Santa Ana River Regional Monitoring Program

2023-2024 Program Update

Becky Dunavant

05/06/2024

CDM Smith

Agenda

- Overview of 2023-2024 Sampling Year
  - Bacteria monitoring results for each priority group
  - Overview of compliance for each priority group
  - Wet Weather Sampling results (Priority 2)

- Recommendations/Next Steps
  - 2024-2025 Recommendations
  - Draft Report review/comments
  - MP/QAPP Updates

Overview of 2023-2024 Sampling Year

Overview of RBMP Structure

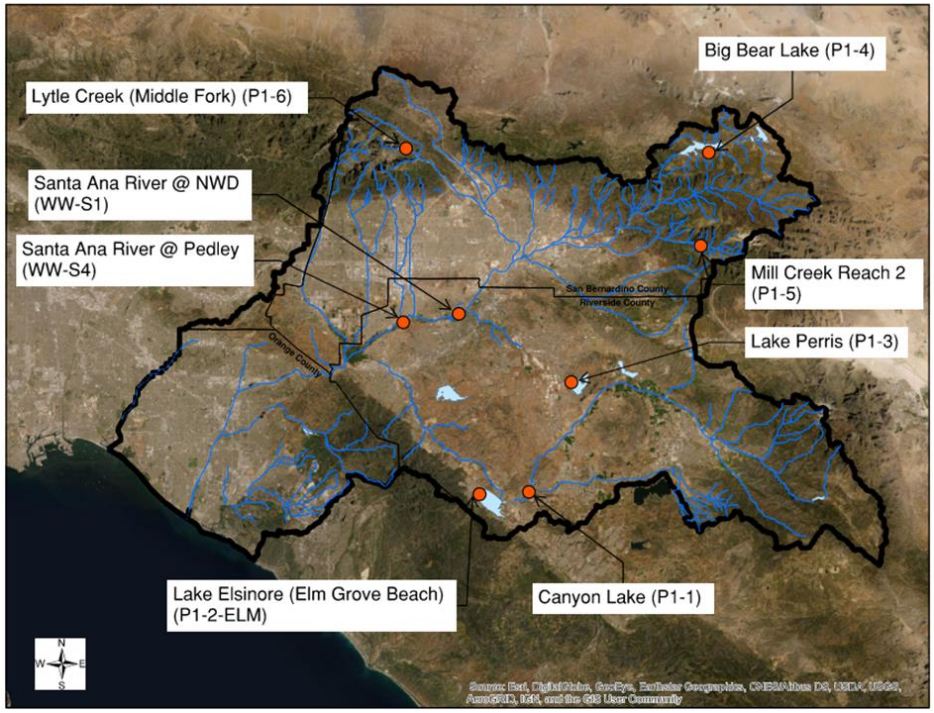
Priority	Goal	Sampling Schedule	Water Quality Objective
1	Monitor fecal bacteria conditions in the areas of greatest risk of exposure including lakes and streams with designated beaches and active recreational use to ensure water quality objectives (WQOs) are being met or actively addressed	20 Consecutive dry, warm weeks and 5 consecutive cool, dry weeks	E.Coli STV: 320 MPN/100mL E.Coli Geomean: 100 MPN/100mL Entero STV: 100 MPN/100mL Entero Geomean: 30 MPN/100mL
2	Evaluate effectiveness of implementation actions taken to comply with the Middle Santa Ana River (MSAR) bacteria TMDL	20 Consecutive dry, warm weeks and 5 consecutive cool, dry weeks	E. coli: 5-sample/30-day logarithmic mean less than 113 organisms/100 mL and not more than 10 percent of the samples exceed 212 organisms/100 mL for any 30-day period.
3	Collect data to evaluate status and trends in other bacteria impaired waters throughout the Santa Ana Basin	5 Consecutive dry weeks	No TMDL requirement
4	Ensure that waters re-designated as 'REC2 Only' meet anti-degradation requirements in the absence of a numeric WQO	Once/per year If exceedance, continue to collect monthly until 3 consecutive samples are in compliance	Site Dependent antidegradation target

Samples Collected vs Planned

Priority	Planned/Collected	Dry Weather	Wet Weather
Priority 1	Planned	200	--
	Collected	200	--
Priority 2	Planned	150	20
	Collected	150	20
Priority 3	Planned	45	--
	Collected	42[1]	--
Priority 4	Planned	5	--
	Collected	5[2]	--

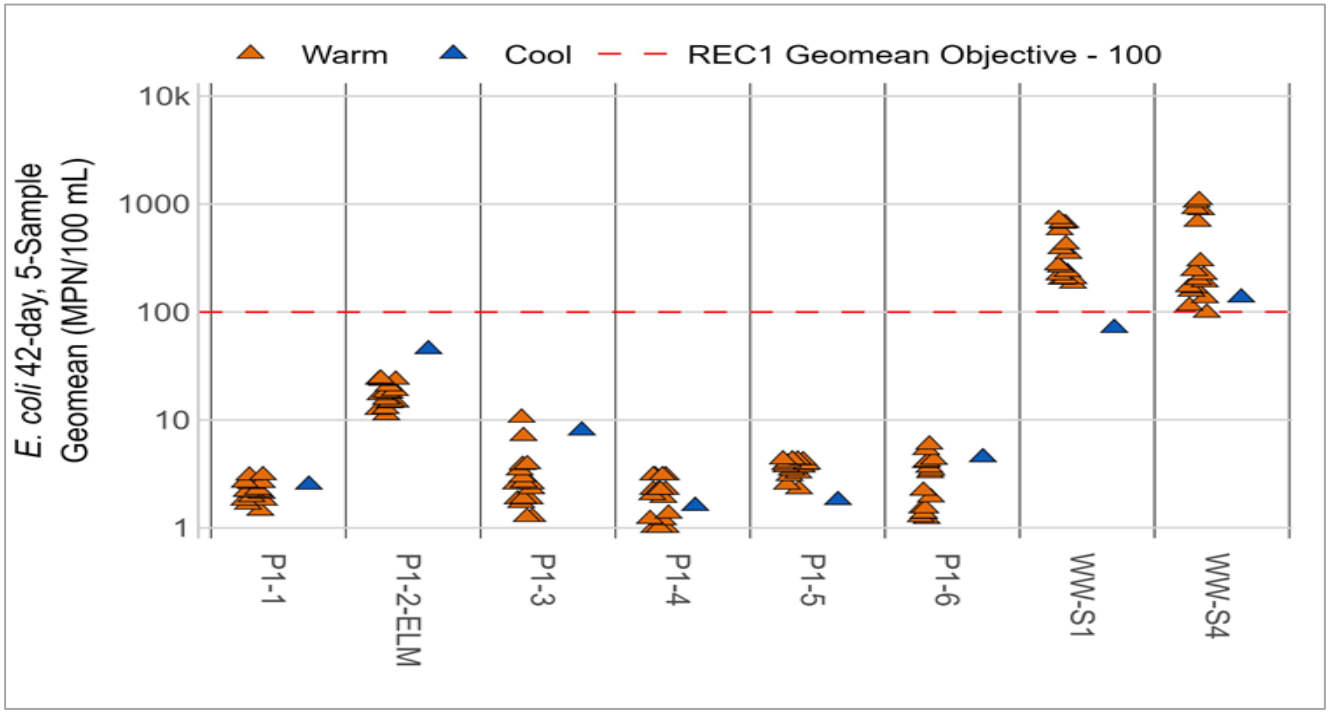
- Note 1: Only 2 of 5 sampled collected at P3-OC2 Borrego Creek likely due to the site typically being dry
- Note 2: Additional samples were collected at Santa Ana-Delhi Channel in Tidal Prism (P4-OC2) and Cucamonga Creek at Hellman (P4-SBC1) due to an exceedance of the antidegradation targets in the initial sample

Priority 1

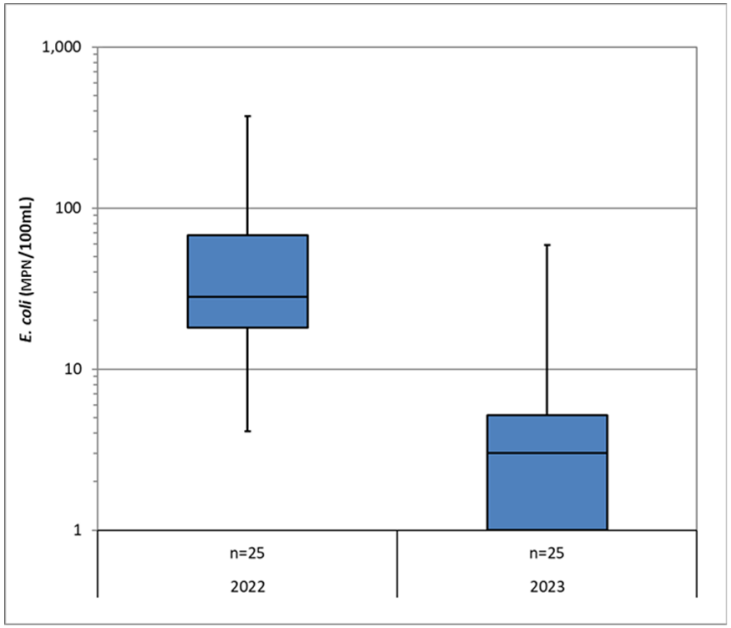


Site ID	Site Description	County
P1-1	Canyon Lake at Holiday Harbor	Riverside
P1-2-ELM	Lake Elsinore at Elm Grove Beach	Riverside
P1-3	Lake Perris	Riverside
P1-4	Big Bear Lake at Swim Beach	San Bernardino
P1-5	Mill Creek Reach 2	San Bernardino
P1-6	Lytle Creek (Middle Fork)	San Bernardino
WW-S1	Santa Ana River Reach 3 at MWD Crossing	Riverside
WW-S4	Santa Ana River Reach 3 at Pedley Avenue	Riverside

Priority 1 *E. coli* Geomeans



- Fecal bacteria conditions in Priority 1 waters during the 2023-2024 warm and cool dry sampling seasons were generally low and support recreational use, except at the two Santa Ana River sites (WW-S1: Santa Ana River Reach 3 at MWD Crossing and WW-S4: Santa Ana River Reach 3 at Pedley Avenue)
- Conditions at the non-Santa Ana River Priority 1 sites are improved from the previous year with notable reductions at Lake Elsinore (P1-2-ELM) and Lytle Creek (P1-6)



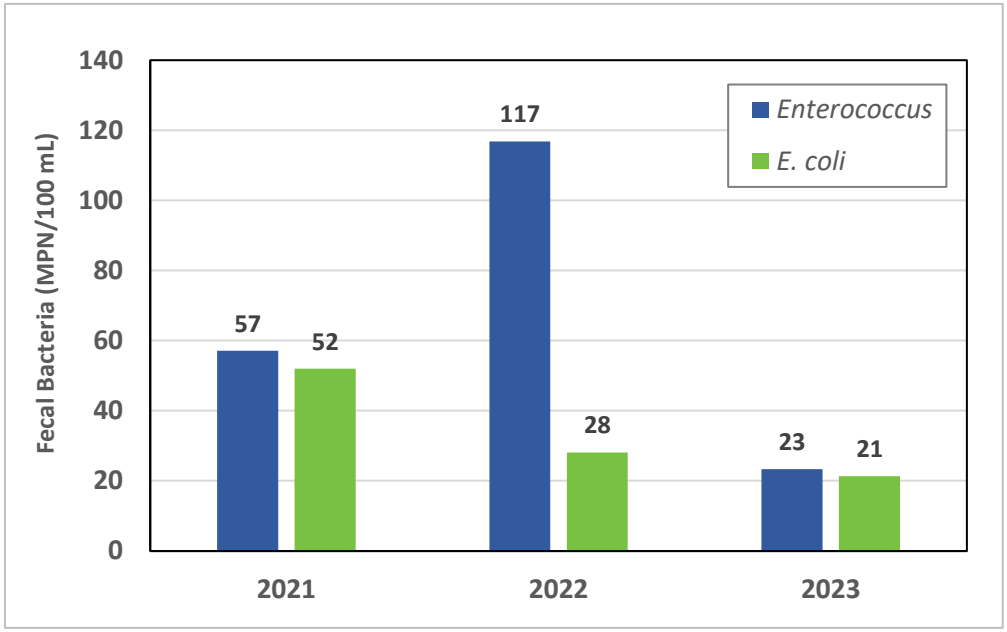
***E. coli* Concentrations at Lytle Creek Priority 1 sites in 2022 compared with 2023**

Lytle Creek

- Lytle Creek improvement likely due to changed baseflow in 2023.
- Downstream flows in 2022: 0-5.2 cfs
- Downstream flows in 2023: 27-105 cfs

Lake Elsinore

- 2022 enterococcus high values appear to be an isolated event
- Lake Elsinore sampling in 2024-2025 will resume at Launch Point site

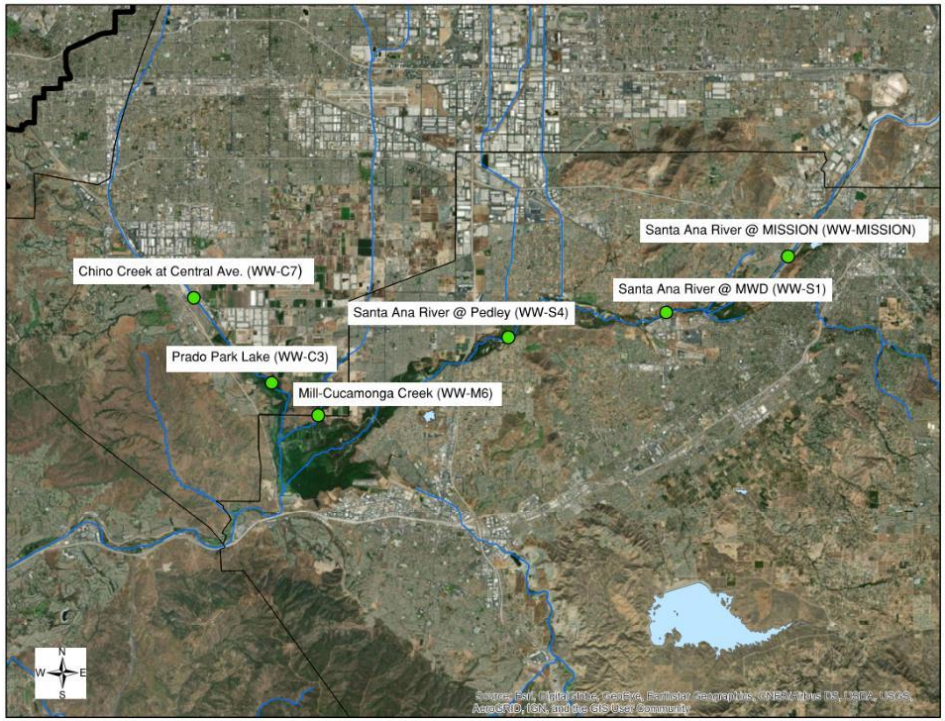


Annual Geomeans for Enterococcus and *E. Coli* Concentration at Elm Grove Beach in Lake Elsinore

Priority 1 Compliance

Site ID	Site	Geometric Mean Criterion Exceedance Frequency (%)	STV Criterion Exceedance Frequency (%)
P1-1	Canyon Lake	0	0
P1-2-ELM	Lake Elsinore at Elm Grove Beach	24	12
P1-3	Lake Perris	0	0
P1-4	Big Bear Lake	0	0
P1-5	Mill Creek Reach	0	0
P1-6	Lytle Creek (Middle Fork)	0	0
WW-S1	Santa Ana River Reach 3 at MWD Crossing	94	60
WW-S4	Santa Ana River Reach 3 at Pedley Avenue	94	56

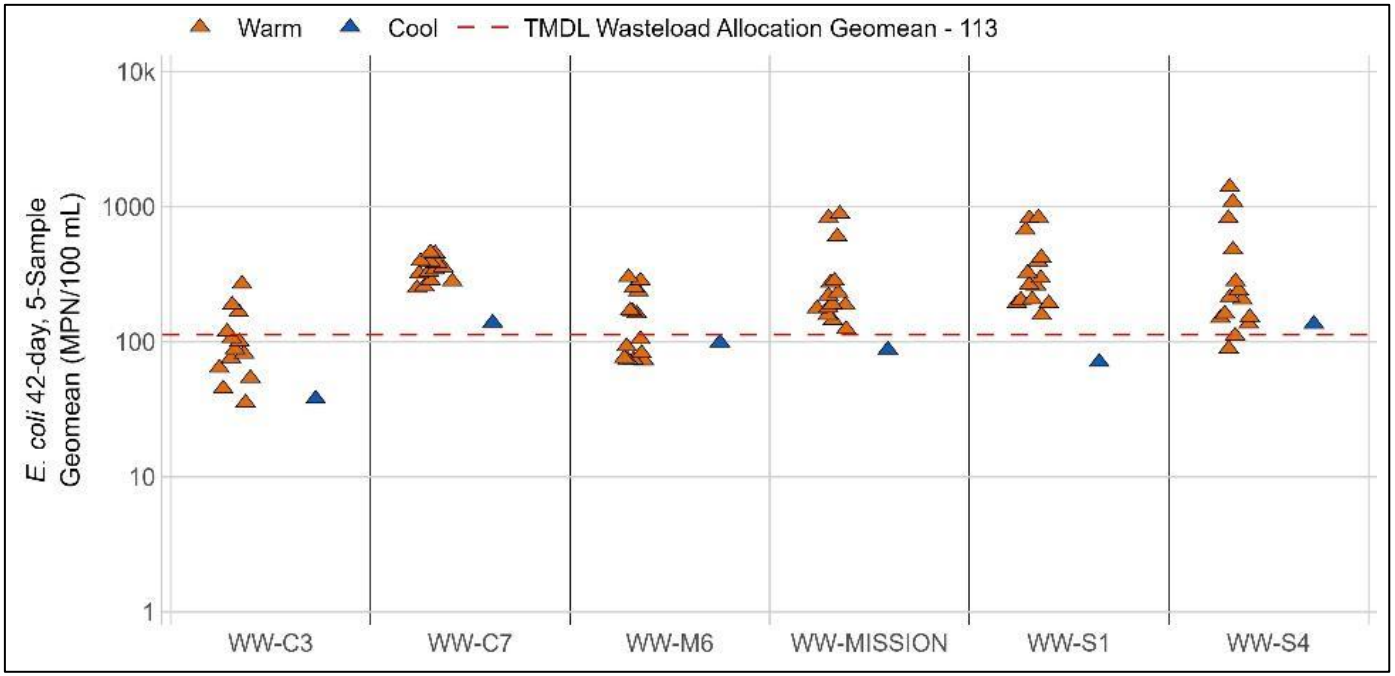
Priority 2



Site ID	Site Description	County
WW-M6	Mill-Cucamonga Creek below Wetlands	San Bernardino
WW-C7	Chino Creek at Central Avenue	San Bernardino
WW-C3	Prado Park Lake	San Bernardino
WW-S1	Santa Ana River Reach 3 at MWD Crossing	Riverside
WW-S4	Santa Ana River Reach 3 at Pedley Avenue	Riverside
MISSION	Santa Ana River at Mission Blvd. Bridge	Riverside

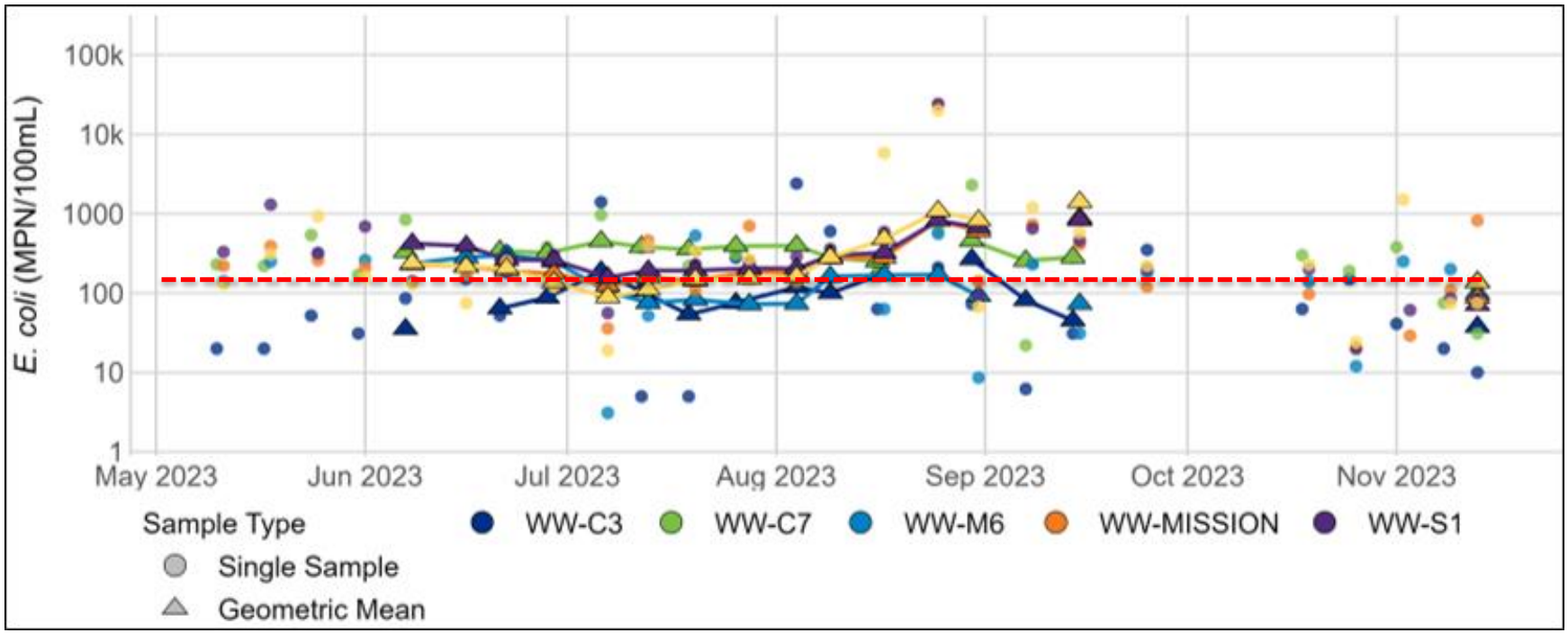
- SAR at Mission Blvd Bridge site is included with Priority 2 monitoring, but the site is not used to assess TMDL compliance

Priority 2 *E. coli* Geomeans



- No Priority 2 site attained TMDL waste load allocations (WLAs) during the warm, dry season
- Elevated baseflow during 2023 may have provided temporary pathways to mobilize sources of fecal bacteria that are typically hydrologically disconnected in dry weather

Priority 2 *E. coli* Results



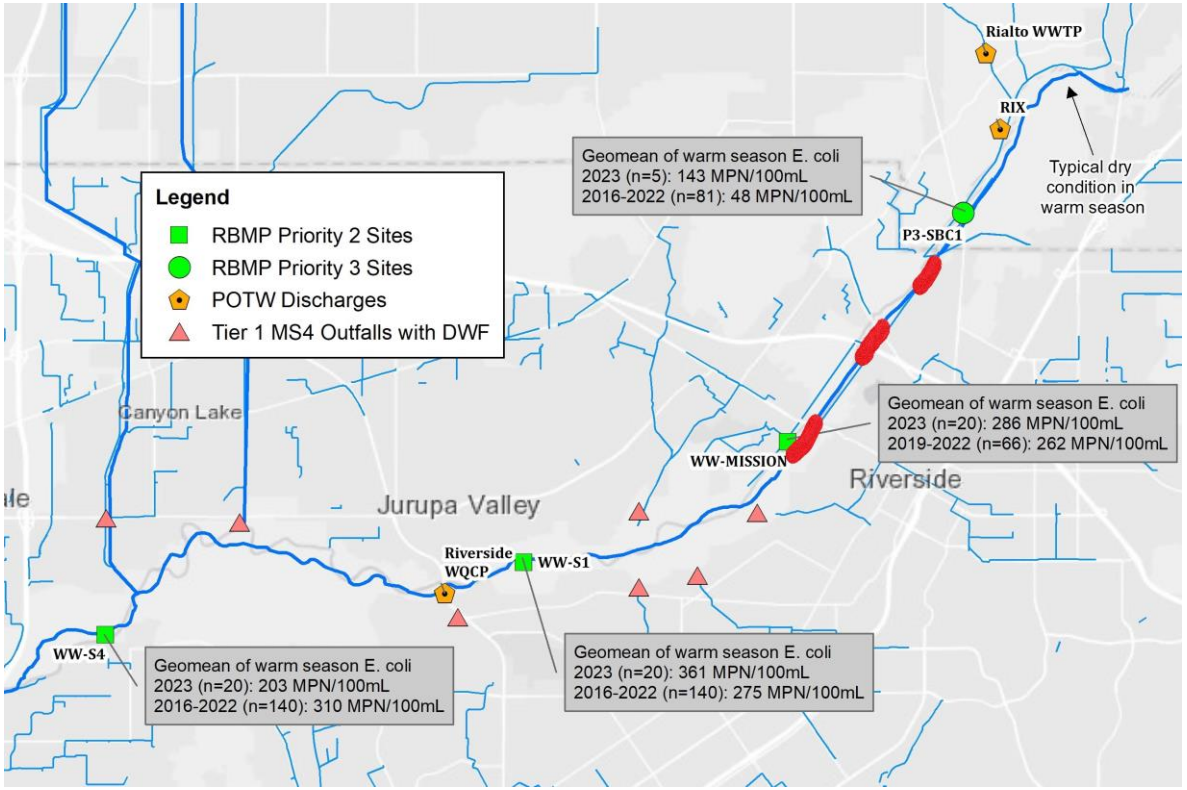
- Annual precipitation in 2023 was the largest in over 20 years as measured at Ontario International Airport (21.9 inches)
- The watershed experienced atypical wet weather in August with Hurricane Hilary (August 20, 2023)

Priority 2 Compliance

Site ID	Site	Warm, Dry Season Geomean WLA/LA Exceedance Frequency (%)	Cool, Dry Season Geomean WLA/LA Exceedance Frequency (%) (n=1)
WW-C3	Prado Park Lake	31%	0%
WW-C7	Chino Creek at Central Avenue	100%	100%
WW-M6	Mill-Cucamonga Creek	50%	0%
MISSION	Santa Ana River at Mission Blvd Bridge	100%	0%
WW-S1	Santa Ana River at MWD Crossing	100%	0%
WW-S4	Santa Ana River at Pedley Avenue	86%	100%

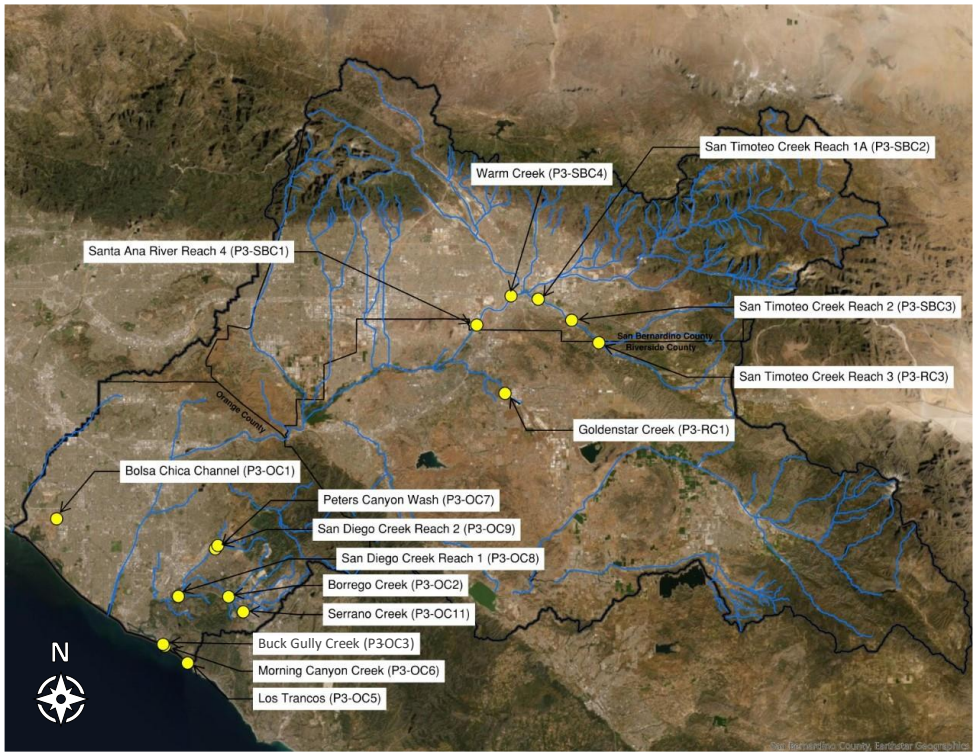
- SAR at Mission Blvd Bridge site is included with Priority 2 monitoring, but the site is not used to assess TMDL compliance. MISSION results were compared to 126 MPN/100mL for this table.

Priority 2 MSAR Historical Comparison



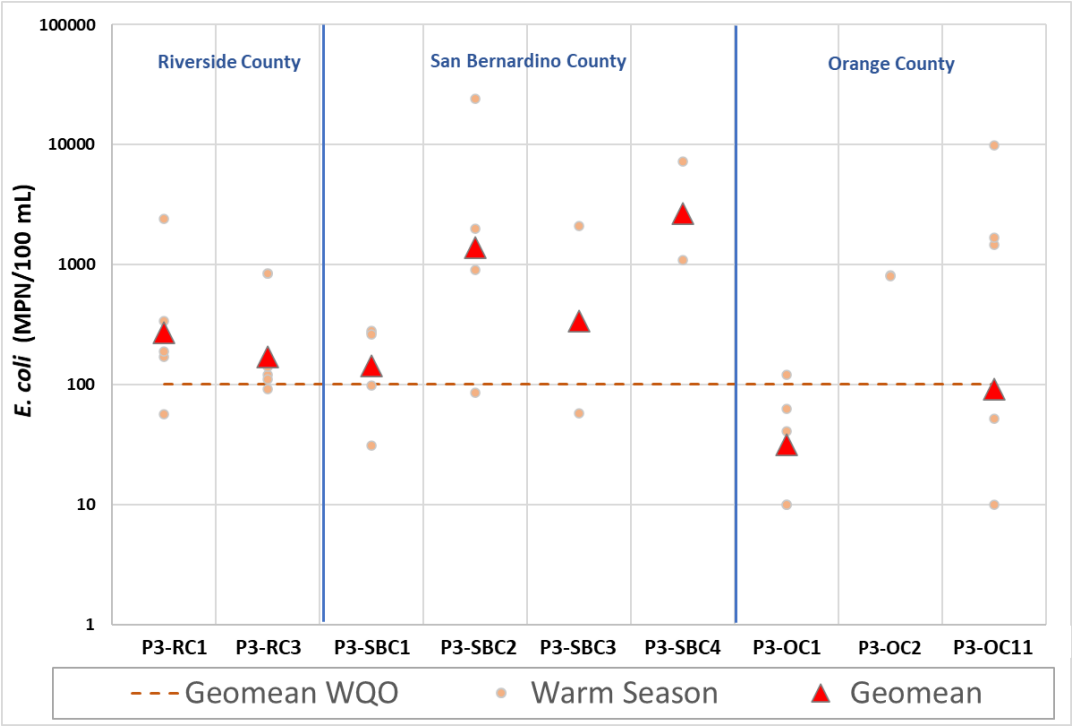
- Changes in 2023 could be attributed to construction activity and/or system connectivity due to increased baseflow
- Note: A significant increase in 2023 *E. coli* levels was observed at P3-SBC1 (Santa Ana River Reach 4 above S. Riverside Avenue Bridge) relative to historical levels within Reach 4 prior to the transition to Reach 3 at Mission Avenue

Priority 3



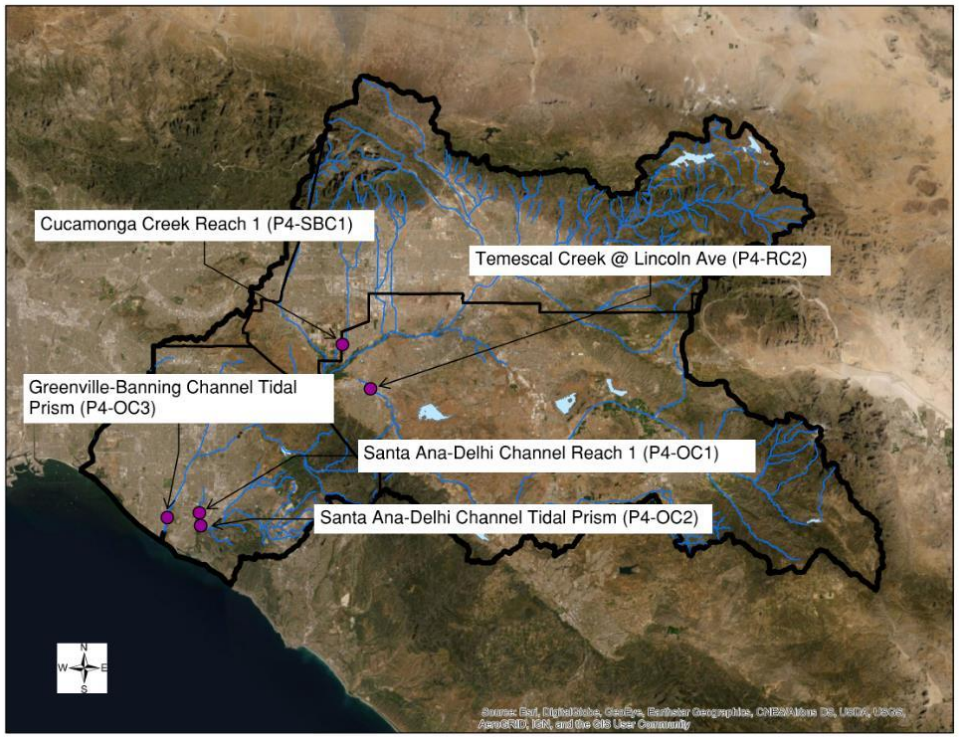
Site ID	Site Description	County
P3-OC1	Bolsa Chica Channel upstream of Westminster Blvd/Bolsa Chica Rd	Orange
P3-OC2	Borrego Creek upstream of Barranca Parkway	Orange
P3-RC1	Goldenstar Creek at Ridge Canyon Drive	Riverside
P3-RC3	San Timoteo Creek Reach 3	Riverside
P3-SBC1	Santa Ana River Reach 4 above S. Riverside Avenue Bridge	San Bernardino
P3-SBC2	San Timoteo Creek Reach 1A at Anderson St.	San Bernardino
P3-SBC3	San Timoteo Creek Reach 2 at San Timoteo Canyon Rd.	San Bernardino
P3-SBC4	Warm Creek below Fairway Dr.	San Bernardino

Priority 3 *E. coli* Geomeans



- Goldenstar Creek (P3-RC1) met WQOs in the 2022 dry season, but 2023 results show this may not be a long-term trend and continued monitoring is recommended
- Bolsa Chica Channel (P3-OC1) met the geomean WQO for *E. coli* in 2023 (also in previous years)
- San Timoteo Creek *E. Coli* concentrations increase from upstream (P3-RC3) to downstream segments (P3-SB3 and then P3-SB2)

Priority 4



Site ID	Site Description	County
P4-RC2	Temescal Creek at Lincoln Avenue	Riverside
P4-OC1	Santa Ana-Delhi Channel Upstream of Irvine Avenue	Orange
P4-OC2	Santa Ana-Delhi Channel in Tidal Prism	Orange
P4-OC3	Greenville-Banning Channel in Tidal Prism	Orange
P4-SBC1	Cucamonga Creek at Hellman Avenue	San Bernardino

Priority 4 Compliance

Site ID	Site Description	Single Sample Antidegradation Target (MPN/100 mL)	*E. coli* Sample Result	Enterococcus Sample Result	Sample Date
P4-OC1	Santa Ana-Delhi Channel Upstream of Irvine Avenue	1,067	238		8/30/2023
P4-OC2	Santa Ana-Delhi Channel in Tidal Prism	464		1,125	8/30/2023, Monthly
P4-OC3	Greenville-Banning Channel in Tidal Prism	64		41	8/30/2023
P4-RC2	Temescal Creek at Lincoln Avenue	725	260		6/23/2023
P4-SBC1	Cucamonga Creek at Hellman Avenue	1,385	3,800		6/23/2023, Monthly

- Santa Ana-Delhi Channel in Tidal Prism (P4-OC2) exceeded the antidegradation target and Orange County will continue to collect monthly samples.
- Cucamonga Creek at Hellman Avenue (P4-SBC1) exceeded the antidegradation target and San Bernardino County will continue to collect monthly samples.

2023-2024 Wet Weather Event

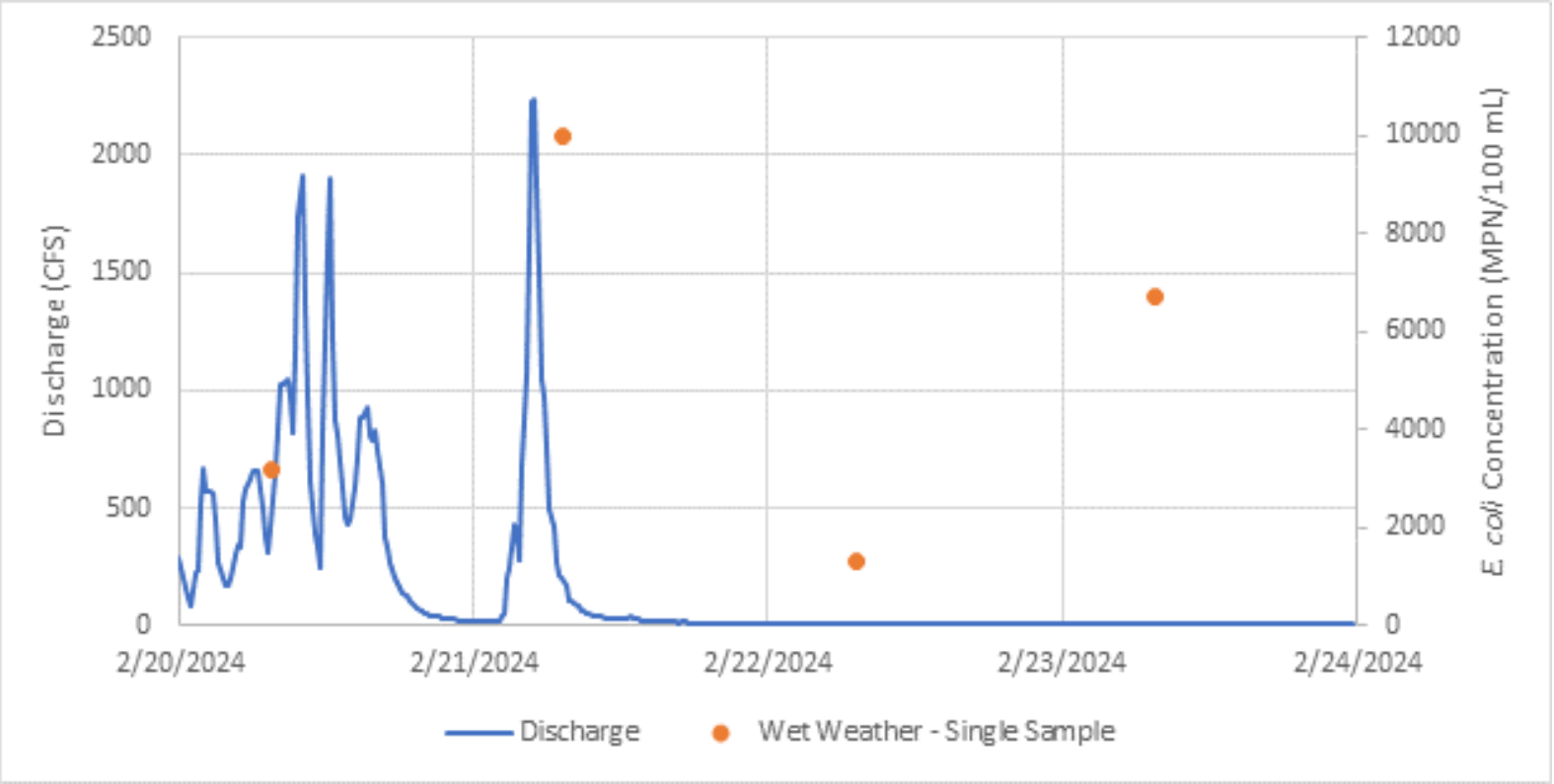
2023-2024 Wet Weather Event

Site	2/20/2024 During Storm	2/21/2024 24 hours after storm start	2/22/2024 48 hours after storm start	2/23/2024 72 hours after storm start
Prado Park Lake (WW-C3)	20,000	24,000	11,000	24,000
Chino Creek at Central Avenue (WW-C7)	3,200	10,000	1,300	6,700
Mill-Cucamonga Creek below Wetlands (WW-M6)	12,000	3,900	750	220
SAR Reach 3 at MWD Crossing (WW-S1)	14,000	5,800	930	360
SAR Reach 3 at Pedley Avenue (WW-S4)	16,000	14,000	1,500	270

Wet Weather Event:

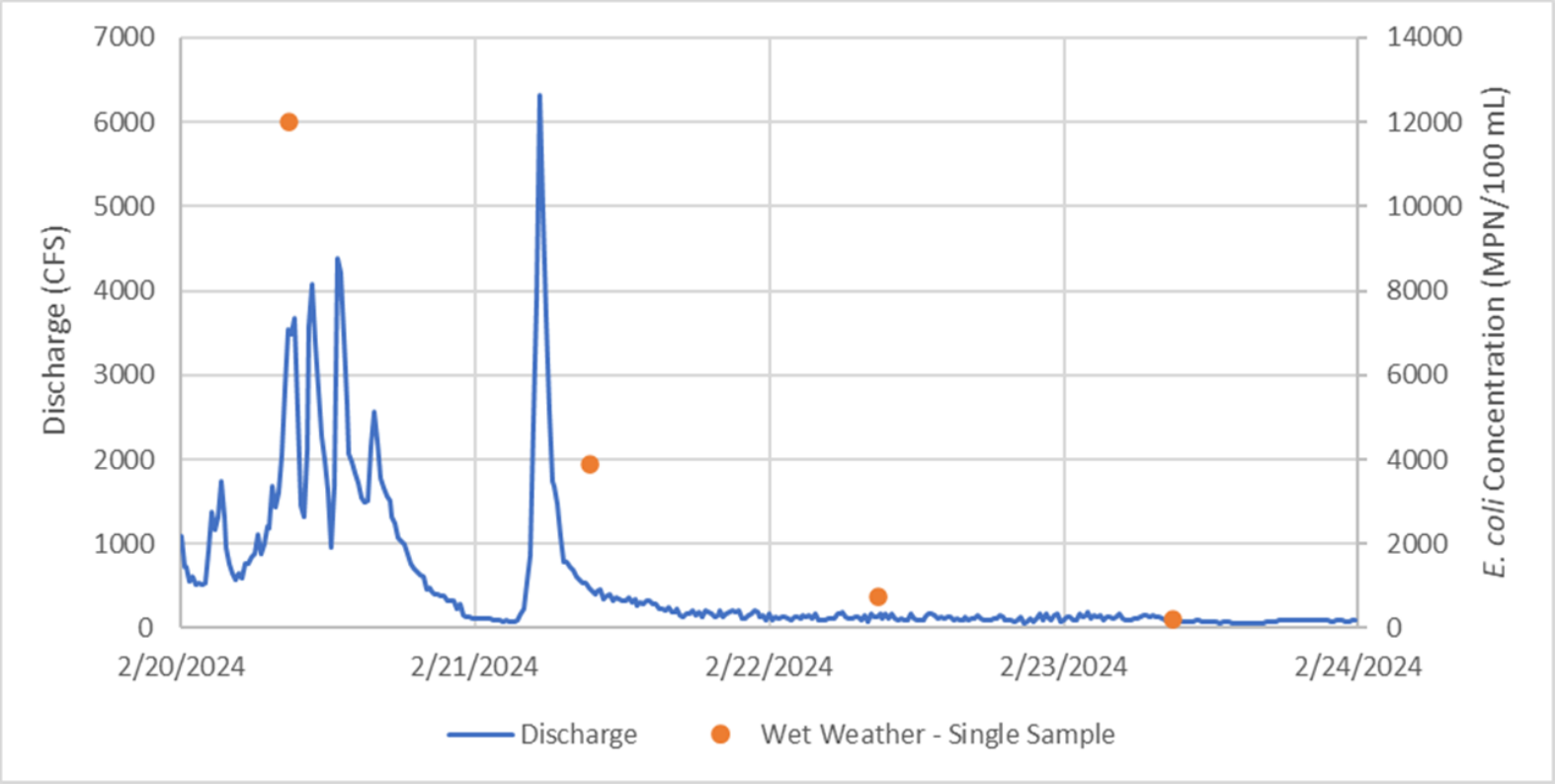
- 0.38 inches on February 19, 2024
- 2.04 inches on February 20, 2024
- 0.76 inches on February 21, 2024

Chino Creek Discharge vs WW-C7 Bacteria



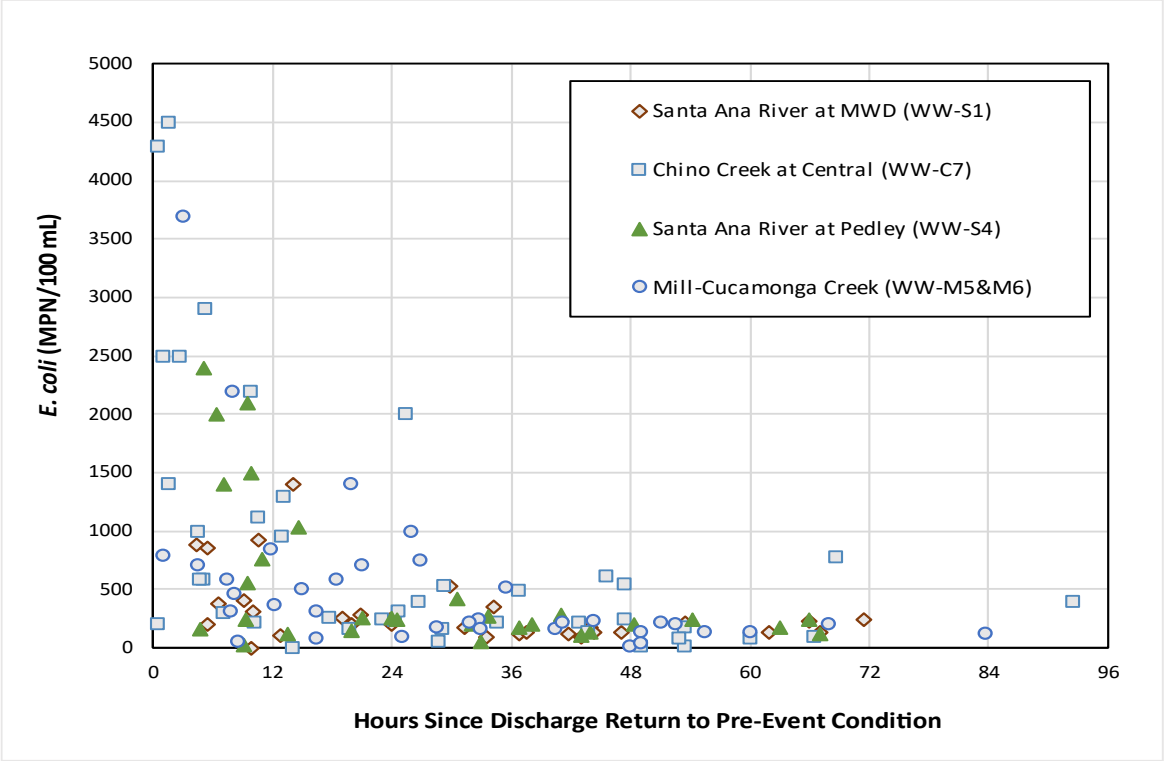
Flow data from USGS gauge 11073360: Chino Creek at Schaefer Ave

Mill-Cucamonga Creek Discharge vs WW-M6 Bacteria



Flow data from USGS gauge 11073495: Cucamonga Creek near Mira Loma

Historical Post-Storm Analysis



- Chart shows all post-storm samples based on the amount of time passed to the return of pre-wet weather event flow conditions (2007-2023)
- *E. coli* concentrations decline most sharply within the first 24 hours following a return to a pre-event flow condition

2024-2025 Sampling Recommendations/Next Steps

2024-2025 Sampling Recommendations

- Monitoring on Lake Elsinore for the upcoming season is recommended to return to Launch Point (P1-2) from the current location at Elm Grove Beach (P1-2ELM).
- Continued follow-up monitoring is needed at the Priority 4 sites that did not meet the antidegradation targets during the 2023 dry monitoring season: Santa Ana-Delhi Channel in Tidal Prism (P4-OC2) and Cucamonga Creek at Hellman Avenue (P4-SBC1).
- Continue to track the Riverside levee rehabilitation construction activities.
- Review the available data from the Greenville Banning Channel (P4-OC3) to determine if an analysis to change the antidegradation target should be considered.

Next Steps

- Comments on Draft Report due COB Friday **May 24**. Send to:
  - Rick Whetsel: rwhetsel@sawpa.gov
  - Becky Dunavant: dunavantra@cdmsmith.com
  - Steve Wolosoff: SWolosoff@geiconsultants.com
- Final Report submitted by June 30, 2024
- Monitoring Plan/QAPP updates (GEI)

Questions/Comments?