Santa Ana River Regional Monitoring Program

2022-2023 Program Update

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04/17/23

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Outline

- Overview of 2022-2023 Sampling Year
  - Number of samples collected vs planned
  - Overview of overall compliance for each priority group
- Mission Avenue
  - Trending bacteria results
  - Ongoing levee work
  - Pig2Bac Synopsis
- Lake Elsinore Elm Grove Beach
  - Higher levels of enterococcus
  - Summary of WSP investigation
- Wet Weather Sampling results
- Things to look forward to in the 2023-2024 sampling year
  - Potential impacts due to unusually wet winter
  - Possible reintroduction of P1-2 boat launch site
  - Further analysis of Orange County Priority 4 sites utilizing growing database
- Things to look forward to in the 2024-2025 sampling
  - Possible additional Priority 3 sites (Draft 303d list)

Overview of 2022-2023 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[1]	--
Priority 2	Planned	150	20
	Collected	150	20
Priority 3	Planned	35	--
	Collected	35	--
Priority 4	Planned	5	--
	Collected	23[2]	--

- Note 1: All 25 samples at Lake Elsinore (P1-2-ELM) were collected but there was a laboratory error resulting in a missing enterococcus result for one sample during the cool, dry season

- Note 2: Additional samples collected at Santa Ana Delhi Channel Upstream of Irvine Avenue (P4-OC1), Santa Ana Delhi Channel in Tidal Prism (P4-OC2) and Greenville-Banning Channel (P4-OC3) due to an exceedance of the anti-degradation targets in the initial sample
  - Per sampling protocol, additional monthly samples were collected

Priority 1 Compliance for *E. coli*
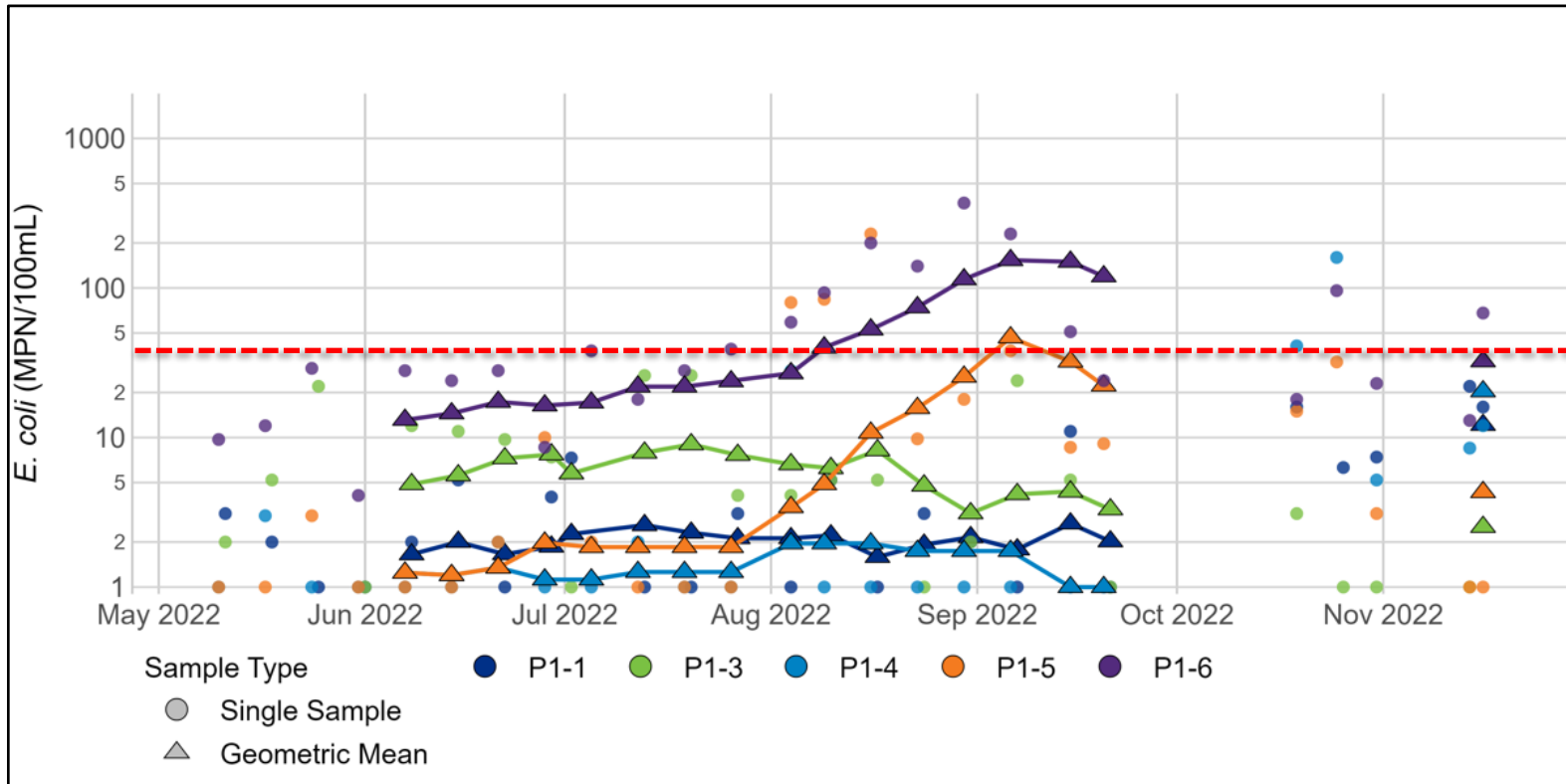
- Lytle Creek (P1-6) and Mill Creek (P1-5) follow consistent trend of increasing bacteria concentrations throughout the dry season
- Continued low concentrations and compliance at Canyon Lake (P1-1), Lake Perris (P1-3), and Big Bear (P1-4)

# Priority 1 Compliance for enterococcus
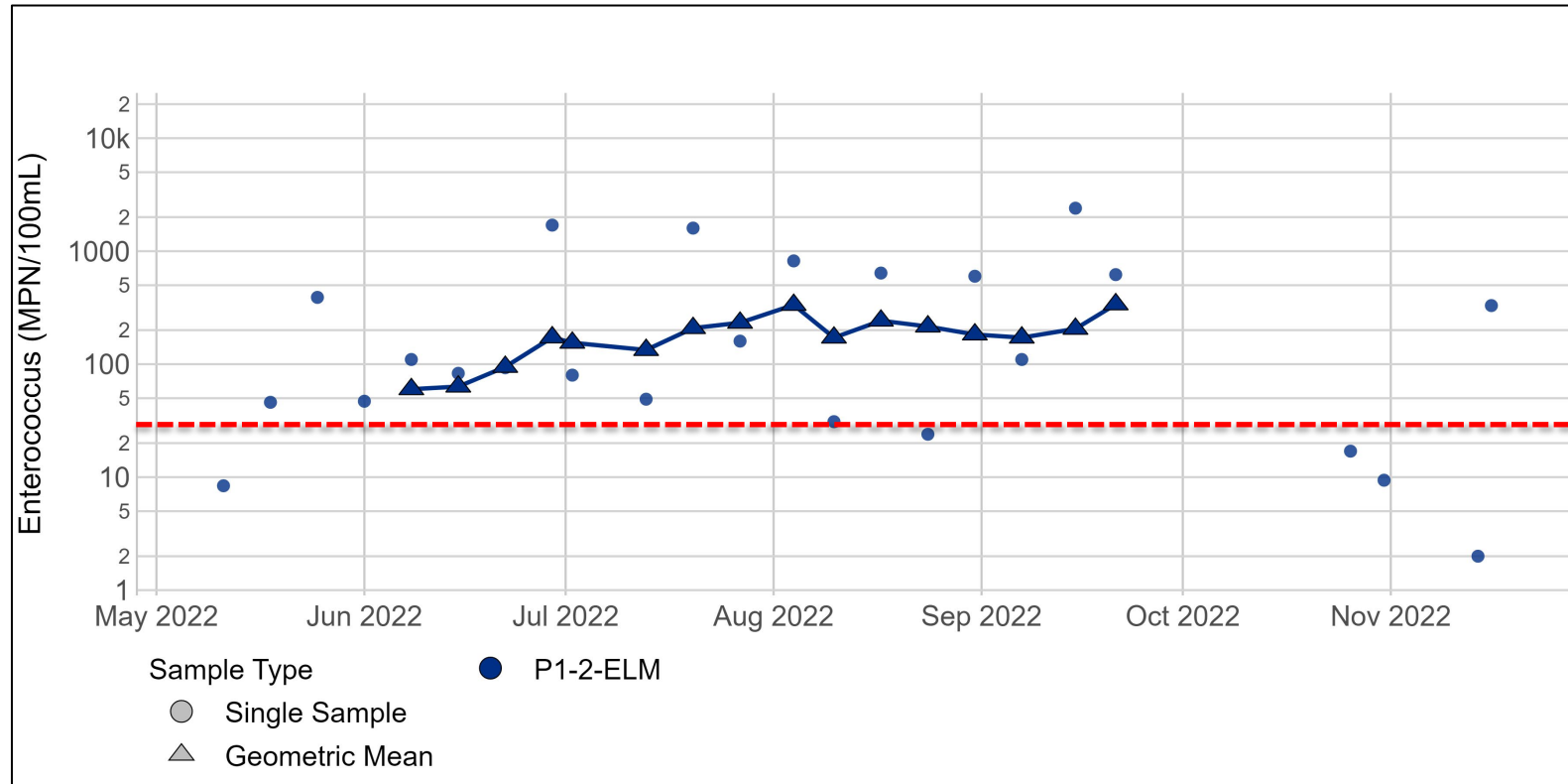
Priority 1 Compliance

| 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	100	50
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)	24	4
WW-S1	Santa Ana River Reach 3 at MWD Crossing	100	72
WW-S4	Santa Ana River Reach 3 at Pedley Avenue	100	16

Priority 2 Compliance
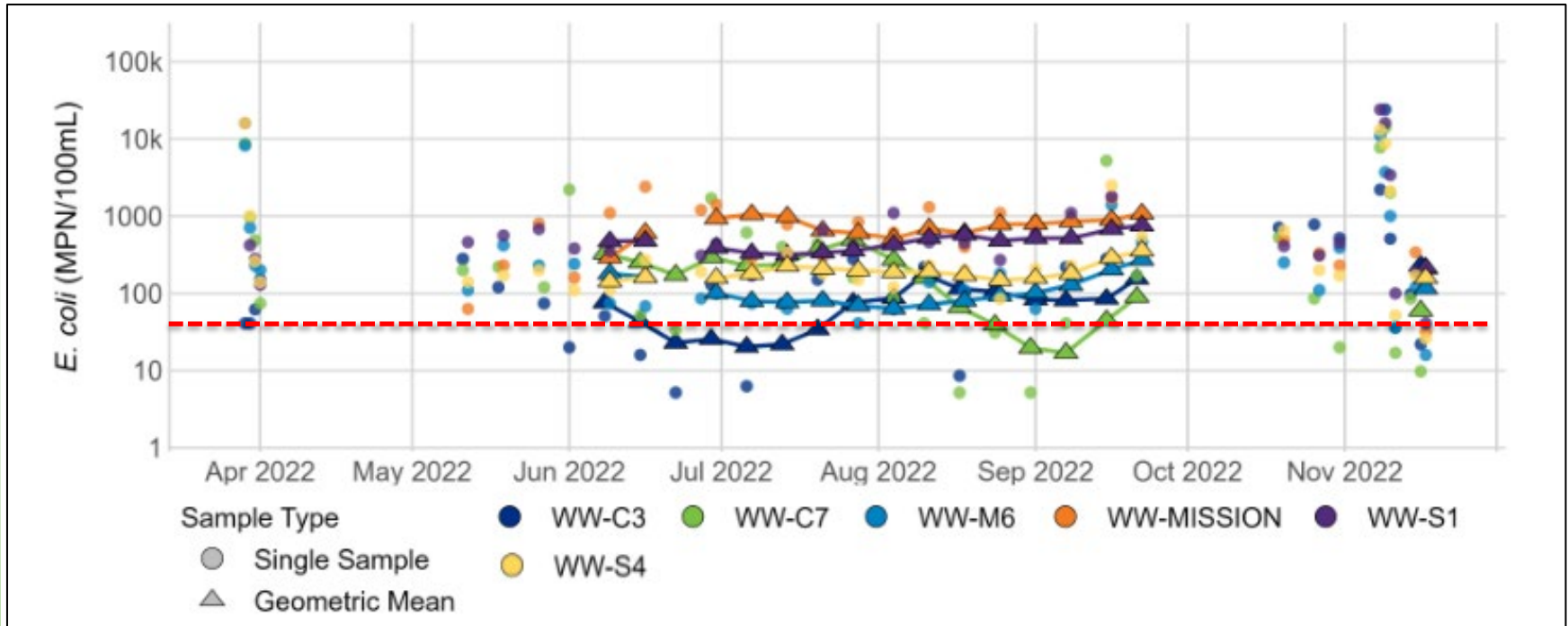
- Mission Avenue (WW-MISSION) continues to have elevated bacteria without MS4 inputs
- Prado Park Lake (WW-C3) experienced low water levels for most of dry season with no connectivity on 8/31/22
- Chino Creek (WW-C7) had highly variable bacteria samples leading to fluctuating geomean

Priority 2 Compliance

Month	# of Samples Collected	STV Criterion Exceedance Frequency (%)				
		Prado Park Lake	Chino Creek at Central Avenue	Mill-Cucamonga Creek	SAR @ MWD Crossing	SAR @ Pedley Avenue
May	3	33%	33%	67%	100%	0%
June	5	0%	40%	20%	100%	20%
July	4	25%	75%	0%	75%	25%
August	4	50%	0%	0%	100%	25%
September	4	50%	25%	50%	100%	75%
October	3	100%	33%	67%	100%	33%
November	2	0%	0%	0%	0%	0%

Priority 3 Compliance
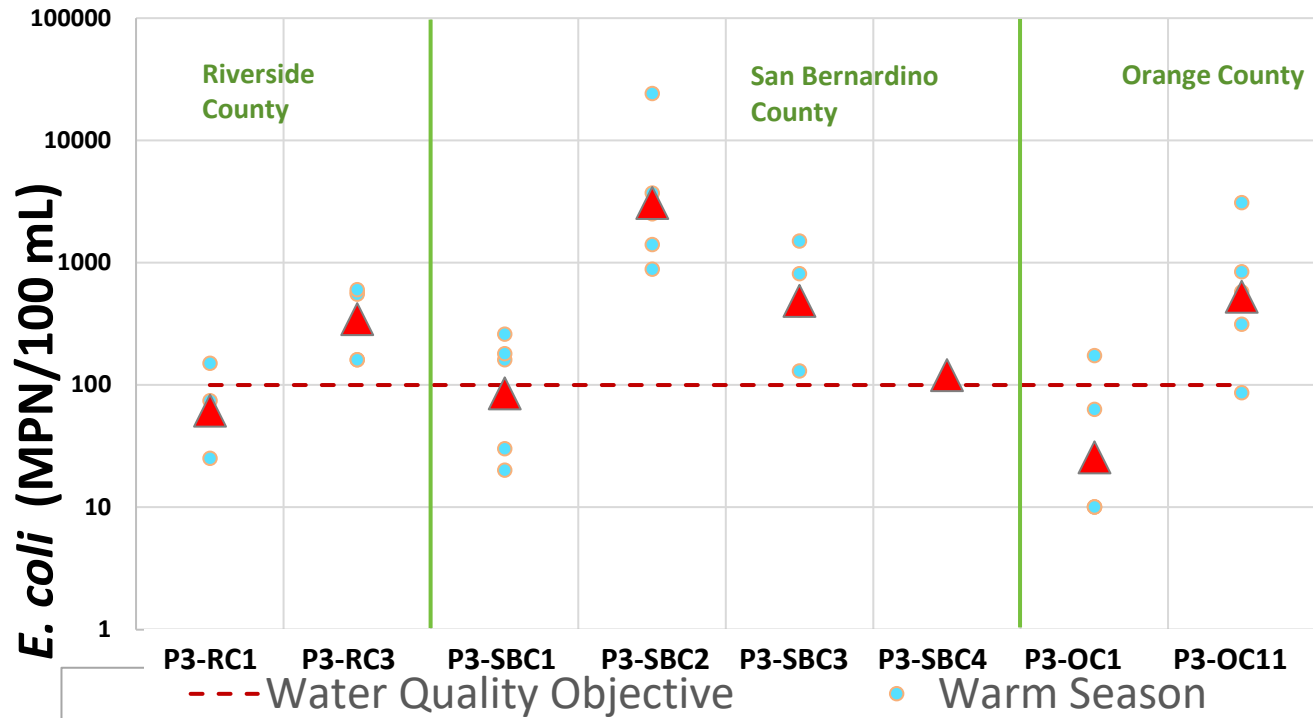
- For the first time, Goldenstar Creek (P3-RC1) geomean has fallen below 100 MPN/100mL since beginning of program in 2016
- Continued linear increase of bacteria in San Timoteo Creek (P3-SBC2, 3, and 4) implying equal bacteria inputs despite changing land uses

Priority 4 Compliance

Site ID	Site Description	Single Sample Antidegradation Target	EC Result	ENT Result	Sample Date
P4-OC1	Santa Ana Delhi Channel Upstream of Irvine Avenue	1067	(108 – 19863)		9/15/2022, Monthly
P4-OC2	Santa Ana Delhi Channel in Tidal Prism	464		(31 – 1391)	9/15/2022, Monthly
P4-OC3	Greenville-Banning Channel in Tidal Prism	64		(ND - 627)	Monthly
P4-RC2	Temescal Creek at Lincoln Avenue	725	22		7/8/2022
P4-SBC1	Cucamonga Creek at Hellman Avenue	1385	340		7/8/2022

- Temescal Creek at Lincoln Avenue (P4-RC2) remains in compliance
- Cucamonga Creek at Hellman (P4-SBC1) returned to compliance after antidegradation update and exceedance in 2021
- Greenville-Banning Channel in Tidal Prism (P4-OC3) continued to struggle with compliance after 2021 exceedance

Mission Avenue Bacteria Results 2020-2022
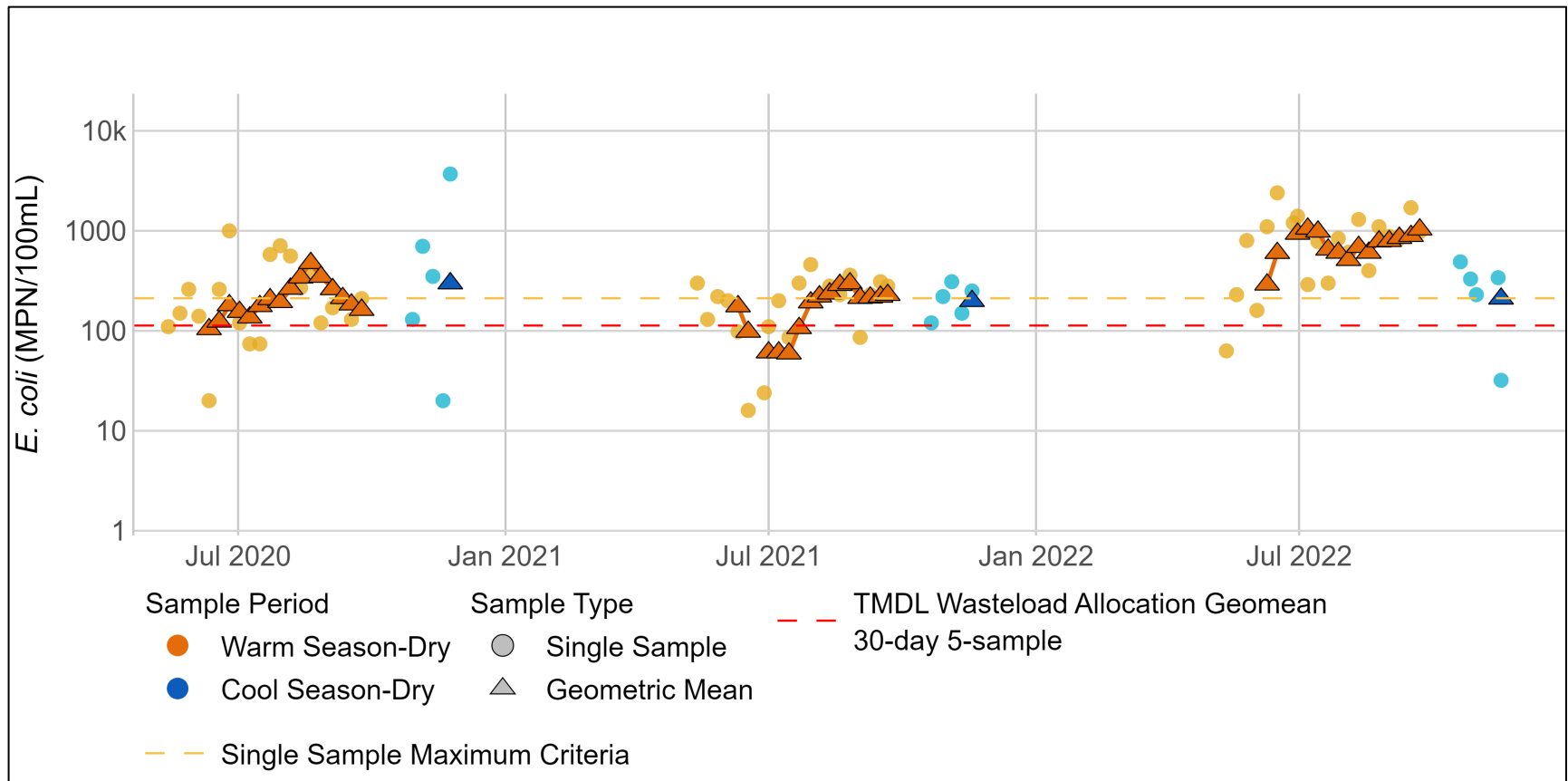
Market St to Mission Ave Levee Work

Photos counterclockwise from top:

- Ongoing levee work upstream of Mission Ave
- Abandoned encampment upstream of Mission Ave
- Active encampment underneath Mission Ave

Homeless Encampment Phase A Results

Date	Bacteria or Marker		Market Street Bridge		Mission Blvd Bridge		Van Buren Bridge	
			MSB-1	MSB-2	MBB-1	MBB-2	VBB-1	VBB-2
11/18/2021	E. coli		130	230	84	440	150	430
	Pig	Result	ND	ND	ND	Detect	Detect	Detect
		Quantity				945	1,924	26,915
1/6/2022	E. coli		31	60	59	59	99	93
	Pig	Result	ND	ND	BDL	Detect	Detect	Detect
		Quantity			66	102	102	1919

downstream →

Homeless Encampment Study Sites
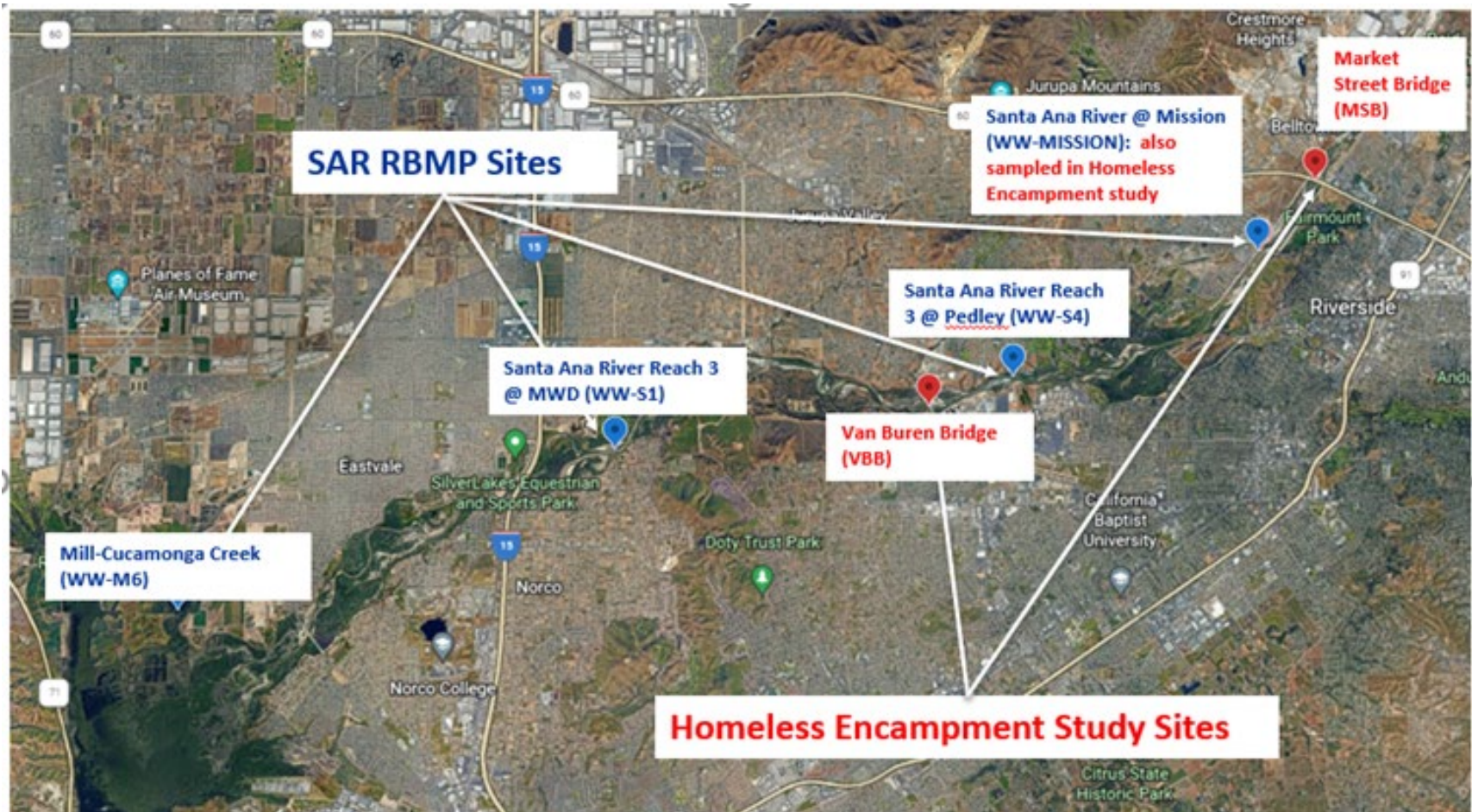
2022 Pig2Bac Study Results

Sample Date	MISSION		WW-S4		WW-S1		WW-M6	
	E.coli	Pig2Bac	*E. coli*	Pig2Bac	*E. coli*	Pig2Bac	*E. coli*	Pig2Bac
5/12/2022	63	ND	140	795	460	1,072	110	ND
5/26/2022	800	ND	200	438	680	7,629	230	ND
6/9/2022	1,100	ND	880	1,599	350	3,057	74	ND
6/27/2022	190	ND	190	1,161	310	4,099	86	ND
6/30/2022	1,400	ND	210	962	440	1,843	98	ND
7/14/2022	780	ND	340	2,042	280	1,044	63	ND
7/28/2022	840	ND	150	1,692	410	1,364	41	ND
8/11/2022	1,300	ND	230	1,802	460	2,728	140	ND
8/25/2022	1,100	ND	85	295	270	5,322	180	ND
9/8/2022	840	1,947	230	1,470	1,100	BDL	200	ND

downstream →

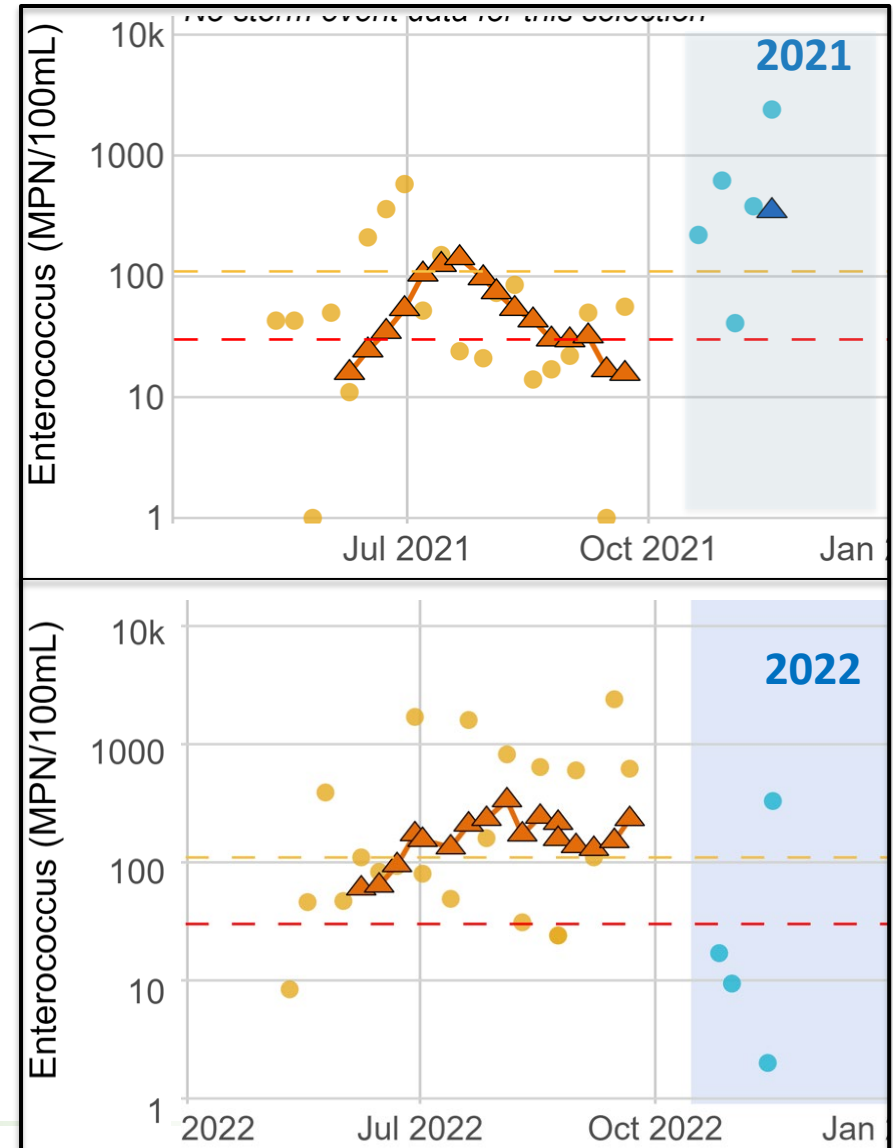*E. coli* units MPN/100 mL; Pig2Bac units (copies/100 mL)

Lake Elsinore Elm Grove Beach

Enterococcus Data at Elm Grove Beach

- **In warm dry period, enterococcus levels higher in 2022 than in 2021**

  - All geomeans in 2022 exceeded WQ objective vs. 56% in 2021

  - STV concentration also were an average of 5x higher in 2022

- **In cool dry period, levels higher in 2021 vs. 2022**

Elm Grove Beach Sampling Location

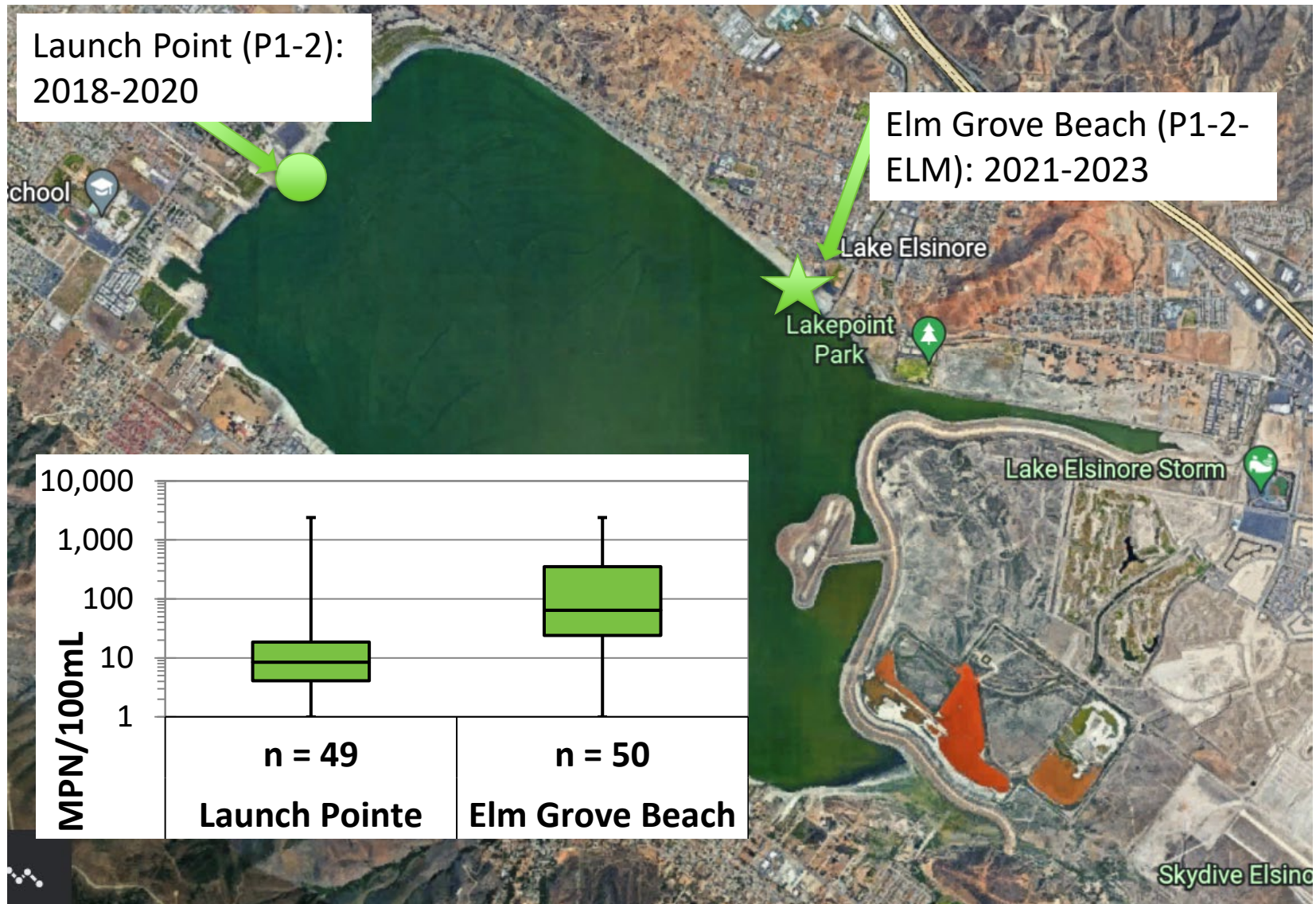| Exceedances/Events in last 5 years	
2021	• Off-spec discharge • Coliform exceedance (no other indicators of water quality issue)
2020	• Raw influent spill (construction activity)
2019	• Secondary spill during storm
2018	• Ammonia exceedance • Coliform Exceedance • Coliform Exceedance
2017	• Turbidity Exceedance

EVMWD Discharge Location

Other Lake Elsinore Bacteria Data

- From 2018-2020, samples collected at boat dock (Launch Point) for enterococcus:
  - Sampling dates did not overlap with Elm Grove Beach location

- City of Lake Elsinore 2022 samples of channel from EVMWD plant
  - 4 locations in channel
  - 3 locations in lake
- For enterococcus and HF-183

RBMP Lake Elsinore Enterococcus Results

Launch Point (P1-2): 2018-2020

Elm Grove Beach (P1-2-ELM): 2021-2023

Lake Elsinore

Lakepoint Park

Lake Elsinore Storm

Skydive Elsino

Chart — MPN/100mL (y-axis, log scale: 1, 10, 100, 1,000, 10,000):
n = 49 — Launch Pointe
n = 50 — Elm Grove Beach

City of Lake Elsinore
February 17, 2022 Study Results

Loca-tion	Station	Ammonia (mg/L as NH3)	Enterococcus (MPN/100 mL)	HF-183 (copies/100 mL)
Channel	Dam near initial discharge	<0.4	200	ND (<37)
	Summer Ave	0.7	<10	ND (<37)
	Old outfall @ LE shore	<0.4	220	177
	New outfall @ LE shore	5.0	<10	1377
Lake Shore	North of discharge	<0.4	120	BLOQ (<34)
	At new discharge	4.5	<10	1768
	South of discharge	<0.4	30	114

- EVMWD discharge had higher ammonia, no detected enterococcus, and high human marker → EVMWD not source of bacteria
- Other locations have variable enterococcus and human marker levels → another source(s) in channel may be important

Lake Elsinore Recommendation

- Continue to work with City of Lake Elsinore to understand source(s) of elevated enterococcus levels since during Priority 1 sampling
  - The city indicated that homeless encampments are found in the delta and under bridges

- During 2023 sampling program, consider sampling concurrently at
  - Elm Grove Beach
  - Launch Point

 To evaluate extent of elevated bacteria levels in lake

2022-2023 Wet Weather Event

2022-2023 Wet Weather Event

Site	E. Coli Concentration (MPN/100 mL)			
	11/8 During Storm	11/9 24 hours after storm start	11/10 48 hours after storm start	11/11 72 hours after storm start
Prado Park Lake (WW-C3)	2,200	24,000	510	36
Chino Creek at Central Avenue (WW-C7)	7,700	14,000	2,000	17
Mill-Cucamonga Creek below Wetlands (WW-M6)	11,000	3,700	1,000	36
SAR Reach 3 at MWD Crossing (WW-S1)	24,000	16,000	3,400	100
SAR Reach 3 at Pedley Avenue (WW-S4)	13,000	8,700	2,100	52

- Wet Weather Event Characteristics
    - 1.16 in (24 hr)
    - 0.23 in/hour max intensity
    - First large rain event of the wet weather season
    - Extended rain event with multiple peaks

Chino Creek Discharge vs WW-C7 Bacteria
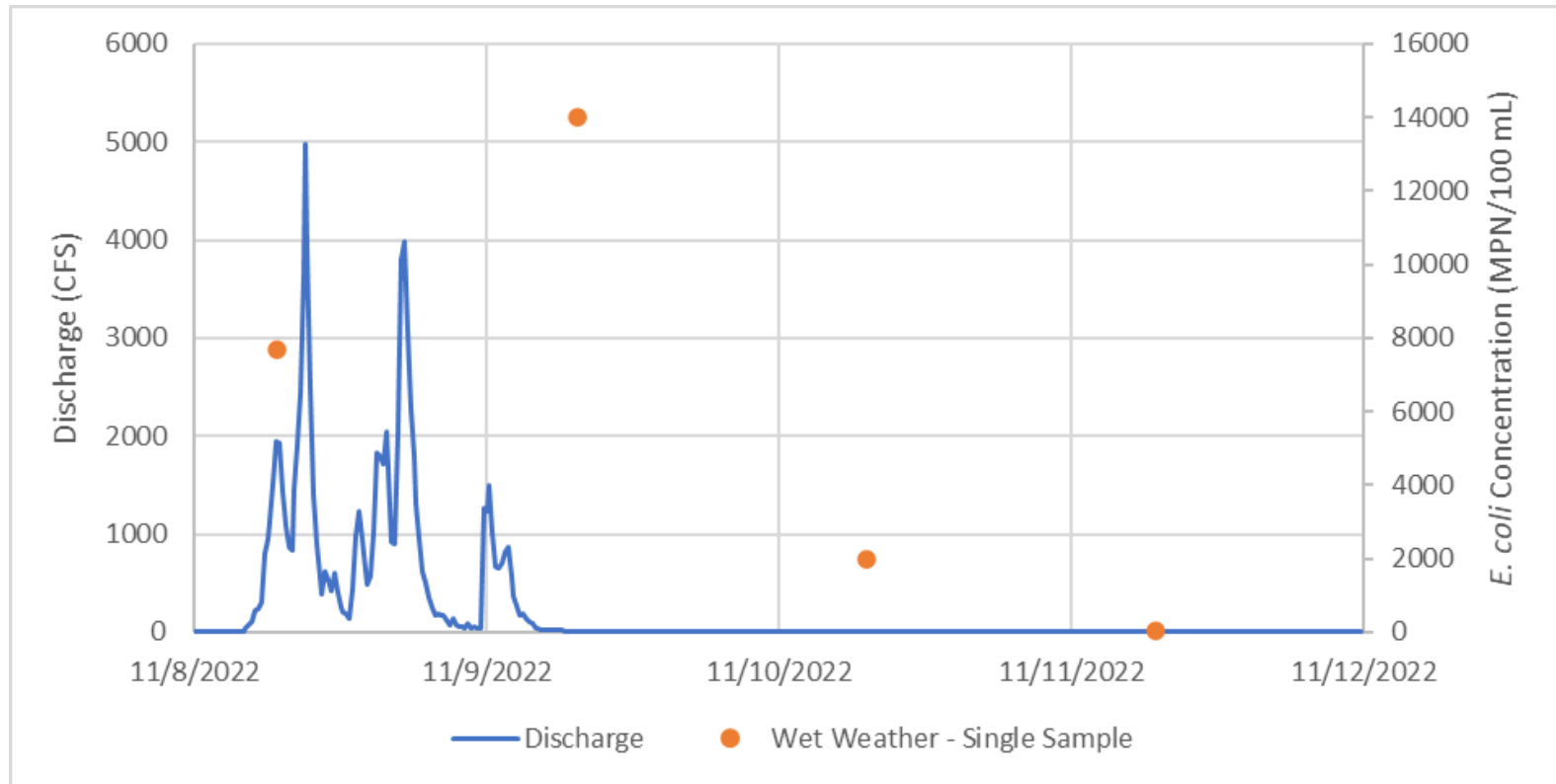
Mill-Cucamonga Creek Discharge vs WW-M6
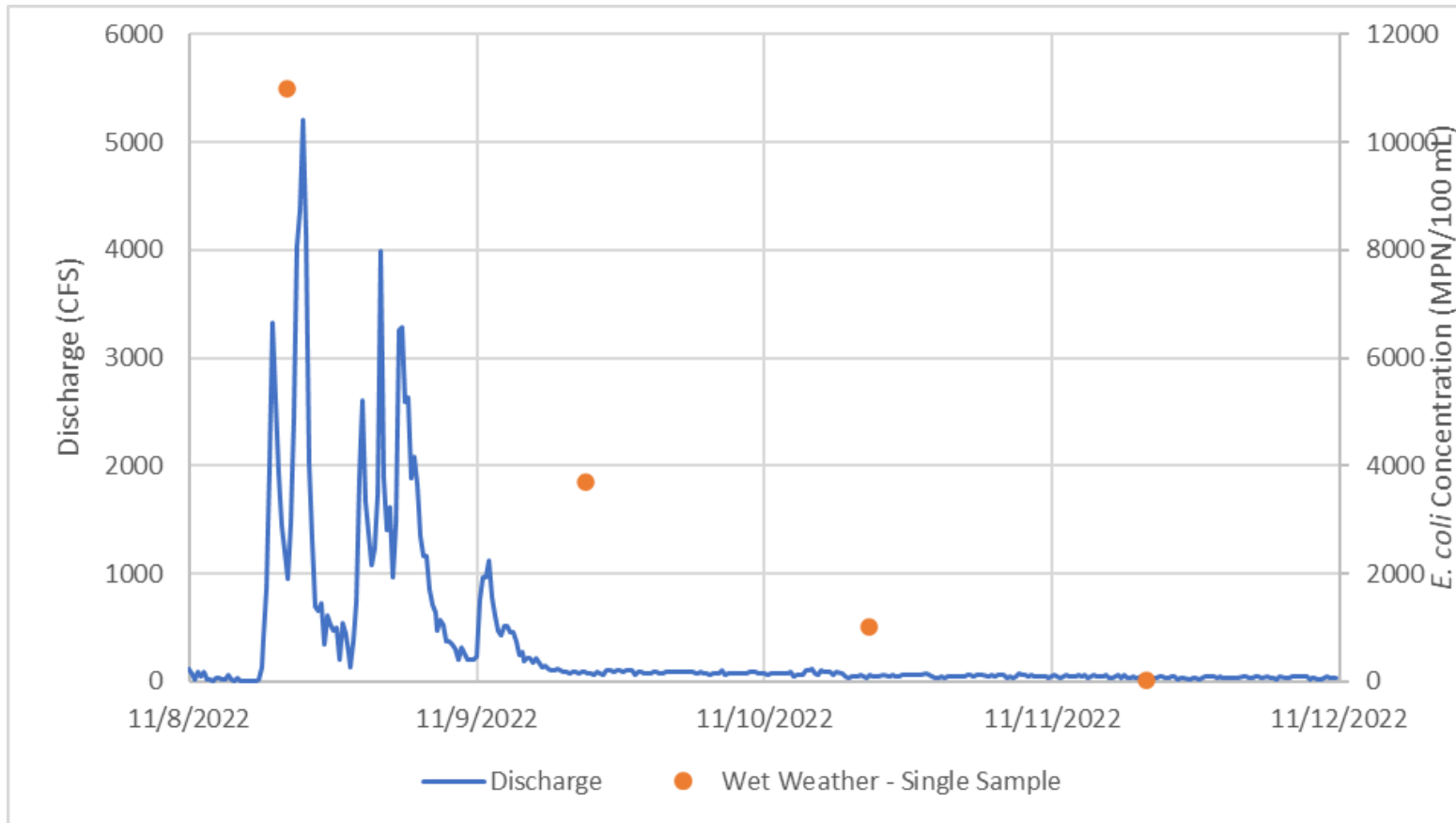
2023-2025 Sampling Recommendations

2023-2024 Sampling Recommendations

- Monitor impacts of winter heavy rains on overall bacteria levels in the Santa Ana River watershed

- Re-introduce sampling at boat launch concurrently with sampling at Elm Grove beach

- Further analysis of Greenville-Banning Channel (P4-OC3) with growing bacteria database

Looking Forward to 2024-2025 Sampling

- A new 303(d) listing was added for fecal bacteria in the draft 2024 Integrated listing cycle. RBMP may need to be updated to include Perris Valley Channel

Questions/Comments?