County of Monterey

Saffron Room
1441 Schilling Place
Salinas, Ca. 93901

Meeting Agenda

Wednesday, November 6, 2024

8:30 AM

Water Resources Agency Basin Management Advisory Committee

.

.

John Baillie Chair
Deidre Sullivan
Matthew Simis
David Bunn
Kevin Piearcy
Patrick Breen
Marc Kelley
Richard Ortiz

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https://montereycty.zoom.us/j/99621772720
OR to participate by phone call any of these numbers below: +1 669 900 6833 US (San Jose)
+1 346 248 7799 US (Houston)
+1 312 626 6799 US (Chicago)
+1 929 205 6099 US (New York)
+1 253 215 8782 US +1 301 715 8592 US

Enter this Meeting ID number: 996 2177 2720 PASSWORD: 478310 when prompted. Please note there is no Participant Code, you will just hit # again after the recording prompts you. You will be placed in the meeting as an attendee; when you are ready to make a public comment, if joined by computer audio, please Raise your Hand; and by phone, please push *9 on your keypad.

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(i.e. Basin Management Advisory Committee) and item number (i.e. Item No. 10). Every effort will be made to read your comment into the record, but some comments may not be read due to time limitations. Comments received after an agenda item will be made part of the record if received prior to the end of the meeting.

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9. The Chair and/or Secretary may set reasonable rules as needed to conduct the meeting in an orderly manner.

PARA PARTICIPAR EN LA REUNIÓN DEL COMITE DE ASESOR DE GESTION DE LA CUENCA A TRAVES DE LOS SIGUIENTES METODOS:

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5. Los miembros del público que deseen hacer un comentario público general para temas que no están en la agenda del día o que deseen comentar en un artículo específico mientras se escucha la presentación, lo pueden hacer enviando un comentario por correo electrónico, preferiblemente limitado a 250 palabras o menos, a WRApubliccomment@co.monterey.ca.us. Para ayudar al personal de la Agencia a identificar el artículo de la agenda con el cual se relaciona el comentario, se solicita al público que indique el nombre del Comité (por ejemplo: Comité de Asesor de Gestion de la Cuenca) y el número del artículo de la agenda (por ejemplo: Artículo # 10). Se hará todo lo posible para leer el comentario en el registro, pero algunos comentarios pueden no leerse en voz alta debido a limitaciones de tiempo. Los comentarios recibidos después del cierre del período de comentarios públicos sobre un artículo de la agenda serán parte del registro si se reciben antes que termine la reunión del Comité.

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9. El Presidente y / o Secretario pueden establecer reglas razonables según sea necesario para llevar a cabo la reunión de manera ordenada.

Call to Order

Roll Call

Public Comment

Committee Member Comments

Consent Calendar

1. Approve the minutes of the Basin Management Advisory Committee meeting held on October 2, 2024.

Attachments: Draft BMAC Minutes October 2, 2024

Presentations

2. Review of the Quarterly Salinas Valley Water Conditions Report for the Fourth Quarter of Water Year 2024. (Staff Presenting: Guillermo Diaz-Moreno)

Attachments: Quarterly Rpt 4thQtr WY24

3. Review of the 2024 Salinas River Discharge Measurement Series report. (Staff Presenting: Ricardo Carmona)

Attachments: River Series 2024 Final

Staff Reports

4. Update on Department of Water Resources Bulletin 74 Well Standards Project.
(Staff Presenting: Amy Woodrow)

5. Update on the Groundwater Monitoring Program and Extraction Reporting Timelines.
(Staff Presenting: Amy Woodrow)

Calendar

Adjournment

County of Monterey

Board Report

Legistar File Number: WRABMAC 24-034

Item No.1

Board of Supervisors
Chambers
168 W. Alisal St., 1st Floor
Salinas, CA 93901

November 06, 2024

Introduced: 10/25/2024
Version: 1

Current Status: Agenda Ready
Matter Type: WRA BMAC Item

Approve the minutes of the Basin Management Advisory Committee meeting held on October 2, 2024.

County of Monterey

Cayenne Room
1441 Schilling Place
Salinas, Ca. 93901

Meeting Minutes

Wednesday, October 2, 2024

8:30 AM

Water Resources Agency Basin Management Advisory Committee

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Deidre Sullivan
Matthew Simis
David Bunn
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Patrick Breen
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la solicitud .**

**9. El Presidente y / o Secretario pueden establecer reglas razonables según sea necesario para
llevar a cabo la reunión de manera ordenada.**

Call to Order

The meeting was called to order at 8:32 a.m.

Roll Call

Present: John Baillie, David Bunn, Patrick Breen, Marc Kelley

Absent: Deidre Sullivan, Matthew Simis, Kevin Piearcy, Richard Oritz

Public Comment

None

Committee Member Comments

John Baillie, David Bunn

Consent Calendar

Upon Motion by David Bunn, Second by Marc Kelley the committee approved the Consent Calendar of the Basin Management Advisory Committee Meeting.

Ayes: David Bunn, Marc Kelley, John Baillie, Patrick Breen
Absent: Matthew Simis, Deidre Sullivan, Kevin Piearcy, Richard Oritz
Abstained: None

1. Approve the minutes of the Basin Management Advisory Committee meeting held on August 7, 2024.

Attachments: Draft BMAC Minutes August 7, 2024

Staff Reports

2. Update on July-September data collection activities. (Staff Presenting: Ricardo Carmona)

Committee Member Comments: Marc Kelley, John Baillie, David Bunn
Public Comments: None

3. Update on Well registration and Reporting Ordinance. (Staff Presenting: Ara Azhderian)

Committee Member Comments: John Baillie, David Bunn, Patrick Breen
Public Comments: None

Calendar

4. Set next meeting date and discuss future agenda items.

Adjournment

The meeting was adjourned at 9:19 a.m.

County of Monterey

Board Report

Legistar File Number: WRABMAC 24-035

Item No.2

Board of Supervisors
Chambers
168 W. Alisal St., 1st Floor
Salinas, CA 93901

November 06, 2024

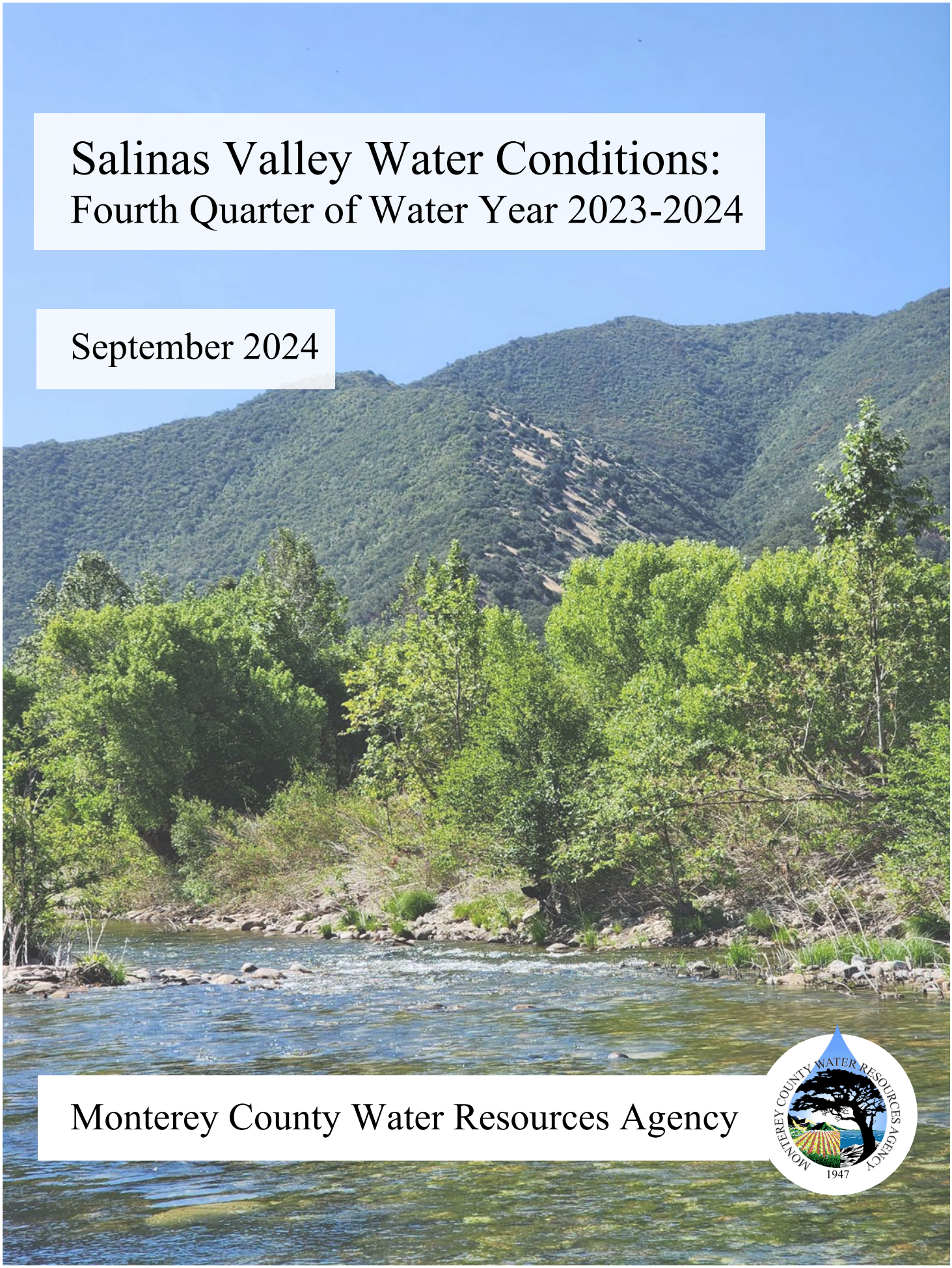
Introduced: 10/25/2024
Version: 1

Current Status: Agenda Ready
Matter Type: WRA BMAC Item

Review of the Quarterly Salinas Valley Water Conditions Report for the Fourth Quarter of Water Year 2024. (Staff Presenting: Guillermo Diaz-Moreno)

Salinas Valley Water Conditions:
Fourth Quarter of Water Year 2023-2024

September 2024



Monterey County Water Resources Agency

MONTEREY COUNTY WATER RESOURCES AGENCY

Salinas Valley Water Conditions
Quarterly Update for Fourth Quarter of Water Year 2023-2024
September 2024

Prepared by Mackaby Pennington, Guillermo Diaz-Moreno, and Amy Woodrow

Table of Contents

List of Figures

Introduction

This report covers the fourth quarter of Water Year 2024 (WY24), consisting of July through September 2024. It provides a brief overview and discussion of hydrologic conditions in the Salinas Valley including precipitation, reservoir storage, streamflow, and groundwater level trends (Figure 1).

Data for the fourth quarter of Water Year 2023-2024 indicate higher than normal levels of precipitation. Storage in Nacimiento Reservoir is lower than in September 2023 and storage is higher in San Antonio Reservoir compared to September 2023. Over the fourth quarter of WY24, groundwater elevations decreased across all subareas and aquifers.

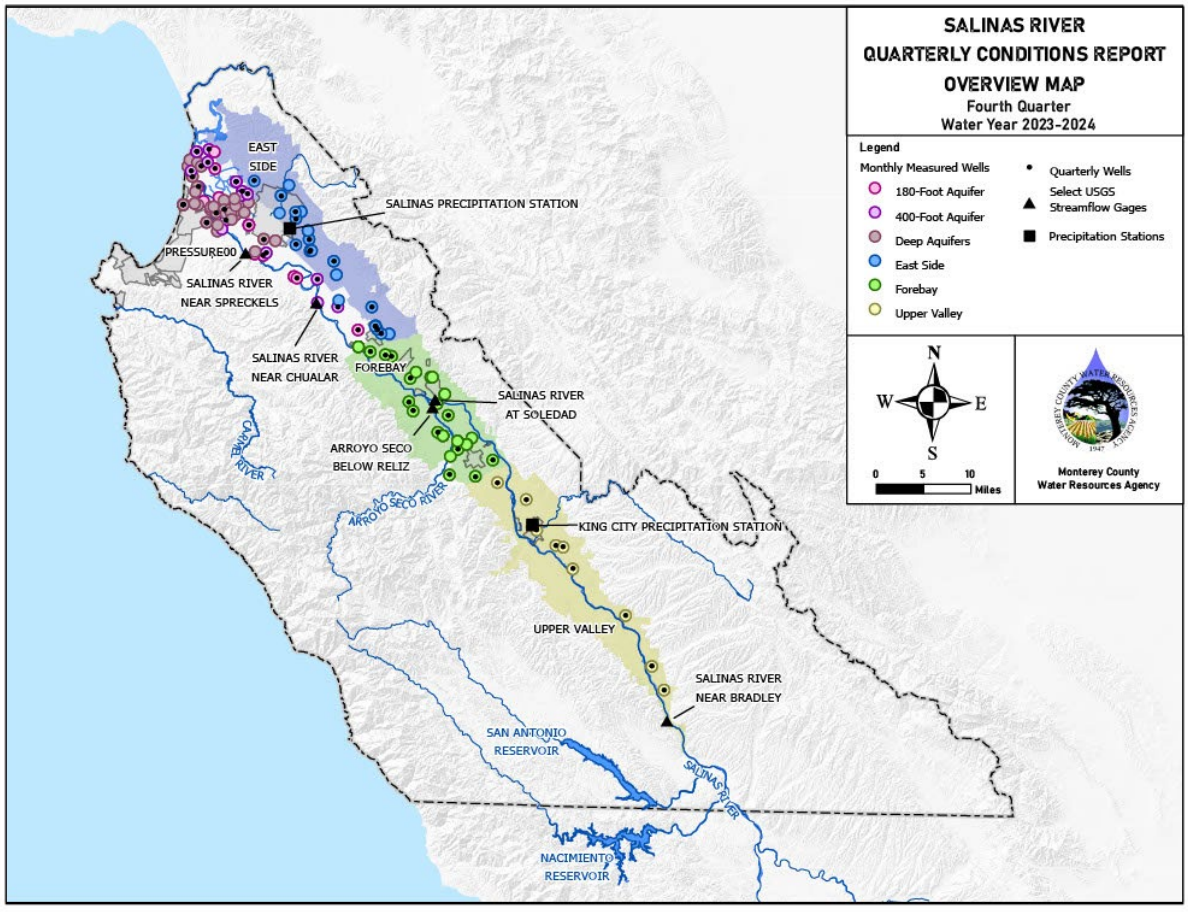
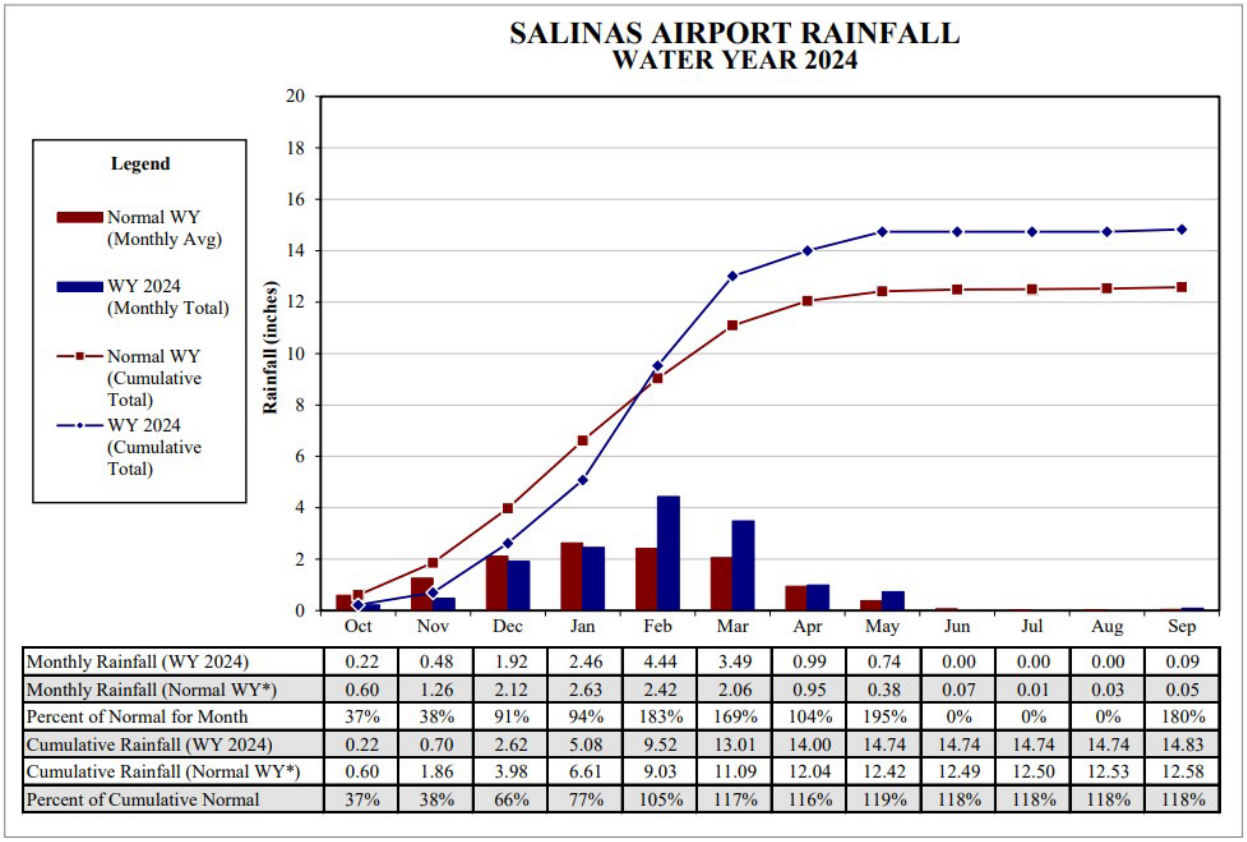


Figure 1: Geographic extent of the area covered by this report and supporting data sources.

Precipitation

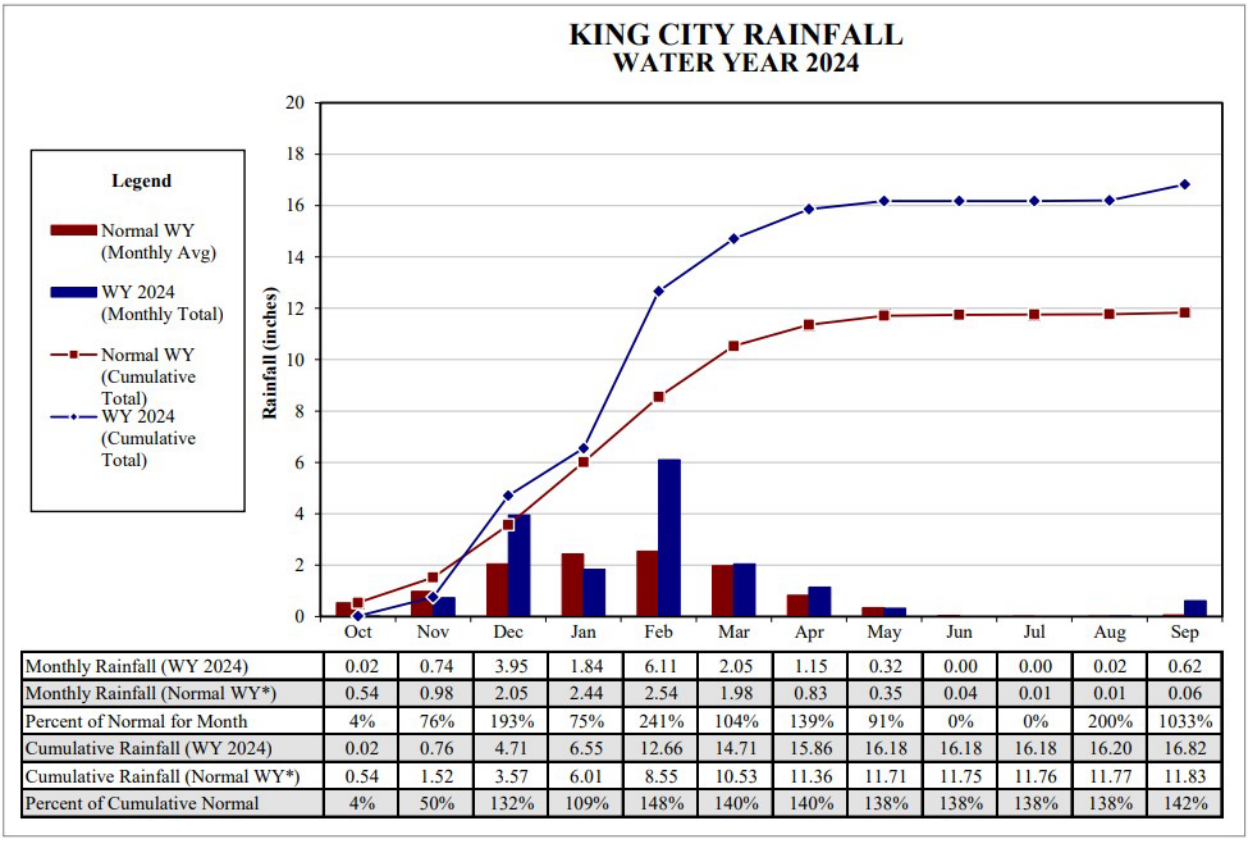
Preliminary National Weather Service rainfall data indicates that the fourth quarter of WY24 brought above normal rainfall to Salinas and above normal rainfall to King City. Totals for the quarter were 0.09 inches at the Salinas Airport (100% of normal rainfall of 0.09 inches for the quarter) and 0.64 inches in King City (800% of normal rainfall of 0.08 inches for the quarter).

Figure 2 and Figure 3 show monthly and cumulative precipitation data for the current water year and for a "normal" water year, based on long-term monthly precipitation averages, for the Salinas Airport and King City sites, respectively. Included below each graph is a table showing the numeric values for precipitation as well as percent of "normal" precipitation. For the purposes of these graphs, a "normal" water year is the average precipitation over the most recent 30-year period ending in a decade. Currently, the period from 1994 to 2023 is used for this calculation.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Rainfall (WY 2024)	0.22	0.48	1.92	2.46	4.44	3.49	0.99	0.74	0.00	0.00	0.00	0.09
Monthly Rainfall (Normal WY*)	0.60	1.26	2.12	2.63	2.42	2.06	0.95	0.38	0.07	0.01	0.03	0.05
Percent of Normal for Month	37%	38%	91%	94%	183%	169%	104%	195%	0%	0%	0%	180%
Cumulative Rainfall (WY 2024)	0.22	0.70	2.62	5.08	9.52	13.01	14.00	14.74	14.74	14.74	14.74	14.83
Cumulative Rainfall (Normal WY*)	0.60	1.86	3.98	6.61	9.03	11.09	12.04	12.42	12.49	12.50	12.53	12.58
Percent of Cumulative Normal	37%	38%	66%	77%	105%	117%	116%	119%	118%	118%	118%	118%

Figure 2: Salinas Airport Rainfall for Water Year 2024



Monthly Rainfall (WY 2024)	0.02	0.74	3.95	1.84	6.11	2.05	1.15	0.32	0.00	0.00	0.02	0.62
Monthly Rainfall (Normal WY*)	0.54	0.98	2.05	2.44	2.54	1.98	0.83	0.35	0.04	0.01	0.01	0.06
Percent of Normal for Month	4%	76%	193%	75%	241%	104%	139%	91%	0%	0%	200%	1033%
Cumulative Rainfall (WY 2024)	0.02	0.76	4.71	6.55	12.66	14.71	15.86	16.18	16.18	16.18	16.20	16.82
Cumulative Rainfall (Normal WY*)	0.54	1.52	3.57	6.01	8.55	10.53	11.36	11.71	11.75	11.76	11.77	11.83
Percent of Cumulative Normal	4%	50%	132%	109%	148%	140%	140%	138%	138%	138%	138%	142%

Figure 3: King City Rainfall for Water Year 2024

Reservoir Storage

At the end of the fourth quarter of WY24, storage at Nacimiento Reservoir on September 30, 2024 was 216,010 acre-feet, which is 20,190 acre-feet lower than at the same time in September 2023. Storage in San Antonio Reservoir on September 30, 2024 was 244,900 acre-feet, which is 25,350 acre-feet higher than at the same time in September 2023.

Reservoir	**September 30, 2024 (WY24) Storage in acre-feet**	**September 30, 2023 (WY23) Storage in acre-feet**	**Difference in acre-feet**
Nacimiento	216,010	236,200	-20,190
San Antonio	244,900	219,550	25,350

Graphs showing daily reservoir storage for the last five water years, along with 30-year average daily storage for comparison, are included as Figure 4 and Figure 5.

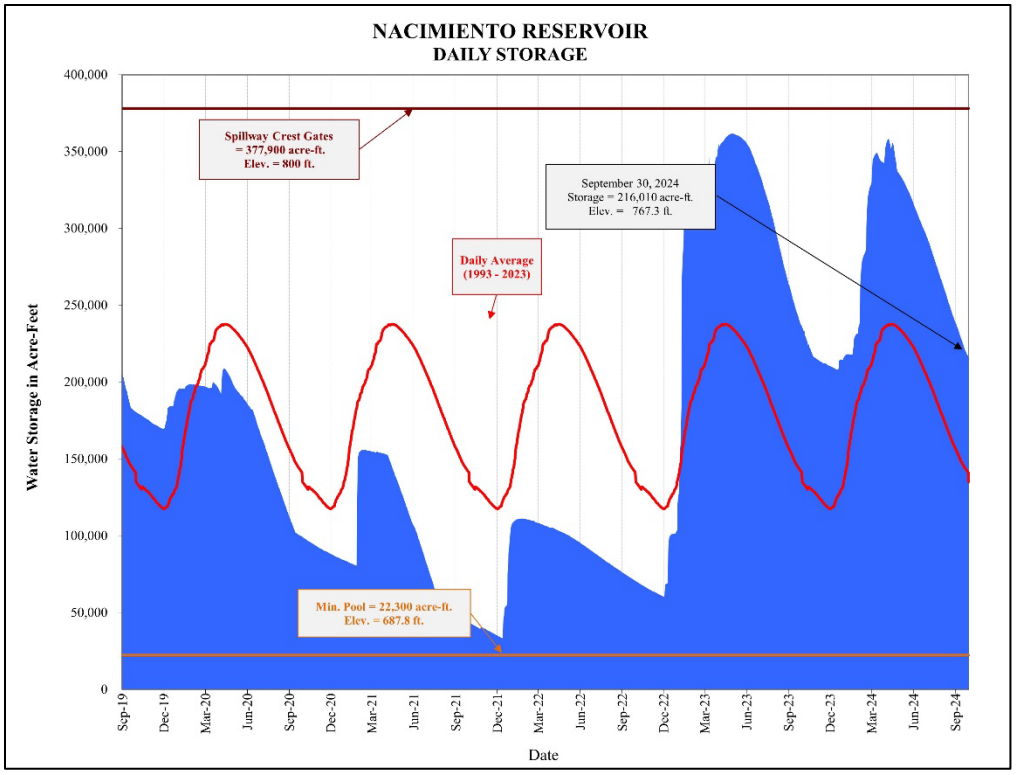


Figure 4: Nacimiento Reservoir Storage

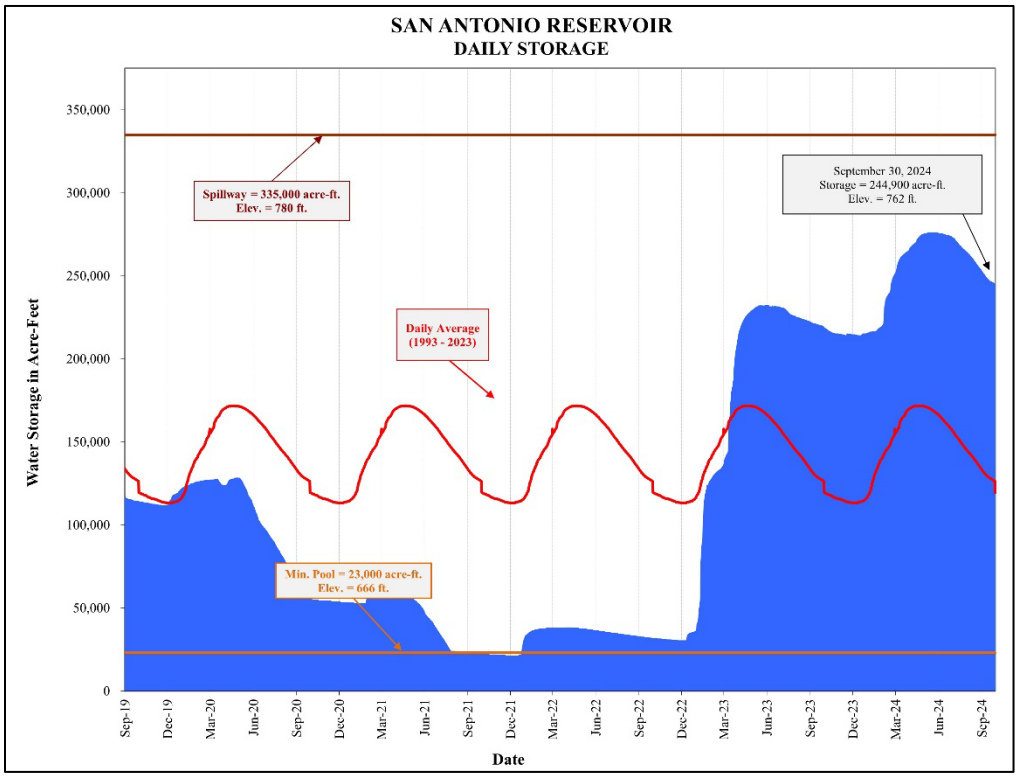


Figure 5: San Antonio Reservoir Storage

Streamflow

The Salinas River is predominately a losing stream, meaning streamflow moves from the streambed into the underlying aquifers. The U.S. Geological Survey maintains several streamflow gages throughout the Salinas River watershed that continuously measure discharge or flow in the river (Figure 1). Figure 6 shows mean daily flow, in cubic feet per second, from select gages on the Salinas River and Arroyo Seco for the last five years (WY 2020-2024) and the current water year (WY 2024).

Streamflow recorded during the fourth quarter of WY24 can be attributed to conservation and environmental releases from the Nacimiento and San Antonio reservoirs, as is evidenced by the very consistent streamflow measurements during the fourth quarter of WY24. The conservation releases from the Nacimiento and San Antonio Reservoirs support groundwater recharge and SRDF operations, while environmental releases support fish and wildlife habitat.

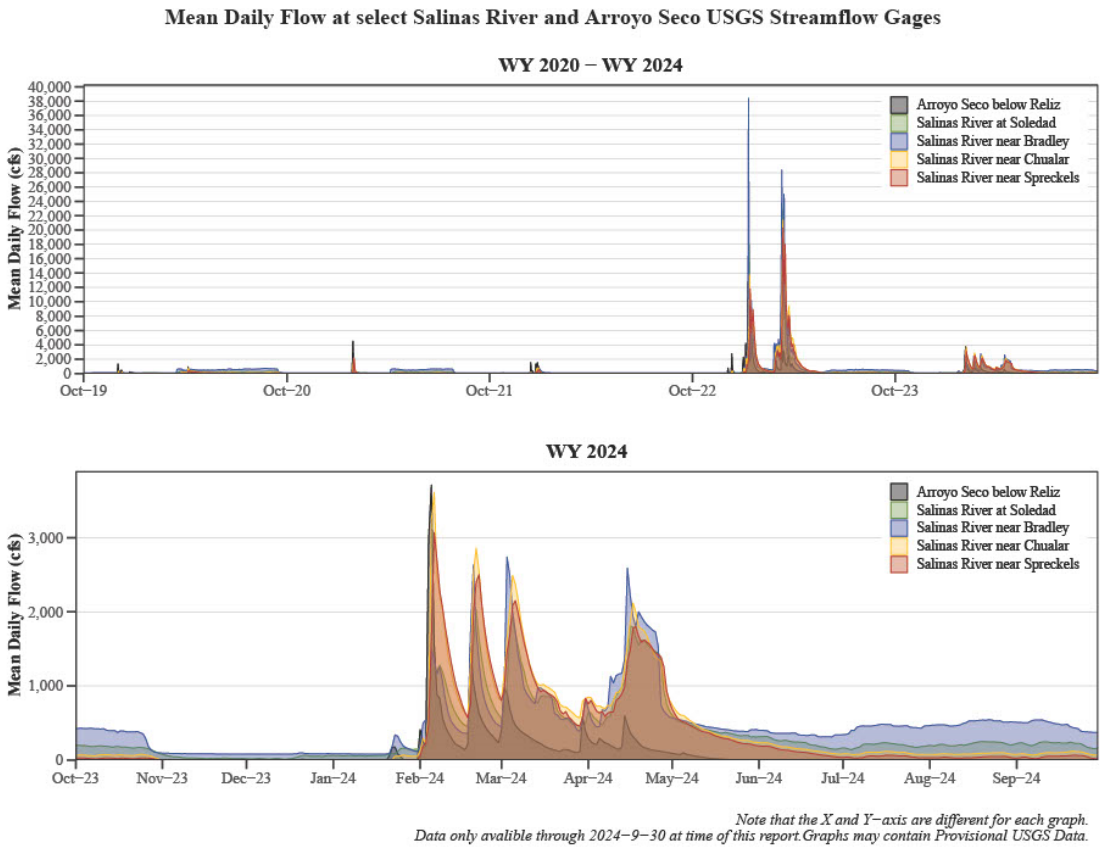


Figure 6: Mean Daily Flow at Selected Stream Gages

Groundwater Elevations

Groundwater elevation data provides insight into how an aquifer or subarea responds to hydrologic conditions over time, such as changes in precipitation and reservoir releases. A one-year comparison can show the short-term effects of a single wet or dry year while a long-term comparison will help provide information on general trends in groundwater storage and demonstrate effects that occur on a longer time scale as surface hydrology interacts with the underlying geology. Subareas or aquifers will respond differently to these hydrologic conditions. For example, groundwater elevations in shallower aquifers may respond more quickly to a wet season while aquifers that are confined, deeper, or more depleted may take longer to show a response to hydrologic conditions. Changes in groundwater elevations within a confined aquifer will also occur in response to groundwater pumping demands.

More than 130 wells are measured monthly throughout the Salinas Valley to monitor seasonal groundwater elevation fluctuations. Data from approximately 50 of these wells are used in the preparation of this report (Figure 1). The measurements are grouped by hydrologic subarea, averaged, and a single groundwater elevation value for the wells within each subarea is graphed to compare current groundwater elevations (WY24) with past conditions. Graphs for individual subareas, showing the current year's groundwater elevation conditions, last year's conditions (WY23) and dry conditions (WY15) are found in the following sections.

For comparison to long term conditions, a curve showing monthly groundwater elevations averaged over the most recent 30 years (WY1994-WY2023) is included on each graph. The Deep Aquifers graph (Figure 9) does not include a 30-year average because there is not yet a 30-year period of record to make that comparison. Table 1 provides a summary of the groundwater elevation trends for September 2024, with additional detail provided on Figures 7-12.

Table 1: Groundwater Elevation Trends Summary for September 2024

Subarea/Aquifer	September 2024 Groundwater Elevation (ft-msl)	Change during Fourth Quarter	One Year Change	Difference from 30-Year Average Elevation
180-Foot Aquifer	4 feet	Down 4 feet	Up 1 foot	Up 3 feet
400-Foot Aquifer	-8 feet	Down 3 feet	No change	Up 5 feet
Deep Aquifers	-35 feet	Down 6 feet	Down <1 foot	Not applicable
East Side	-30 feet	Down 7 feet	Down 4 feet	Down 7 feet
Forebay	162 feet	Down 5 feet	Up <1 foot	Up 7 feet
Upper Valley	317 feet	Up <1 feet	Up 2 feet	Up 5 feet

180-Foot Aquifer

Over the last quarter, groundwater elevations decreased four feet in the 180-Foot Aquifer (Figure 7). Groundwater elevations for September 2024 are up one foot compared to September 2023 and are up three feet from the 30-year average.

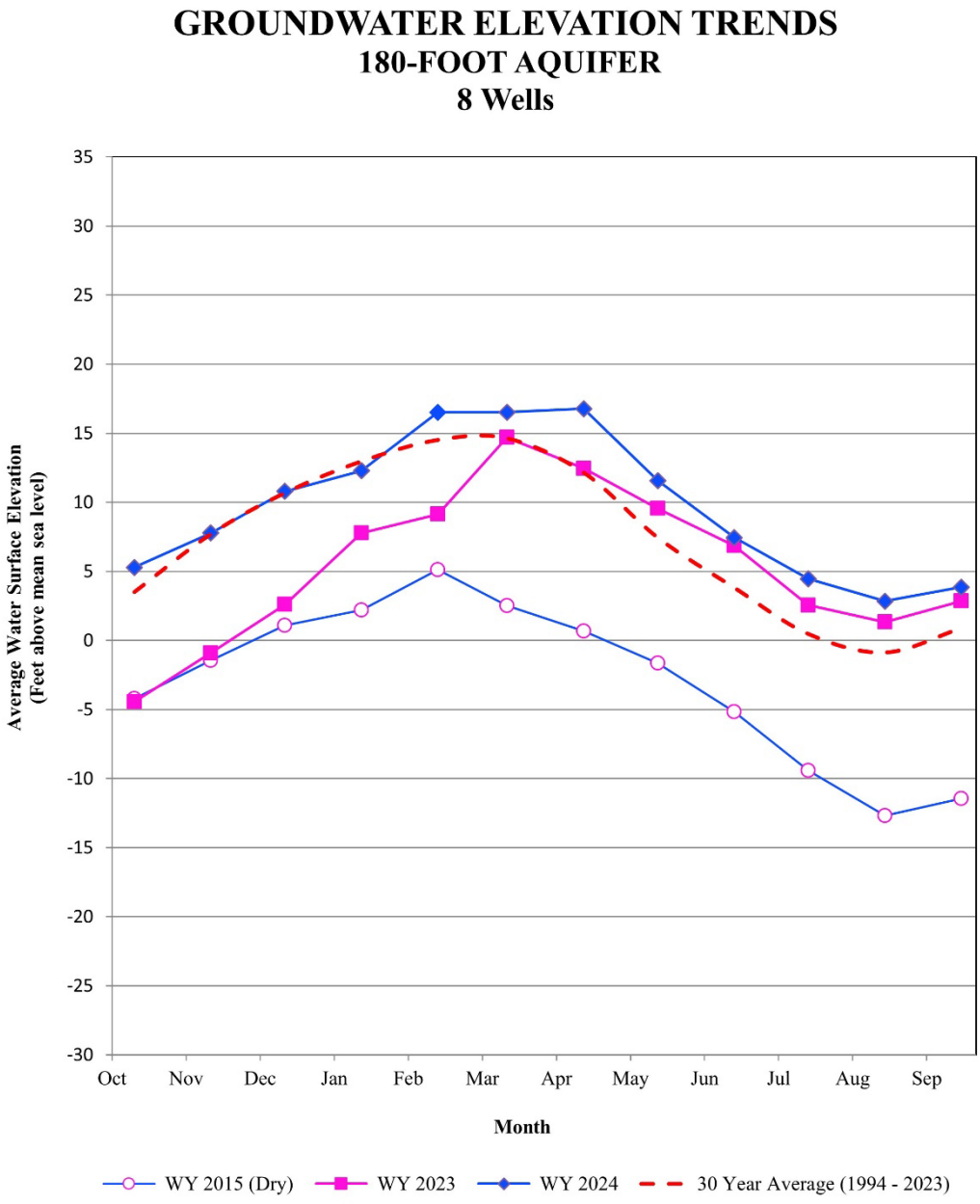


Figure 7: Groundwater Elevation Trends for the 180-Foot Aquifer

400-Foot Aquifer

Over the last quarter, groundwater elevations decreased three feet in the 400- Foot Aquifer (Figure 8). Groundwater elevations for September 2024 are the same compared to September 2023 and up five feet from the 30-year average.

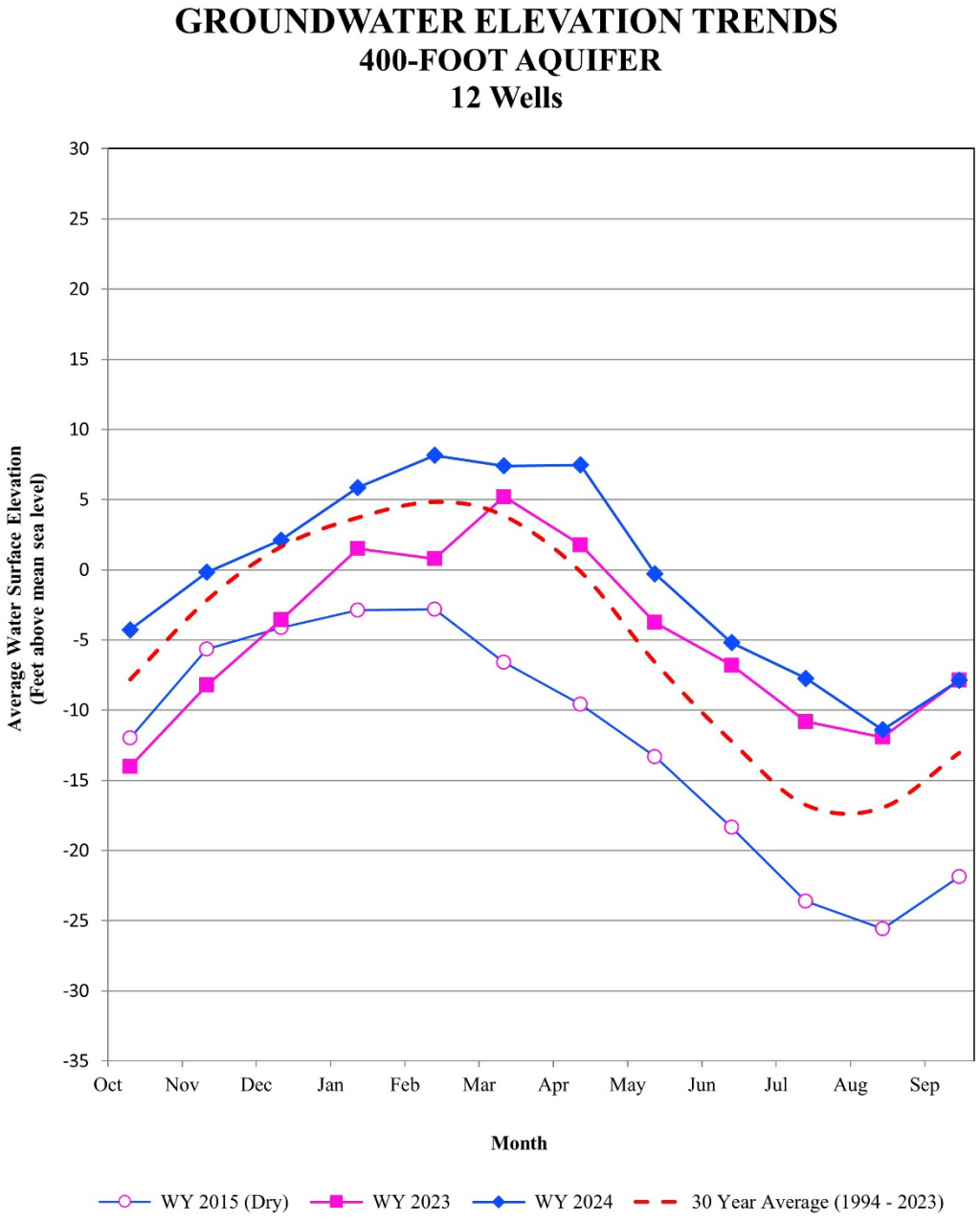


Figure 8: Groundwater Elevation Trends in the 400-Foot Aquifer

Deep Aquifers

Over the last quarter, groundwater elevations decreased six feet in the Deep Aquifers (Figure 9). Groundwater elevations for September 2024 are down less than one foot compared to September 2023. Given the shorter period of record available for some of the wells monitored in the Deep Aquifers, a 30-year average cannot yet be calculated. To represent the long-term trends in the Deep Aquifers, Figure 9 also includes a 30-year time series graph with groundwater elevation data from the eleven wells to show the seasonal and long-term trends in these wells.

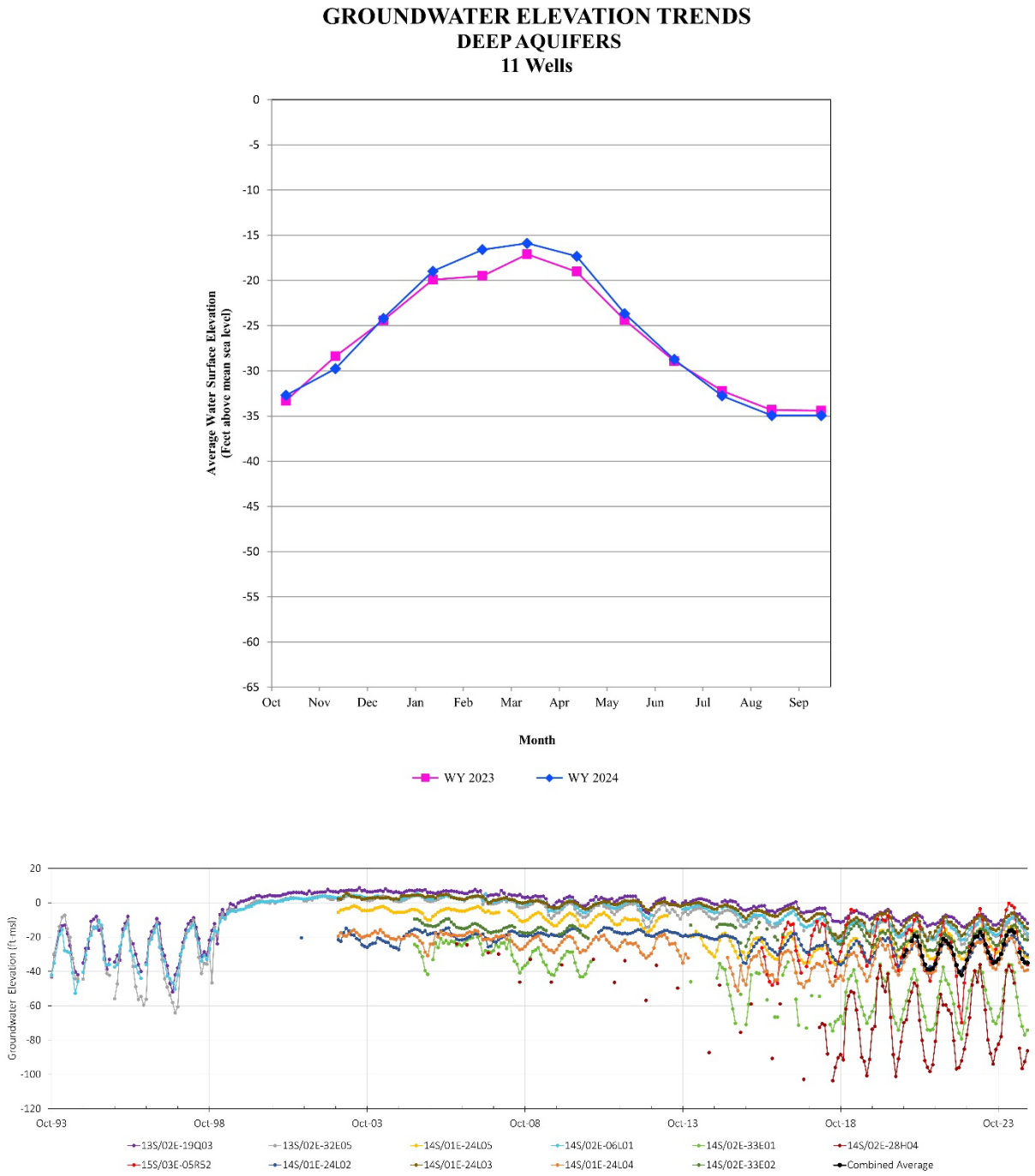


Figure 9: Groundwater Elevation Trends in the Deep Aquifers

East Side Subarea

East Side groundwater elevations decreased seven feet over the last quarter (Figure 10). Groundwater elevations for September 2024 are down four feet from September 2023 elevations and down seven feet from the 30-year average.

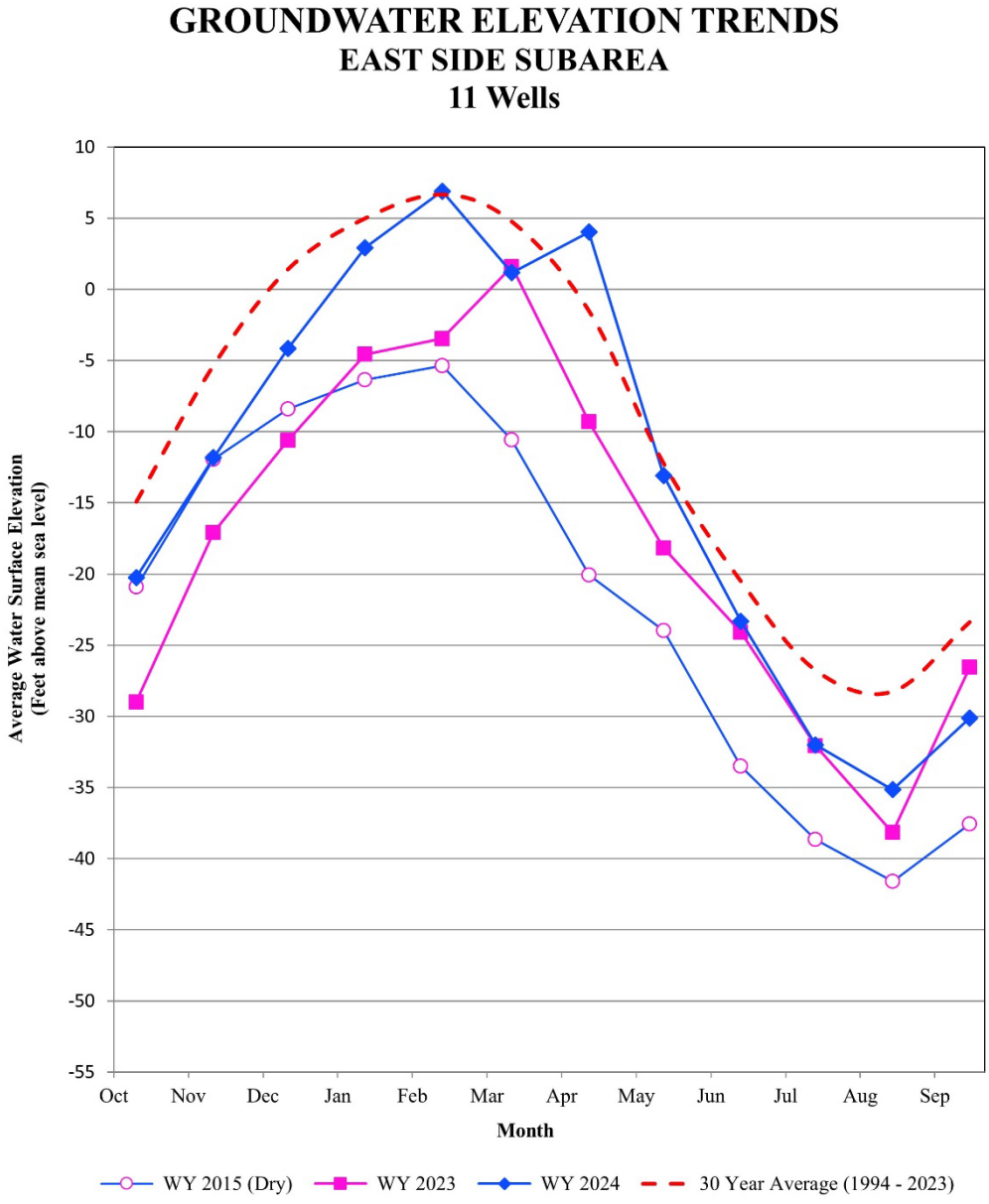


Figure 10: Groundwater Elevation Trends in the East Side Subarea

Forebay Subarea

Over the last quarter, groundwater elevations have decreased five feet in the Forebay (Figure 11). Groundwater elevations for September 2024 are up less than one foot from September 2023 elevations and are up seven feet from the 30-year average.

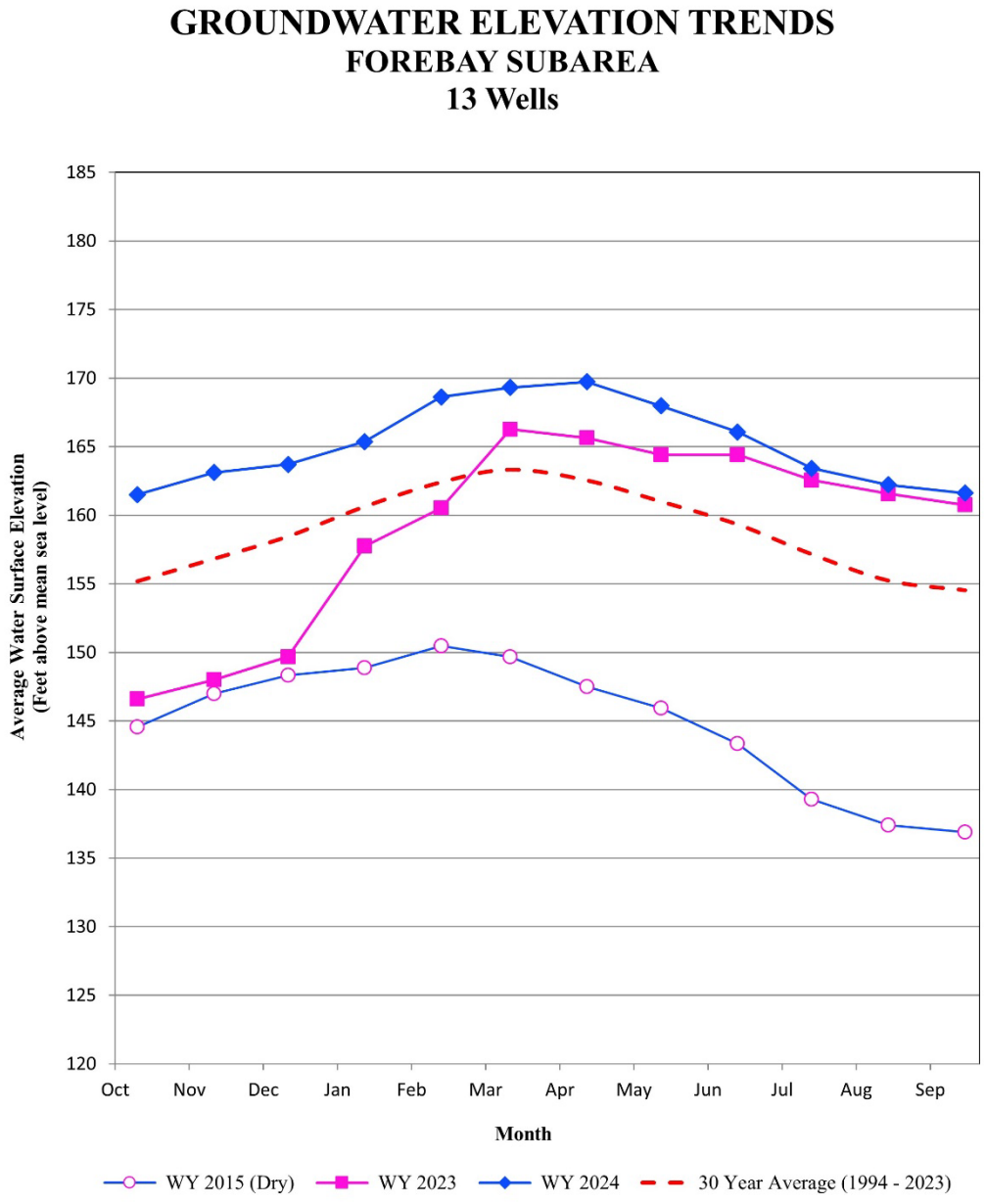


Figure 11: Groundwater Elevation Trends in the Forebay Subarea

Upper Valley Subarea

Upper Valley groundwater elevations have increased less than one foot over the last quarter (Figure 12). Groundwater elevations for September 2024 are up two feet from September 2023 elevations and up five feet from the 30-year average.

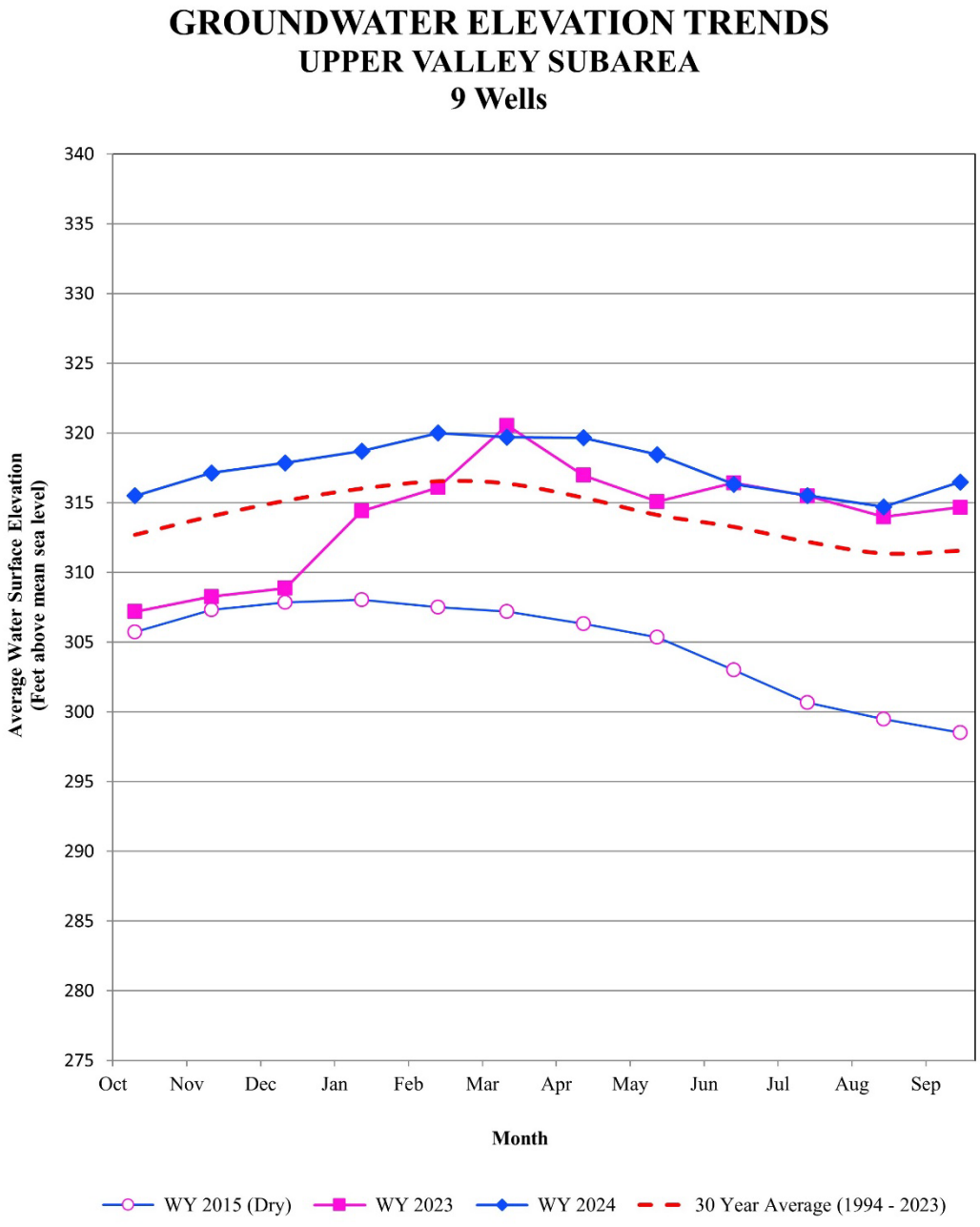


Figure 12: Groundwater Elevation Trends in the Upper Valley Subarea

Figure 13 shows the spatial distribution of changes in groundwater elevations from September 2023 to September 2024. Over the last Water Year, most of the monitored wells in all hydrologic subareas experienced no significant change in groundwater elevation. However, localized variability in groundwater elevation trends was observed, particularly in the East Side subarea.

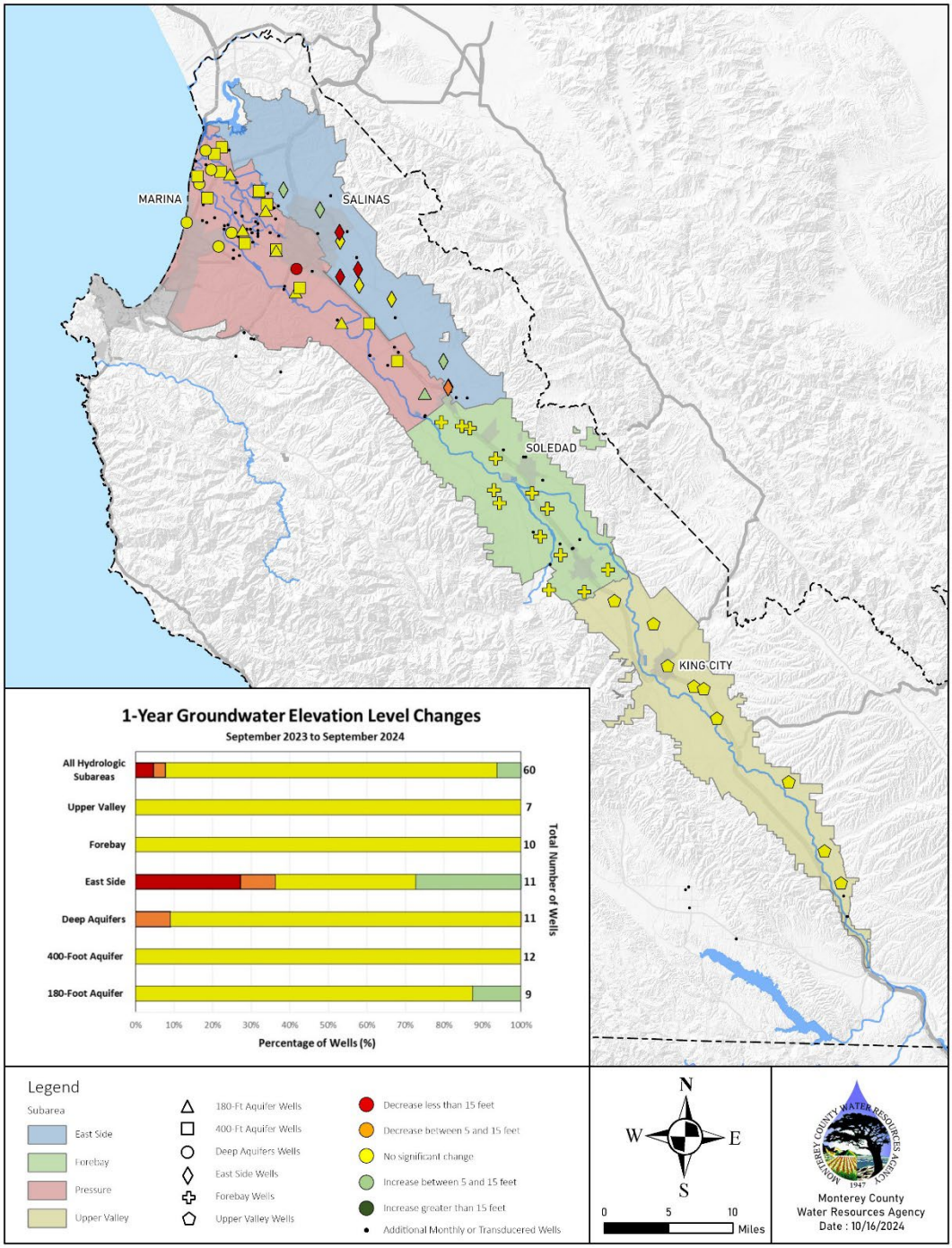


Figure 13: One-Year Groundwater Elevation Changes

Depth to Groundwater vs Groundwater Elevation

Most of the figures in this report use groundwater elevation as a means of describing where groundwater was observed in a well. Figure 14 shows the method for determining depth to groundwater and groundwater elevation in each well.[1] The depth to groundwater is measured from a reference point that is unique to each well. Groundwater elevation is calculated from the measured depth to groundwater using the reference point elevation and ground surface elevation.

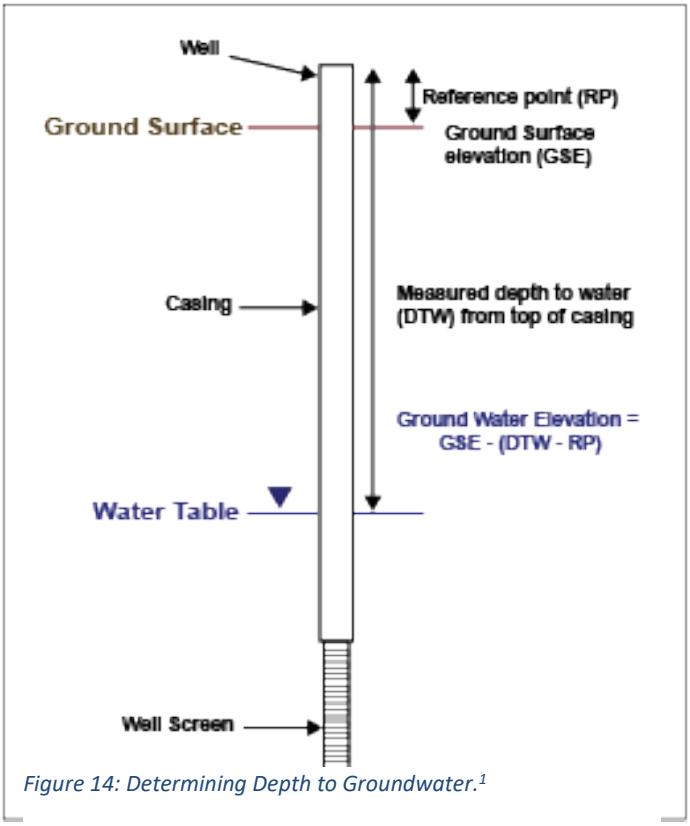


Figure 14: Determining Depth to Groundwater.[1]

Figure 15 shows the depth to groundwater that was measured in each of the wells, within a given subarea, that is used for developing this quarterly water conditions report. As shown on Figure 15, there is a range of depth to water values within each subarea with some, like the East Side Subarea, having a wider range of measured values than others, like the 180-Foot Aquifer. The black line on each of the subarea graphs in Figure 15 is the average depth to groundwater for each set of wells. This value is converted from "depth to groundwater" to "groundwater elevation" and graphed as the "2024 WY" line on each of the preceding subarea-specific graphs (Figures 7-12).

[1] Figure 14 is modified from the Idaho Department of Environmental Quality.

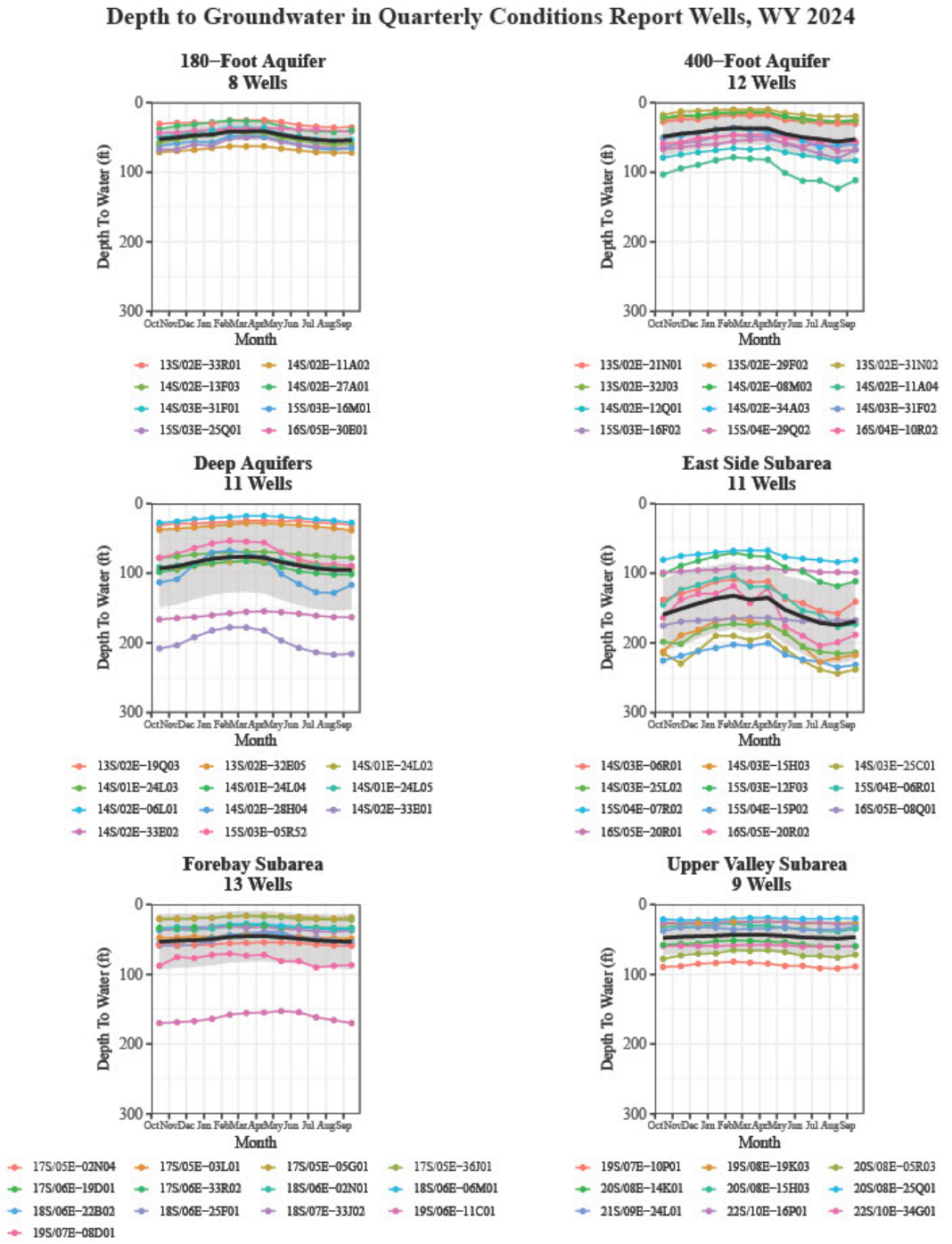


Figure 15: Depth to Groundwater in Wells Used for Quarterly Conditions Report, WY 2024

County of Monterey

Board Report

Legistar File Number: WRABMAC 24-036

Item No.3

Board of Supervisors
Chambers
168 W. Alisal St., 1st Floor
Salinas, CA 93901

November 06, 2024

Introduced: 10/25/2024
Version: 1

Current Status: Agenda Ready
Matter Type: WRA BMAC Item

Review of the 2024 Salinas River Discharge Measurement Series report. (Staff Presenting: Ricardo Carmona)

WATER RESOURCES AGENCY

M E M O R A N D U M

Monterey County

September 18, 2024

2024 Salinas River Discharge Measurement Series Results

Background

The Salinas River Discharge Measurement Series (River Series) is a streamflow measurement event, conducted annually when conditions allow, that provides information essential to understanding the hydrologic conditions under which reservoir releases and flows in the Salinas River are managed. During the River Series, discharge (streamflow) measurements are collected at multiple locations along the Salinas River in a discreet time period and changes in discharge rates between locations are analyzed to inform the nature of the groundwater-surface water interaction along the channel.

2024 River Series Overview

The 2024 River Series event occurred between August 20 and 21, 2024. Ten discharge measurements were performed by Monterey County Water Resources Agency (Agency) and U.S. Geological Survey (USGS) staff. Overall, the 2024 River Series documented an entirely losing stream (Figure 1) system with a total of 510 cubic feet per second (cfs), or 1,012 acre-feet per day, leaving the surface water system across the ninety-one sampled river miles (Figure 2).

The 2024 River Series measurements recorded a discharge reduction that is comparable with the 2023 River Series, following the overall decreasing trend in the discharge losses[1] since the 2012-2016 drought. Further analysis of the reach-to-reach variations in rates of discharge loss, comparison to historical and recent River Series events, and discussion of factors that may have influenced the 2024 River Series are provided in following sections of this report.

[1] Discharge "loss" refers to discharge (streamflow) rates that decrease with distance from the reservoirs, indicating that surface water is moving into the groundwater system or moving from the land surface to the atmosphere through evapotranspiration.

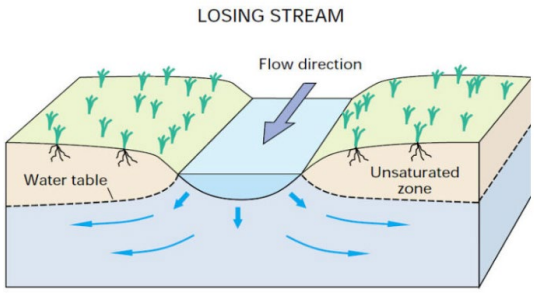


Figure 1. Conceptual illustration of a losing stream

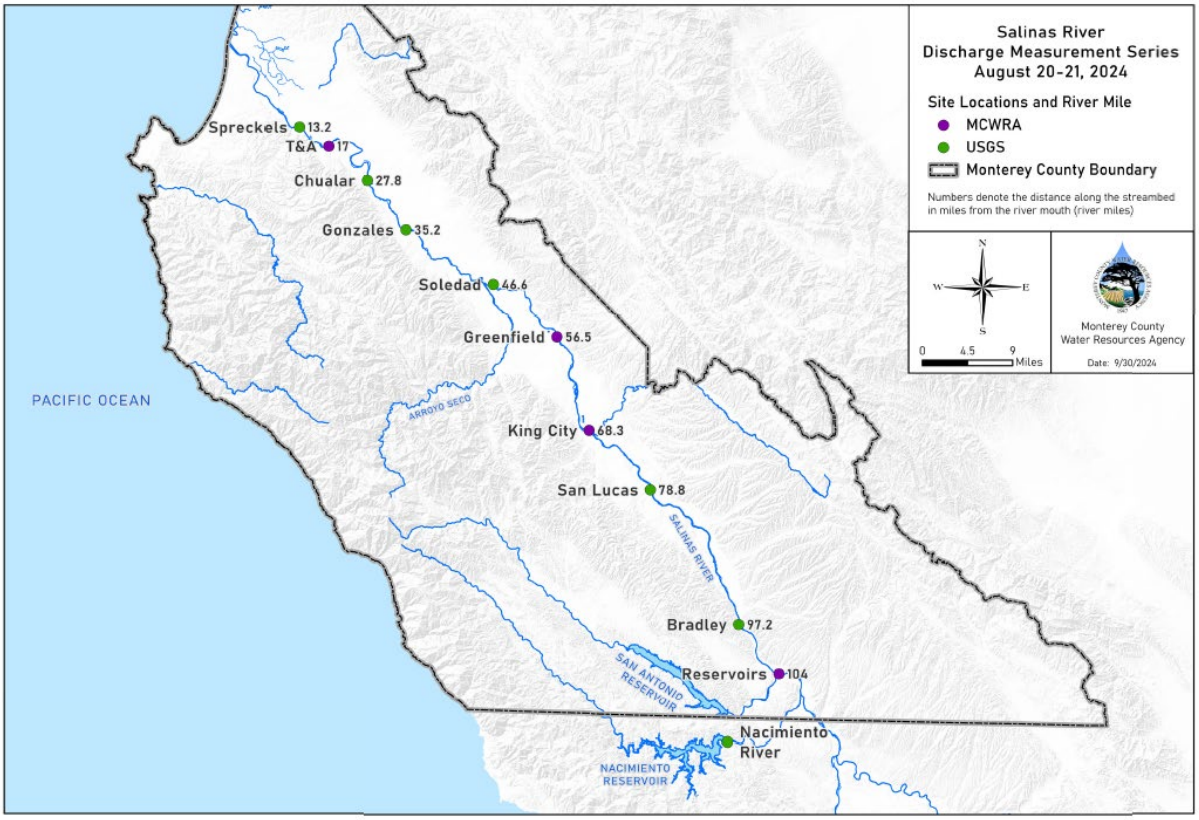


Figure 2. Salinas River Discharge Measurement Series Site Locations

Procedures and Methods

Measurements were collected from a total of 10 sample sites located downstream of Nacimiento and San Antonio Reservoirs, within the lower one hundred miles of the Salinas River watershed (Figure 2).

Combined reservoir releases were held approximately constant at 562 cfs for five days prior to the River Series measurement event (Figure 3). This steady release was planned to minimize the effect of fluctuating river flow, and it allowed these variations to move through the fluvial system prior the River Series event. By minimizing this variable, the measured discharge during the River Series can more accurately characterize the nature of the groundwater-surface water interaction along the channel.

It should be noted that, during the month of August in 2024, there was no measurable precipitation recorded[2] that could have influenced the river discharge measurements.

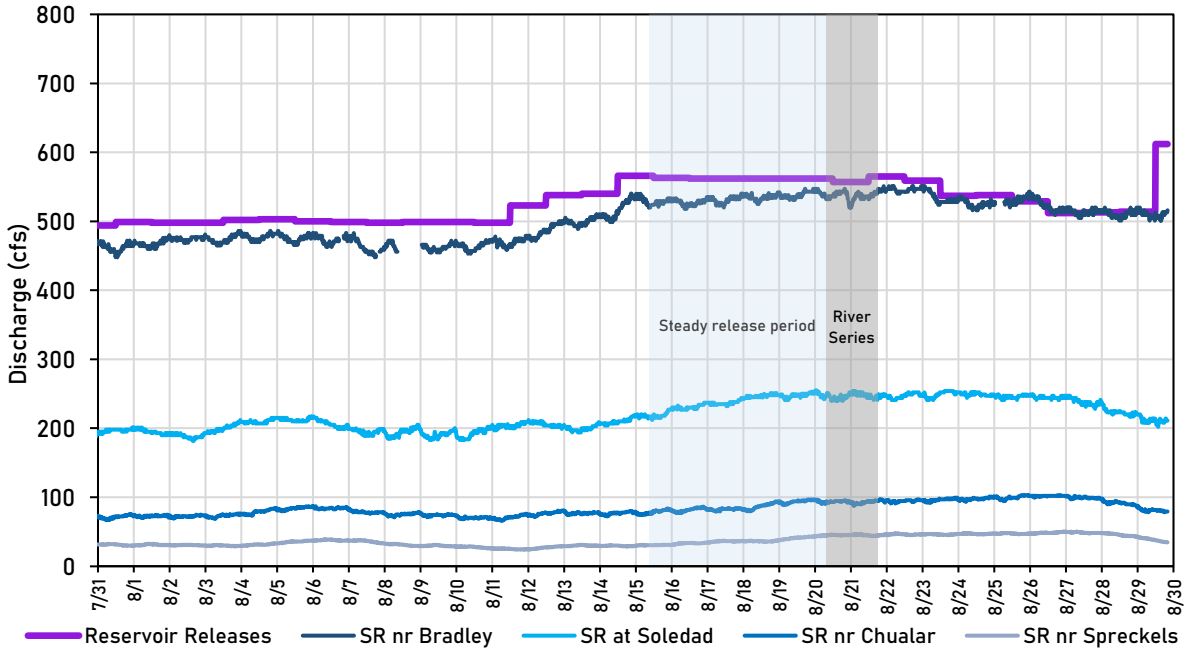


Figure 3. August 2024 Reservoir Releases and Salinas River Discharge at USGS Gages

River Series measurements were coordinated with USGS staff to coincide discharge measurements with their routine monthly calibration measurements at the five USGS automated gage stations on the Salinas River. USGS staff performed measurements at established USGS gages. Agency staff performed measurements at the following sites: King City (river mile 68.3), Greenfield (river mile 56.5) and T&A, a site approximately two miles south of the town of Spreckels (river mile 17.0). All Agency measurements were collected using an acoustic doppler velocimeter. USGS measurements were collected using either an acoustic doppler velocimeter or an acoustic doppler current profiler.

Discharge Observations and Analysis

Discharge (Q) results for each site are summarized in Table 1 and graphed by river mile (RM) in Figure 4. The changes in discharge (ΔQ) between measurement sites, referred to as a 'river reach' and reach-to-reach loss rates (ΔQ/RM) are summarized in Table 2.

[2] King City Weather Station, as provided by the National Weather Service (NOAA)

Table 1. Discharge Measurement Results for 2024 River Series					
Measurement Site Name	River Mile (RM)	Measurement			Discharge Q (cfs)
		Date	Time	Source	
San Antonio Reservoir		8/20/2024	7:00	MCWRA	165*
Nacimiento Reservoir		8/20/2024	10:30	USGS	390**
Combined Reservoirs	104	8/20/2024	7:00	MCWRA	555***
Bradley	97.5	8/20/2024	12:52	USGS	549
San Lucas	78.8	8/20/2024	12:00	USGS	459
King City	68.3	8/20/2024	12:31	MCWRA	371
Greenfield	56.5	8/20/2024	12:12	MCWRA	257
Soledad	46.7	8/21/2024	9:41	USGS	247
Gonzales	35.2	8/21/2024	12:00	USGS	151
Chualar	27.8	8/21/2024	10:27	USGS	94
T&A	17	8/20/2024	17:04	MCWRA	50.3
Spreckels	13	8/21/2024	13:39	USGS	45.0

* Reservoir releases as reported by the Agency
** Nacimiento USGS Gage Station
***Combined release from San Antonio releases and Nacimiento USGS Station

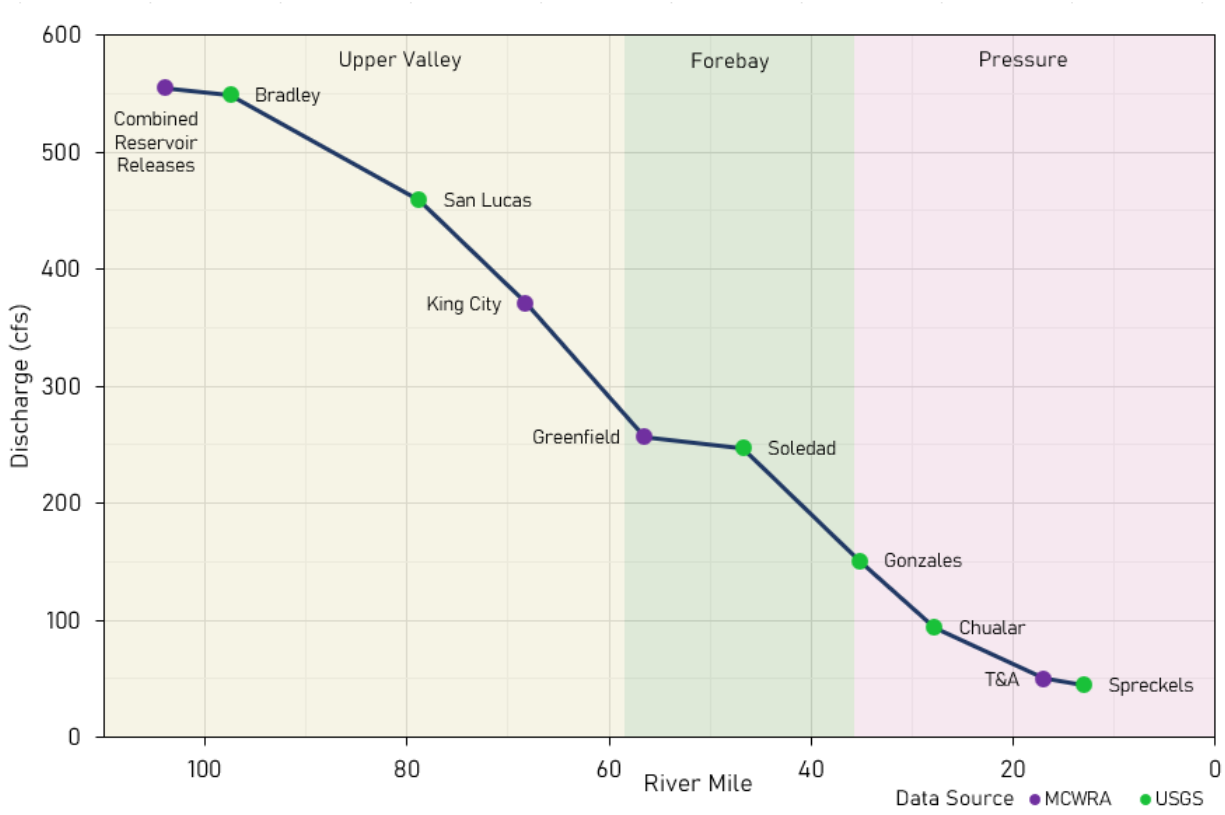


Figure 4. Discharge Measurement Series Results for the 2024 Salinas River Series

Table 2. 2024 Discharge Loss Rates by River Reach					
River Reach	Upstream River Mile	Downstream River Mile	Reach Length (miles)	ΔQ (cfs)	ΔQ/RM (cfs/mile)
Reservoirs - Bradley	104	97.5	6.5	6	0.9
Bradley - San Lucas	97.5	78.8	18.7	90	4.8
San Lucas - King City	78.8	68.3	10.5	88	8.4
King City - Greenfield	68.3	56.5	11.8	114	9.7
Greenfield - Soledad	56.5	46.7	9.8	10	1.0
Soledad - Gonzales	46.7	35.2	11.5	96	8.3
Gonzales - Chualar	35.2	27.8	7.4	57	7.7
Chualar - T&A	27.8	17	10.8	44	4.1
T&A - Spreckels	17	13	4	5	1.3
Chualar - Spreckels *	27.8	13	14.8	49	3.3

* Included for comparison of loss rates discussed in text

During the April through October conservation season, Salinas River flow is maintained by the modulated release of accumulated winter and spring inflow that is stored in Nacimiento and San Antonio Reservoirs. The Salinas River is predominantly a losing stream, meaning the amount of discharge decreases downstream as water from the river recharges the underlying aquifers, evaporates, is diverted from the river, or is taken up by riparian vegetation. By contrast, a gaining stream would show an increase in the amount of discharge downstream as groundwater was discharged to the surface water system. Table 1 and Figure 4 show that all the discharge measurements decreased downstream; the resulting data indicate that the Salinas River is an entirely losing stream for the sampled portion of the river during the 2024 River Series.

River Discharge Loss Rate

Taking the difference between the combined reservoir releases and the discharge measured at the furthest downstream Spreckels site, the total discharge lost over the 91 miles of the River Series is:

555 cfs – 45.0 cfs = 510 cfs

Assuming that reservoir releases remained constant over a twenty-four-hour period, this loss rate can be converted to a daily volume for comparison to water stored in the reservoirs. Using a conversion factor of 1 cfs to 1.9835 acre-feet/day (afd), this loss rate would equate to 1,011.5 acre-feet per day between the two ends of the sampled portion of the Salinas River:

1,100.8 afd – 89.3 afd = 1,011.5 afd

A total discharge loss of 510 cfs suggests that, on average, 5.6 cfs are lost every river mile. However, discharge does not decrease uniformly throughout the measured system. Variations in loss rates across the different reaches are evident in loss rate hydrographs (Figure 5). These hydrographs compare 2024 discharge loss rates per river mile (ΔQ/RM) to the mean loss rates for each reach. Mean loss rates are calculated using a reference period of 1995-2023, excluding the years in which there was no River Series such as the 2012-2016 drought.

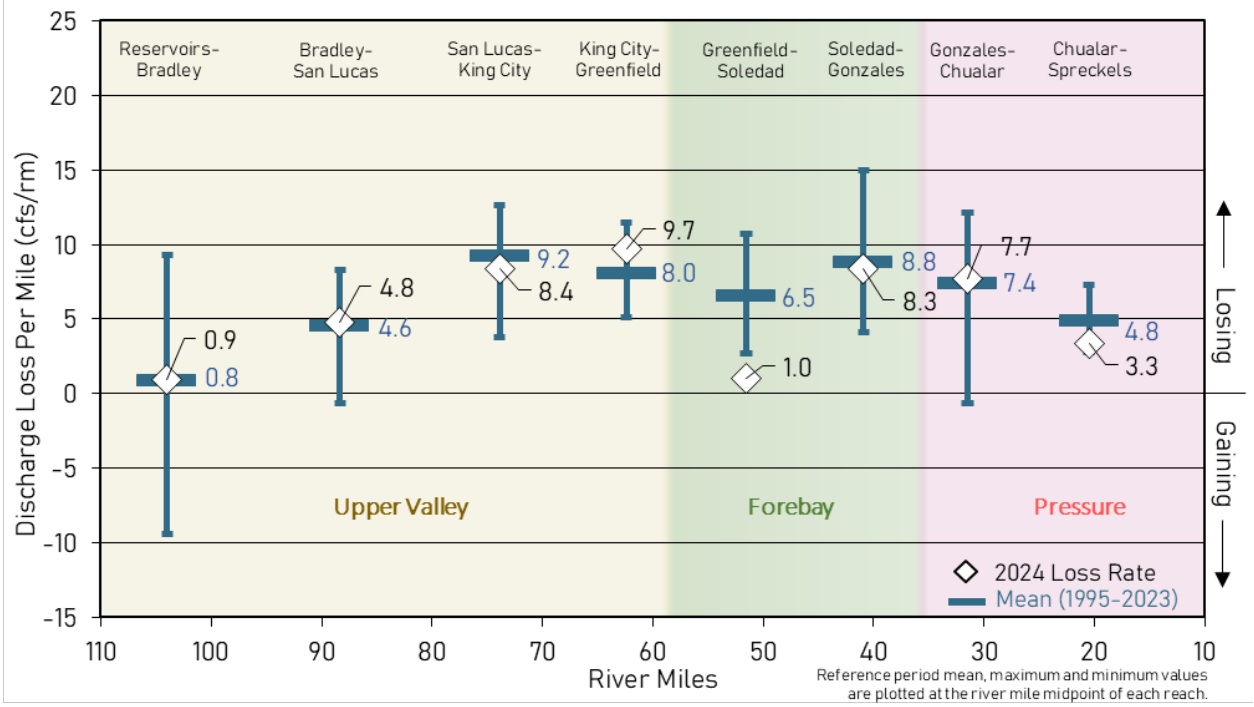


Figure 5. Comparison of 2024 Reach-to-Reach Discharge Loss Rates to 1995-2023 Loss Rate Ranges

Reach-to-Reach Analysis

This section discusses the reach-by-reach discharge loss rates. Data are also provided in Table 3.

Table 3. 2024 Discharge Loss Rates compared to historical data, by River Reach

River Reach	2024	1995-2023[a]		
	Loss Rate (cfs/rm)	Mean Loss Rate[a] (cfs/rm)	Minimum Loss Rate [Year] (cfs/rm)	Maximum Loss Rate [Year] (cfs/rm)
Reservoirs - Bradley	0.9	0.8	-9.4 (2002)	9.3 (2007)
Bradley - San Lucas	4.8	4.6	-0.6 (2007)	8.3 (2002)
San Lucas - King City	8.4	9.2	3.8 (1998)	12.7 (2019)
King City - Greenfield	9.7	8.0	5.1 (2008)	11.5 (2017)
Greenfield - Soledad	1.0	6.5	2.7 (2023)	10.7 (2007)
Soledad - Gonzales	8.3	8.8	4.1 (2005)	15.0 (1998)
Gonzales - Chualar	7.7	7.4	-0.7 (1998)	12.2 (2018)
Chualar - Spreckels	3.3	4.8	3.3 (2021)	7.3 (2019)

[a] Historical data includes measurements collected in years 1995, 1998-2000, 2002-2005, 2007-2009, 2011, 2012, 2017-2021 and 2023.

- **Reservoirs-to-Bradley reach:** The reach between the confluence of the Reservoirs and Bradley in the Upper Valley is the only section of the Salinas River that has historically recorded gains in flow, meaning a negative loss rate is observed; this section of the river was considered to be a gaining reach before the 2012-2016 drought. River Series data show that this reach shifted to be a losing reach since the end of the 2012-2016 drought period, including a loss rate of 0.9 cfs/rm recorded during the 2024 River Series. This reach had

the smallest loss rate observed during the 2024 measurement event.

- **Bradley-to-San Lucas reach:** This reach had a loss rate of 4.8 cfs/rm, which is very close to its historical period average of 4.6 cfs/rm.
- **San Lucas-to-King City reach:** This reach contains galleries of agricultural production wells in direct hydraulic communication with the Salinas River that can impact the overall discharge loss rate. Historically, this reach has the highest loss rates in the system, although during the 2024 measurement event, a higher loss rate was measured in the King City-to-Greenfield reach.
  During the 2024 River Series a discharge loss rate of 8.4 cfs/rm was measured, slightly below its historical average (9.2 cfs/rm). This loss rate is comparable to that rate of 2021 (8.6 cfs/rm) but smaller compared to other recent years (10.6 cfs/rm in 2020, 12.7 cfs/rm in 2019).
- **King City-to-Greenfield reach:** The 2024 loss rate for this reach (9.7 cfs/rm) was the highest measured in the system, greater than the historical period average 8.0 cfs/rm.
- **Greenfield-to-Soledad reach:** A loss rate of 1.0 cfs/rm was measured in 2024, which for the second year in a row was smaller than the minimum value previously recorded during the historical period (2.7 cfs/rm). This loss rate is also the second lowest loss rate recorded during the 2024 event. The low discharge loss values are probably influenced by the Arroyo Seco River system contributing groundwater to the aquifer in this reach; the Arroyo Seco stream converges with the Salinas River just south of Soledad, saturating the soil where the Salinas Valley and the Arroyo Seco Cone meet. In 2024, Arroyo Seco gauge recorded 75,425 acre-feet of surface water streamflow between the months of January and May (Figure 7).
- **Soledad-to-Gonzales reach:** The loss rate recorded in the 2024 River Series (8.3 cfs/rm) was lower but comparable with the average for the reference period (8.8 cfs/rm).
- **Gonzales-to-Chualar reach:** The loss rate recorded in the 2024 River Series (7.7 cfs/rm) was higher but comparable with the reference period average value (7.4 cfs/rm).
- **Chualar-to-Spreckels reach:** This is the furthest downstream reach. It had a loss rate of 3.3 cfs/rm in 2024 which is below its reference period average (4.8 cfs/rm). This reach is located over strata dominated by low permeability clay layers of the 180/400-Foot Aquifer Subbasin.

Overall, during the 2024 River Series all the reaches showed loss rates that are comparable to their historical average rates, with the exception Greenfield-Soledad, in which the measured loss rate attained a new minimum for a second consecutive year (2023 and 2024).

More specifically, the reaches upstream of Greenfield (Upper Valley) showed loss rates slightly above their reference period averages except for the San Lucas-King City reach, in which the loss rate fell slightly below its historical average.

Total System Discharge Losses

The overall discharge lost during the 2024 River Series can also be compared with the other River Series measurement events since 2017.

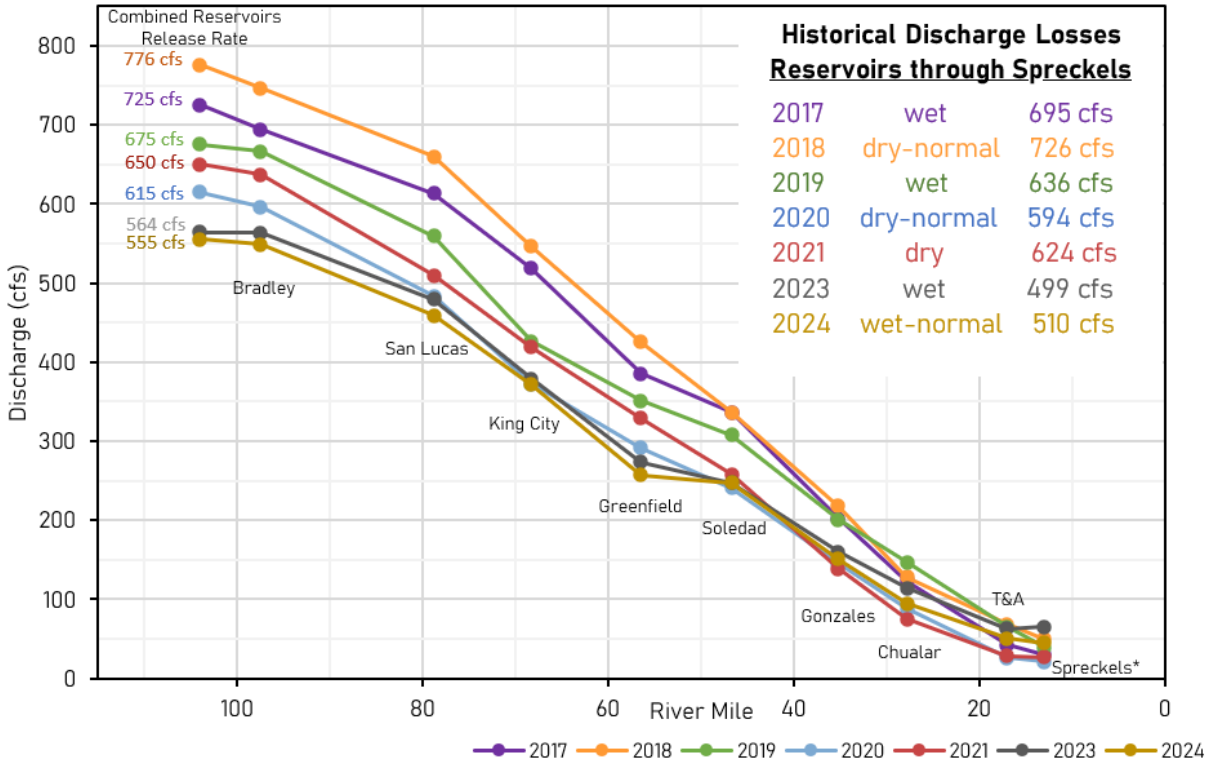


Figure 6. Changes in Discharge between Reservoirs and Spreckels.

Figure 6 shows the variability in hydrologic conditions and water year types under which Rivers Series data have been collected while reservoir releases and Salinas River flows have been managed in order to achieve similar discharge rates at Spreckels. Overall, a decreasing trend in the amount of total flow lost between the reservoirs and Spreckels has been observed since the end of the 2012-2016 drought, however, the 2024 overall discharge loss (510 cfs) was slightly higher than the loss measured in 2023, which it should be noted was conditioned by high precipitation in early 2023 and the overall loss measured (499 cfs) was the lowest flow loss recorded between the reservoirs and Spreckels since 2017.

Considering that the water released at the reservoirs is not constant every year, the estimated water loss in the fluvial system can also be compared in terms of discharge rate loss ratio between the initial discharge rate from the reservoirs and the rate measured at the end of the fluvial system in Spreckels (Table 4). The yearly ratios show a decrease in discharge losses in 2023 and 2024, where 88.5% and 91.9% of the released discharge rate was lost to the system in comparison to higher percentual losses in previous years.

Table 4. Discharge Rate Loss Ratio between Reservoirs and Spreckels					
River Series Year	Water Year Type	Combined Reservoirs Release Discharge (cfs)	Spreckels Discharge (cfs)	Discharge Rate Loss (cfs)	Discharge Rate Loss Ratio (%)
2017	Wet	725	30	695	95.9%
2018	Dry-Normal	776	50	726	93.6%
2019	Wet	675	39	636	94.2%
2020	Dry-Normal	615	21	594	96.6%
2021	Dry	650	26	624	96%
2023	Wet	564	65	499	88.5%
2024	Wet-Normal	555	45	510	91.9%

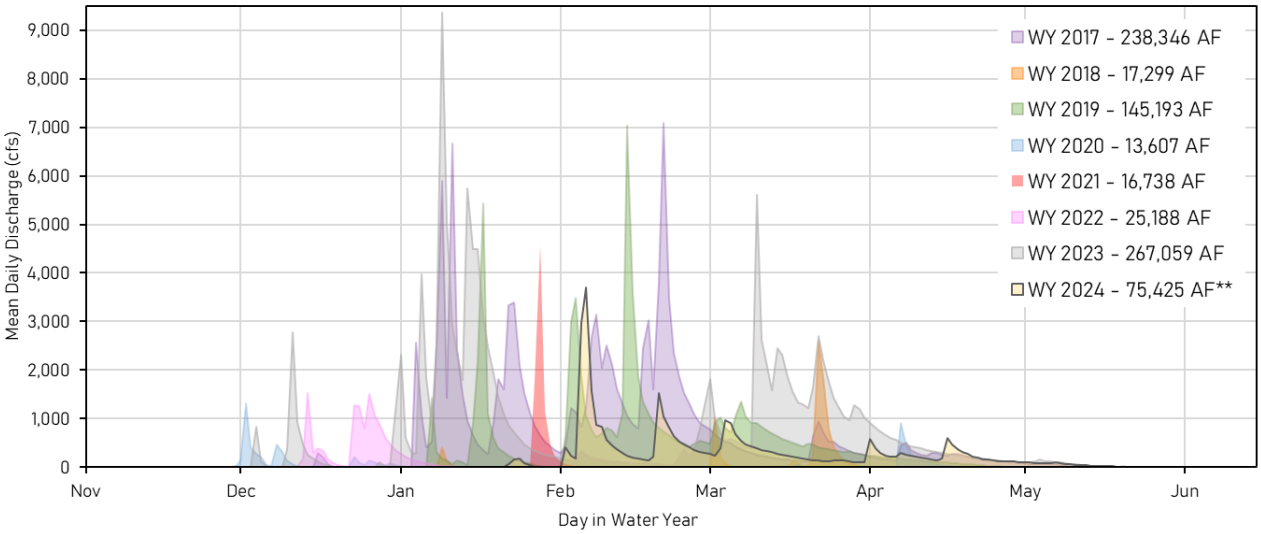
Several factors can impact flow and discharge rate losses in the Salinas River including weather, riparian vegetation, groundwater extractions, surface water diversions, the degree of aquifer depletion and antecedent moisture conditions which reflect the degree of saturation in the subsurface. The overall 2024 discharge loss of 510 cfs is comparable to the historical minimum loss measured in 2023 (499 cfs); it may be attributed predominately to a combination of the rainfall recorded in water years 2023 (wet year) and 2024 (wet-normal), and lower groundwater extractions in 2023. Above-average rainfall during wet years 2023 and 2024 helped diminish the river losses in comparison with previous years because it conditioned many controlling factors in the surface water-to-groundwater interaction: by increasing soil saturation beneath and around the channel; by reducing evapotranspiration and by alleviating groundwater demand for agricultural irrigation and urban uses.

Natural Discharge

One way to evaluate antecedent groundwater conditions is by looking at the water year type and timing of natural discharge in the system. While the River Series occurs in late summer, usually after several months of conservation releases, natural discharge can indicate the amount of groundwater recharge that occurred during the winter and spring recharge period. For example, frequent rainfall over an extended period of time allows for the subsurface to become saturated, which promotes groundwater recharge, while times with episodic storms may only penetrate the top portion of the subsurface and potentially dry out before recharging the aquifers.

The frequency and intensity of natural discharge has been very different every year after the 2012-2016 drought, as illustrated by the mean daily discharge at the USGS Arroyo Seco near Reliz stream gage (Figure 7). This gage is often used to represent unimpaired, natural discharge in the Salinas Valley watershed. In some years the Arroyo Seco had continuous discharge throughout the winter and spring seasons (water years 2017 and 2023) while other years only saw a few rain events that resulted in short periodic discharge (water years 2018, 2020, 2021 and 2022). Even though each of the 2017-2024 annual River Series events all documented an entirely losing stream system, the frequency, duration, or intensity of natural discharge does not correlate to the amount of discharge lost during the River Series; for example, the river discharge losses measured in 2023 and 2024 are very similar (499 cfs and 510 cfs, respectively) while the natural discharge measured

at the Arroyo Seco Reliz gage in those years were significantly different: 267,059 acre-feet recorded in water year 2023 (an historical maximum value since 2017) compared to the 75,425 acre-feet registered in water year 2024.



*Legend values represent the Total Annual Discharge Volume (in acre-feet) by Water Year at the Arroyo Seco near Reliz gage.
**WY 2024 discharge is based on preliminary USGS data and the assumption that there will not be flow in the Arroyo Seco for the remainder of the water year

Figure 7. Mean Daily Discharge by Water Year at the USGS Arroyo Seco near Reliz Gage

Groundwater Elevation Trends

Another factor that can influence discharge losses in the river is the degree of aquifer depletion, which can be thought of as the long-term decline in groundwater levels due to water demand and well pumping. When groundwater levels are lower than average there is more aquifer storage available to accept recharge from the river system, which is reflected in higher discharge losses. compared to when groundwater levels are higher. On the contrary, above average groundwater levels can contribute to diminishing discharge loss.

Figure 8 shows the average groundwater elevations in the Forebay subarea over the last decade. The first year of the 2012-2016 drought seems to have had little impact on groundwater levels, but from 2013 to 2016 groundwater levels saw a steep basin-wide decline. In water year 2017, the first wet year following the 2012-2016 drought, groundwater levels showed a rapid recovery, followed by a slower but continual recovery through 2019. By water year 2020, groundwater levels started to stabilize or slow in their recovery compared to the pre-drought levels. The return of groundwater levels to pre-drought levels, except for the Deep Aquifers and the East Side Subarea[3], indicated a lessening in the degree of aquifer depletion by water year 2020. By water year 2021, groundwater levels in the Forebay Subarea started to decline again and by water year 2022 the groundwater

[3] The Quarterly Conditions Report shows groundwater elevations for the major aquifers and subareas in the Salinas Valley and is updated every quarter of the water year. These reports can be accessed at: https://www.co.monterey.ca.us/government/government-links/water-resources-agency/documents/quarterly-salinas-valley-water-conditions

levels had dramatically decreased. This declining trend in groundwater levels within the Forebay Subarea shifted at the beginning of water year 2023 coinciding with the previously mentioned high precipitation events, which may explain the lower amount of discharge lost in the 2023 River Series compared to previous years.

In 2024, groundwater levels were generally above average due to the abundant precipitation in water years 2023 (wet) and 2024 (wet-normal), which conditioned the 2024 overall discharge loss to be close to the historical minimum measured in 2023.

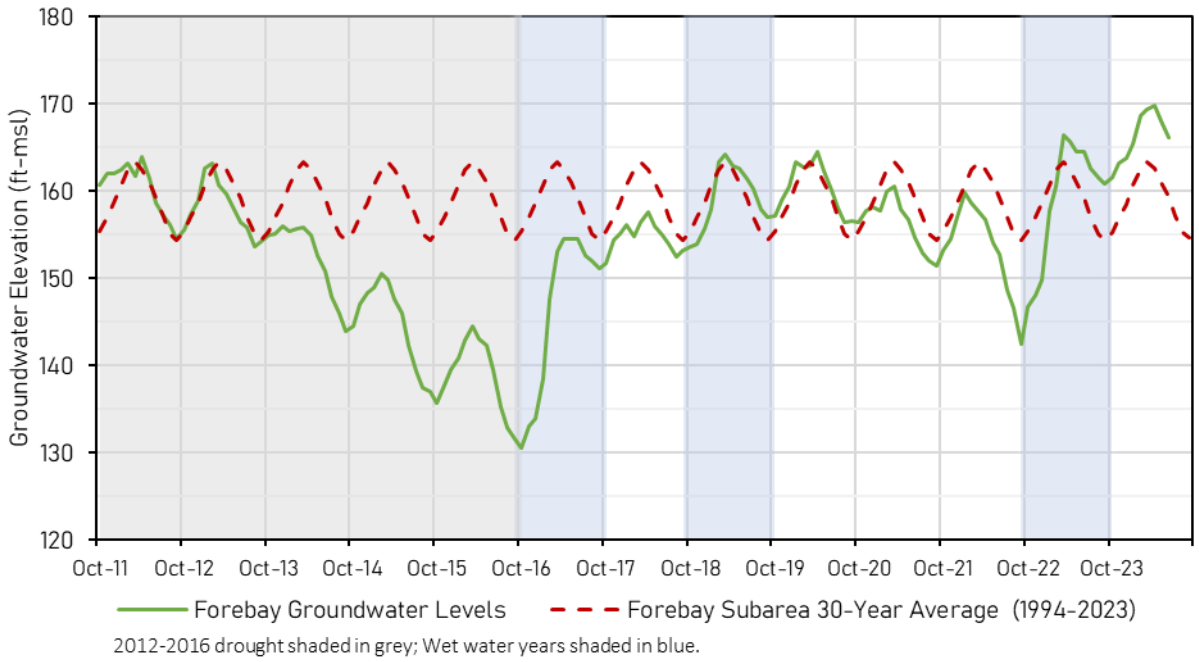


Figure 8. Groundwater Level Trends in the Forebay Subarea

It should be noted that other variables besides natural discharge and the degree of aquifer depletion may need to be considered to better represent antecedent groundwater conditions and their impact on discharge in the Salinas River. The extent to which these variables may contribute to reach-to-reach loss rates in the Salinas River is beyond the scope of this memorandum but warrants further investigation. These variables may be better quantified in the future using modeling tools such as the Salinas Valley Integrated Hydrologic Model (SVIHM).

Summary

Overall, the 2024 River Series documented an entirely losing system, where 510 cfs (1,011.5 acre-feet per day), or 91.9% of the combined reservoirs release discharge, were lost across the ninety-one sampled river miles. Most of the reaches saw loss rates that were similar to their respective reference averages except for one reach, Greenfield-to-Soledad, in which a new minimum loss rate was measured for a second year in a row (1.0 cfs per river mile in 2024) which is attributed to the influence of surface water flow from the Arroyo Seco on the groundwater system in this reach.

The 2024 River Series recorded a slightly greater discharge loss than the historical minimum loss measured in 2023 (499 cfs; or 88.5% of the 2023 release discharge). The discharge loss measured in 2024 was conditioned by a wet-normal water year and the above-average rainfall events that occurred in early 2023.

County of Monterey

Board Report

Legistar File Number: WRABMAC 24-037

Item No.4

Board of Supervisors
Chambers
168 W. Alisal St., 1st Floor
Salinas, CA 93901

November 06, 2024

Introduced: 10/28/2024
Version: 1

Current Status: Agenda Ready
Matter Type: WRA BMAC Item

Update on Department of Water Resources Bulletin 74 Well Standards Project. (Staff Presenting: Amy Woodrow)

County of Monterey

Board Report

Legistar File Number: WRABMAC 24-038

Item No.5

Board of Supervisors
Chambers
168 W. Alisal St., 1st Floor
Salinas, CA 93901

November 06, 2024

Introduced: 10/28/2024
Version: 1

Current Status: Agenda Ready
Matter Type: WRA BMAC Item

Update on the Groundwater Monitoring Program and Extraction Reporting Timelines. (Staff Presenting: Amy Woodrow)