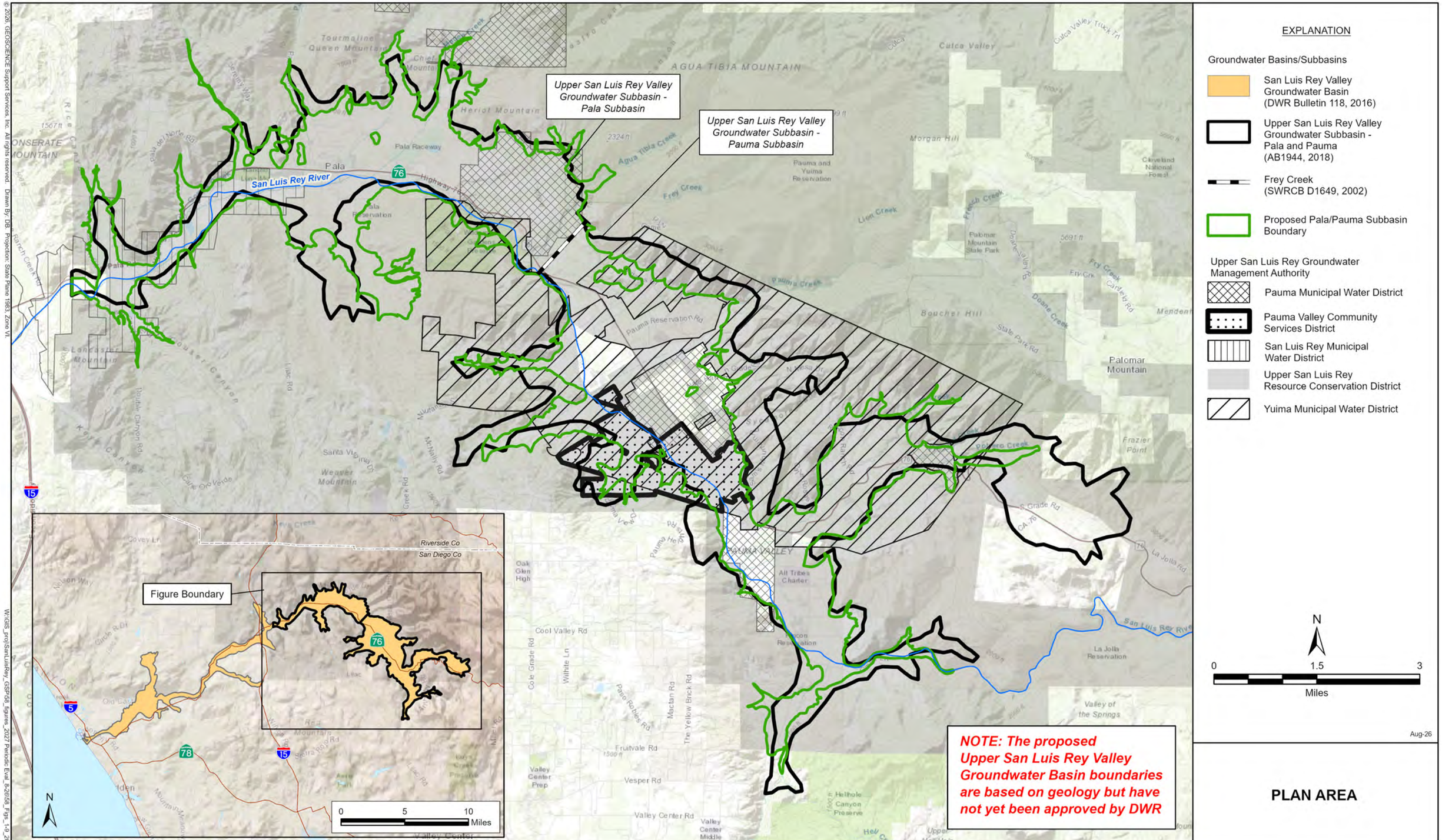
FIGURES



PLAN AREA

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_1-9_2027_Eval_8-26.aprx

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 1

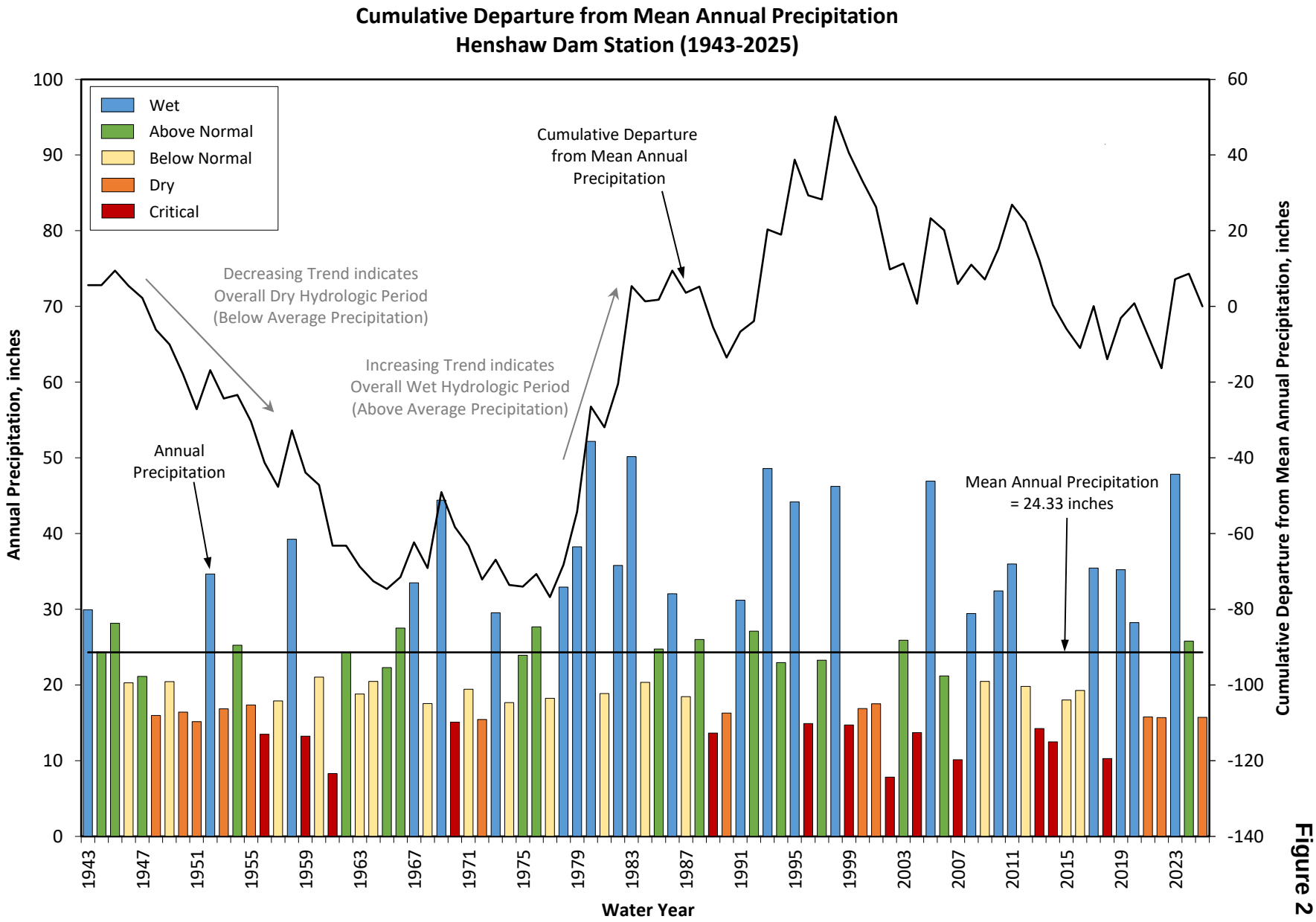
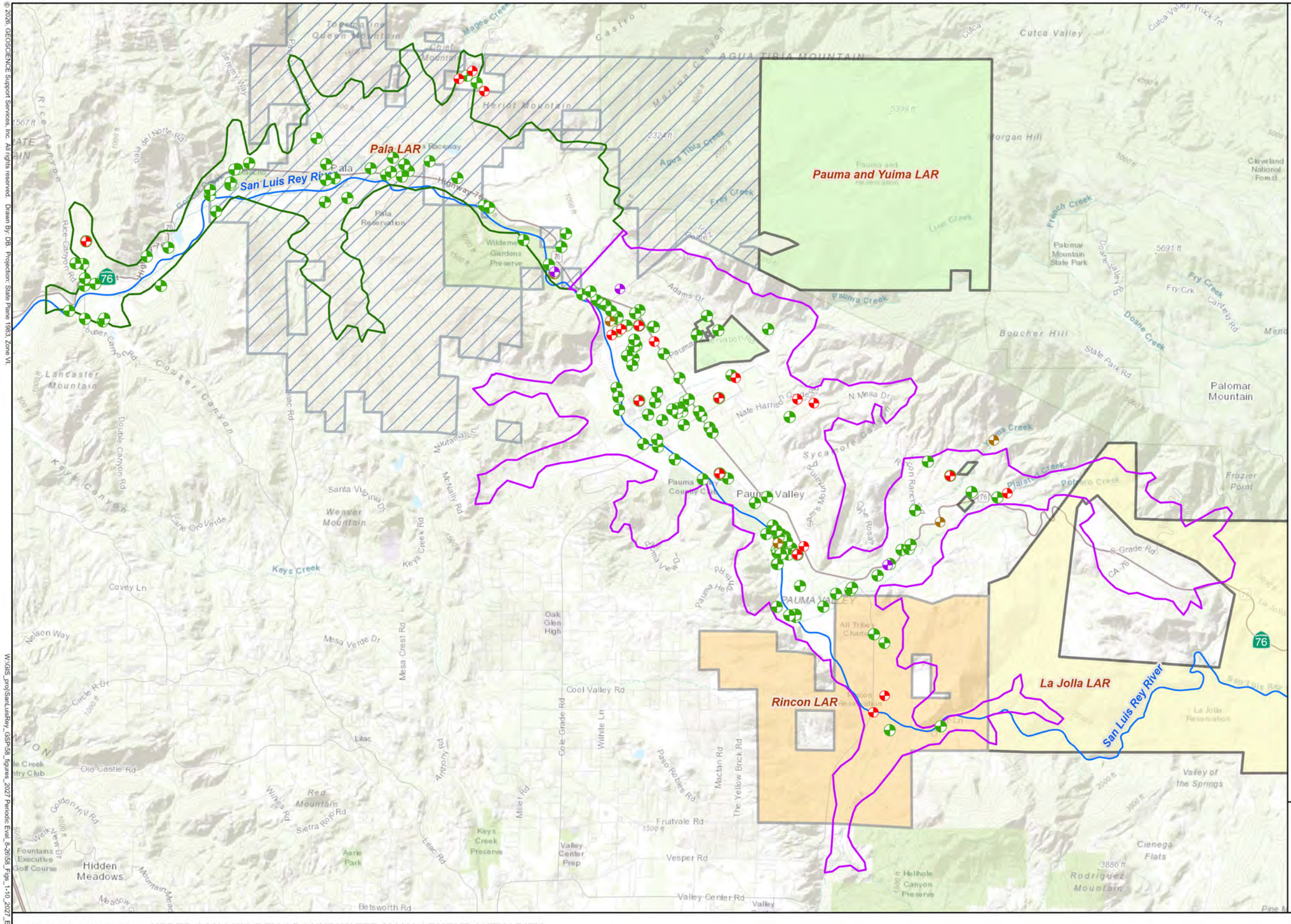

Cumulative Departure from Mean Annual Precipitation
Henshaw Dam Station (1943-2025)
Wet
Above Normal
Below Normal
Dry
Critical
Cumulative Departure from Mean Annual Precipitation
Decreasing Trend indicates Overall Dry Hydrologic Period (Below Average Precipitation)
Increasing Trend indicates Overall Wet Hydrologic Period (Above Average Precipitation)
Annual Precipitation
Mean Annual Precipitation = 24.33 inches
Annual Precipitation, inches
Cumulative Departure from Mean Annual Precipitation, inches
Water Year
100
90
80
70
60
50
40
30
20
10
0
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
1943
1947
1951
1955
1959
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
2003
2007
2011
2015
2019
2023

Figure 2

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

Potential Impact Under Minimum Threshold Water Level Conditions

- Low Apparent Vulnerability
- Vulnerable
- High Vulnerability
- Potentially Dry

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

Aug-26

POTENTIAL WELL IMPACT ANALYSIS - ALL RESULTS

GEOSCIENCE

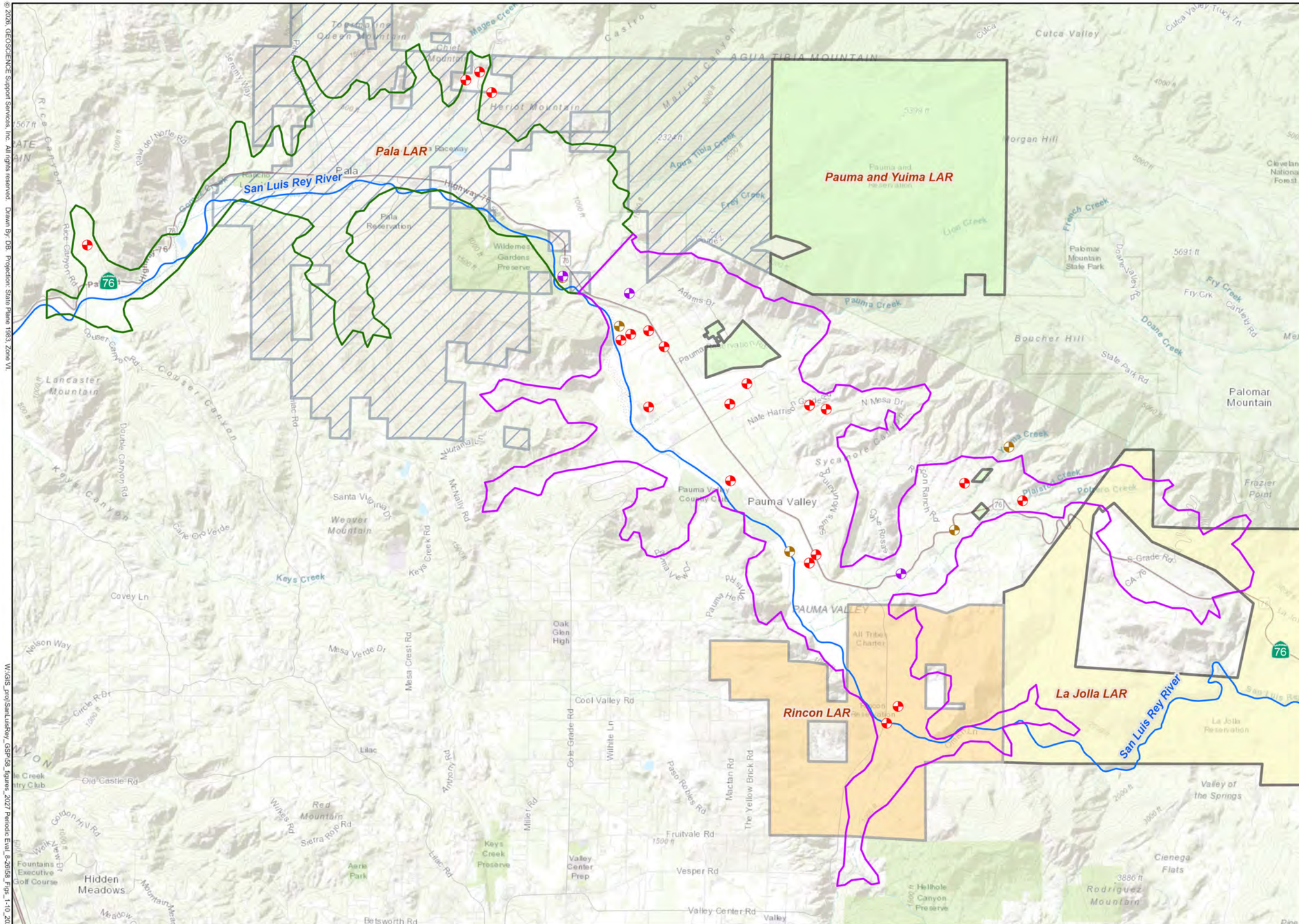
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 3

W:\GIS_proj\SanLuisRey_GSP\56_figures_2027 Periodic Eval_8-26\56_Figs_1-10_2027_Eval_8-26.aprx



EXPLANATION

Potential Impact Under Minimum Threshold Water Level Conditions

- Vulnerable
- High Vulnerability
- Potentially Dry

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 1 2

Miles

Aug-26

POTENTIAL WELL IMPACT ANALYSIS - POTENTIALLY VULNERABLE OR DRY WELLS

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

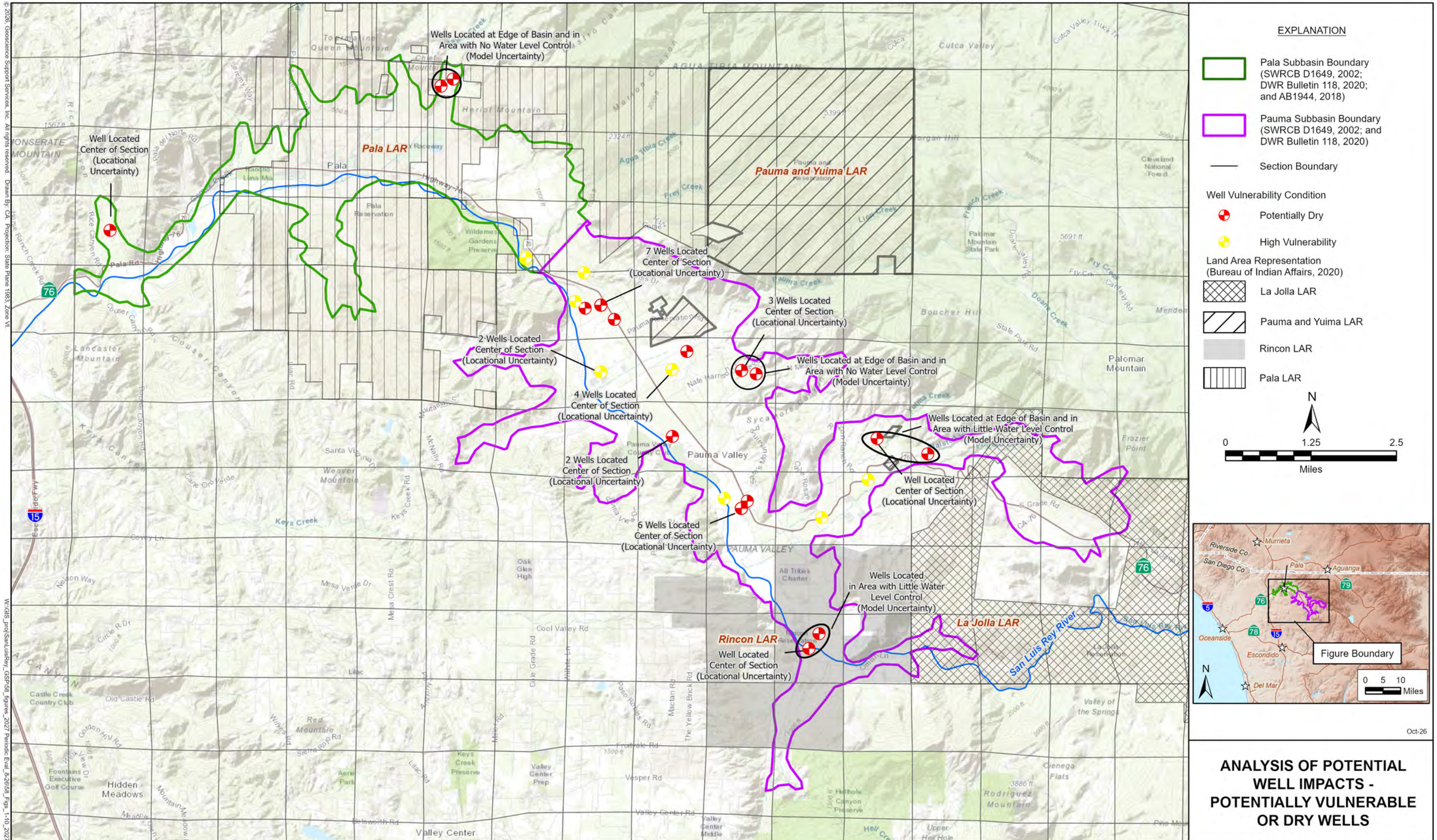
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 4

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_1-10_2027_Eval_8-26.aprx



ANALYSIS OF POTENTIAL WELL IMPACTS - POTENTIALLY VULNERABLE OR DRY WELLS

© 2026, Geoscience Support Services, Inc. All rights reserved. Drawn By: CA. Projection: State Plane 1983, Zone VI.

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_1-10_2027_Eval_10_26.aprx

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 4

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

Pala Creek
Gomez Creek
San Luis Rey River
Marion Creek
Agua Tibia Creek
Frey Creek
Pauma Creek
Yuima Creek
Plaisted Creek
Potrero Creek
Paradise Creek
Escondido Canal
Hell Creek

Pala LAR
Pauma and Yuima LAR
Rincon LAR
La Jolla LAR

Pala 1
Pala 2
Pala 3
Pauma 1
Pauma 2
Pauma 3

MONSERATE MOUNTAIN
AGUA TIBIA MOUNTAIN
Heriot Mountain
Morgan Hill
Boucher Hill
Palomar Mountain
Lancaster Mountain
Weaver Mountain
Red Mountain
Rodriguez Mountain
Pine Mountain
Pauma Valley
Valley Center
Hidden Meadows
Valley of the Springs
Cienega Flats
Frazier Point
Cleveland National Forest
Palomar Mountain State Park
Pauma and Yuima Reservation
La Jolla Reservation
Rincon Reservation
Wilderness Gardens Preserve
Keys Creek Preserve
Aerie Park
Valley Center Prep
Oak Glen High
Valley Center Middle
Castle Creek Country Club
Fountains Executive Golf Course
Pauma Valley Country Club
Sycamore Canyon
Keys Canyon
Cougar Canyon
Double Canyon
Lilac
Cutca Valley
Castro Canyon
Magee Creek
French Creek
Fry Creek
Doane Creek
Doane Valley Rd
Fry Creek Canyon Rd
Mendenhall Valley
Palomar Mountain
State Park Rd
Nate Harris Grade
N Mesa Dr
Yuima Creek
Plaisted Creek
Potrero Creek
S Grade Rd
CA-79
La Jolla Rd
Rincon Rd
Highway
Pauma Valley Dr
Pauma Heights Rd
Old Highway 395
Nelson Way
Mesa Verde Dr
Mesa Crest Rd
Cool Valley Rd
Cole Grade Rd
Wilhite Ln
Paso Robles Rd
Mactan Rd
The Yellow Brick Rd
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Miller Rd
Lilac Rd
Wilkes Rd
Antonio Rd
Sierra Rose Rd
Red Mountain Rd
Gilbert Hill Rd
Old Castle Rd
Circle R Dr
Lilac
Keys Creek
Covey Ln
Santa Viviana Dr
Weaver Mountain
Curie Oro Verde
Keys Creek Rd
McNally Rd
Mountain Meadow Rd
Meadow Glen Way
Glen Way
Calle de Vista
Pala del Norte Rd
Horse Ranch Creek Rd
Jeremy Way
Cougar Canyon Rd
Lancaster Rd
Pauma Valley
Adams Dr
Santa Viviana Dr
Pauma Heights Rd
Pauma Valley Dr
Old Highway 395
Nelson Way
Mesa Verde Dr
Mesa Crest Rd
Cool Valley Rd
Cole Grade Rd
Wilhite Ln
Paso Robles Rd
Mactan Rd
The Yellow Brick Rd
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Miller Rd
Lilac Rd
Wilkes Rd
Antonio Rd
Sierra Rose Rd
Red Mountain Rd
Gilbert Hill Rd
Old Castle Rd
Circle R Dr
Lilac
Keys Creek
Covey Ln
Santa Viviana Dr
Weaver Mountain
Curie Oro Verde
Keys Creek Rd
McNally Rd
Mountain Meadow Rd
Meadow Glen Way
Glen Way
Calle de Vista
Pala del Norte Rd
Horse Ranch Creek Rd
Jeremy Way
Cougar Canyon Rd
Lancaster Rd
Pauma Valley
Adams Dr
Santa Viviana Dr
Pauma Heights Rd
Pauma Valley Dr
Old Highway 395
Nelson Way
Mesa Verde Dr
Mesa Crest Rd
Cool Valley Rd
Cole Grade Rd
Wilhite Ln
Paso Robles Rd
Mactan Rd
The Yellow Brick Rd
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Miller Rd
Lilac Rd
Wilkes Rd
Antonio Rd
Sierra Rose Rd
Red Mountain Rd
Gilbert Hill Rd
Old Castle Rd
Circle R Dr
Lilac
Keys Creek
Covey Ln
Santa Viviana Dr
Weaver Mountain
Curie Oro Verde
Keys Creek Rd
McNally Rd
Mountain Meadow Rd
Meadow Glen Way
Glen Way
Calle de Vista
Pala del Norte Rd
Horse Ranch Creek Rd
Jeremy Way
Cougar Canyon Rd
Lancaster Rd

76
15

EXPLANATION

Stream Reaches for Evaluation of Interconnected Surface Water

- Pauma Reach 1
- Pauma Reach 2
- Pauma Reach 3
- Pala Reach 1
- Pala Reach 2
- Pala Reach 3

Model-Simulated Depth to Groundwater Less Than 50 ft (represents location for potential interconnected surface waters, as suggested by the Nature Conservancy. Additional information needs to be collected to verify actual areas of interconnected groundwater / surface water)

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 1.25 2.5

Miles

Aug-26

STREAM REACHES FOR EVALUATION OF INTERCONNECTED SURFACE WATER

W:\GIS_proj\SanLuisRey_GSP\56_figures_2027 Periodic Eval_8-26\56_Figs_1-10_2027_Eval_10_26.aprx

GEOSCIENCE

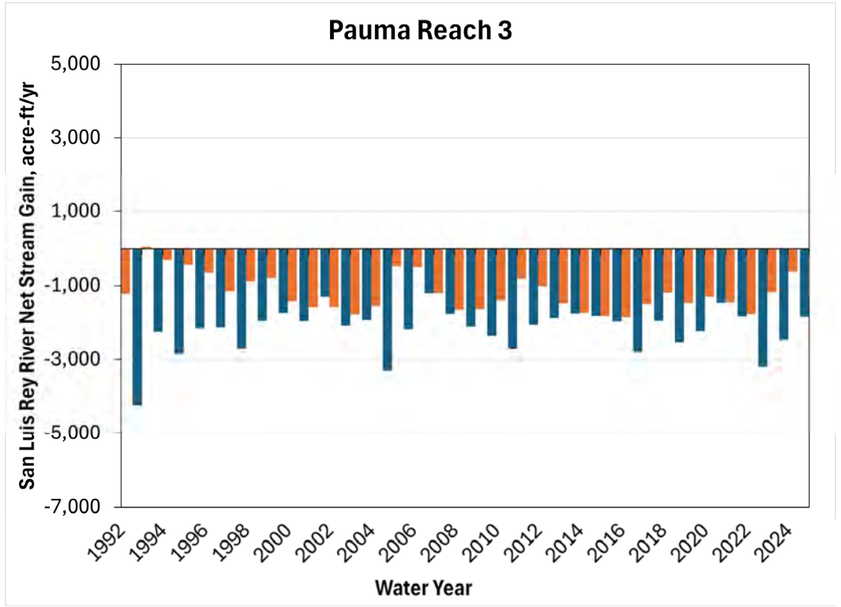
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

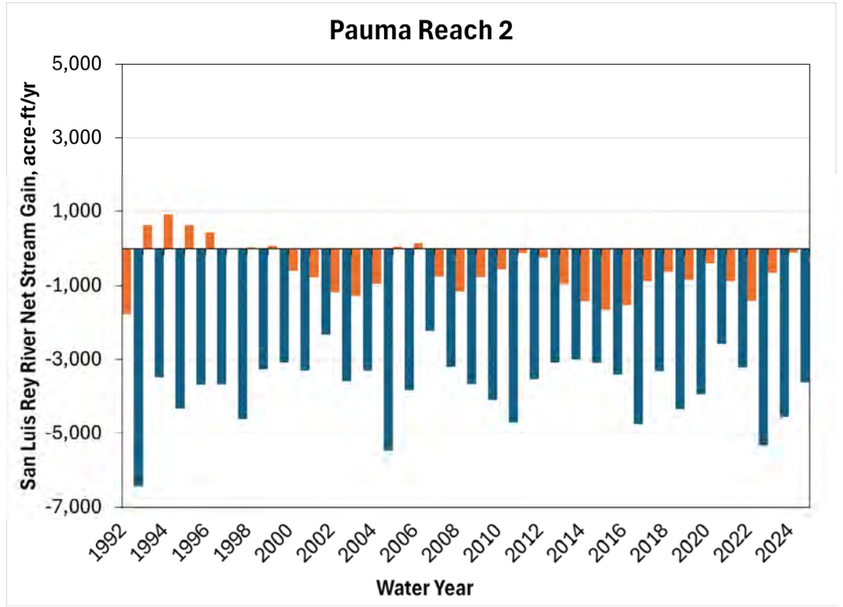
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

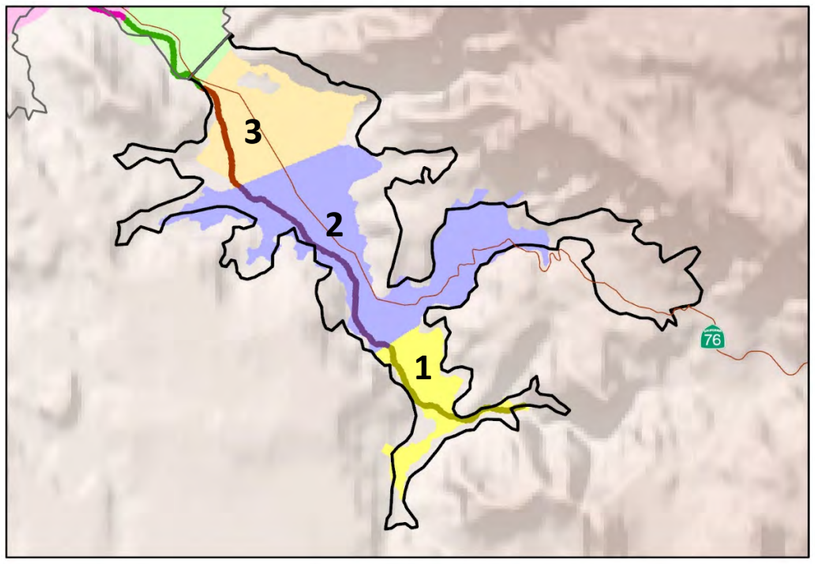
DRAFT

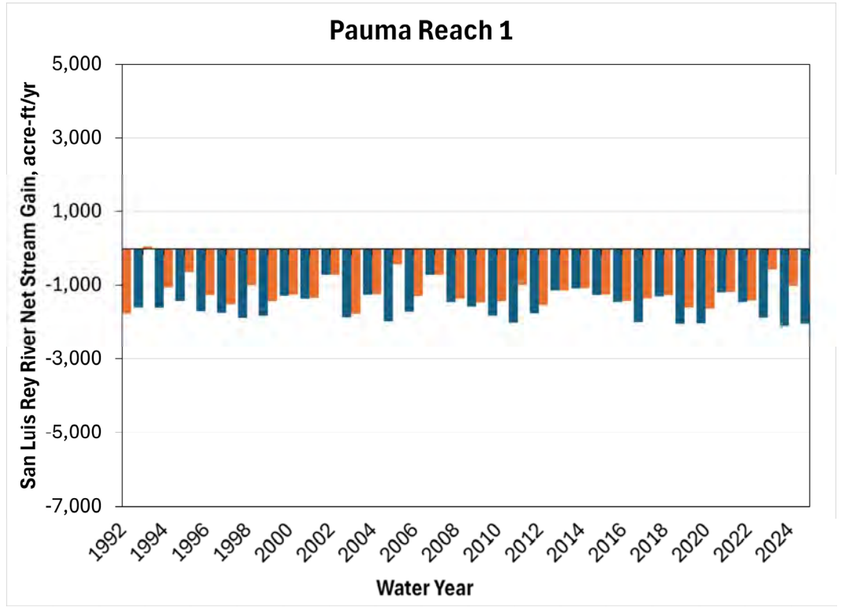
FIGURE 5

©2026 Geoscience Support Services, Inc. All rights reserved.









Explanation

With Pumping

Without Pumping

Sep-2026

SAN LUIS REY RIVER NET STREAM GAIN – PAUMA SUBBASIN

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

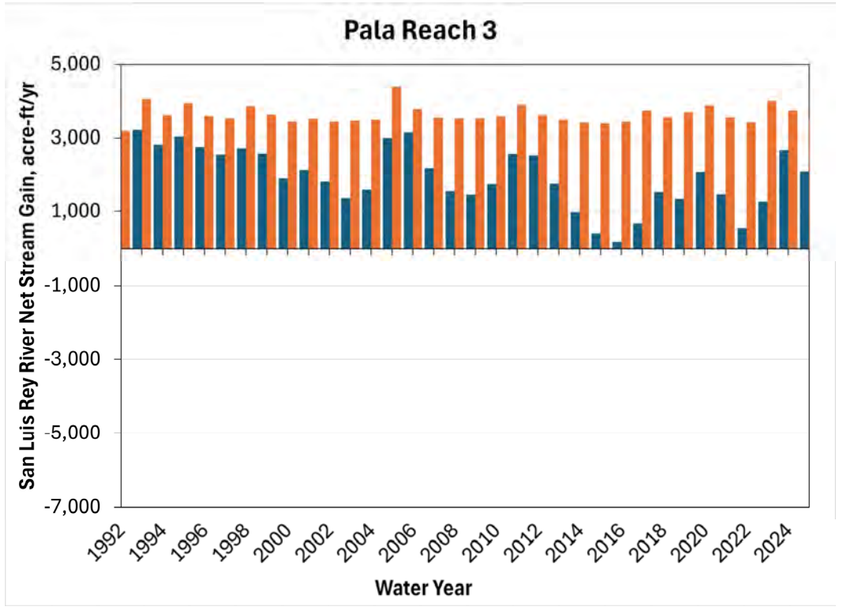
DRAFT

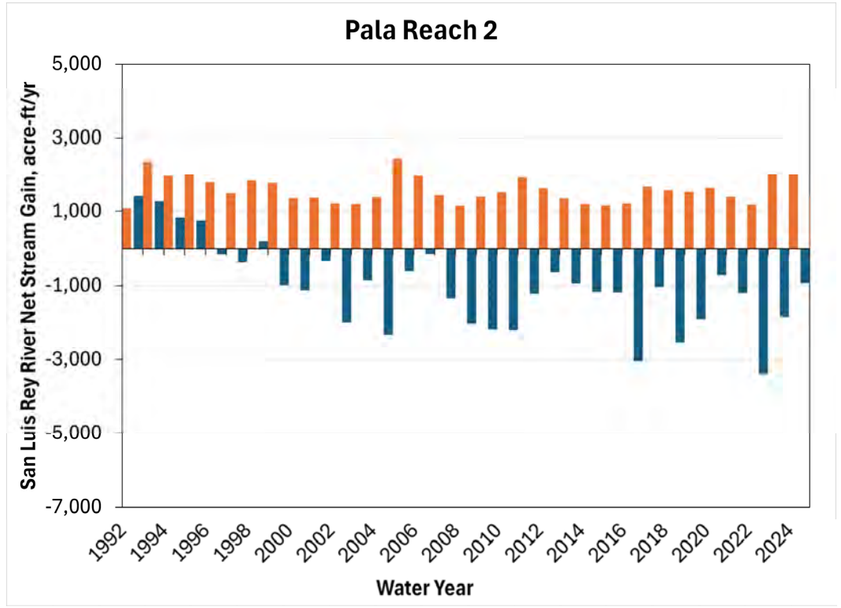
FIGURE 6

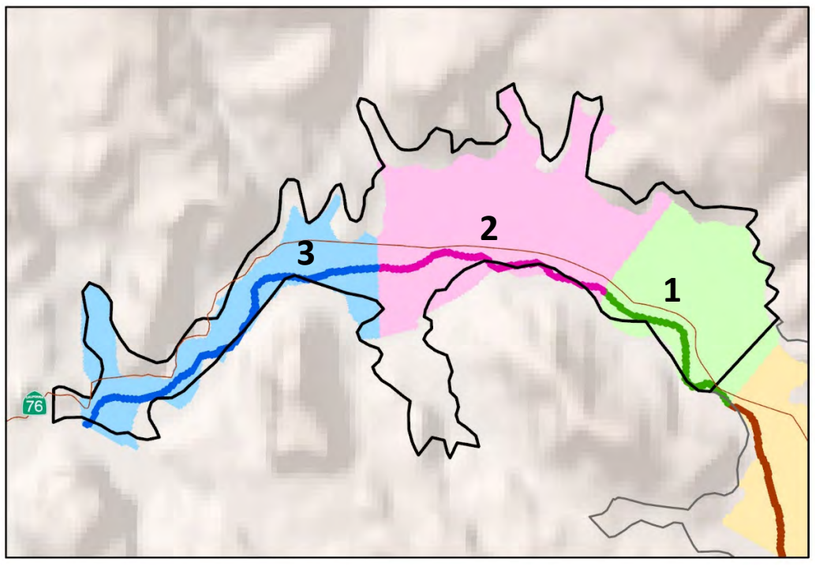
GEOSCIENCE

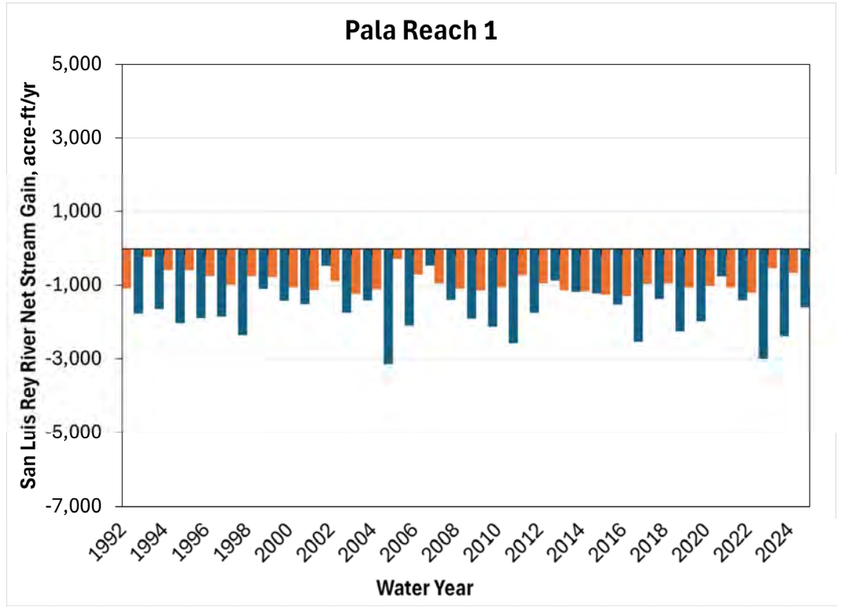
X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026 Geoscience Support Services, Inc. All rights reserved.









Explanation

With Pumping

Without Pumping

Sep-2026

SAN LUIS REY RIVER NET STREAM GAIN – PALA SUBBASIN

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

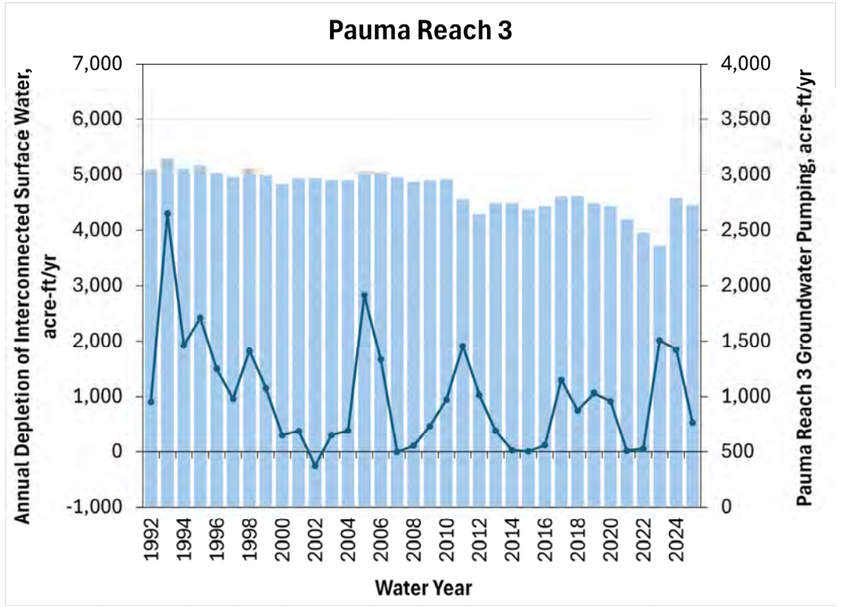
DRAFT

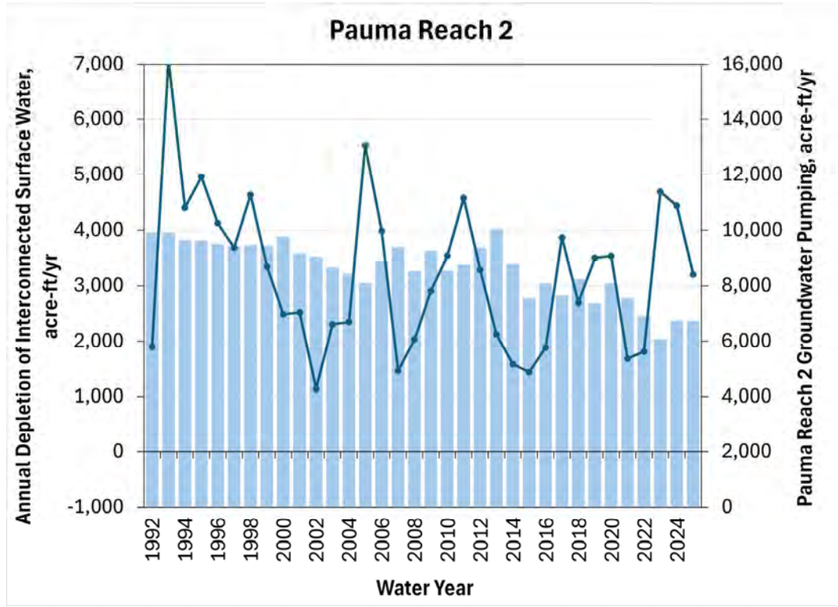
FIGURE 7

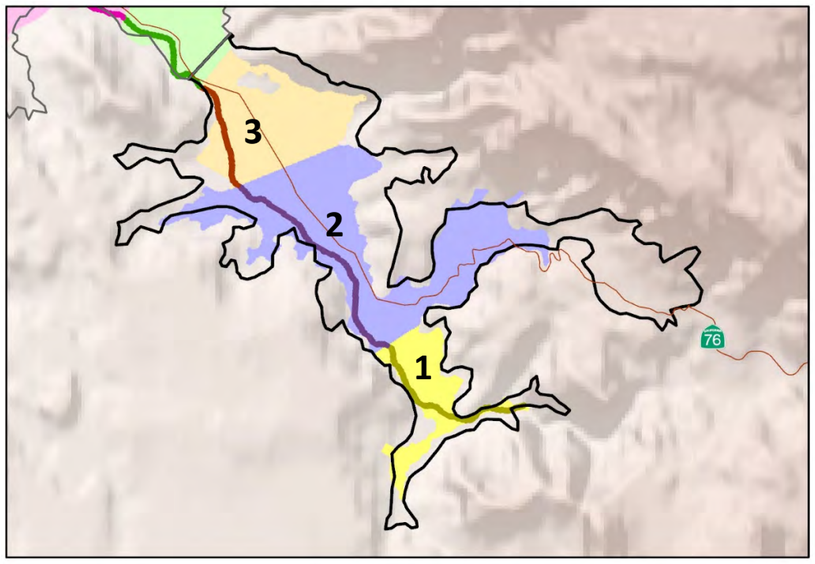
GEOSCIENCE

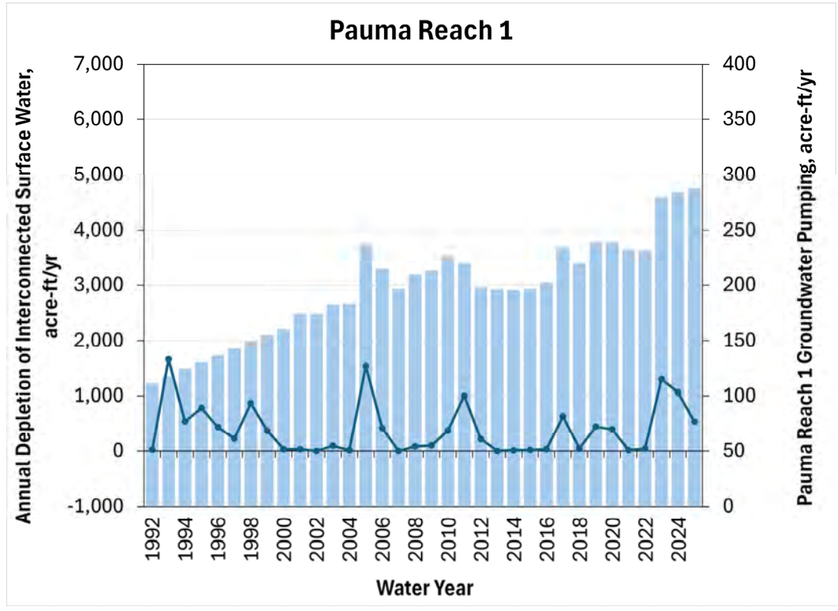
X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026 Geoscience Support Services, Inc. All rights reserved.









Explanation

- Annual Depletion of Interconnected Surface Water
- Groundwater Pumping

Sep-2026

ANNUAL DEPLETION OF INTERCONNECTED SURFACE WATER – PAUMA SUBBASIN

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

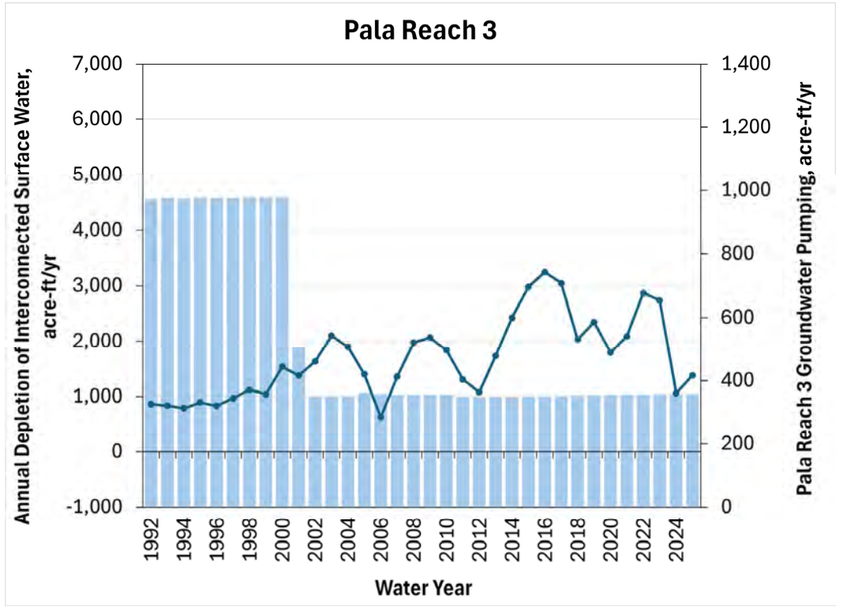
DRAFT

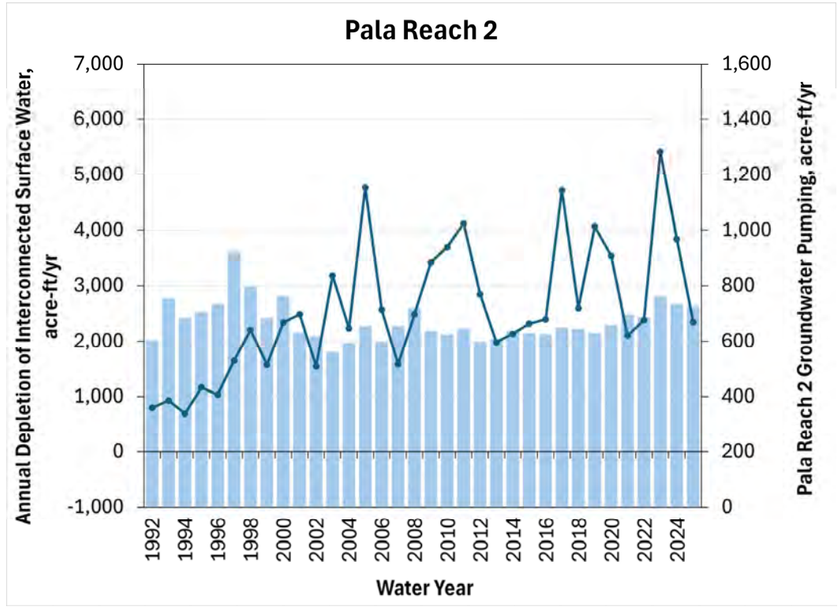
FIGURE 8

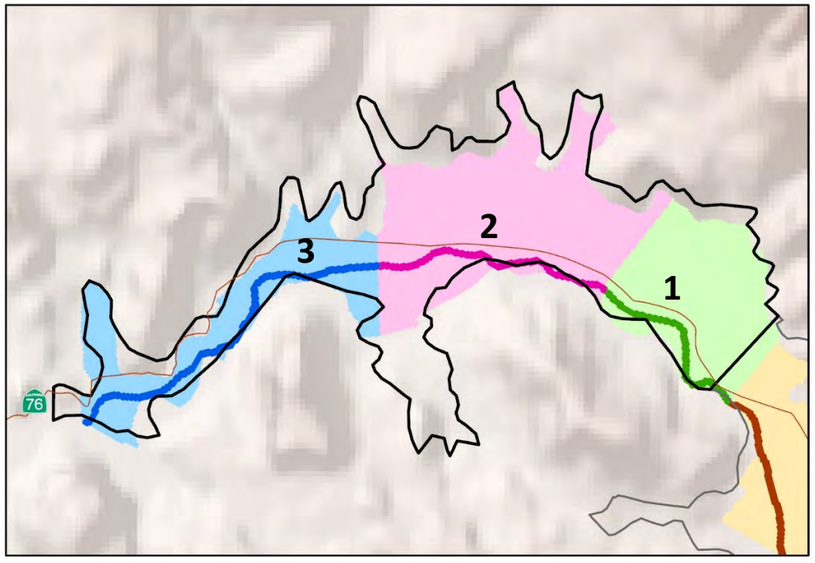
GEOSCIENCE

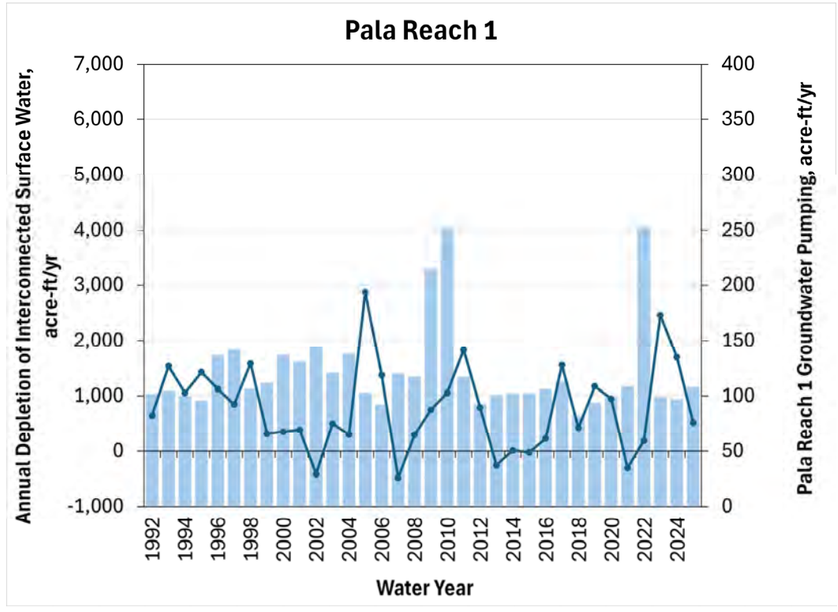
X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026 Geoscience Support Services, Inc. All rights reserved.









Explanation

- Annual Depletion of Interconnected Surface Water
- Groundwater Pumping

Sep-2026

ANNUAL DEPLETION OF INTERCONNECTED SURFACE WATER – PALA SUBBASIN

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

DRAFT

FIGURE 9

GEOSCIENCE

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

DRAFT

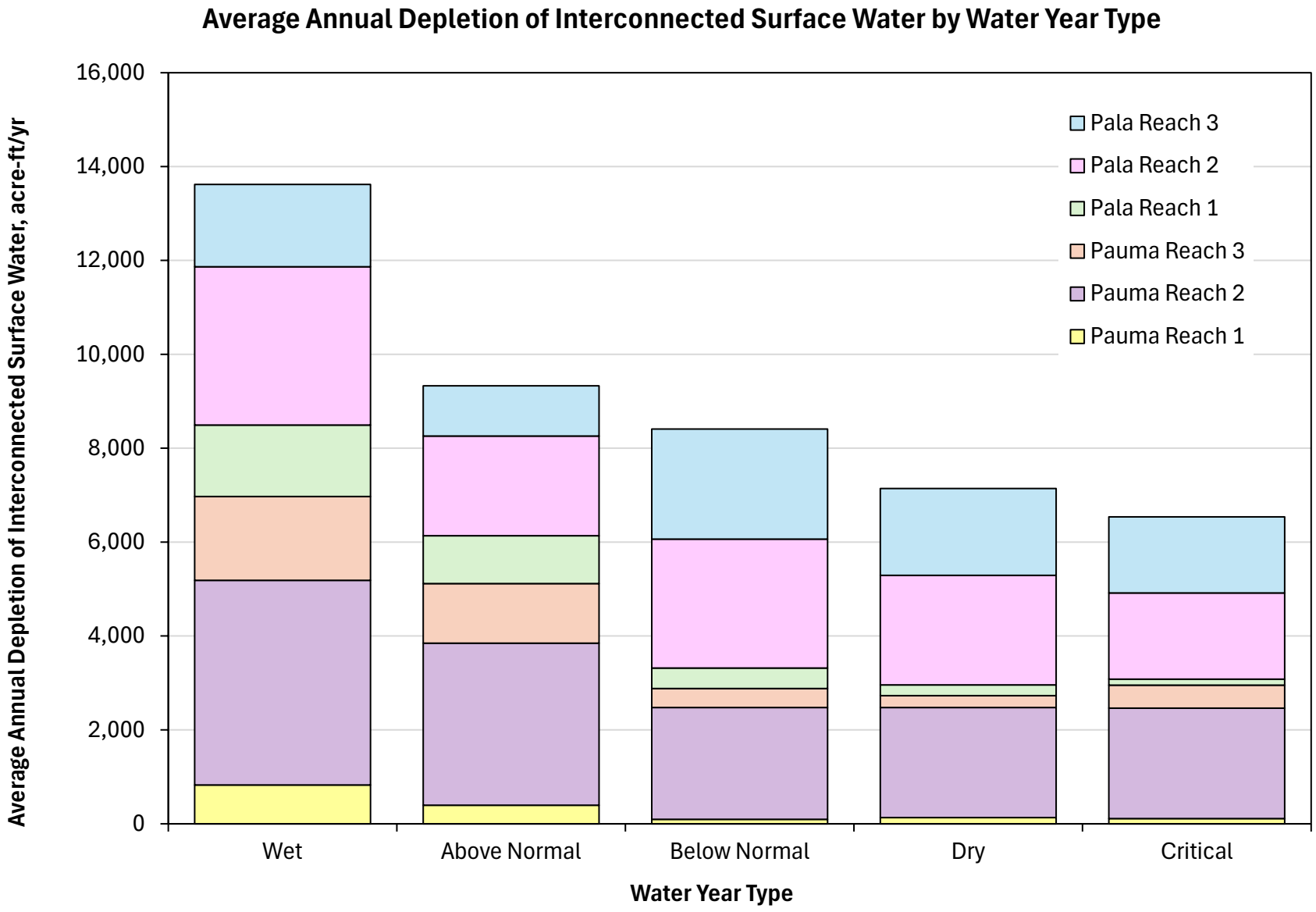


Figure 10

DRAFT

Cumulative Depletion of Interconnected Surface Water versus Cumulative Groundwater Pumping

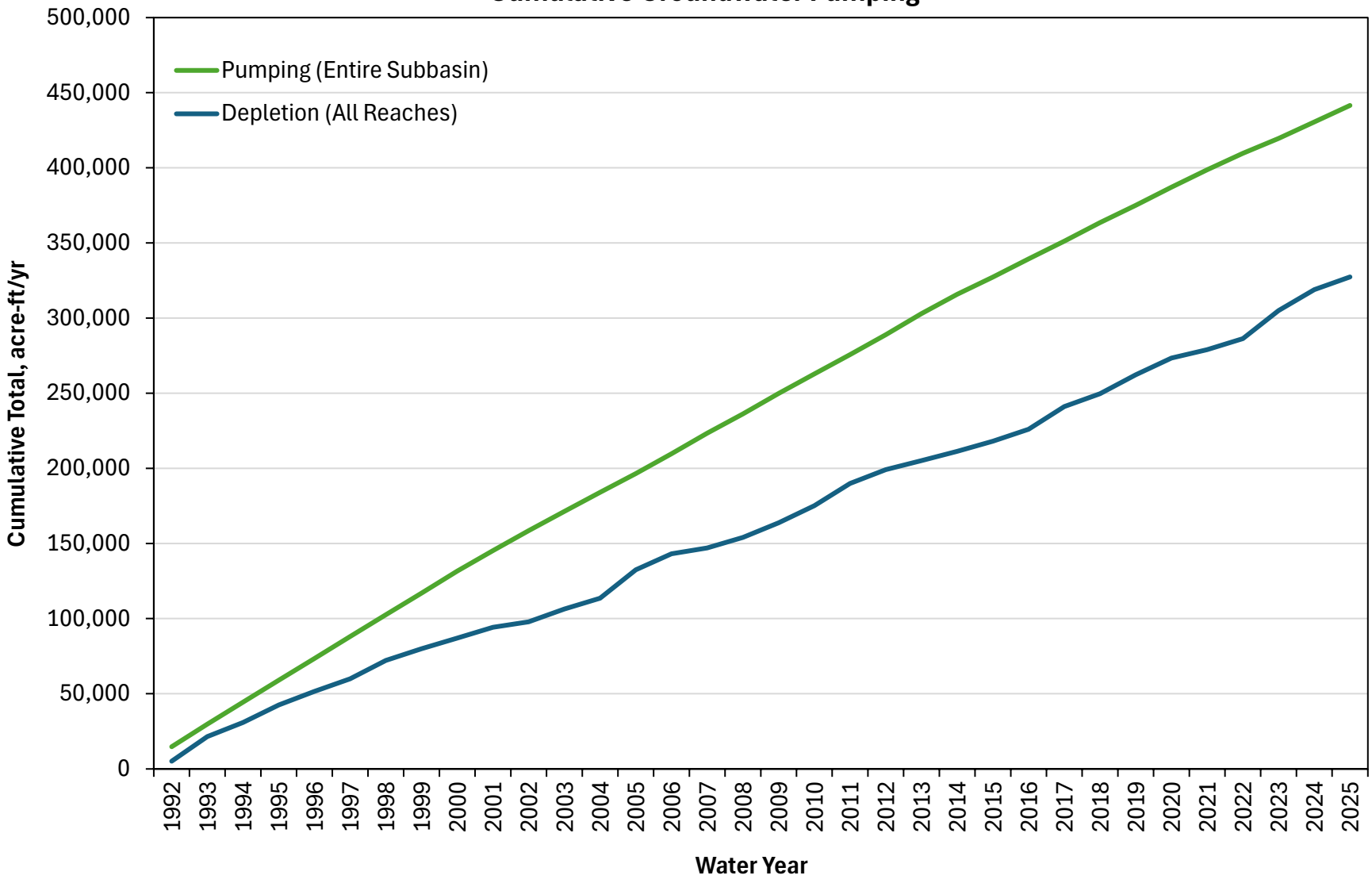
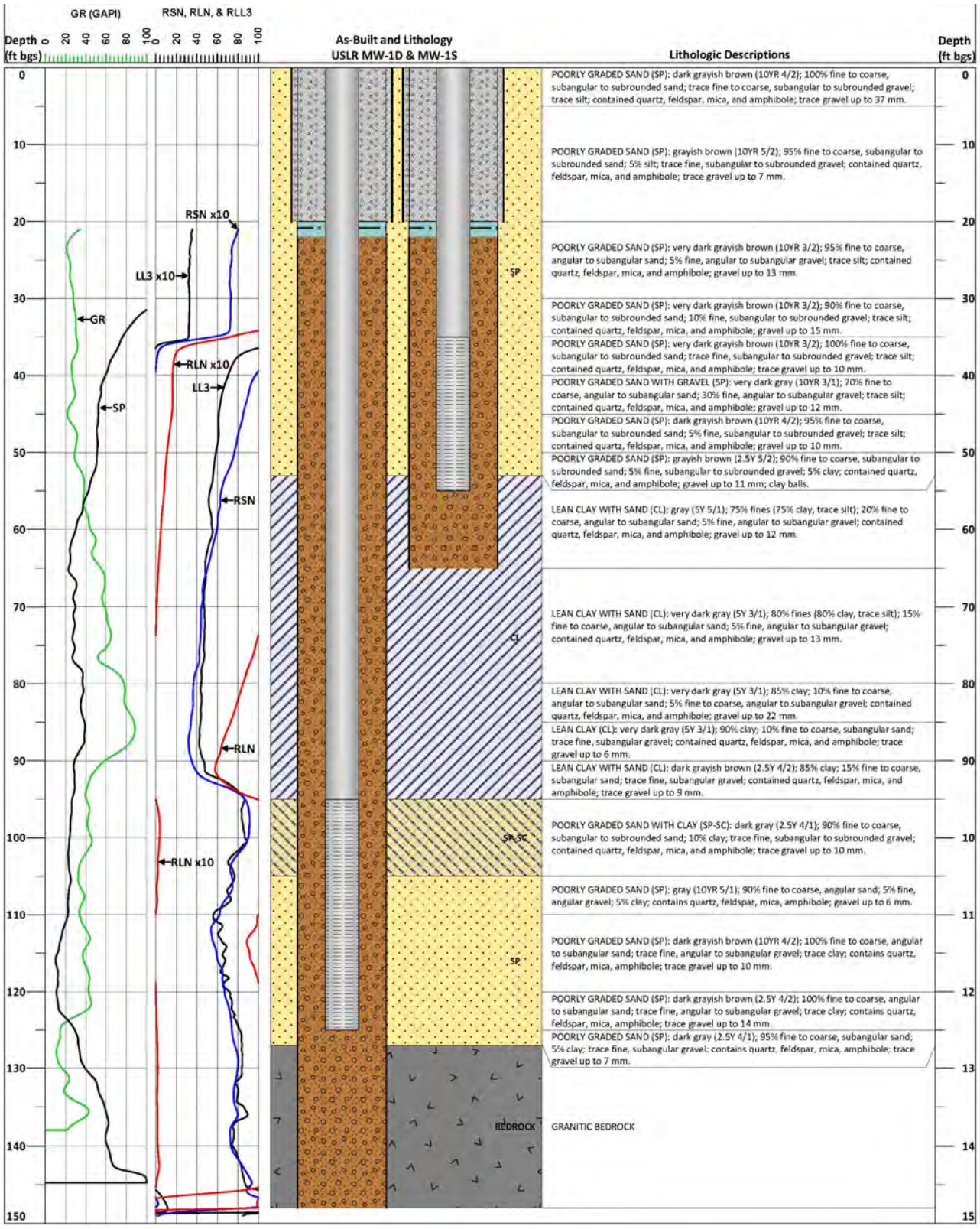


Figure 11

©2026, Geoscience Support Services, Inc. All rights reserved.



DEDICATED CLUSTERED MONITORING WELLS – USLR MW-1S AND MW-1D

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

Sep-2026

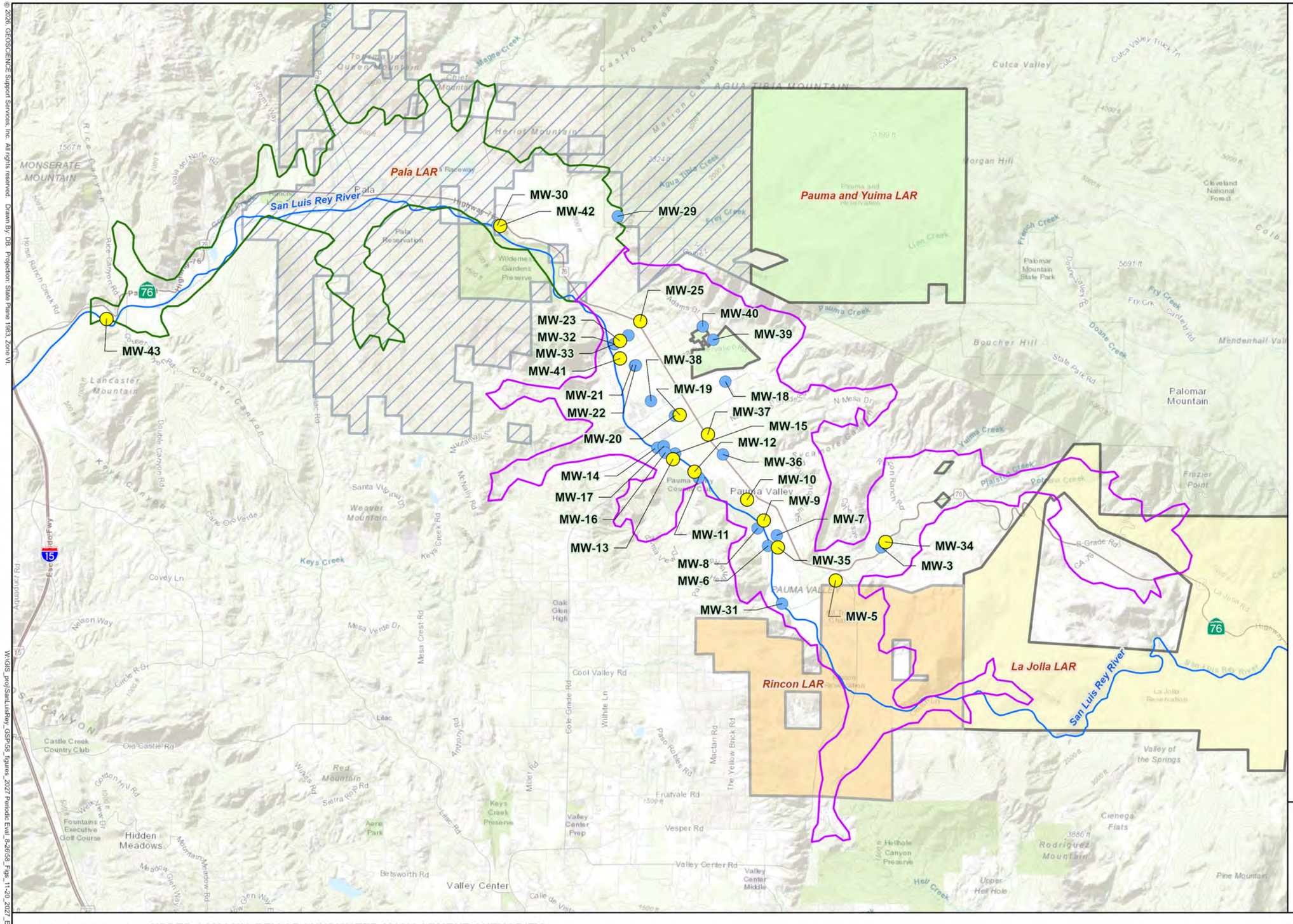
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

FIGURE 12

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

GEOSCIENCE

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

- Groundwater Level Monitoring Network Well Location
- Representative Monitoring Site for Groundwater Level
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 1 2

Miles

Aug-26

GROUNDWATER LEVEL MONITORING NETWORK

W:\GIS_proj\SanLuisRey_GSP\08_figures_2027 Periodic Eval_8-26\08_Figs_11-20_2027_Eval_8-26.aprx

GEOSCIENCE

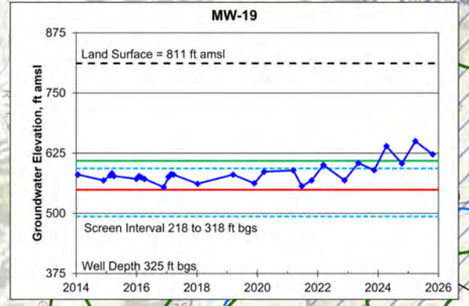
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

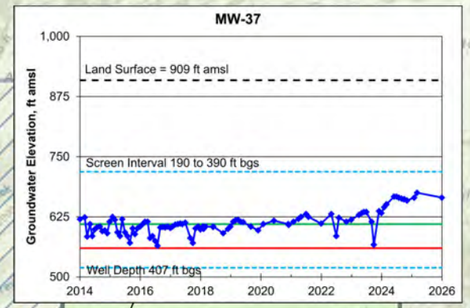
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

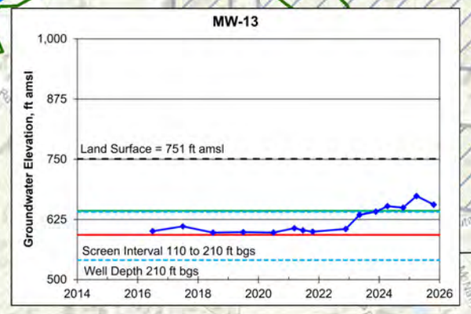
DRAFT

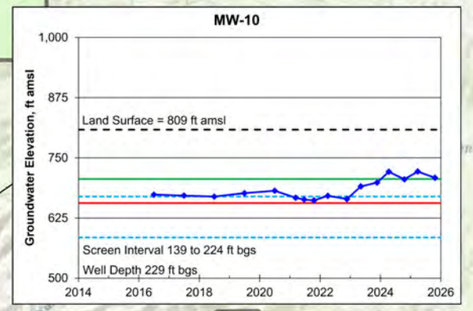
FIGURE 13

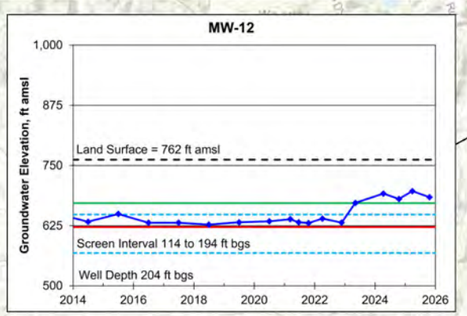
© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

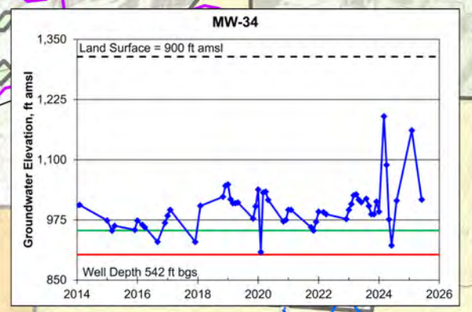


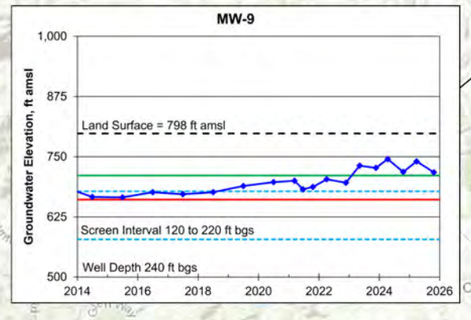


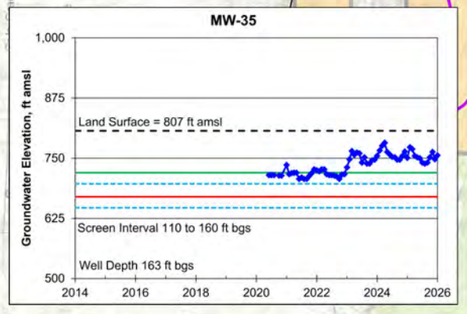


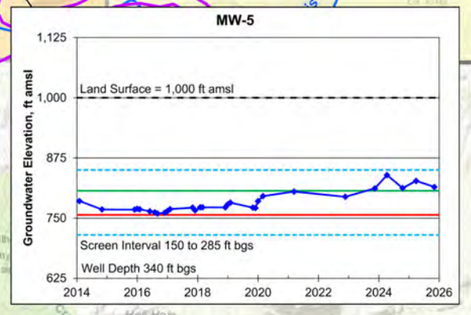












EXPLANATION

- Representative Monitoring Site for Groundwater Elevation
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Screen (top and bottom)
- Land Surface
- Measured Groundwater Level

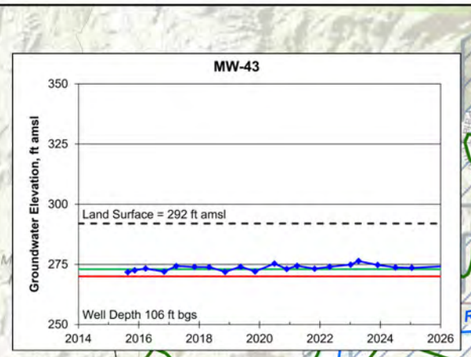
N

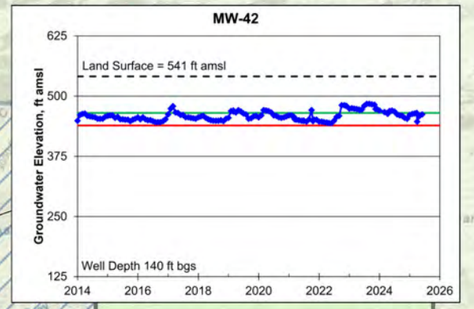
0 1.25 2.5
Miles

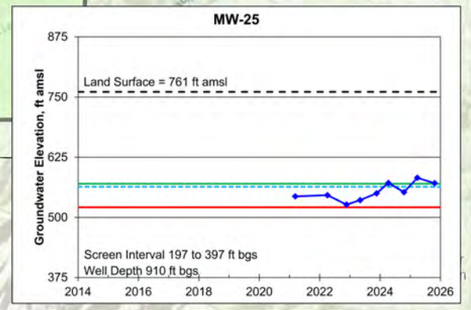
Aug-26

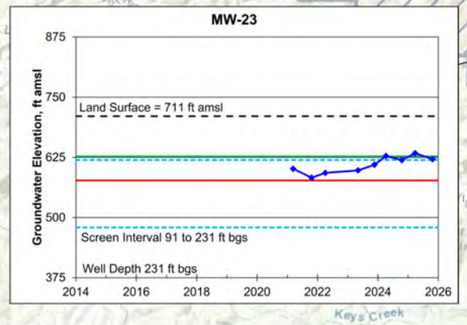
GROUNDWATER HYDROGRAPHS FOR REPRESENTATIVE MONITORING SITES 1 of 2

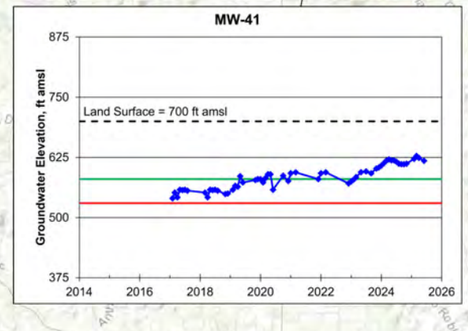
© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.





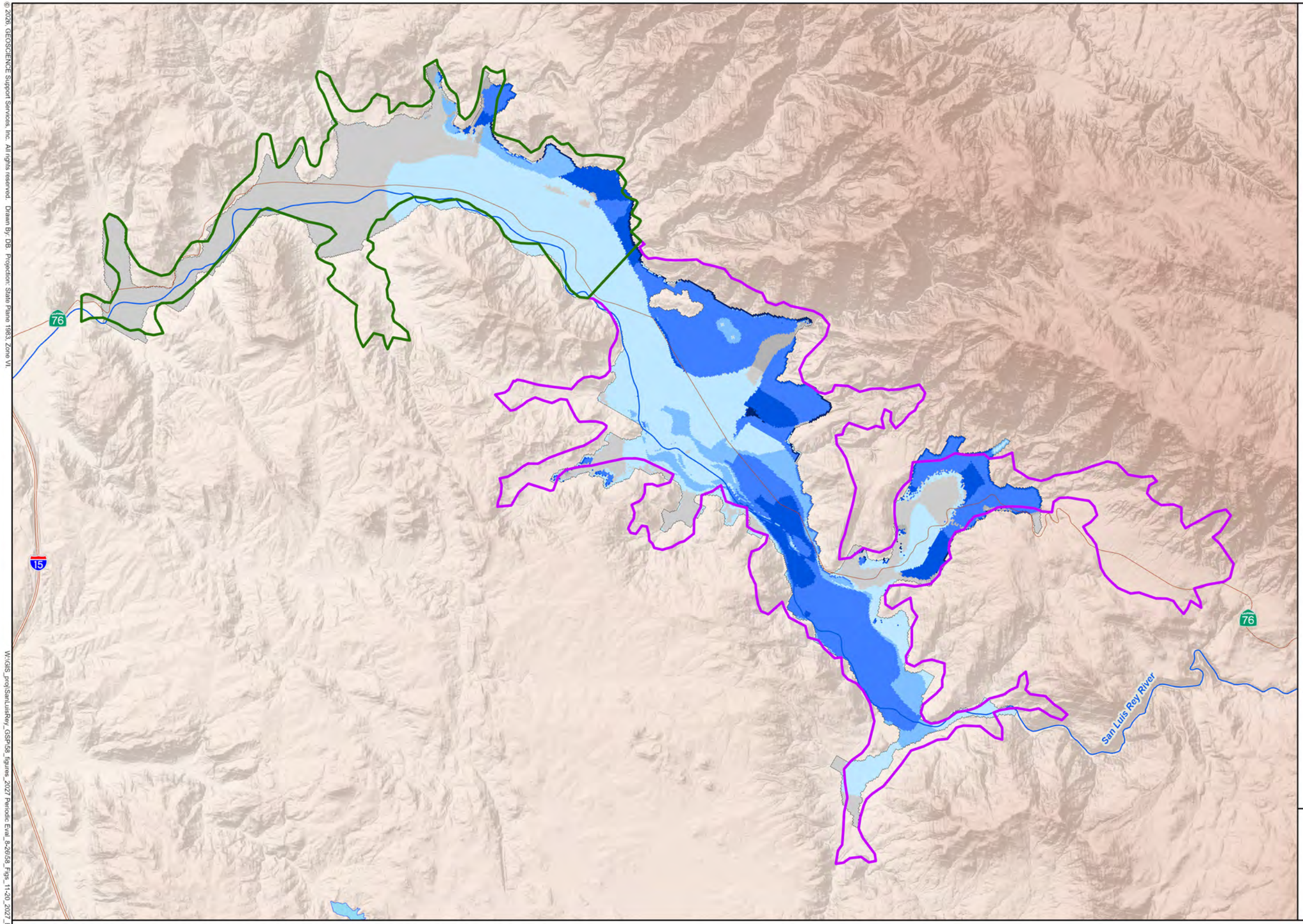






Pala LAR
Pala
Rey River
Highway 76
Pala Reservation
Wildemess Gardens Preserve
Pauma Creek
Pauma Valley
Pauma Valley Country Club
PAUMA VALLEY
Pauma Reservation
La Jolla LAR
San Luis Rey River
Rincon LAR
Keys Creek
Valley Center
Hidden Meadows
Castle Creek Country Club
Fountains Executive Golf Course
Valley Center Prep
Keys Creek Preserve
Valley Center Middle
Hellhole Canyon Preserve
Cleveland National Forest
Cuca Valley
Frazier Point
Valley of the Springs
Cienega Flats
Rodriguez Mountain
Pine Mountain
Upper Hellhole
Hellhole Creek
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Old Castle Rd
Pala Rd
Couser Canyon Rd
Rice Canyon Rd
Nate Harris Grade
N Mesa Dr
Adams Dr
Nelson Way
Covey Ln
Red Mountain
Sierra Rose Rd
Miller Rd
Lilac Rd
Wilkes Rd
Gilson Hill Rd
Mountain Meadow Rd
Meadow Glen Way
Circle R Dr
Mesa Verde Dr
Lilac
Frey
Agua Tibia
Heriot Mountain
Magee Creek
Castro Canyon
Marron Valley
Tourmaline Queen Mountain
Chief Mountain
Horse Ranch Creek Rd
Highway 76
Interstate 15
SAN DIEGO COUNTY
Pala Raceway
Mendenhall Valley
Lake Wohlford Rd
Valley Center Rd
Pauma Heights Rd
Mission Rd
Yuima Creek
Platanos Creek
Petes Creek
Rincon Ranch Rd
Cole Ranch Rd
S Grade Rd
CA-79
Highway 76
Old Highway 395
Mataguay Rd
Lake Wohlford Rd
Valley Center Rd
Mission Rd
Pauma Heights

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

Model-Simulated Change in Groundwater Storage (acre-ft/cell) (Fall 2020 to 2025)

- -5.4- -0.25
- -0.25 - 0
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 - 6.2

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

N

0 1.25 2.5

Miles

Aug-26

CHANGE IN GROUNDWATER STORAGE (FALL 2020 TO 2025)

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_11-20_2027_Eval_10_26.aprx

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 16

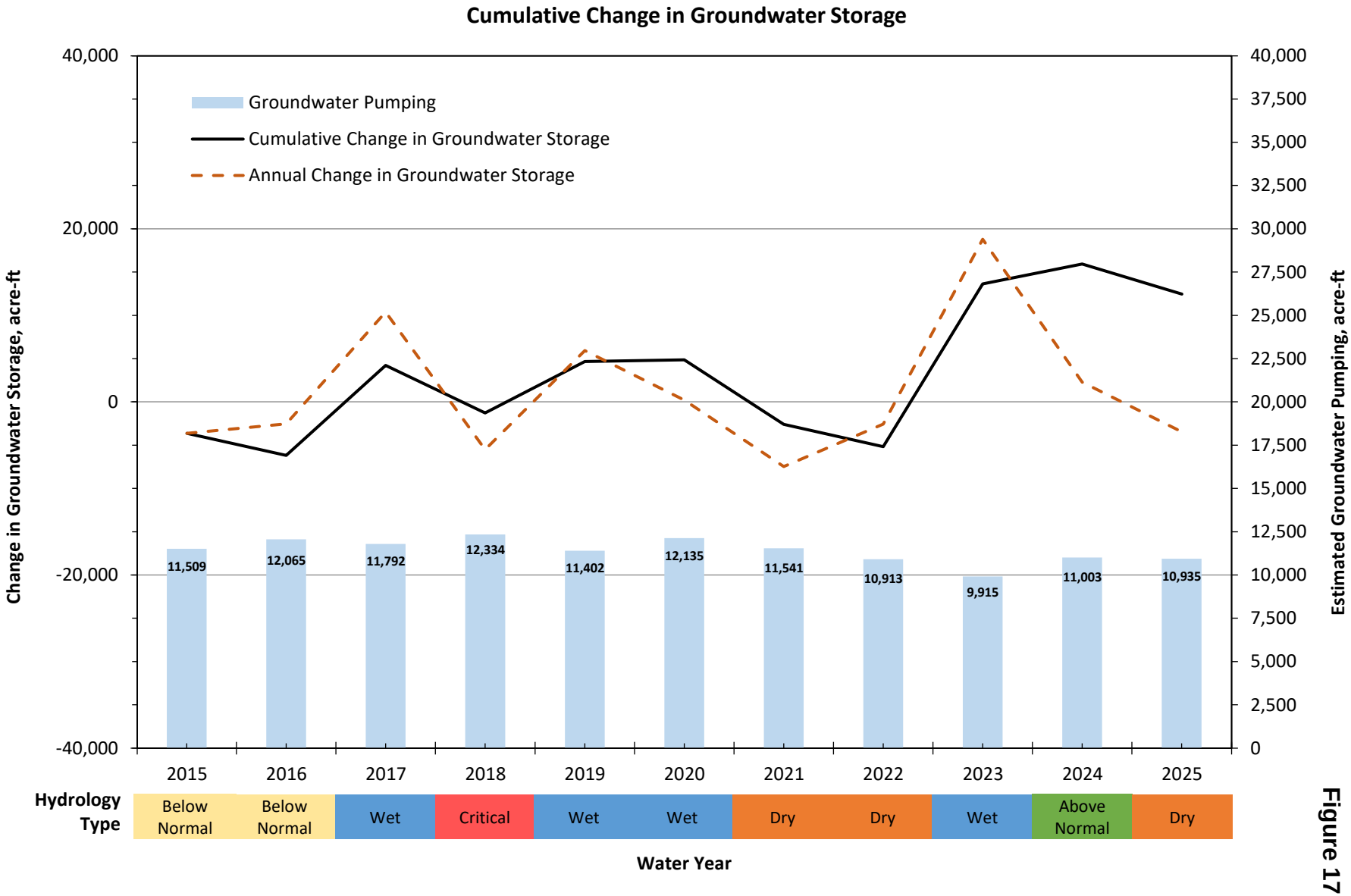
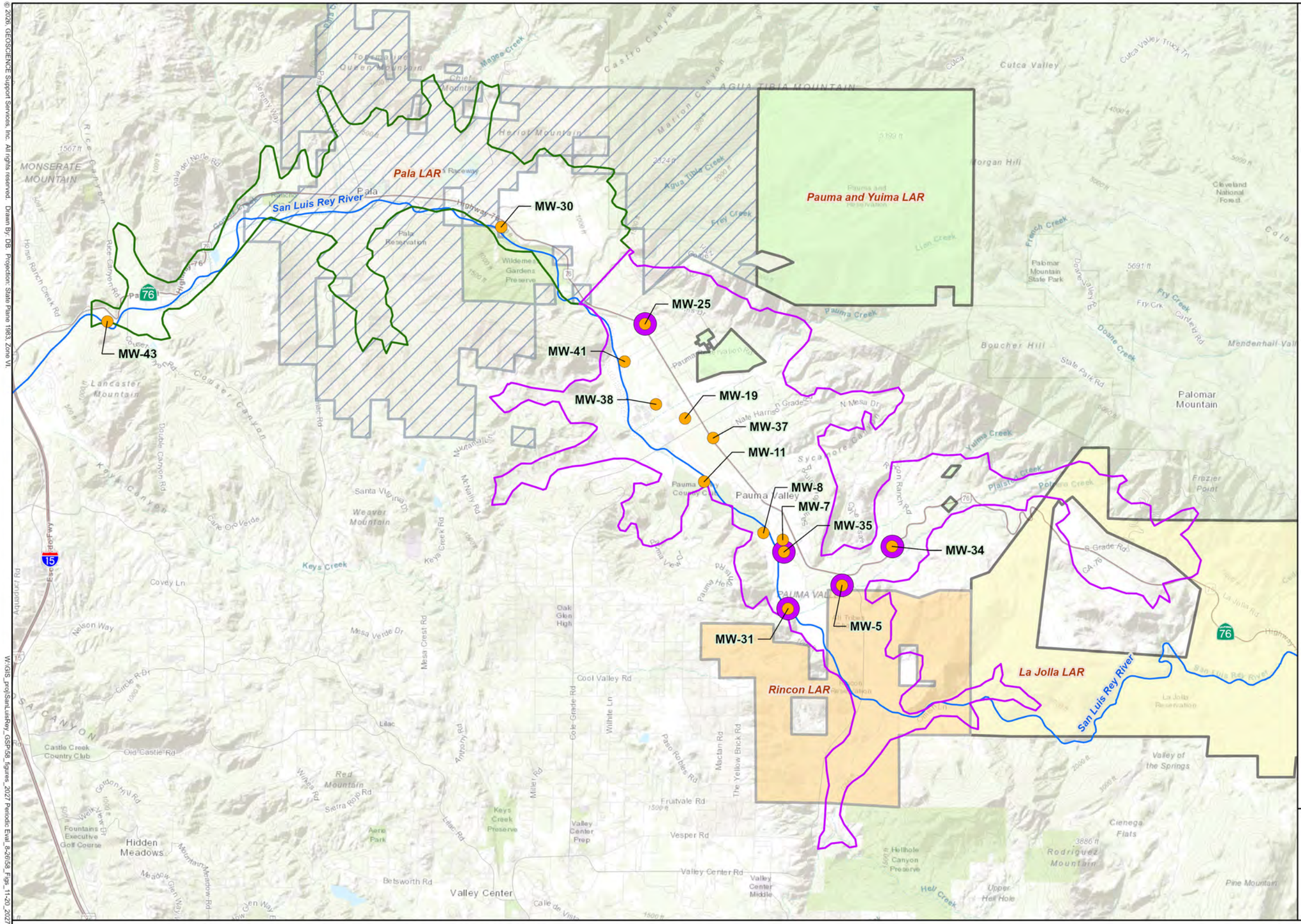

Cumulative Change in Groundwater Storage
Groundwater Pumping
Cumulative Change in Groundwater Storage
Annual Change in Groundwater Storage
Change in Groundwater Storage, acre-ft
Estimated Groundwater Pumping, acre-ft
40,000
20,000
0
-20,000
-40,000
37,500
35,000
32,500
30,000
27,500
25,000
22,500
17,500
15,000
12,500
10,000
7,500
5,000
2,500
11,509
12,065
11,792
12,334
11,402
12,135
11,541
10,913
9,915
11,003
10,935
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Hydrology Type
Below Normal
Below Normal
Wet
Critical
Wet
Wet
Dry
Dry
Wet
Above Normal
Dry
Water Year

Figure 17

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

- Representative Monitoring Site for TDS and Nitrate
- Representative Monitoring Site for Perchlorate
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 1 2

Miles

Aug-26

GROUNDWATER QUALITY MONITORING NETWORK

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

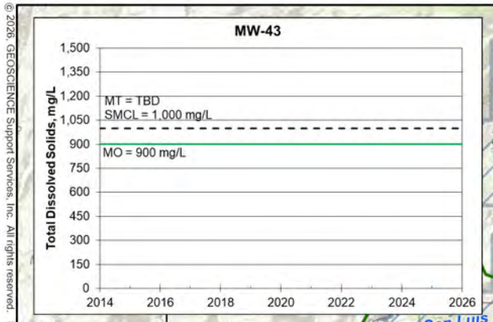
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

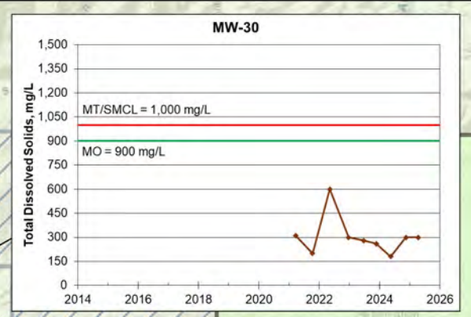
DRAFT

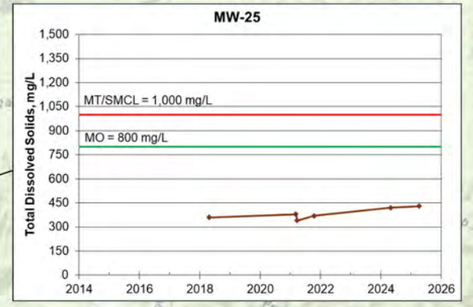
FIGURE 18

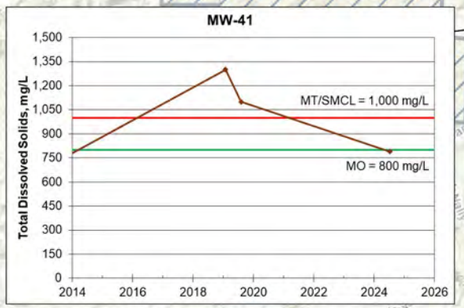
W:\GIS_proj\SanLuisRey_GSP\56_figures_2027 Periodic Eval_8-26\58_Figs_11-20_2027_Eval_8-26.aprx

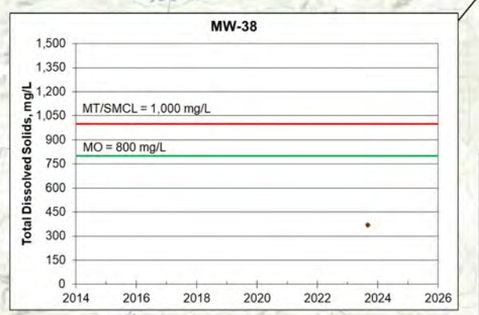
© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

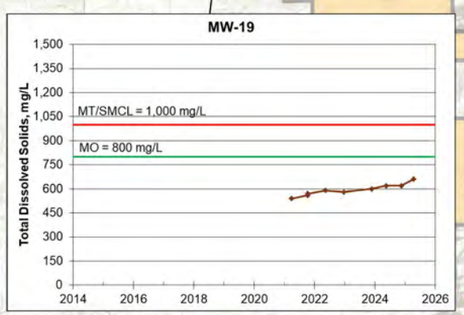


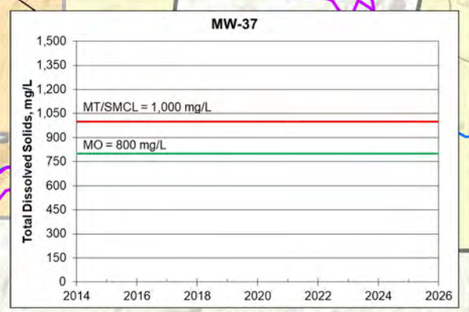












EXPLANATION

Representative Monitoring Site for Total Dissolved Solids (TDS)

Average TDS Concentration, mg/L (WY 2021-2025) (Source: DDW CLIP and Supplemental Water Quality Sampling, 2025)

- 0 - 500
- 500 - 800
- 800 - 1,000
- >1,000

Secondary Maximum Contaminant Level (SMCL) for TDS = 1,000 mg/L

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Secondary Maximum Contaminant Level (SMCL)
- Measured TDS Concentration

Aug-26

N

0 1.25 2.5

Miles

AVERAGE TDS CONCENTRATIONS AND CHEMOGRAPHS FOR REPRESENTATIVE MONITORING SITES 1 of 2

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_11-20_2027_Eval_8-26.aprx

GEOSCIENCE

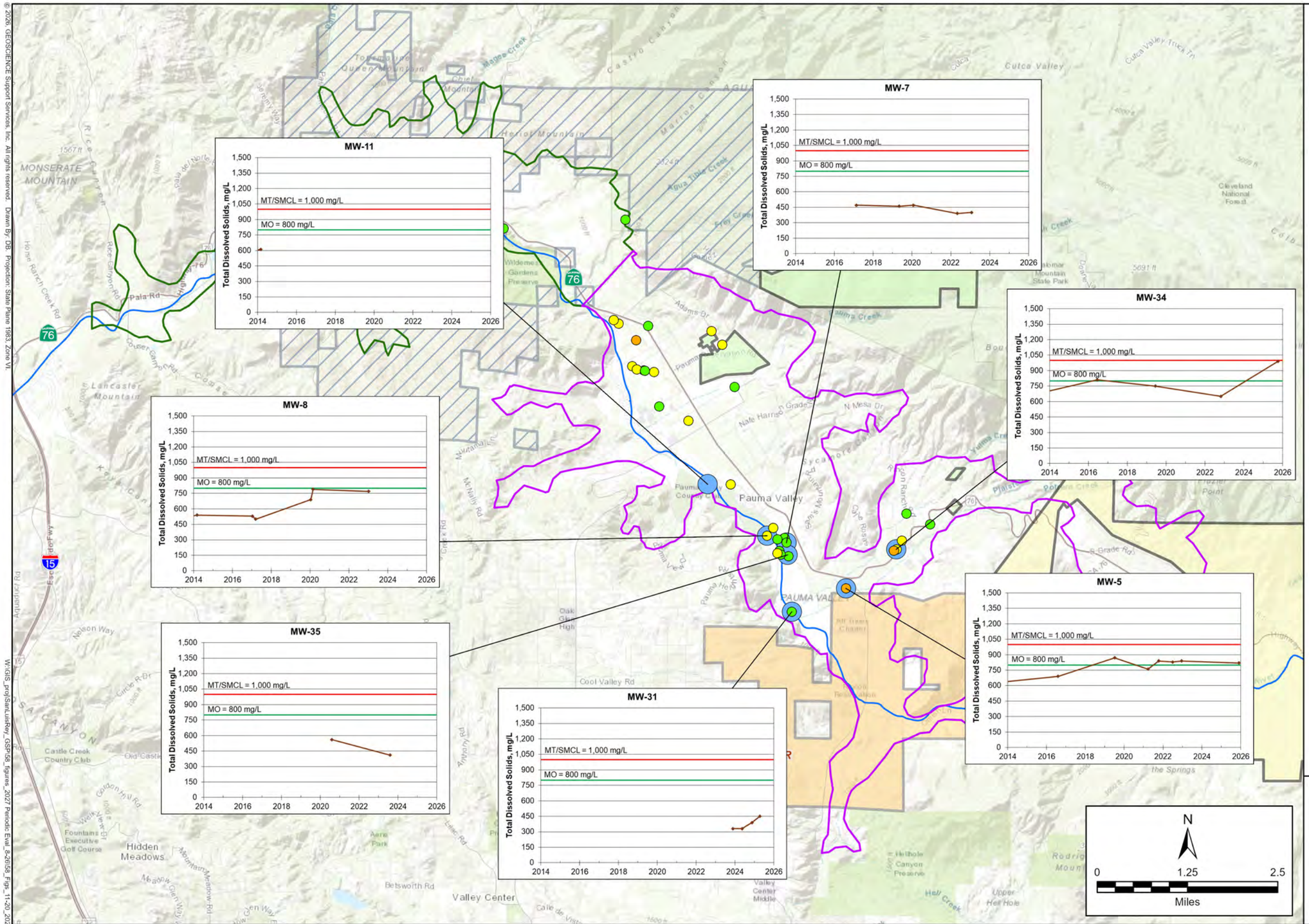
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 19

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

Representative Monitoring Site for Total Dissolved Solids (TDS)

Average TDS Concentration, mg/L
(WY 2021-2025)
(Source: DDW CLIP and Supplemental Water Quality Sampling, 2025)

- 0 - 500
- 500 - 800
- 800 - 1,000
- >1,000

Secondary Maximum Contaminant Level (SMCL) for TDS = 1,000 mg/L

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Secondary Maximum Contaminant Level (SMCL)
- Measured TDS Concentration

Aug-26

AVERAGE TDS CONCENTRATIONS AND CHEMOGRAPHS FOR REPRESENTATIVE MONITORING SITES 2 of 2

GEOSCIENCE

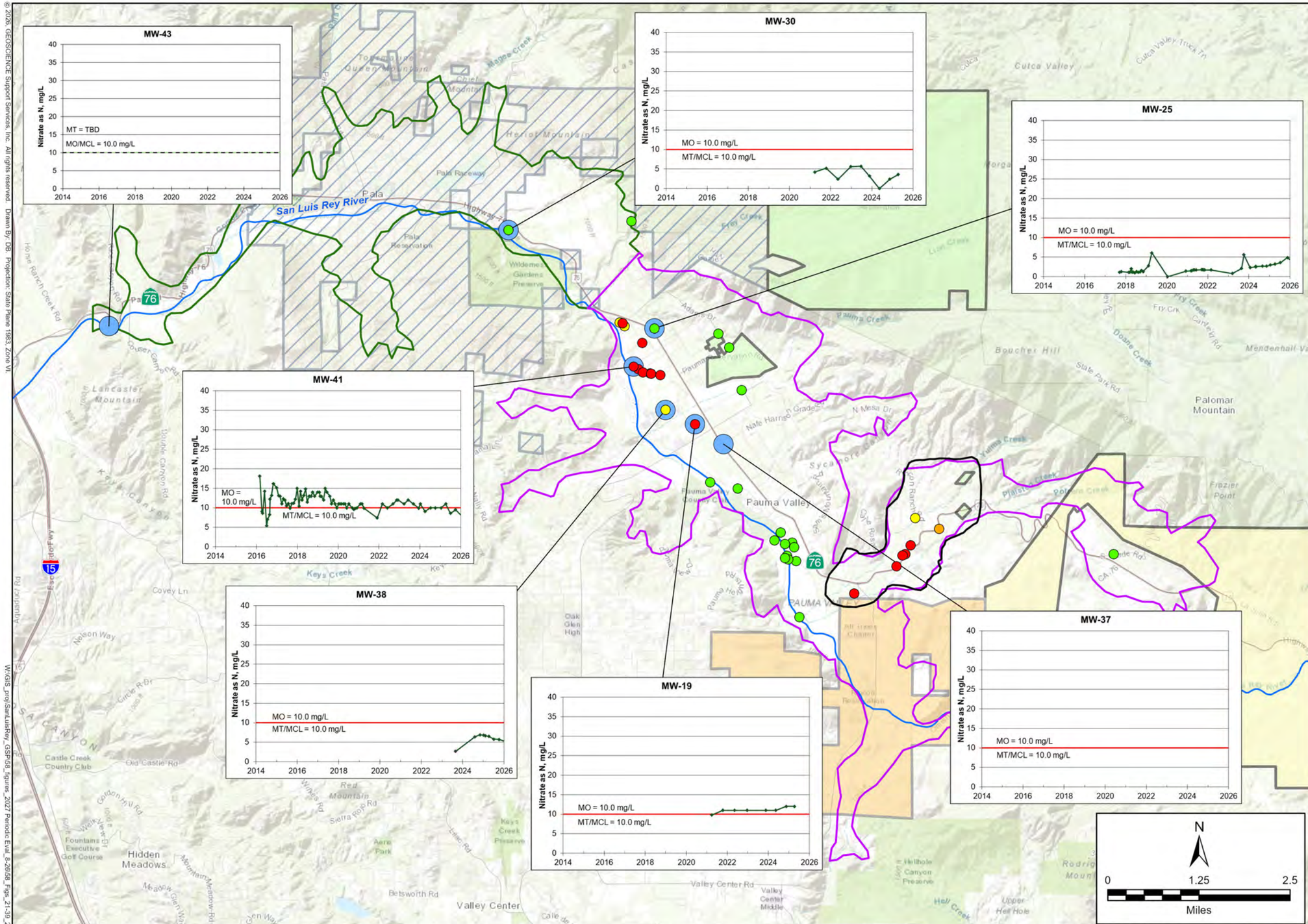
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 20

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_11-20_2027_Eval_8-26.aprx



EXPLANATION

Representative Monitoring Site for Nitrate

Average Nitrate as N Concentration, mg/L (WY 2021-2025) (Source: DDW CLIP and Supplemental Water Quality Sampling, 2025)

- 0 - 5
- 5 - 8
- 8 - 10
- >10

Primary Maximum Contaminant Level (MCL) for Nitrate as N = 10 mg/L

- Upper Pauma Nitrate/ Perchlorate-Affected Area
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Primary Maximum Contaminant Level (MCL)
- Measured Nitrate Concentration

Aug-26

AVERAGE NITRATE CONCENTRATIONS AND CHEMOGRAPHS FOR REPRESENTATIVE MONITORING SITES
1 of 2

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_21-39_2027_Eval_8-26.aprx

GEOSCIENCE

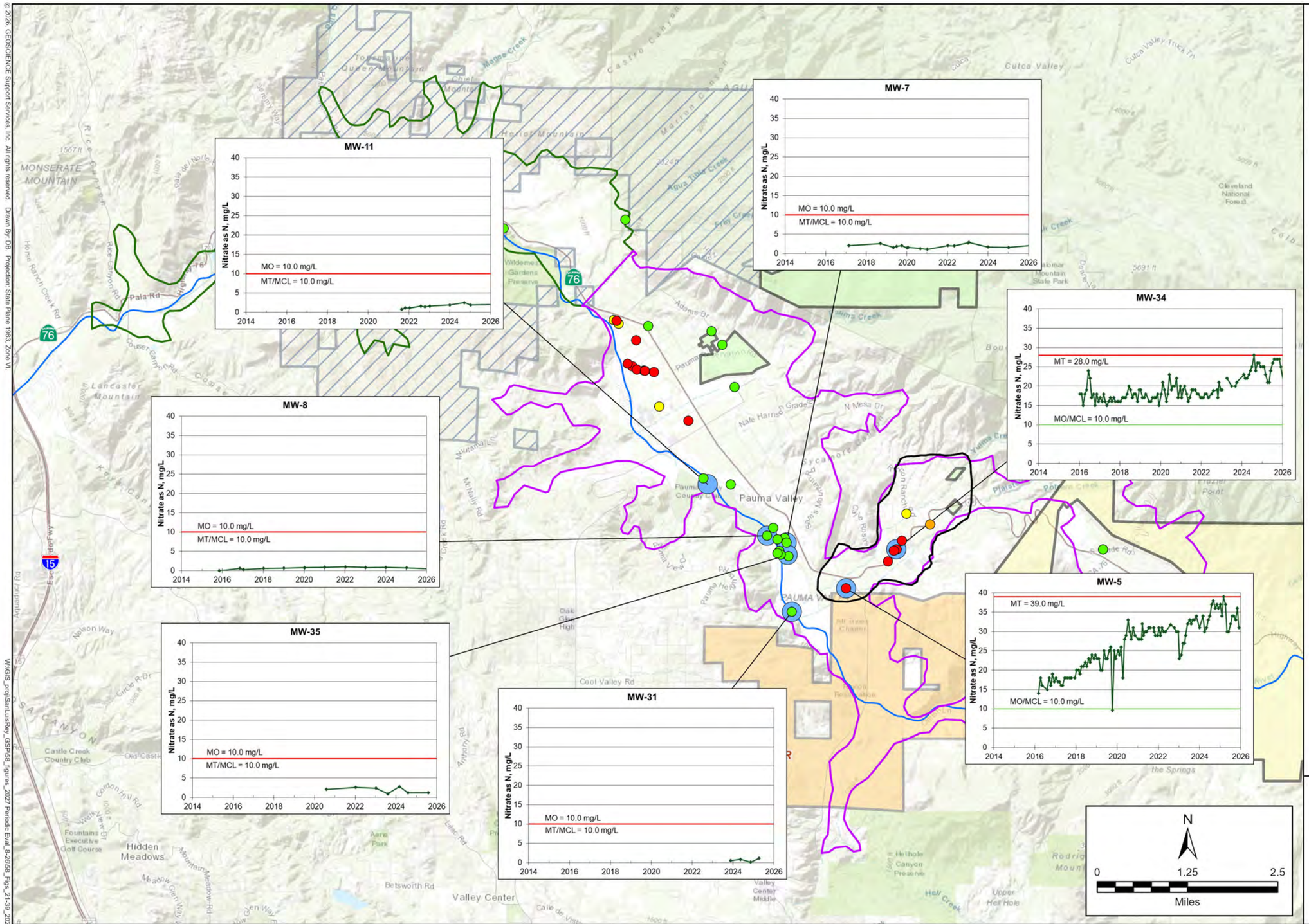
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 21

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

Representative Monitoring Site for Nitrate

Average Nitrate as N Concentration, mg/L (WY 2021-2025)
(Source: DDW CLIP and Supplemental Water Quality Sampling, 2025)

- 0 - 5
- 5 - 8
- 8 - 10
- >10

Primary Maximum Contaminant Level (MCL) for Nitrate as N = 10 mg/L

- Upper Pauma Nitrate/ Perchlorate-Affected Area
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Primary Maximum Contaminant Level (MCL)
- Measured Nitrate Concentration

Aug-26

AVERAGE NITRATE CONCENTRATIONS AND CHEMOGRAPHS FOR REPRESENTATIVE MONITORING SITES 2 of 2

GEOSCIENCE

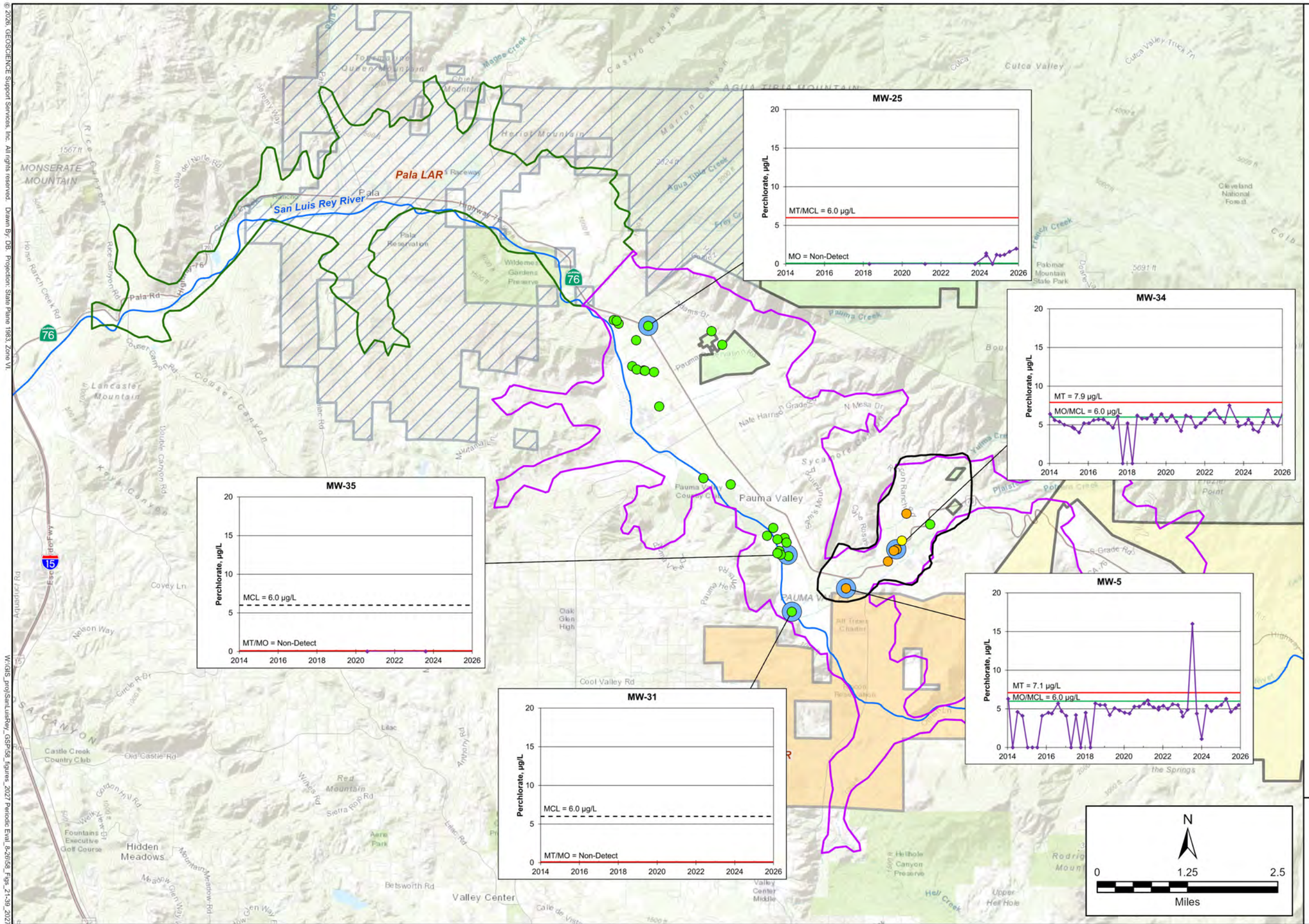
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 22

W:\GIS_proj\SanLuisRey_GSP\56_figures_2027 Periodic Eval_8-26\56_Figs_21-39_2027_Eval_8-26.aprx



EXPLANATION

Representative Monitoring Site for Perchlorate

Average Perchlorate Concentration, ug/L (WY 2021-2025) (Source: DDW CLIP and Supplemental Water Quality Sampling, 2025)

- 0 - 1
- 1 - 3
- 4 - 6
- >6

Primary Maximum Contaminant Level (MCL) for Perchlorate = 6 ug/L

- Upper Pauma Nitrate/ Perchlorate-Affected Area
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold (MT)
- Measurable Objective (MO)
- Primary Maximum Contaminant Level (MCL)
- Measured Perchlorate Concentration

Aug-26

AVERAGE PERCHLORATE CONCENTRATIONS AND CHEMOGRAPHS FOR REPRESENTATIVE MONITORING SITES

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_21-39_2027_Eval_10-26.aprx

GEOSCIENCE

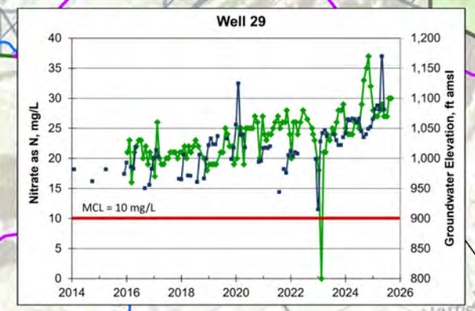
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

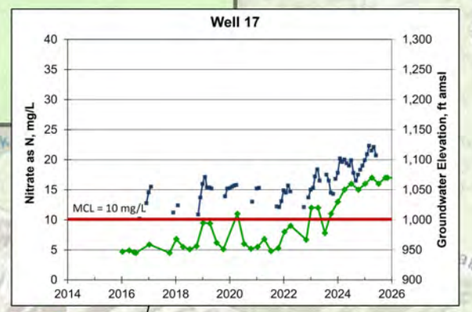
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

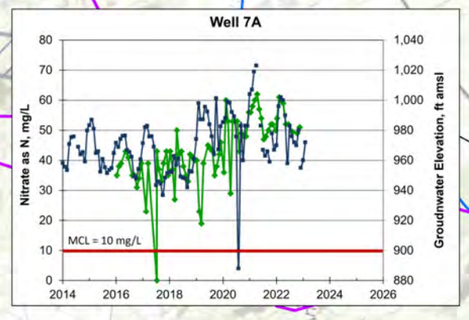
DRAFT

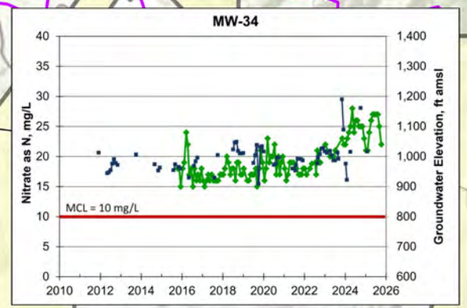
FIGURE 23

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.

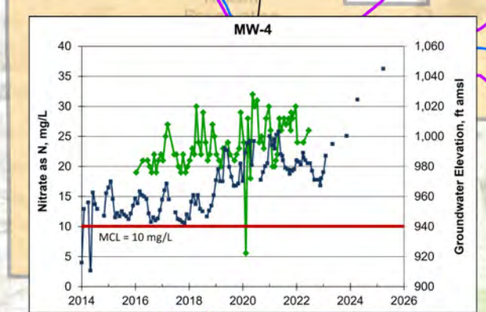












EXPLANATION

- Well with Nitrate and Groundwater Level Data
- Upper Pauma Nitrate/ Perchlorate-Affected Area
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Primary Maximum Contaminant Level (MCL)
- Measured Nitrate Concentration
- Measured Groundwater Level

N

0 1 2

Miles

Aug-26

RELATIONSHIP BETWEEN NITRATE AND GROUNDWATER ELEVATION WITHIN THE UPPER PAUMA NITRATE/ PERCHLORATE-AFFECTED AREA

W:\GIS_proj\SanLuisRey_GSP\58_figures_2027 Periodic Eval_8-26\58_Figs_21-39_2027_Eval_8-26.aprx

GEOSCIENCE

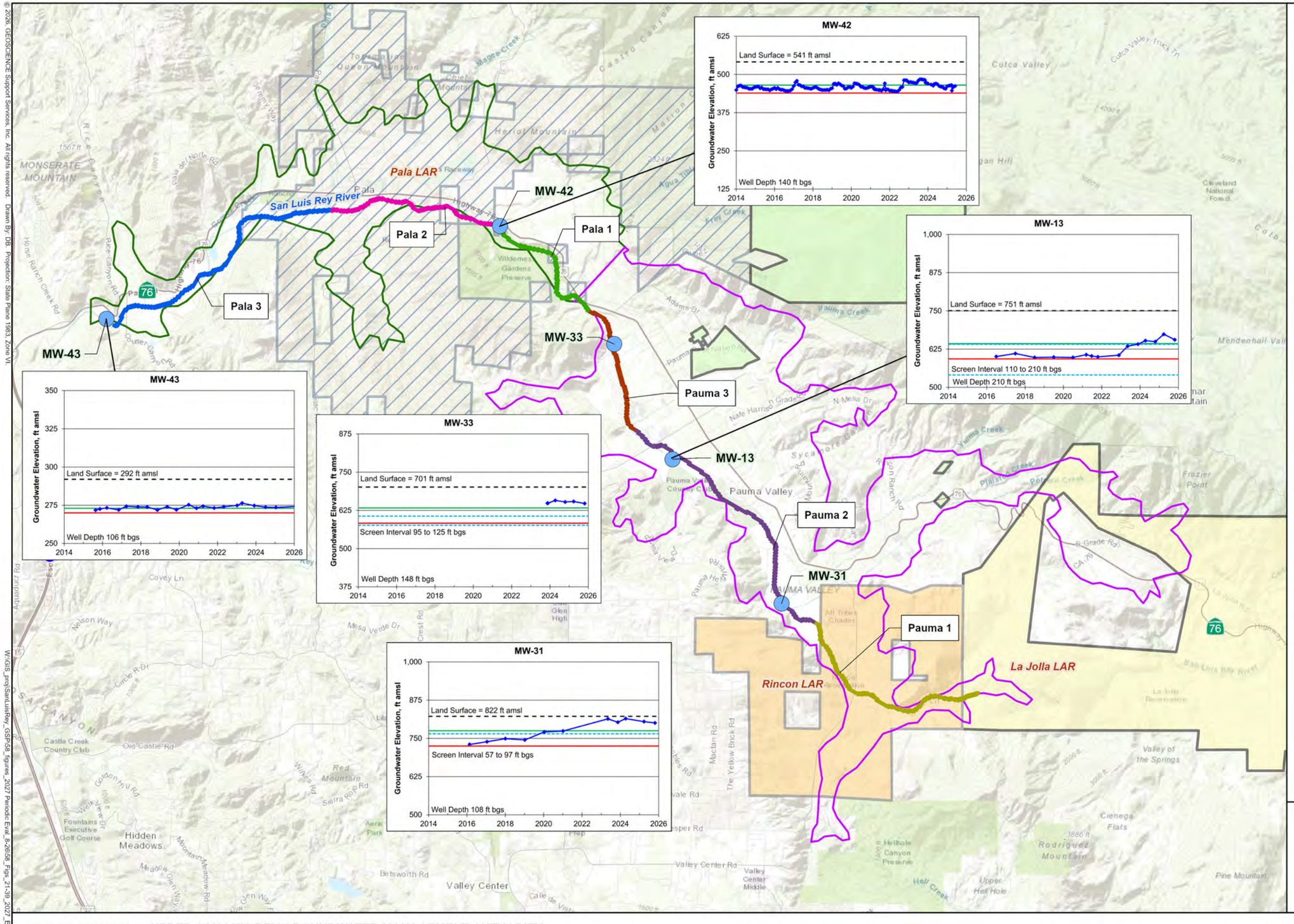
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

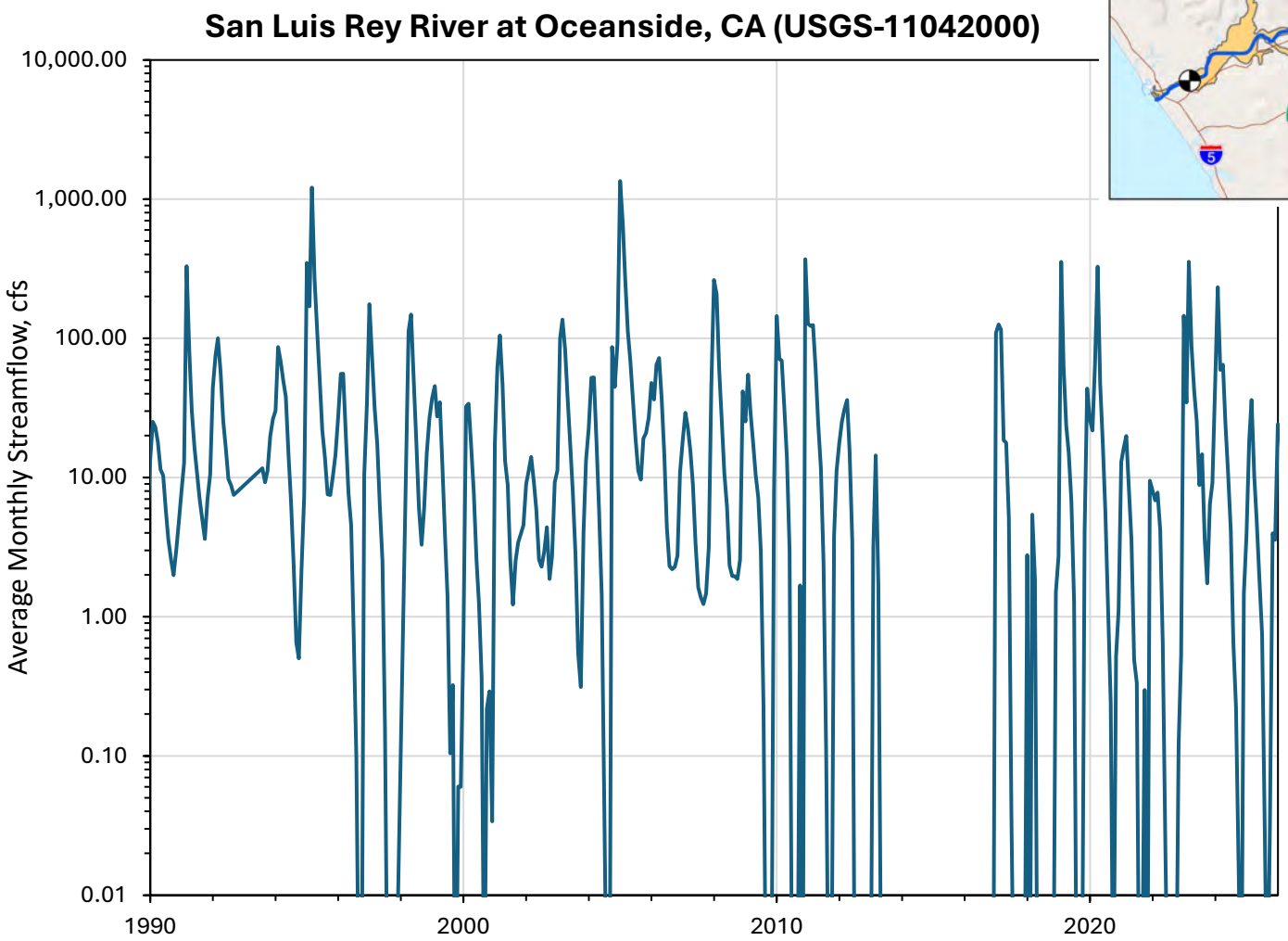
DRAFT

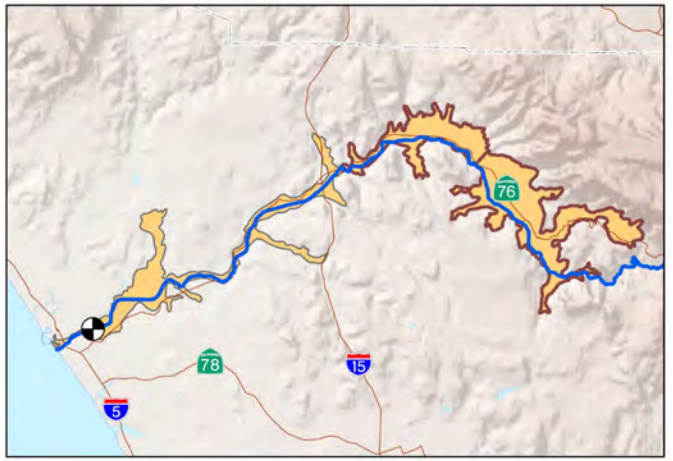
FIGURE 24

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.


MONSERATE MOUNTAIN
Pala LAR
San Luis Rey River
Pala
Highway 76
Pala 1
Pala 2
Pala 3
MW-42
MW-33
MW-13
MW-31
MW-43
Pauma 1
Pauma 2
Pauma 3
Pauma Valley
Rincon LAR
La Jolla LAR
Pauma Creek
Frey Creek
Palomar Mountain
Cuca Valley
Heriot Mountain
Wilderness Gardens Preserve
Adams Dr
N Mesa Dr
Nate Harrison Grade
Rincon Ranch Rd
S Grade Rd
CA 79
Frazier Point
Cleveland National Forest
Valley of the Springs
Cienega Flats
Rodriguez Mountain
Pine Mountain
Hellhole Canyon Preserve
Upper Hell Hole
Hell Creek
Valley Center Rd
Valley Center
Valley Center Middle
Betsworth Rd
Hidden Meadows
Fountains Executive Golf Course
Castle Creek Country Club
Old Castle Rd
Red Mountain
Sierra Rose Rd
Wilkes Rd
Gilbert Hill Rd
Mountain Meadow Rd
Meadow Glen Way
Nelson Way
Covey Ln
Mesa Verde Dr
Crest Rd
Circle R Dr
Rice Canyon Rd
Horse Ranch Creek Rd
Couser Canyon Rd
Agua Tibia Wilderness
Castro Canyon
Magee Creek
Chief Mountain
Tomahawk Queen Mountain
Agua Tibia Mountain
Frey Creek
Mendenhall Valley
Yuima Creek
Palomar Creek
Platts Creek
Pauma Heights Rd
Pauma Valley Country Club
Mission Rd
Macbain Rd
The Yellow Brick Rd
Glen High
Aero Park
Prep
Valley of the Springs
Cuca Valley Truck Trl
Agua Tibia Rd
Jeremy Way
Rice Canyon Rd
Horse Ranch Creek Rd
Couser Canyon Rd

©2026, Geoscience Support Services, Inc. All rights reserved.



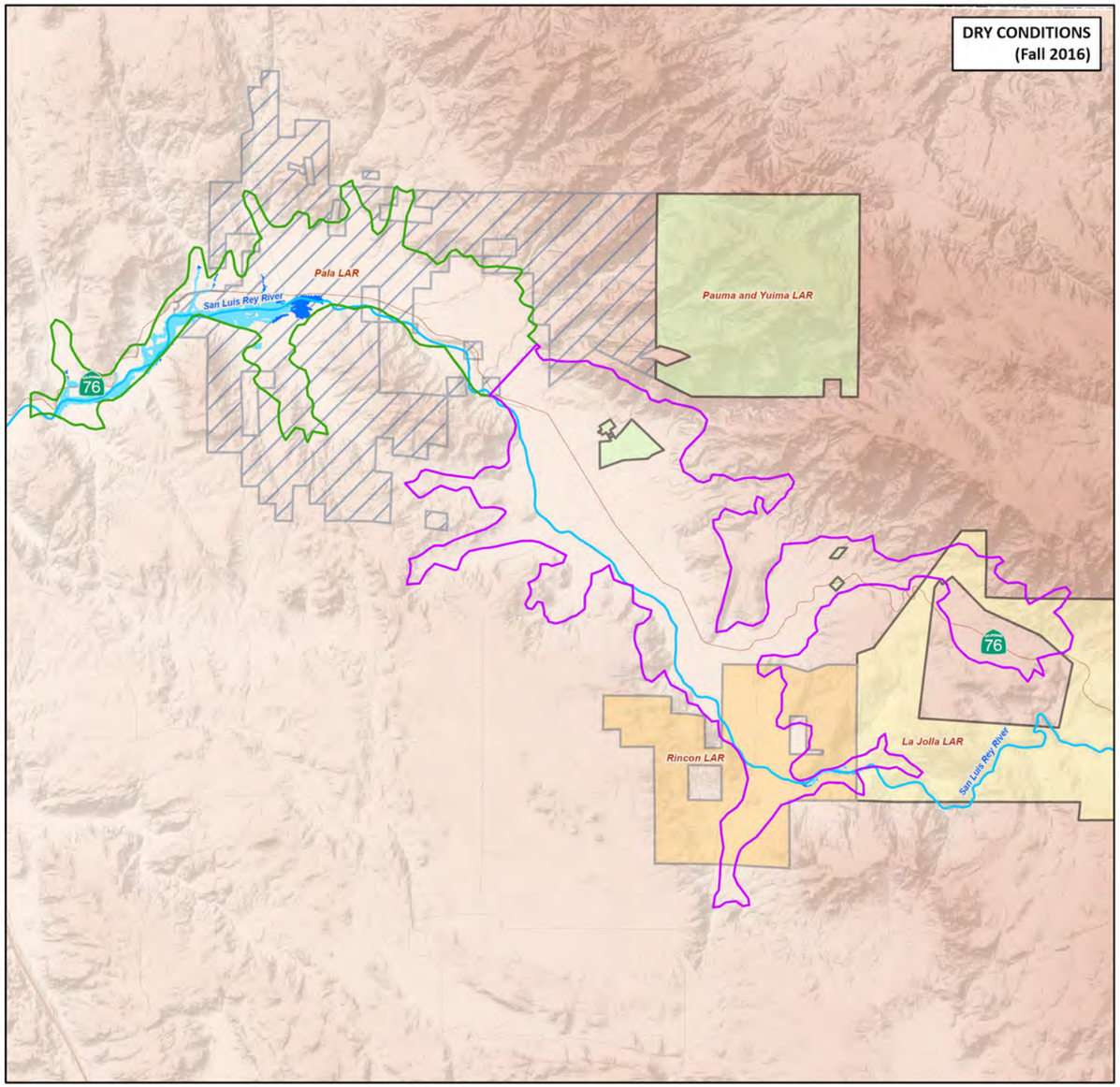


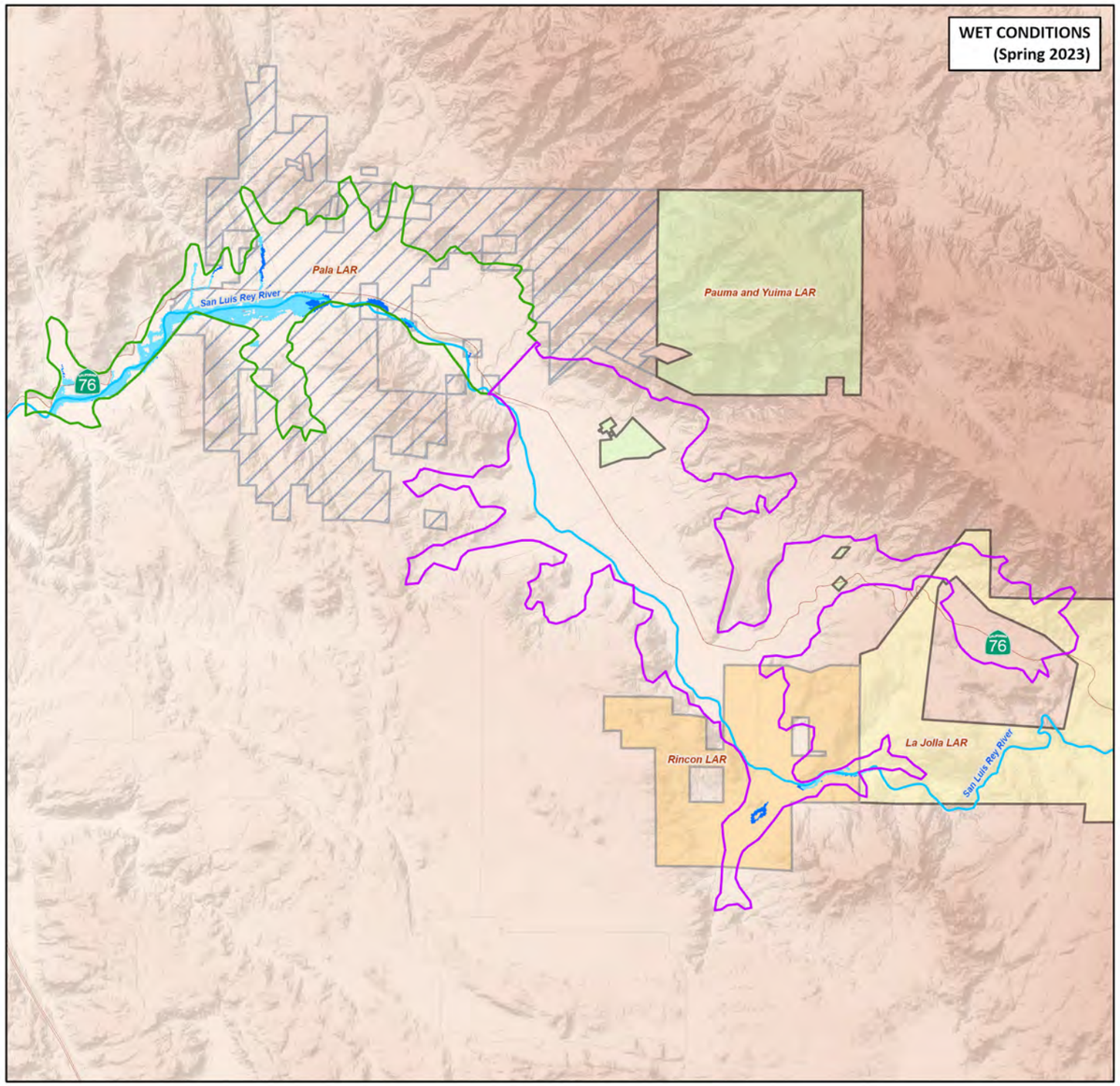
Aug-2026

STREAMFLOW FOR SAN LUIS REY RIVER AT OCEANSIDE, CA (USGS GAGE 11042000)

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.





Modeled Areas of Shallow Groundwater within
Areas of Potential Groundwater Dependent Vegetation Communities

- < 20 ft (represents extinction depth of most deep-rooted riparian vegetation (Maddock et al., 2012))
- 20 - 30 ft (30 ft represents the depth suggested by the Nature Conservancy to be used in identification of potential GDEs. Additional information needs to be collected to verify actual extent of GDEs)

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 2 4
Miles

Aug-26

AREAS OF POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEMS (GDEs)

GEOSCIENCE

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

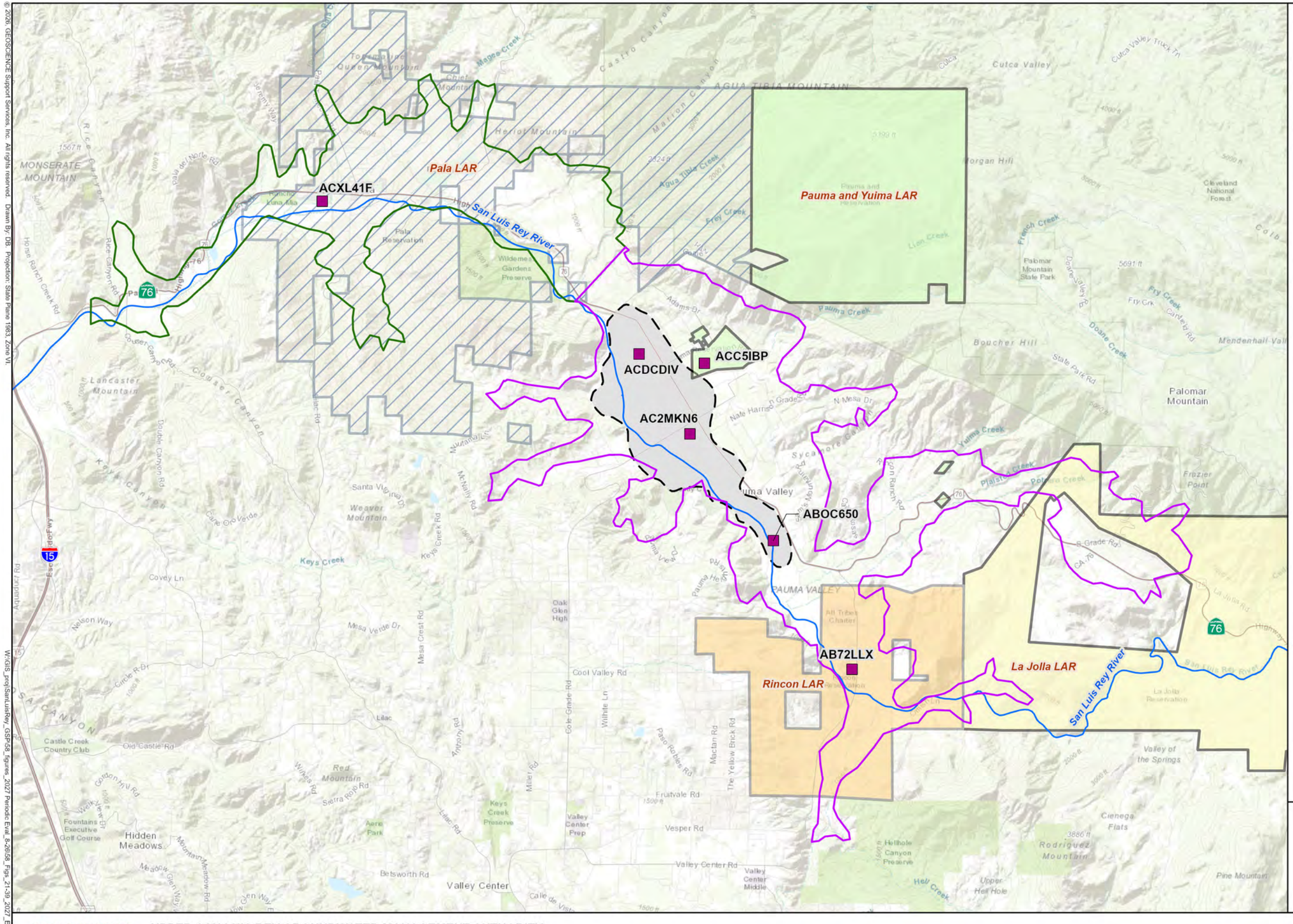
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 27

W:\GIS_proj\SanLuisRey_GSP\06_figures_2027 Periodic Eval_8-26\08_Figs_21-39_2027_Eval_8-26.aprx

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.



EXPLANATION

- Representative Monitoring Site for Land Subsidence with TRE Altamira InSAR Point ID
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)
- Paleo Lake Pauma Boundary (Howes, 1955)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

Aug-26

LAND SUBSIDENCE MONITORING NETWORK

W:\GIS_proj\SanLuisRey_GSP\08_figures_2027 Periodic Eval_8-26\08_Figs_21-39_2027_Eval_8-26.aprx

GEOSCIENCE

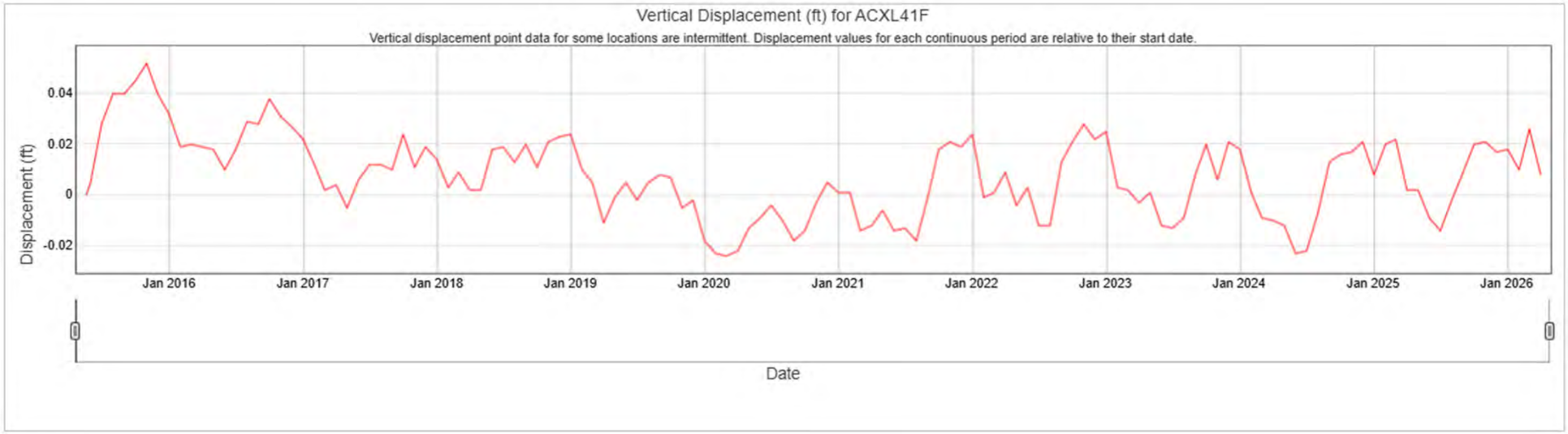
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

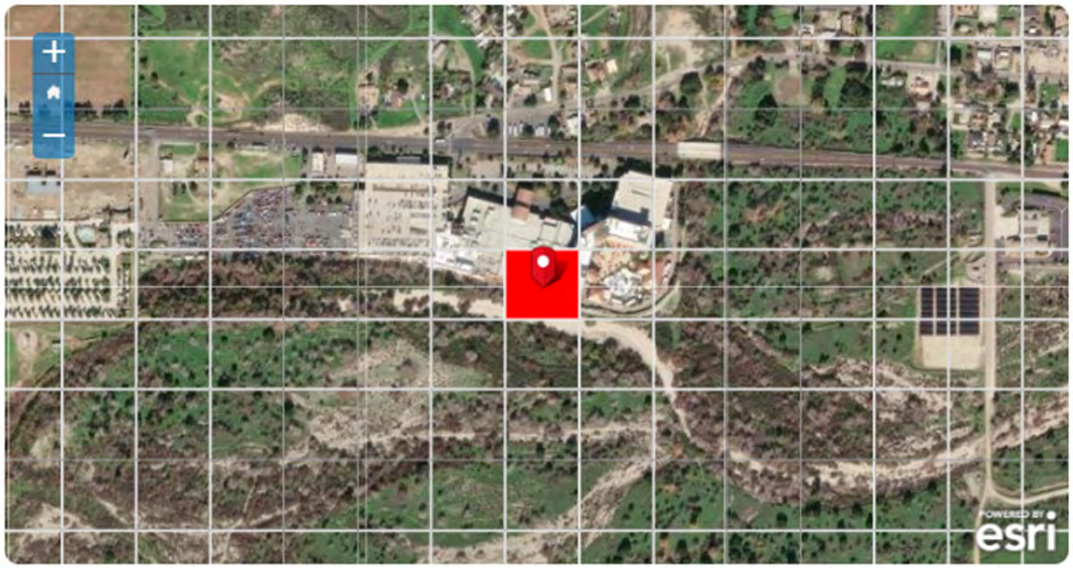
UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - 2027 PERIODIC EVALUATION

DRAFT

FIGURE 28

©2026, Geoscience Support Services, Inc. All rights reserved.





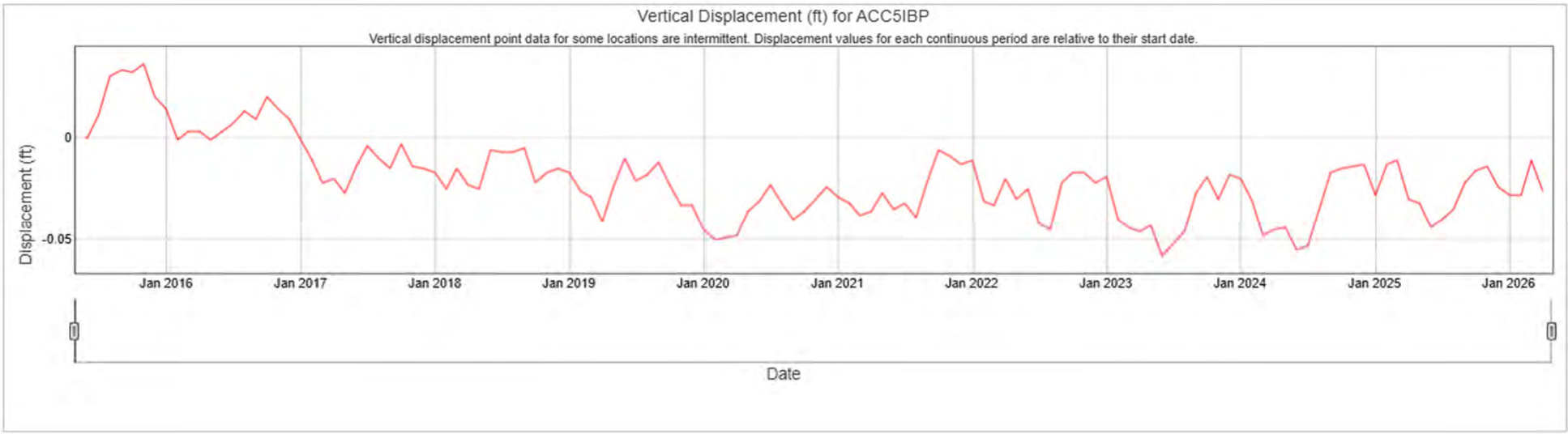
InSAR Point Code: ACXL41F
Latitude: 33.36266825
Longitude: -117.08407982

Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

Aug-2026

VERTICAL DISPLACEMENT AT PALA CASINO – InSAR POINT ACXL41F

©2026, Geoscience Support Services, Inc. All rights reserved.





InSAR Point Code: ACC5IBP

Latitude: 33.33027473

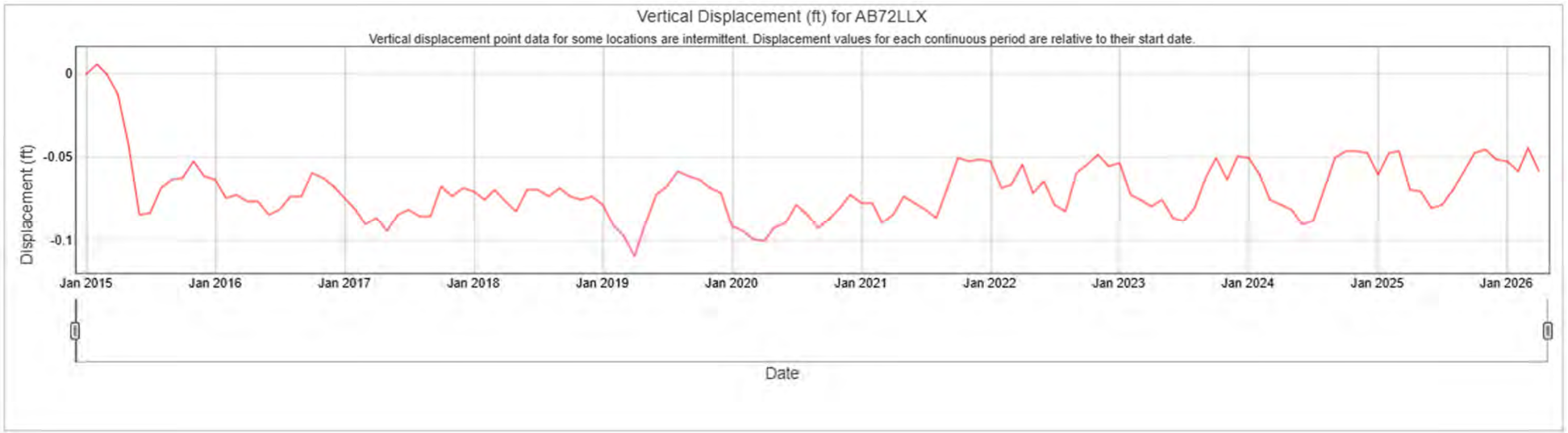
Longitude: -116.99112592

Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

Aug-2026

VERTICAL DISPLACEMENT AT CASINO PAUMA – InSAR POINT ACC5IBP

©2026 Geoscience Support Services, Inc. All rights reserved.





InSAR Point Code: AB72LLX

Latitude: 33.26818715

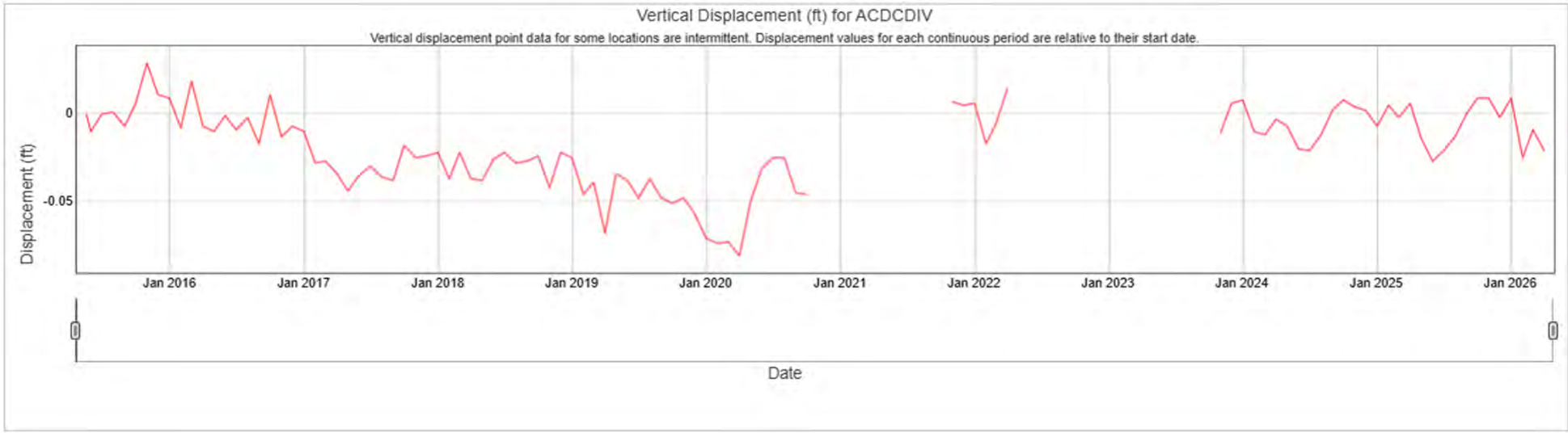
Longitude: -116.95485122

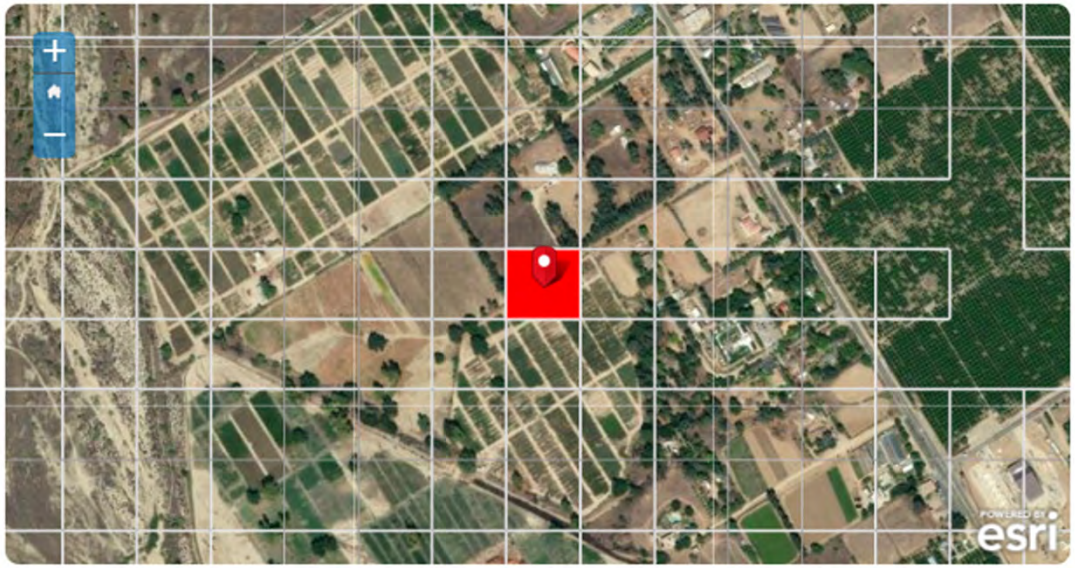
Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

Aug-2026

VERTICAL DISPLACEMENT AT HARRAH'S RESORT – InSAR POINT AB72LLX

©2026, Geoscience Support Services, Inc. All rights reserved.





InSAR Point Code: ACDCDIV
Latitude: 33.33207437
Longitude: -117.00699609

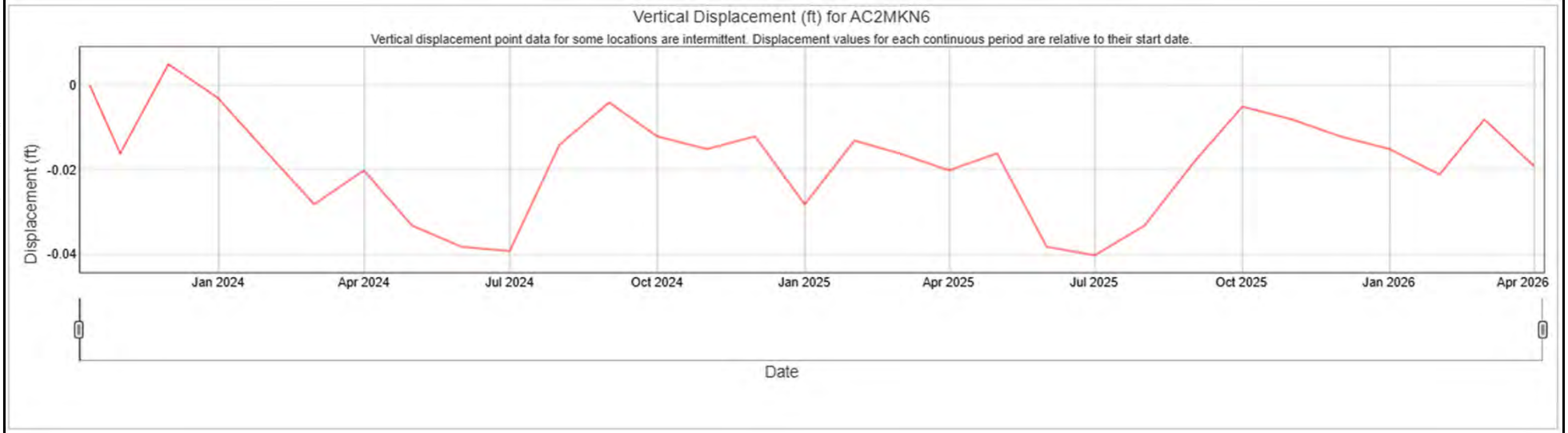
Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

Aug-2026

VERTICAL DISPLACEMENT IN PALEO LAKE PAUMA EXTENT (1 of 3) – InSAR POINT ACDCDIV

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026, Geoscience Support Services, Inc. All rights reserved.





InSAR Point Code: AC2MKN6

Latitude: 33.31587761

Longitude: -116.99452667

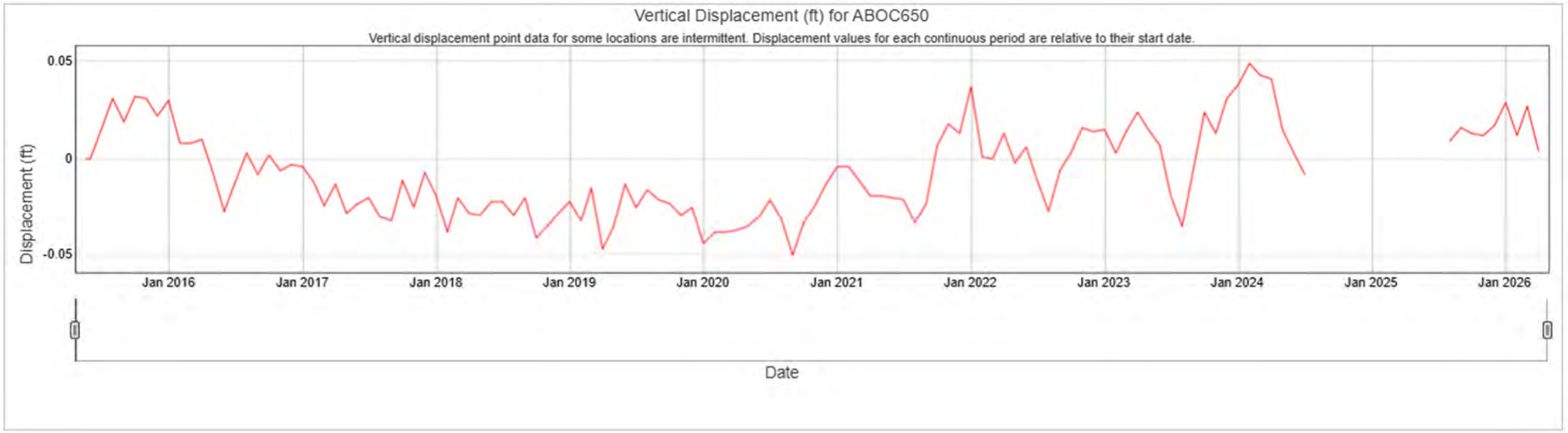
Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

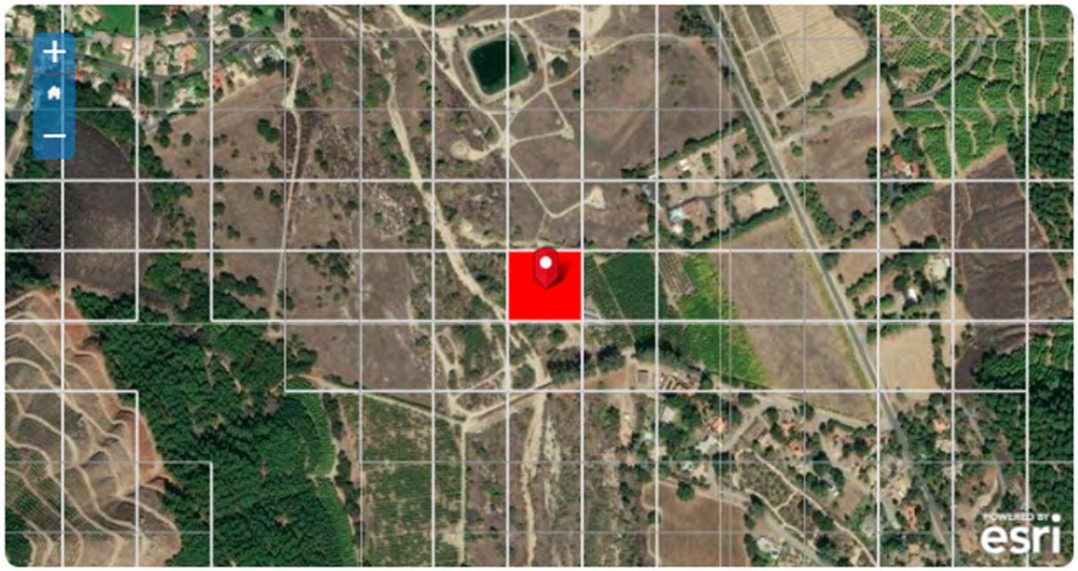
Aug-2026

VERTICAL DISPLACEMENT IN PALEO LAKE PAUMA EXTENT (2 of 3) – InSAR POINT AC2MKN6

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

©2026 Geoscience Support Services, Inc. All rights reserved.





InSAR Point Code: ABOC650

Latitude: 33.29428193

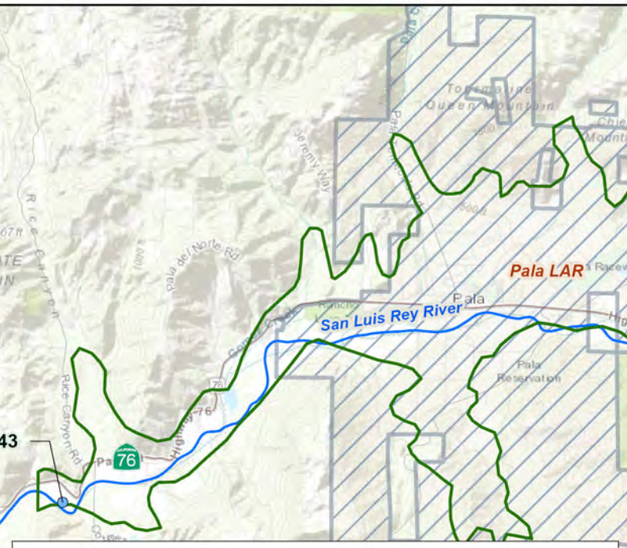
Longitude: -116.97412215

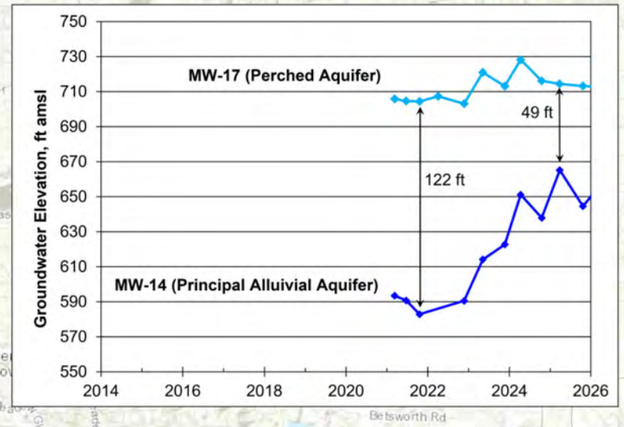
Data and images from SGMA Data Viewer: https://sgma.water.ca.gov/

Aug-2026

VERTICAL DISPLACEMENT IN PALEO LAKE PAUMA EXTENT (3 of 3) – InSAR POINT ABOC650

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.





MW-43
MW-30
MW-42
MW-29
MW-25
MW-41
MW-40
MW-39
MW-23
MW-32
MW-33
MW-38
MW-19
MW-18
MW-37
MW-21
MW-22
MW-20
MW-15
MW-12
MW-36
MW-11
MW-10
MW-9
MW-7
MW-16
MW-13
MW-35
MW-34
MW-3
MW-14
MW-17
MW-8
MW-6
MW-5
MW-31
Pala LAR
Pauma and Yuima LAR
Rincon LAR
La Jolla LAR
San Luis Rey River
PAUMA VALLEY
Valley Center
Palomar Mountain
Boucher Hill
Morgan Hill
Cutca Valley
AGUA TIBIA MOUNTAIN
MONSERATE MOUNTAIN
Pala
Pauma Creek
Frey Creek
Doane Creek
Fry Creek
Yuima Creek
Agua Tibia Creek
Castro Canyon
Marron Canyon
Magee Creek
Temecula Queen Mountain
Chief Mountain
Heriot Mountain
Pala Reservation
Wilderness Gardens Preserve
Palomar Mountain State Park
Cleveland National Forest
Cool Valley Rd
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Valley Center Prep
Valley Center Middle
Cole Grade Rd
Willhite Ln
Paso Robles Rd
Mactan Rd
The Yellow Brick Rd
Castle Creek Country Club
Fountains Executive Golf Course
Hidden Meadows
Nelson Way
Circle R Dr
SAN ONOFRE
Valley of the Springs
Cienega Flats
Rodriguez Mountain
Pine Mountain
Frazier Point
Helhole Canyon Preserve
Upper Hell Hole
Hell Creek
Mendenhall Valley
Palomar Mountain
Doane Valley Rd
French Creek
Lake Henshaw
Aguanga
Warner Springs
Julian
Escondido
Fallbrook
Temecula
Oceanside
Carlsbad
Vista
San Marcos
Encinitas
Solana Beach
Del Mar
San Diego
Chula Vista
National City
Coronado
Imperial Beach
Tijuana
Mexicali
Ensenada
Rosarito
Tecate
Palomar Observatory
Lake Wohlford
Lake Hodges
Lake Poway
Lake Murray
Lake Cuyamaca
Lake Morena
Lake Jennings
Lake Sutherland
Lake Cachuma
Lake Skinner
Lake Elsinore
Lake Perris
Lake Matthews
Lake Mathews
Lake Castaic
Lake Piru
Lake Casitas
Lake Fulmor
Lake Ramona
Lake Wildomar
Lake Temescal
Lake Vail
Lake Rancho California
Lake Rancho California
Lake Rancho California

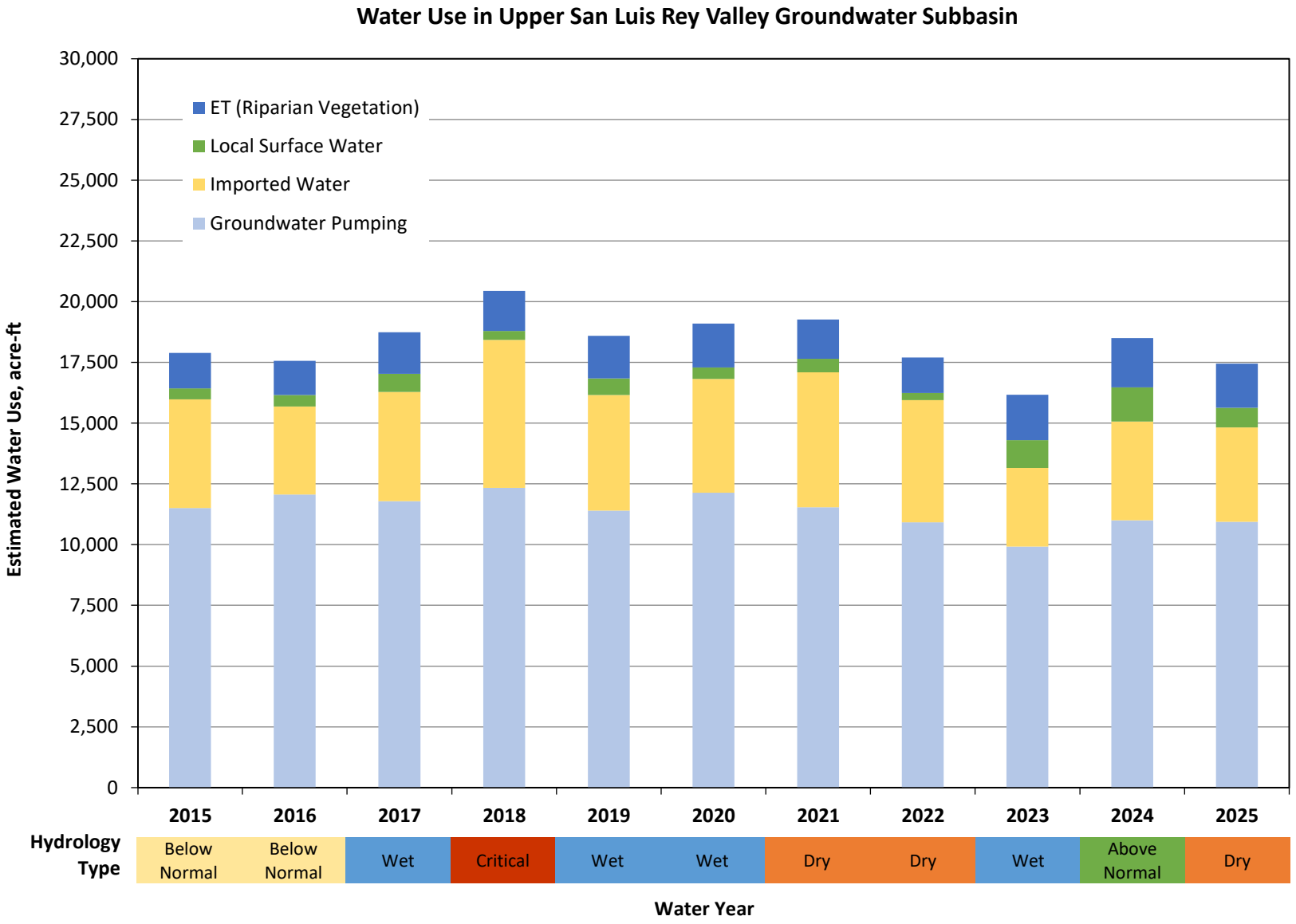
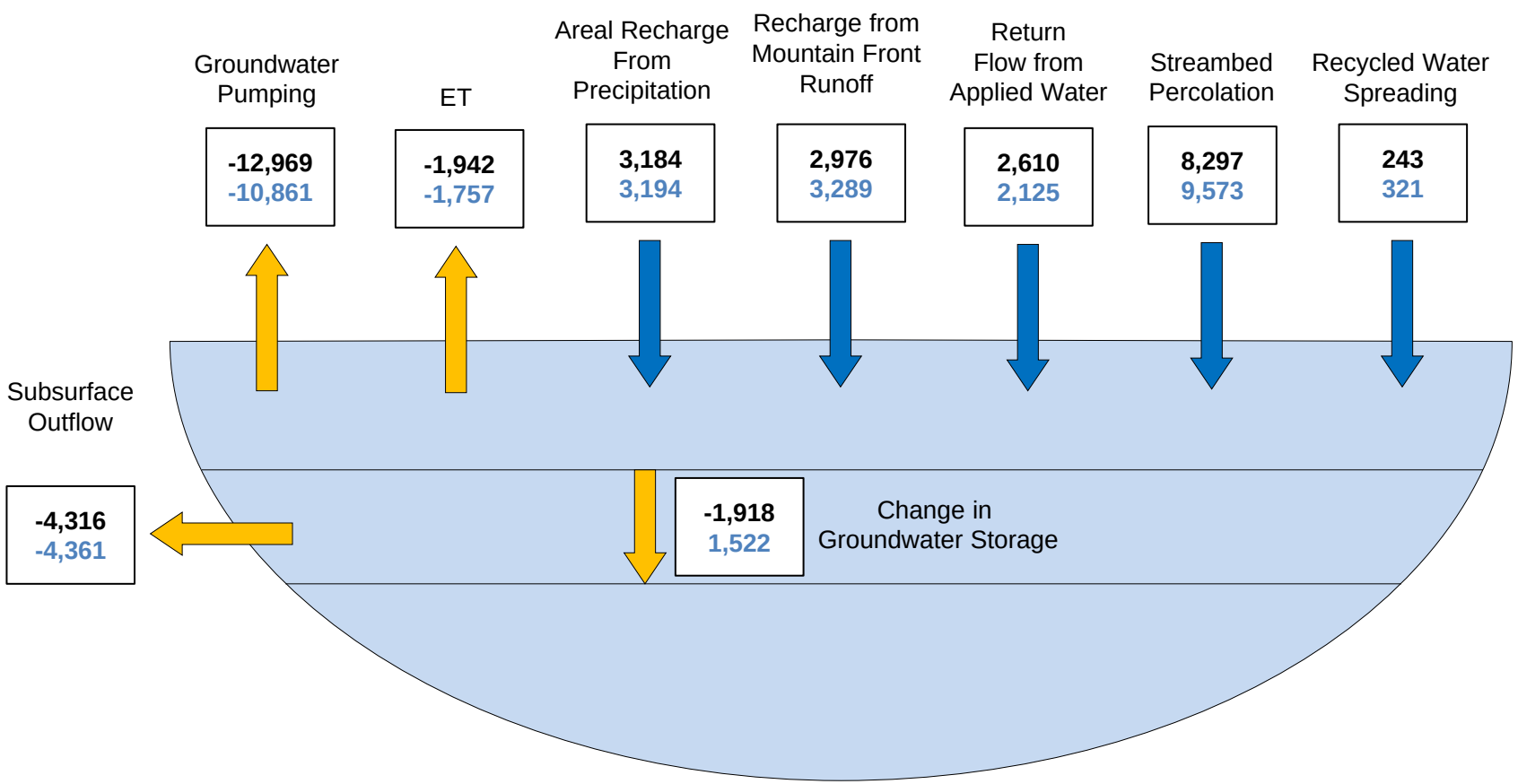

Water Use in Upper San Luis Rey Valley Groundwater Subbasin
Estimated Water Use, acre-ft
30,000
27,500
25,000
22,500
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
ET (Riparian Vegetation)
Local Surface Water
Imported Water
Groundwater Pumping
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Hydrology Type
Below Normal
Below Normal
Wet
Critical
Wet
Wet
Dry
Dry
Wet
Above Normal
Dry
Water Year

Figure 36

©2026, Geoscience Support Services, Inc. All rights reserved.



Historical (WY1992 – 2025)
Current (WY2021 – 2025)

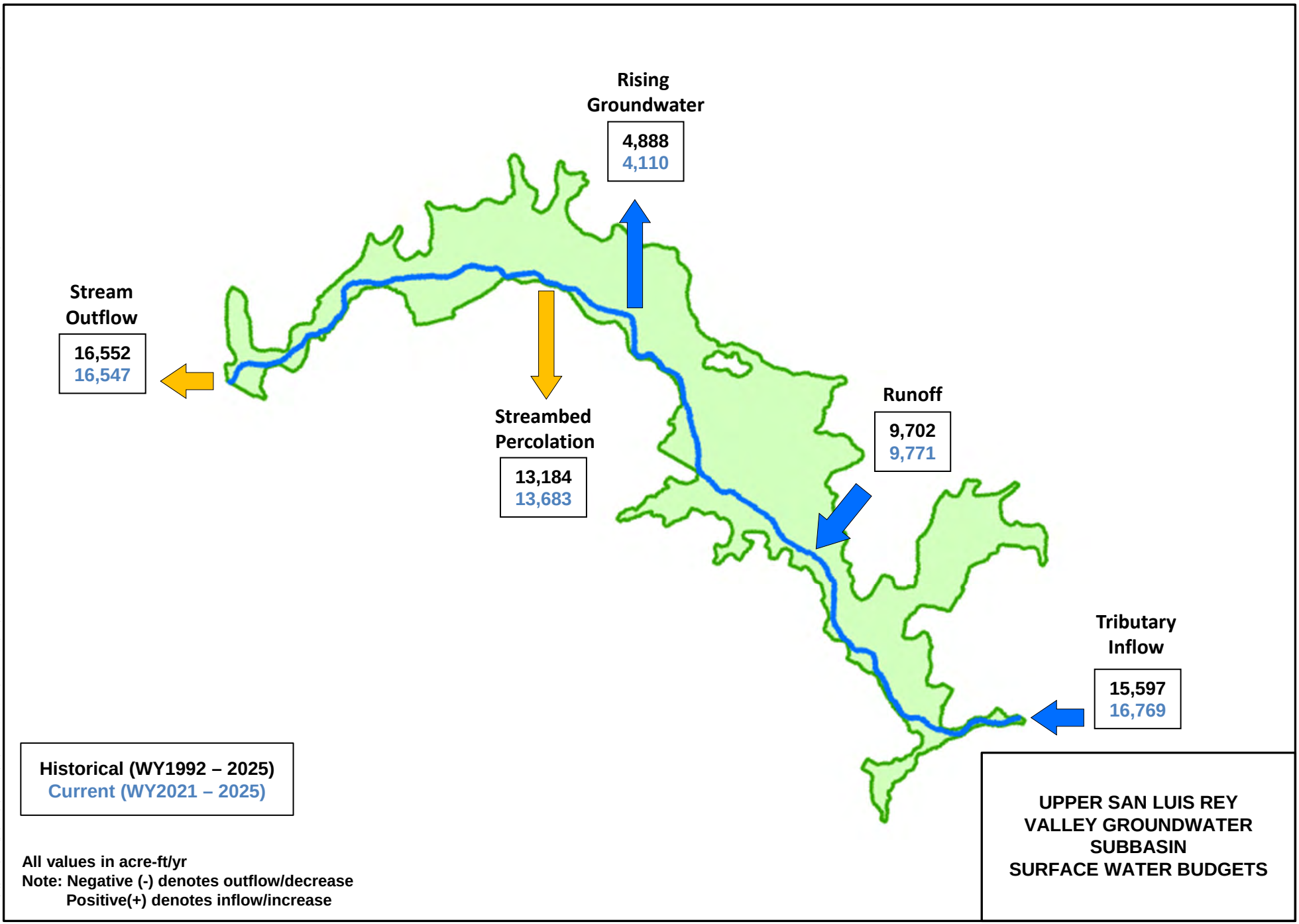
All values in acre-ft/yr
Note: Negative (-) denotes outflow/decrease
Positive(+) denotes inflow/increase

UPPER SAN LUIS REY VALLEY GROUNDWATER SUBBASIN GROUNDWATER BUDGETS

X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) Periodic Eval_Draft\Figures

Aug-26

©2026, Geoscience Support Services, Inc. All rights reserved.



X:\Projects\USLRGMA\5_2027 GSP Update\Reports\1) PeriodicEval_Draft\Figures

Aug-26

UPPER SAN LUIS REY VALLEY GROUNDWATER MANAGEMENT AUTHORITY

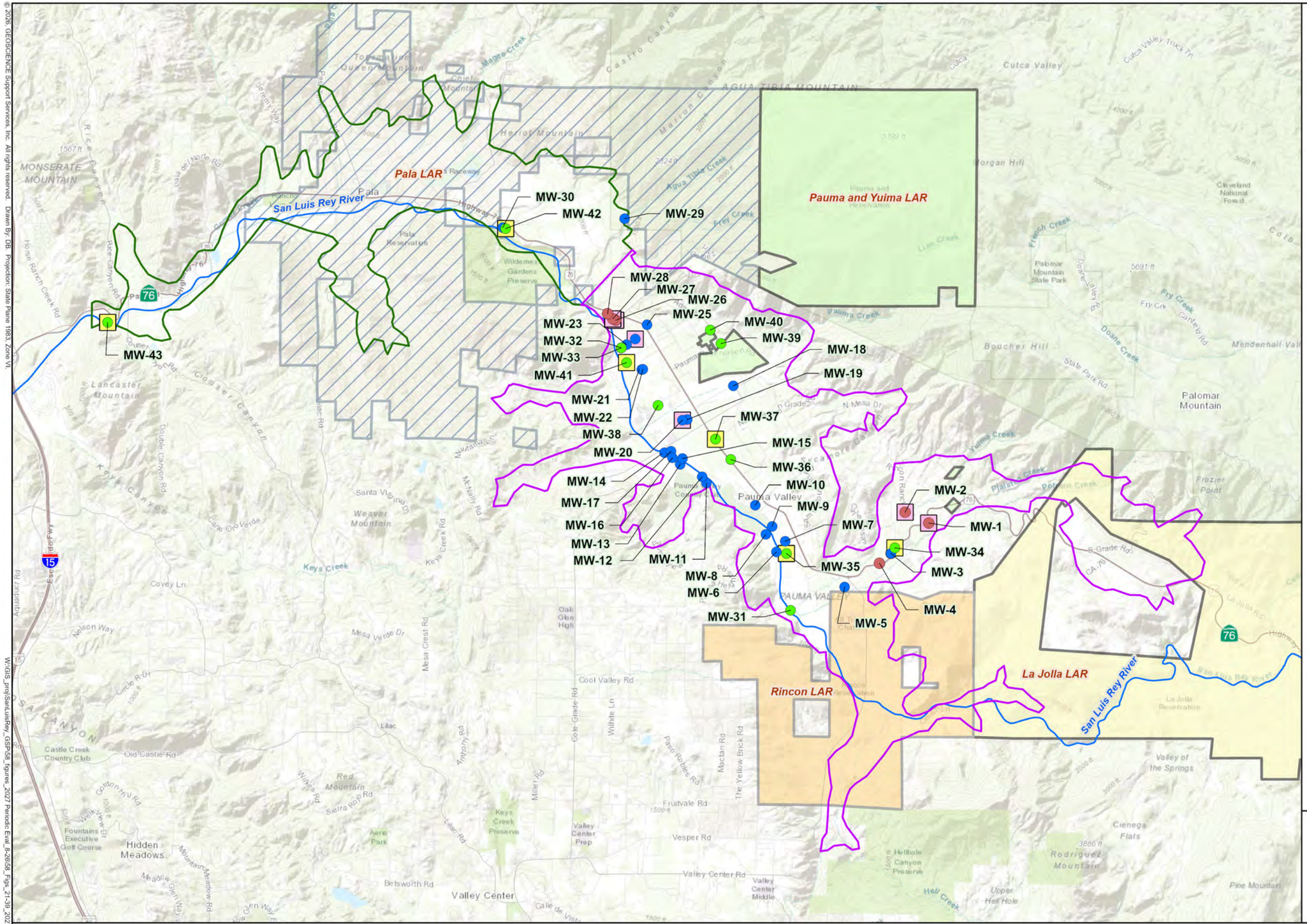
DRAFT

FIGURE 38

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN – 2027 PERIODIC EVALUATION

GEOSCIENCE

© 2026, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone VI.


MW-30
MW-42
MW-29
MW-28
MW-27
MW-26
MW-25
MW-23
MW-32
MW-33
MW-41
MW-40
MW-39
MW-18
MW-19
MW-21
MW-22
MW-38
MW-37
MW-15
MW-20
MW-36
MW-14
MW-10
MW-17
MW-9
MW-16
MW-7
MW-13
MW-12
MW-11
MW-8
MW-6
MW-35
MW-34
MW-3
MW-31
MW-4
MW-5
MW-2
MW-1
MW-43
Pala LAR
Pauma and Yuima LAR
Rincon LAR
La Jolla LAR
San Luis Rey River
Pala
Pauma Valley
PAUMA VALLEY
Valley Center
Hidden Meadows
Palomar Mountain
Boucher Hill
Morgan Hill
Monserate Mountain
Lancaster Mountain
Weaver Mountain
Red Mountain
Rodriguez Mountain
Pine Mountain
Frazier Point
Cleveland National Forest
Palomar Mountain State Park
Pala Reservation
La Jolla Reservation
Valley of the Springs
Cienega Flats
Keys Creek
Pauma Creek
Frey Creek
Agua Tibia Mountain
Cool Valley Rd
Fruitvale Rd
Vesper Rd
Valley Center Rd
Betsworth Rd
Old Castle Rd
Covey Ln
Nelson Way
Mesa Verde Dr
Circle R Dr
Lilac
Castle Creek Country Club
Fountains Executive Golf Course
Valley Center Prep
Valley Center Middle
Keys Creek Preserve
Aero Park
Oak Glen High
Pauma Valley Country Club
Wildemess Gardens Preserve
Pauma and Yuima Reservation
Pala Casino Spa & Resort
Pala Raceway
Yuima Creek
Doane Creek
Fry Crk
Mendenhall Valley
Cuca Valley
Cuca Valley Truck Tr
Agua Tibia Wilderness
Castro Canyon
Marron Canyon
Magee Creek
French Creek
Llien Creek
Pfaisch Creek
Potrero Creek
Sycamore Canyon
Double Canyon Rd
Keys Canyon
Lusardi Canyon
Rice Canyon
Couser Canyon
Horse Ranch Creek Rd
Pala del Norte Rd
Highway 76
Interstate 15
Gole Grade Rd
Wilhite Ln
Paso Robles Rd
Mission Rd
The Yellow Brick Rd
Miller Rd
Lilac Rd
Anthony Rd
Wilkes Rd
Sierra Rose Rd
Mesa Crest Rd
McNally Rd
Keys Creek Rd
Couser Canyon Rd
Rice Canyon Rd
Pala Mesa Dr
N Mesa Dr
S Grade Rd
N Grade Rd
Palomar Mountain State Park Rd
Doane Valley Rd
Fry Creek Rd
Pauma Valley Dr
Sycamore Canyon Rd
Yuima Rd
Pfaisch Rd
Potrero Rd
Sun Valley Rd
Pauma Heights Rd
Old Highway 395
Aguanga
Anza-Borrego Desert
SAN DIEGUITO
SAN DIEGO
SAN LUIS REY
SAN DIEGO
SAN DIEGO
SAN DIEGO

TABLES

DRAFT
Table 1

Upper San Luis Rey Valley Groundwater Subbasin Annual Groundwater Budget (WY 1992 - 2025)

Water Year	Areal Recharge from Precipitation	Recharge from Mountain Front Runoff	Return Flow from Applied Water	Streambed Percolation	Recycled Water Spreading	Total Inflow	Groundwater Pumping	Evapotranspiration	Subsurface Outflow	Total Outflow	Change in Groundwater Storage	Cumulative Change in Storage
	acre-ft						acre-ft				acre-ft	
1992	2,362	2,141	2,907	6,719	154	14,282	14,733	2,281	4,087	21,102	-6,819	-6,819
1993	10,197	8,660	2,915	9,400	159	31,331	14,989	3,093	4,991	23,074	8,258	1,438
1994	2,375	2,300	2,916	4,867	165	12,622	14,566	2,689	4,204	21,458	-8,836	-7,397
1995	6,736	5,764	2,916	6,749	170	22,335	14,601	2,826	4,596	22,023	312	-7,085
1996	2,027	2,048	2,935	5,894	175	13,079	14,486	2,488	4,143	21,116	-8,038	-15,123
1997	2,196	2,069	2,973	6,974	181	14,393	14,562	2,227	4,112	20,901	-6,508	-21,631
1998	6,550	5,565	2,937	9,167	186	24,405	14,526	2,450	4,497	21,472	2,933	-18,698
1999	1,246	1,615	2,930	5,335	191	11,317	14,328	2,170	4,077	20,575	-9,258	-27,955
2000	1,711	1,531	3,002	6,607	197	13,048	14,702	1,914	3,998	20,613	-7,566	-35,521
2001	1,960	1,737	2,799	7,117	202	13,816	13,546	1,876	4,175	19,597	-5,781	-41,302
2002	885	873	2,772	3,332	208	8,069	13,260	1,693	4,112	19,065	-10,996	-52,298
2003	2,963	2,395	2,736	9,871	213	18,178	12,816	1,725	4,261	18,802	-625	-52,923
2004	1,493	1,275	2,722	7,153	218	12,861	12,631	1,669	4,130	18,430	-5,569	-58,492
2005	10,602	8,996	2,604	13,204	224	35,630	12,497	2,168	4,976	19,641	15,988	-42,504
2006	2,470	2,478	2,700	7,254	229	15,131	13,164	2,098	4,386	19,648	-4,516	-47,020
2007	841	784	2,821	2,555	234	7,235	13,662	1,766	4,166	19,594	-12,359	-59,379
2008	1,811	2,039	2,735	7,598	240	14,423	12,862	1,681	4,209	18,753	-4,330	-63,709
2009	2,961	2,409	2,825	9,798	245	18,237	13,594	1,721	4,251	19,565	-1,328	-65,037
2010	3,463	3,442	2,541	10,786	251	20,483	12,957	1,796	4,359	19,113	1,371	-63,666
2011	5,867	5,602	2,441	11,587	256	25,752	12,867	1,998	4,663	19,527	6,225	-57,441
2012	1,817	1,906	2,502	7,773	261	14,260	13,222	1,897	4,278	19,397	-5,137	-62,578
2013	1,211	1,174	2,609	5,850	267	11,111	14,020	1,693	4,171	19,885	-8,773	-71,351
2014	1,238	1,088	2,534	6,986	272	12,118	12,806	1,541	4,109	18,455	-6,337	-77,688
2015	1,391	1,252	2,372	8,140	278	13,432	11,509	1,454	4,093	17,055	-3,623	-81,311
2016	1,500	1,415	2,486	9,357	283	15,041	12,065	1,410	4,111	17,586	-2,545	-83,856
2017	5,893	5,556	2,365	14,409	288	28,512	11,792	1,709	4,617	18,119	10,393	-73,463
2018	1,281	1,214	2,426	7,447	294	12,662	12,334	1,649	4,181	18,164	-5,502	-78,966
2019	4,324	4,337	2,321	12,324	299	23,606	11,402	1,759	4,513	17,673	5,933	-73,033
2020	2,913	3,083	2,359	9,959	304	18,619	12,135	1,809	4,477	18,421	197	-72,836
2021	1,008	1,074	2,242	5,257	310	9,891	11,541	1,616	4,191	17,349	-7,458	-80,294
2022	1,499	1,408	2,176	8,548	315	13,946	10,913	1,467	4,130	16,510	-2,564	-82,858
2023	9,238	8,322	1,999	15,539	321	35,419	9,915	1,865	4,825	16,605	18,814	-64,043
2024	2,990	3,747	2,099	10,614	326	19,777	11,003	2,021	4,469	17,493	2,284	-61,759
2025	1,232	1,893	2,110	7,909	331	13,475	10,935	1,816	4,188	16,940	-3,465	-65,224
Average 1992 to 2025	**3,184**	**2,976**	**2,610**	**8,297**	**243**	**17,309**	**12,969**	**1,942**	**4,316**	**19,227**	**-1,918**	
Average 2021 to 2025	**3,194**	**3,289**	**2,125**	**9,573**	**321**	**18,502**	**10,861**	**1,757**	**4,361**	**16,979**	**1,522**	

DRAFT
Table 2

Upper San Luis Rey Valley Groundwater Subbasin Annual Groundwater Budget (WY 2026 - 2075)

Water Year	Areal Recharge from Precipitation	Recharge from Mountain Front Runoff	Return Flow from Applied Water	Streambed Percolation	Recycled Water Spreading	Total Inflow	Groundwater Pumping	Evapotranspiration	Subsurface Outflow	Total Outflow	Change in Groundwater Storage	Cumulative Change in Storage
	acre-ft						acre-ft				acre-ft	
2026	2,362	2,141	2,361	9,434	321	16,619	10,878	1,777	4,267	16,922	-303	-303
2027	10,197	8,660	2,361	16,565	321	38,104	11,517	2,416	5,101	19,035	19,069	18,766
2028	2,375	2,300	2,361	6,923	321	14,280	11,481	2,194	4,354	18,029	-3,749	15,016
2029	6,736	5,764	2,361	9,279	321	24,461	11,537	2,341	4,736	18,614	5,848	20,864
2030	2,027	2,048	2,361	6,929	321	13,685	11,424	2,157	4,301	17,882	-4,197	16,667
2031	2,196	2,069	2,361	7,563	321	14,510	11,283	2,012	4,277	17,572	-3,062	13,605
2032	6,550	5,565	2,361	9,952	321	24,750	11,396	2,207	4,646	18,249	6,501	20,106
2033	1,246	1,615	2,361	5,562	321	11,105	11,341	1,988	4,246	17,575	-6,470	13,636
2034	1,711	1,531	2,361	6,729	321	12,652	11,130	1,825	4,170	17,125	-4,473	9,163
2035	1,960	1,737	2,361	7,540	321	13,919	11,011	1,793	4,238	17,041	-3,122	6,041
2036	885	873	2,361	3,767	321	8,206	10,842	1,626	4,125	16,593	-8,387	-2,346
2037	2,963	2,395	2,361	10,379	321	18,419	10,772	1,664	4,276	16,711	1,708	-638
2038	1,493	1,275	2,361	7,533	321	12,983	10,759	1,603	4,143	16,506	-3,523	-4,161
2039	10,602	8,996	2,361	13,799	321	36,079	11,409	2,119	4,993	18,521	17,558	13,398
2040	2,470	2,478	2,361	7,597	321	15,227	11,355	2,071	4,408	17,835	-2,608	10,790
2041	841	784	2,361	2,764	321	7,071	11,062	1,744	4,185	16,992	-9,921	869
2042	1,811	2,039	2,361	7,740	321	14,272	10,863	1,668	4,229	16,760	-2,488	-1,619
2043	2,961	2,409	2,361	9,899	321	17,951	10,868	1,716	4,270	16,853	1,097	-522
2044	3,463	3,442	2,186	10,725	321	20,136	10,939	1,814	4,382	17,135	3,000	2,479
2045	5,867	5,602	2,125	11,391	321	25,306	11,241	2,037	4,667	17,946	7,360	9,839
2046	1,817	1,906	2,125	7,703	321	13,872	11,157	1,928	4,269	17,354	-3,482	6,357
2047	1,211	1,174	2,125	5,784	321	10,614	10,929	1,710	4,160	16,798	-6,184	173
2048	1,238	1,088	2,125	6,830	321	11,601	10,780	1,577	4,102	16,458	-4,857	-4,683
2049	1,391	1,252	2,125	7,843	321	12,931	10,663	1,516	4,095	16,274	-3,342	-8,026
2050	1,500	1,415	2,125	8,968	321	14,329	10,630	1,490	4,117	16,237	-1,908	-9,933
2051	5,893	5,556	2,125	13,757	321	27,652	10,919	1,790	4,620	17,329	10,322	389
2052	1,281	1,214	2,125	6,989	321	11,930	10,895	1,720	4,184	16,799	-4,869	-4,480
2053	4,324	4,337	2,125	11,735	321	22,842	10,950	1,835	4,515	17,299	5,542	1,062
2054	2,913	3,083	2,125	9,438	321	17,879	10,998	1,877	4,478	17,354	525	1,587
2055	1,008	1,074	2,125	4,877	321	9,405	10,876	1,681	4,198	16,755	-7,350	-5,763
2056	1,499	1,408	2,125	8,078	321	13,431	10,724	1,559	4,147	16,430	-2,999	-8,761
2057	9,238	8,322	2,125	14,626	321	34,632	11,222	1,985	4,838	18,046	16,586	7,825
2058	2,990	3,747	2,125	9,816	321	19,000	11,365	2,103	4,481	17,949	1,050	8,875
2059	1,232	1,893	2,125	7,612	321	13,183	11,180	1,877	4,197	17,253	-4,071	4,804
2060	2,362	2,141	2,361	9,092	321	16,277	11,047	1,829	4,275	17,151	-874	3,930
2061	10,197	8,660	2,361	15,756	321	37,296	11,622	2,542	5,107	19,271	18,024	21,954
2062	2,375	2,300	2,361	6,669	321	14,025	11,554	2,285	4,358	18,198	-4,172	17,782
2063	6,736	5,764	2,361	9,001	321	24,183	11,605	2,429	4,738	18,772	5,411	23,193

DRAFT
Table 2

Upper San Luis Rey Valley Groundwater Subbasin Annual Groundwater Budget (WY 2026 - 2075)

Water Year	Areal Recharge from Precipitation	Recharge from Mountain Front Runoff	Return Flow from Applied Water	Streambed Percolation	Recycled Water Spreading	Total Inflow	Groundwater Pumping	Evapotranspiration	Subsurface Outflow	Total Outflow	Change in Groundwater Storage	Cumulative Change in Storage
	acre-ft						acre-ft				acre-ft	
2064	2,027	2,048	2,361	6,763	321	13,519	11,482	2,224	4,304	18,011	-4,492	18,701
2065	2,196	2,069	2,361	7,421	321	14,368	11,339	2,042	4,280	17,661	-3,293	15,408
2066	6,550	5,565	2,361	9,779	321	24,576	11,449	2,252	4,648	18,350	6,226	21,634
2067	1,246	1,615	2,361	5,483	321	11,026	11,383	2,018	4,247	17,648	-6,622	15,012
2068	1,711	1,531	2,361	6,661	321	12,585	11,180	1,840	4,172	17,191	-4,606	10,406
2069	1,960	1,737	2,361	7,467	321	13,846	11,067	1,806	4,239	17,112	-3,266	7,140
2070	885	873	2,361	3,712	321	8,151	10,891	1,635	4,127	16,653	-8,502	-1,362
2071	2,963	2,395	2,361	10,313	321	18,353	10,823	1,673	4,277	16,773	1,580	218
2072	1,493	1,275	2,361	7,487	321	12,937	10,804	1,612	4,145	16,561	-3,624	-3,406
2073	10,602	8,996	2,361	13,707	321	35,988	11,447	2,128	4,994	18,569	17,419	14,013
2074	2,470	2,478	2,361	7,556	321	15,187	11,385	2,076	4,408	17,869	-2,682	11,330
2075	841	784	2,361	2,750	321	7,057	11,089	1,747	4,185	17,021	-9,964	1,366
Average 2026 to 2075	**3,297**	**3,028**	**2,287**	**8,515**	**321**	**17,448**	**11,131**	**1,911**	**4,378**	**17,421**	**27**	

Upper San Luis Rey Valley Annual Watershed Budget (WY 1992-2025)

Water Year	Inflow				Outflow					Soil Storage Change
	Precipitation	Agriculture Irrigation Application	Urban Irrigation Application	Henshaw Dam Release	ET	Stream Out (Reach 81)	Streambed Percolation	Diversion	Deep Percolation	
1991	255,635	55,623	5,536	12,777	248,123	3,350	33,542	11,335	10,741	22,481
1992	231,361	54,731	5,453	11,921	251,012	1,692	26,145	10,365	7,309	6,943
1993	446,082	54,781	5,465	49,612	315,171	81,009	99,433	21,389	34,541	4,398
1994	185,152	55,493	5,528	17,039	232,072	1,287	29,467	16,006	6,418	-22,038
1995	372,953	53,350	5,314	16,088	306,329	14,967	68,999	16,845	21,486	19,080
1996	144,862	56,960	5,673	21,558	201,554	1,112	26,636	17,965	5,016	-23,231
1997	193,728	55,894	5,573	14,506	215,168	1,379	25,593	11,028	6,424	10,109
1998	382,320	51,133	5,102	15,244	324,169	4,657	66,134	16,940	21,616	20,282
1999	113,375	54,811	5,455	17,361	180,635	995	21,291	13,040	2,828	-27,787
2000	144,140	55,625	5,547	11,563	176,608	716	18,906	8,824	4,805	7,016
2001	151,338	53,921	5,958	9,955	188,844	1,334	21,706	8,788	5,396	-4,896
2002	69,736	55,523	6,237	6,717	128,763	632	11,538	4,214	1,918	-8,853
2003	233,201	53,825	6,031	5,309	233,171	1,458	29,458	5,119	8,474	20,685
2004	115,936	55,114	6,187	4,737	175,219	856	16,848	3,705	3,445	-18,101
2005	457,292	51,607	5,794	10,492	313,920	19,472	109,225	14,948	31,805	35,817
2006	173,496	53,762	6,035	16,333	221,449	1,798	31,832	14,089	6,213	-25,755
2007	74,655	55,128	6,188	4,044	134,377	822	10,473	2,701	1,940	-10,298
2008	173,954	55,946	6,272	14,187	200,378	1,357	23,610	12,804	6,501	5,709
2009	180,133	55,807	6,261	8,073	199,560	1,587	30,299	8,249	7,663	2,917
2010	245,454	54,415	6,107	12,900	246,347	1,781	42,086	12,840	11,285	4,537
2011	316,787	49,244	9,506	12,747	274,301	5,319	69,793	14,507	18,232	6,131
2012	169,121	49,574	10,229	8,234	207,476	1,288	24,530	7,459	4,983	-8,578
2013	116,422	50,298	10,364	4,794	160,003	865	15,307	3,973	3,253	-1,524
2014	116,368	50,447	10,395	3,290	164,696	808	14,344	2,493	3,226	-5,066
2015	146,203	50,074	10,311	3,783	173,802	801	16,192	2,913	3,814	12,850
2016	137,719	50,205	10,348	3,209	179,897	1,007	18,196	3,083	4,308	-5,009
2017	303,344	50,290	10,365	8,567	253,493	8,693	68,975	9,844	18,493	13,068
2018	88,807	51,451	10,607	2,139	153,688	1,036	16,710	2,473	3,012	-23,916
2019	295,756	48,084	9,920	10,317	258,409	9,301	52,992	11,223	14,092	18,059
2020	230,727	48,933	10,099	3,056	242,683	3,006	37,573	5,406	10,261	-6,113
2021	113,732	49,206	11,257	3,553	161,490	1,107	14,436	2,578	2,635	-4,498
2022	142,135	48,605	11,316	4,656	182,019	1,210	18,616	2,776	4,028	-1,938
2023	446,707	46,324	10,798	5,852	296,577	17,009	104,291	11,700	29,681	50,422
2024	203,480	47,310	11,018	10,781	258,147	2,003	49,108	1,354	8,449	-46,472
2025	113,956	49,052	11,398	9,197	156,315	1,007	24,734	98	3,125	-1,676

Historical Conditions WY 1992 - 2025	**206,777**	**52,262**	**7,886**	**10,642**	**216,698**	**5,687**	**36,926**	**8,875**	**9,608**	**-227**
Current Conditions WY 2021 - 2025	**204,002**	**48,099**	**11,157**	**6,808**	**210,910**	**4,467**	**42,237**	**3,701**	**9,584**	**-832**

DRAFT
Table 4

Upper San Luis Rey Valley Groundwater Subbasin Annual Surface Water System Budget
(WY 2026 - 2075)

Water Year	Tributary Inflow	Surface Runoff	Rising Groundwater	Total Inflow	Streambed Percolation	Surface Outflow	Total Outflow
	acre-ft				acre-ft		
2026	8,075	7,025	3,994	19,094	13,429	5,665	19,094
2027	108,422	27,858	8,169	144,449	24,734	119,713	144,446
2028	8,546	8,086	6,601	23,233	13,523	9,710	23,233
2029	36,143	16,370	7,189	59,703	16,469	43,235	59,704
2030	7,411	6,978	6,279	20,669	13,208	7,461	20,669
2031	7,545	6,604	5,306	19,455	12,869	6,586	19,455
2032	26,808	14,766	6,375	47,949	16,327	31,622	47,949
2033	5,631	4,825	5,490	15,946	11,052	4,894	15,946
2034	5,211	5,200	4,168	14,580	10,897	3,683	14,580
2035	5,100	6,692	4,048	15,841	11,589	4,252	15,841
2036	2,172	3,722	3,162	9,056	6,929	2,127	9,056
2037	8,343	8,912	3,077	20,332	13,457	6,876	20,332
2038	3,731	5,882	2,912	12,526	10,445	2,080	12,526
2039	51,761	26,891	6,538	85,191	20,337	64,849	85,186
2040	7,445	8,954	5,879	22,278	13,475	8,803	22,278
2041	2,186	3,636	3,981	9,803	6,745	3,058	9,803
2042	5,631	5,995	3,372	14,999	11,112	3,886	14,999
2043	8,480	8,821	3,520	20,820	13,420	7,401	20,821
2044	12,580	11,198	4,296	28,074	15,020	13,052	28,073
2045	24,946	16,813	5,751	47,509	17,143	30,367	47,510
2046	5,690	7,221	4,930	17,841	12,633	5,208	17,842
2047	3,404	5,158	3,766	12,328	9,549	2,778	12,328
2048	3,551	5,149	2,712	11,413	9,542	1,870	11,413
2049	3,842	5,519	2,401	11,762	10,244	1,518	11,762
2050	4,412	6,155	2,304	12,871	11,272	1,599	12,871
2051	28,307	17,593	4,185	50,085	17,942	32,146	50,088
2052	3,989	6,125	3,821	13,935	10,809	3,125	13,935
2053	22,853	13,043	4,440	40,337	16,175	24,162	40,337
2054	11,041	9,807	4,869	25,717	14,307	11,410	25,717
2055	3,665	4,086	3,653	11,404	8,530	2,874	11,404
2056	5,335	5,186	2,757	13,278	10,835	2,442	13,277
2057	50,615	24,390	5,364	80,369	19,989	60,387	80,376
2058	15,279	10,475	6,166	31,920	15,982	15,937	31,919
2059	6,860	4,719	4,750	16,329	12,362	3,966	16,329
2060	8,075	7,025	4,308	19,407	13,400	6,008	19,407
2061	108,422	27,858	8,604	144,884	24,360	120,522	144,882
2062	8,546	8,086	6,829	23,462	13,498	9,964	23,462
2063	36,143	16,370	7,406	59,919	16,407	43,512	59,919
2064	7,411	6,978	6,439	20,829	13,202	7,627	20,829

DRAFT
Table 4

Upper San Luis Rey Valley Groundwater Subbasin Annual Surface Water System Budget
(WY 2026 - 2075)

Water Year	Tributary Inflow	Surface Runoff	Rising Groundwater	Total Inflow	Streambed Percolation	Surface Outflow	Total Outflow
	acre-ft				acre-ft		
2065	7,545	6,604	5,441	19,590	12,863	6,728	19,591
2066	26,808	14,766	6,499	48,073	16,277	31,796	48,073
2067	5,631	4,825	5,583	16,039	11,066	4,973	16,039
2068	5,211	5,200	4,227	14,639	10,888	3,750	14,639
2069	5,100	6,692	4,114	15,906	11,581	4,325	15,906
2070	2,172	3,722	3,226	9,119	6,938	2,181	9,119
2071	8,343	8,912	3,130	20,385	13,443	6,942	20,385
2072	3,731	5,882	2,966	12,579	10,453	2,126	12,579
2073	51,761	26,891	6,603	85,256	20,310	64,947	85,257
2074	7,445	8,954	5,915	22,315	13,471	8,844	22,315
2075	2,186	3,636	3,995	9,817	6,745	3,072	9,817
Average 2026 to 2075	**16,191**	**9,845**	**4,830**	**30,866**	**13,345**	**17,521**	**30,866**