MSAR Bacteria TMDL Task Force : Update on Triennial Review

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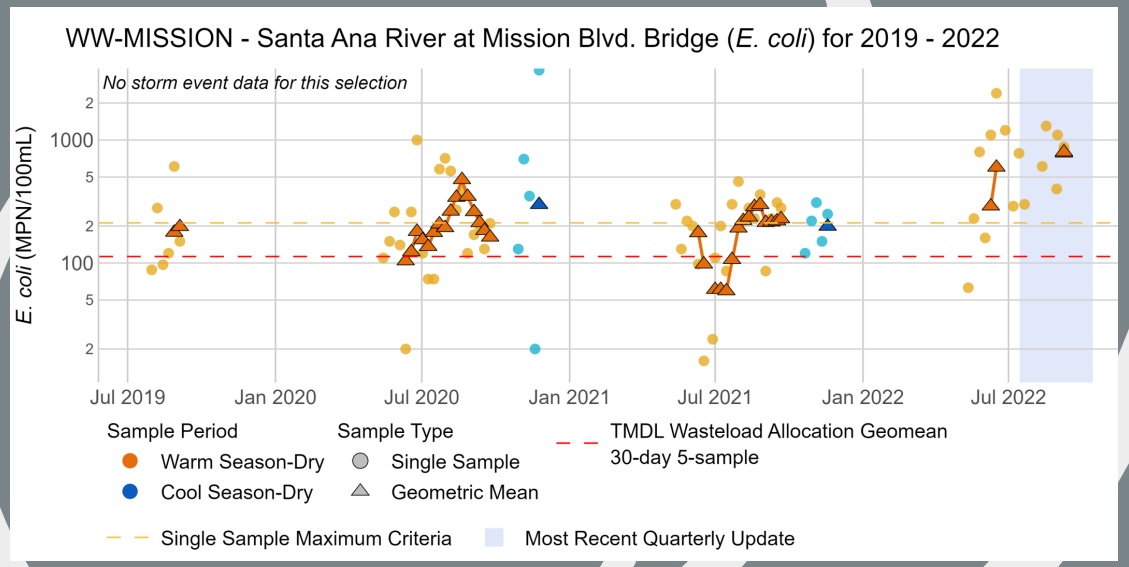
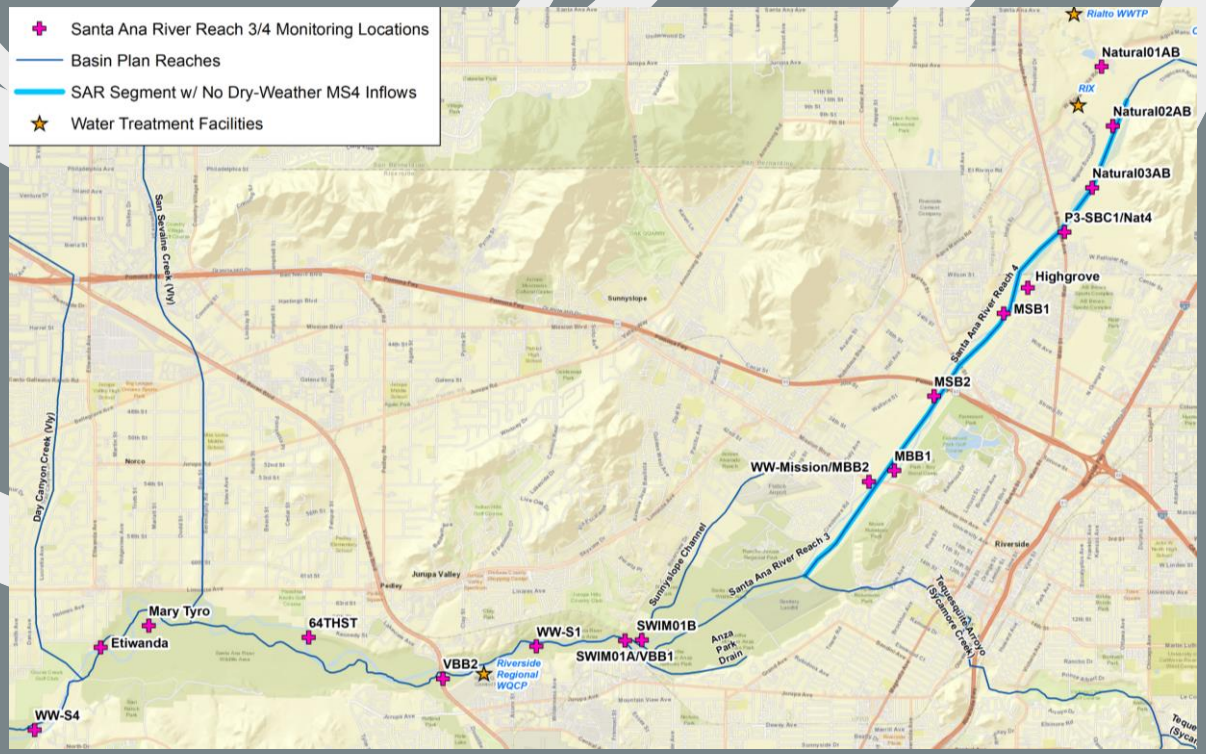
November 7, 2022





Agenda

- California Bacteria Summit
- Santa Ana River Reach 3
- Discuss Next Steps

CA 2022 Bacteria Summit - Key Takeaways

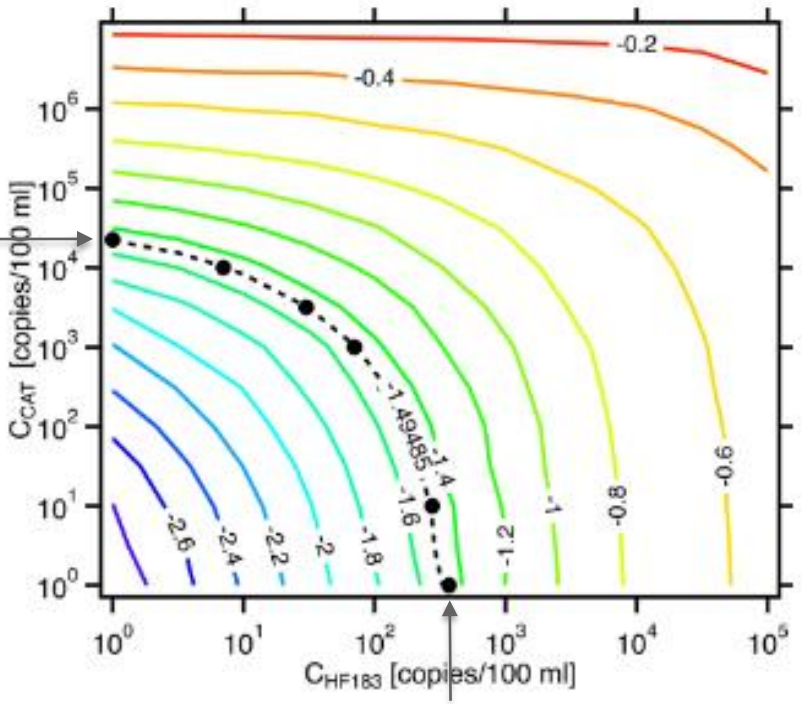
- Common Goal - safe to swim, safe to eat
- Risk-based perspective - fecal source type matters, which includes some non-human animals
- Opportunities for Site-Specific Objectives based on illness risk
- Implementation – prioritize source control for fecal source types with the greater illness risk
  - Case examples presented from Santa Barbara and San Diego– similar efforts as MSAR TMDL Task Force
- Plans to reconvene, potential experts panel to advance science and policy

QMRA to Support Site-Specific Objective

- Opportunities for Site-Specific Objectives based on illness risk
- Range of gull/human fecal source mixture that create illness risk of 32/1000 (or 3.2%)
- A full range of potential hosts would involve a comprehensive QMRA analysis

Source: Boehm and Soller, 2020

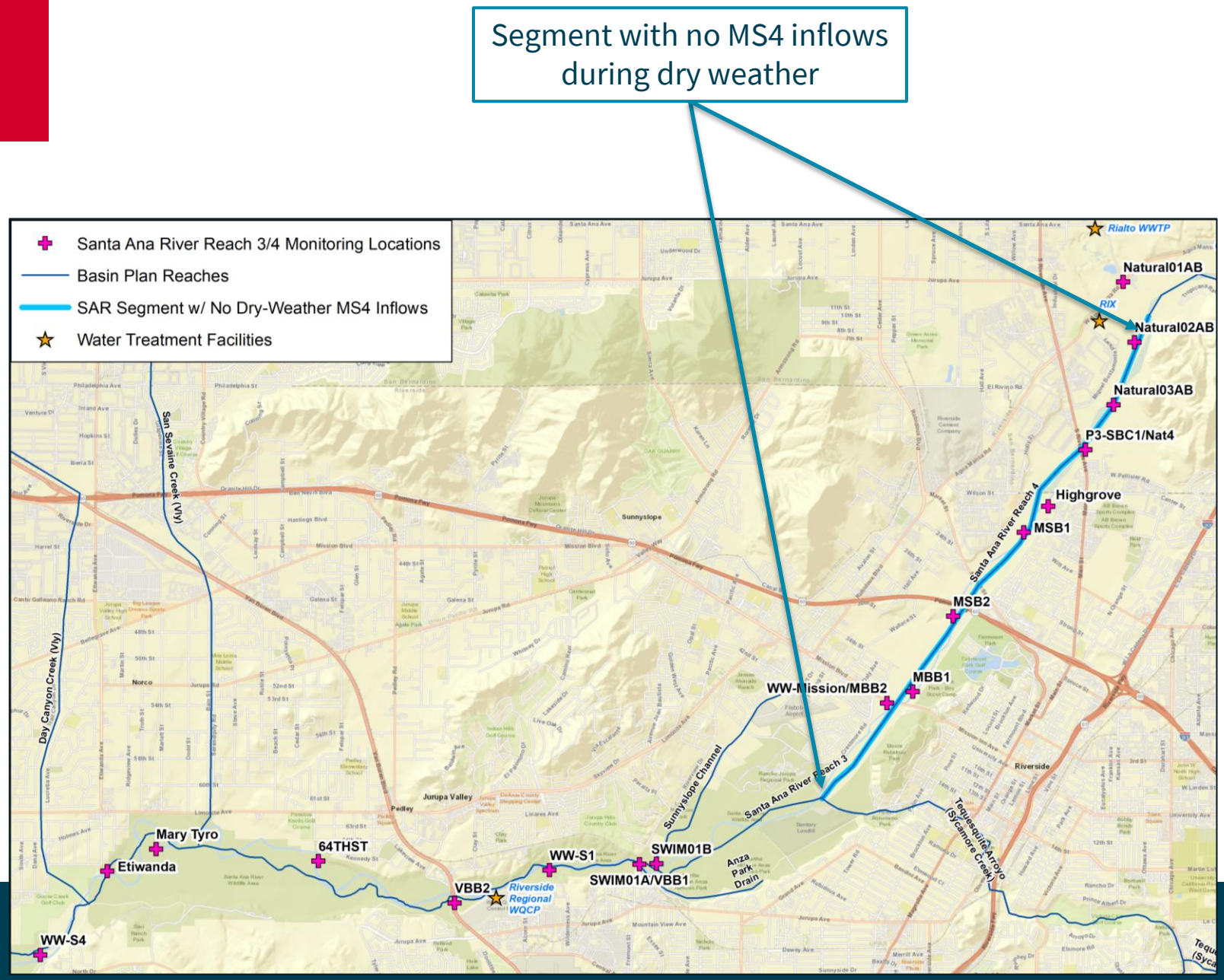
22,500 gc/100mL gull marker



525 gc/100mL human marker

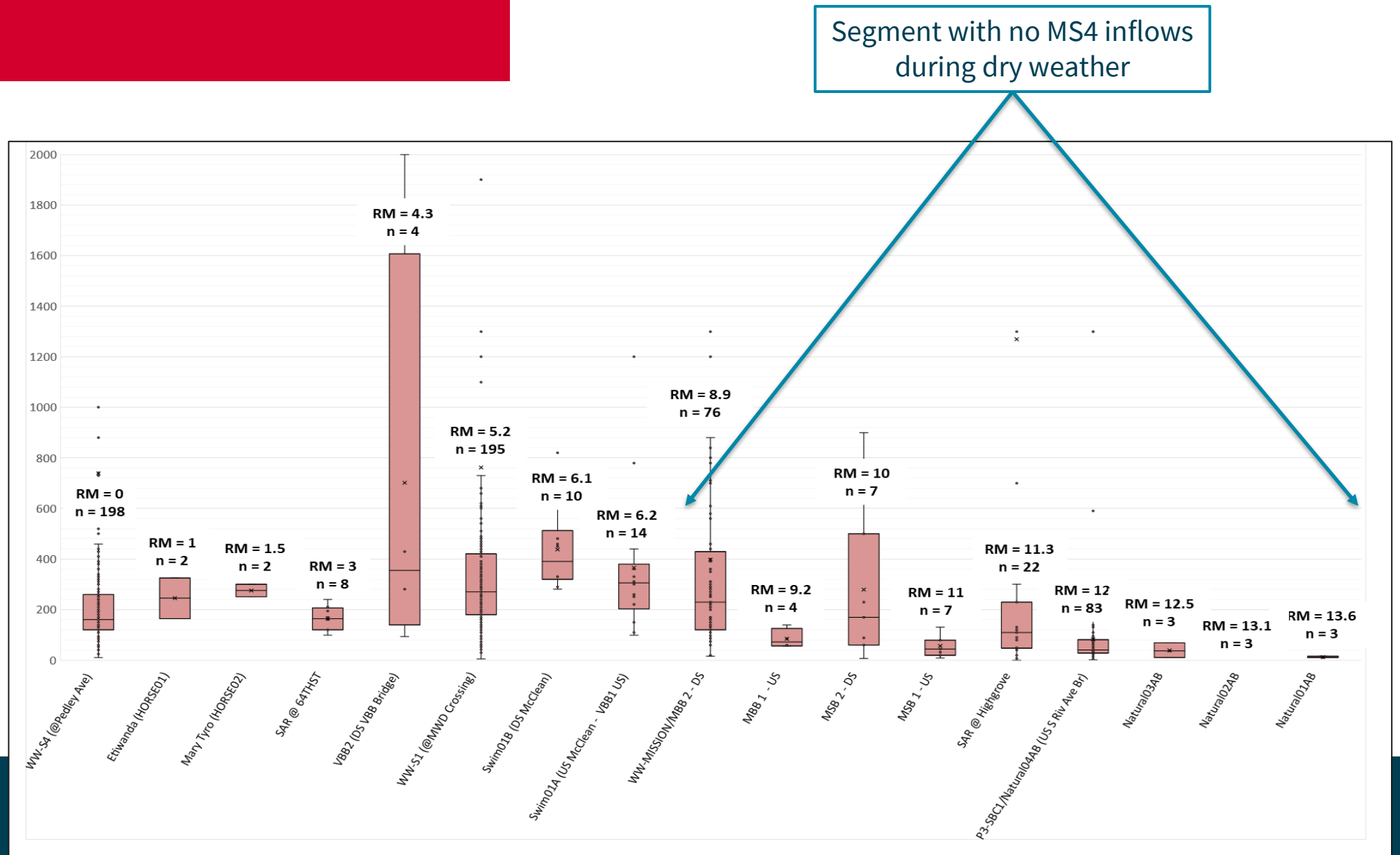
Santa Ana River Reach 3
Data compilation

- Routine TMDL compliance monitoring
- RCFC&WCD core monitoring
- RCFC&WCD 2015 uncontrollable sources study
- SAWPA 2020-21 homeless encampment study



Santa Ana River Reach 3

E. coli



Santa Ana River Reach 3

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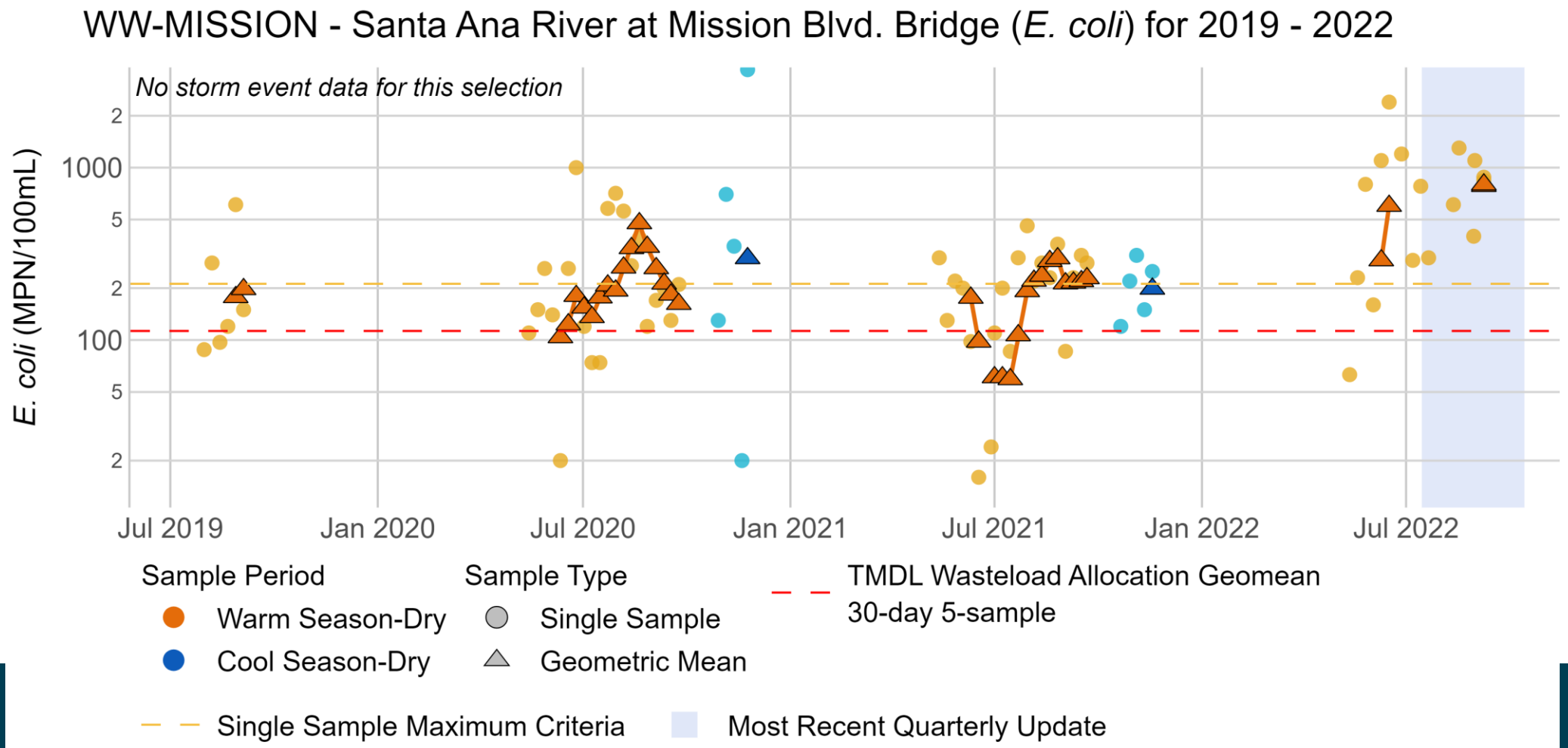

Santa Ana River Reach 3
Pig marker in 2022 dry season

Date	WW-M6		WW-S4		WW-S1		MISSION	
	E.coli (MPN/100mL)	Pig2Bac (copies/100mL)	*E.coli* (MPN/100mL)	Pig2Bac (copies/100mL)	*E.coli* (MPN/100mL)	Pig2Bac (copies/100mL)	*E.coli* (MPN/100mL)	Pig2Bac (copies/100mL)
5/12/2022	110	ND	140	795	460	1072	63	ND
5/26/2022	230	ND	200	438	680	7629	800	ND
6/9/2022	74	ND	880	1599	350	3057	1100	ND
6/27/2022	86	ND	190	1161	310	4099	190	ND
6/30/2022	98	ND	210	962	440	1843	1400	ND
7/14/2022	63	ND	340	2042	280	1044	780	ND
7/28/2022	41	ND	150	1692	410	1364	840	ND
8/11/2022	140	ND	230	1802	460	2728	1300	ND
8/25/2022	180	ND	85	295	270	5322	1100	ND
9/8/2022	200	ND	230	1470	1100	BDL	840	1947

Santa Ana River Reach 3 Microbial Source Tracking

Study	Host Species	Method	Stations	Events	Key Findings
Pig Marker Sampling (2022)	Pig	qPCR	4	10 dry	Detection in 9 of 10 samples at WW-S1, WW-S4, all non-detect at WW-M6, 1 detection of WW-MISSION; range from 300 – 5300 gc/100mL
Homeless Encampment Study (2020-21)	Human	qPCR	6	4 dry	6 of 24 samples with amplification below detection (<100 gc/100mL)
	Pig	qPCR	6	2 dry	Persistent detections at Mission D/S and Van Buren sites ; range from 100 – 27,000 gc/100mL; all non-detect at Market St
	Dog	qPCR	6	2 dry	1 of 12 samples with amplification below detection (<100 gc/100mL)
Synoptic Study (2019)	Human	qPCR	5	6 dry	Amplification below detection in 20 of 30 samples, one sample at MISSION at 100 gc/100mL, no correlation to *E.coli*
UC Fullerton Study (2017-18)	Human	qPCR	5	3 dry, 2 wet	Frequent detection, range 100 to 10,000 gc/100mL
Uncontrollable Source Study (2015)	Human	PCR	6	13 dry	All non-detect
	Bird	PCR	8	5 dry	30-80 % detection of bird, no correlation to *E.coli*
	Dog	PCR	6	7 dry	Detected in 1 of 44 samples
	Rumen	PCR	4	3 dry	All non-detect
	Horse	PCR	6	2 dry	All non-detect
Transient Encampment Cleanup at Market St (2015)	Human	PCR	2	3 dry	All non-detect

Next Steps in Near Term

- Analyze archived samples from pig marker study (2022 dry season) for additional hosts
  - Three assays (GenBac, HF183, Avian) from all weeks at three sites (WW-MISSION, WW-S1, WW-S4)
  - GenBac from two weeks at WW-M6
  - Pig2Bac from WW-MISSION on 9/11 to verify result
- Relate HF183, Pig, Other Assays to GenBac to apportion sources of total Bacteroides
- Revisit special study of river bottom sediments in key locations within non-MS4 segment
  - General Bacteroides versus *E. coli* to assess whether naturalized *E. coli* is an important source
  - *E.coli* in river bottom sediment to assess role of a naturalized source

Next Steps in Long Term

From 2019 Synoptic Survey

E. coli Data Set	n	*E. coli* Geomean (MPN/100 mL)
Human Marker HF183 Detected/Amplified	23	142
Human Marker HF183 Not Detected or Amplified	19	157

- Santa Ana River Reach 3/4 a strong candidate for SSO based on low levels of human marker and *E. coli* above statewide WQOs
- Continue efforts to identify and eliminate controllable, high-risk sources in the period when the statewide approach evolves
- Consider time and expense of QMRA and risk that a SSO is not approved once science study and regulatory alternative documents are completed
- Prepare to participate in a SSO effort when there is a clear path and backing from all entities