

**Watershed:** San Joaquin River

**Years Sampled:** 2008, 2010-2014

**Study Objectives:**

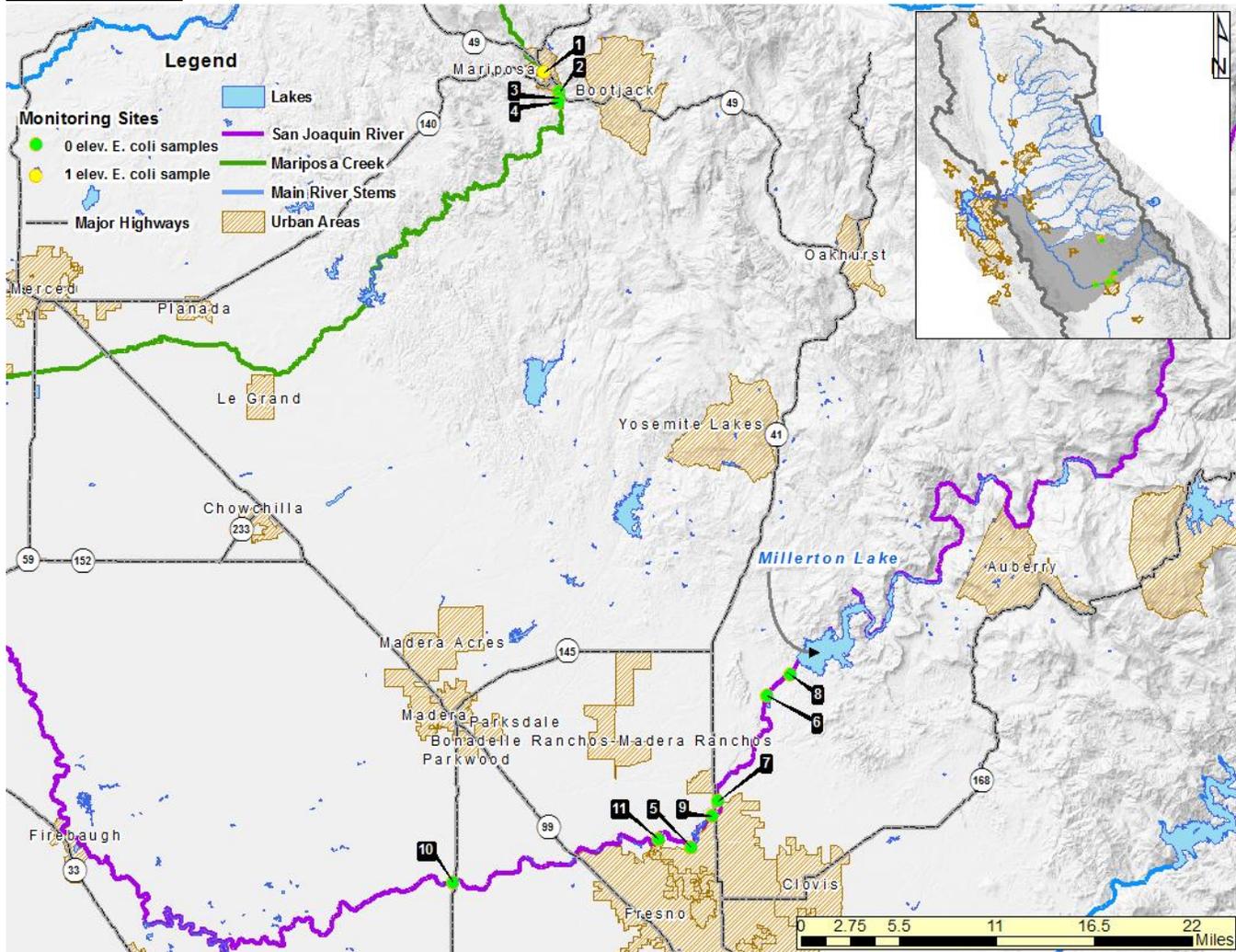
1. Is there any evidence that beneficial uses are being impacted, and if so, what are potential contributors?
2. Are there any noticeable regional, seasonal or trends observed in the water quality data?
3. What are pathogen concentrations at selected monitoring sites?

KEY STATISTICS

Number of sites sampled	11
Sampled by	Water Board Staff (Fresno & Sac) RiverTree Volunteers
Number of sites sampled for pathogens	0
Number of total samples	203
Sampling Frequency	2x/mo. (May-Sept.)
Assessment Threshold	320 MPN/100 mL

**Message:** One of 203 samples has had elevated *E.coli*. Ten sites never exceeded the assessment threshold.

**Site Locations:**



Summary of Results:

Table 1: Field Measurements

Station Code	Map #	Station Name	Oxygen, Dissolved (mg/L)		pH		SpConductivity (uS/cm)		Temperature (°C)		Turbidity (NTU)	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
538MAR010	1	MC at 4th Street	7.75	7.75	7.48	7.48	473.0	473.0	16.54	16.54	0.50	1.36
538MAR020	2	MC Crossing at Don's Auto Clinic and HWY-49	0.67	0.67	7.02	7.02	574.0	574.0	17.13	17.13	NR	NR
538MAR030	3	MC at Mormon Bar Crossing	6.50	6.50	7.58	7.58	578.0	578.0	18.59	18.59	NR	NR
538MAR031	4	MC at Stakeholder Residence	8.86	8.86	8.13	8.13	588.0	588.0	20.12	20.12	NR	NR
545FRE020	5	SJR at Palm Avenue and Nees Avenue	9.06	9.80	6.56	8.00	24.2	28.9	12.00	24.00	0.64	6.19
545FRE502	6	SJR at Lost Lake County Park	9.94	10.64	5.60	7.65	23.9	100.9	9.00	14.00	0.66	3.13
545FRE503	7	SJR at Fort Washington Beach	9.32	9.77	6.27	8.00	24.4	58.0	9.00	20.00	0.56	2.13
545FRE504	8	SJR at Friant Cove	10.10	12.49	6.37	8.00	23.2	54.7	10.00	14.00	0.55	3.42
545MAD008	9	SJR at Wildwood Native Park	4.00	10.02	6.43	8.00	24.7	54.7	1.90	21.00	0.81	6.66
545MAD011	10	SJR at Skaggs Bridge	8.45	8.45	6.60	7.00	27.4	27.4	12.00	26.00	3.73	40.00
545SJ0144	11	SJR at Scout Island	9.48	9.48	6.80	8.00	27.4	27.4	11.00	24.00	0.67	9.08

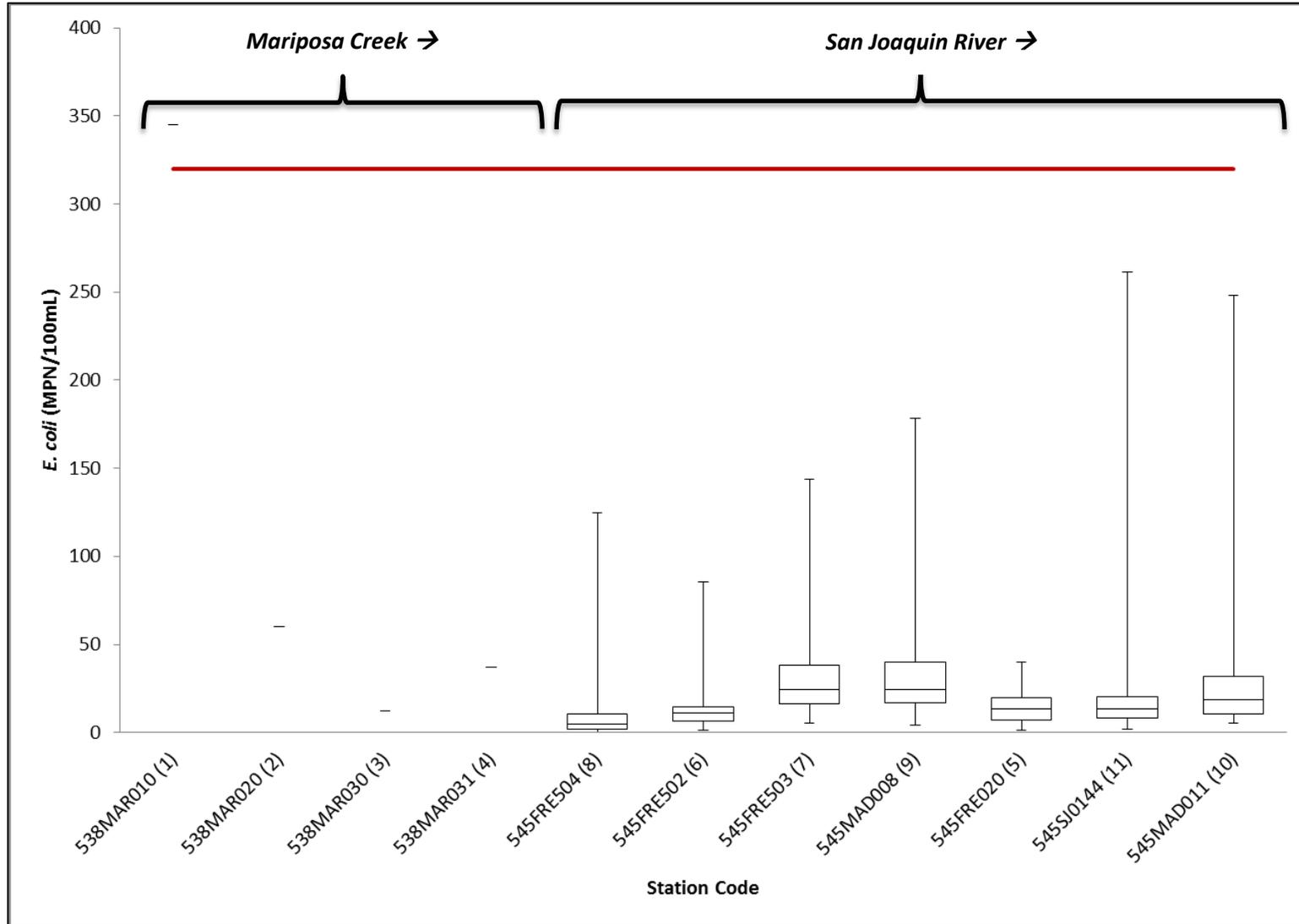
MC: Mariposa Creek, SJR: San Joaquin River, NR: Not Recorded

Table 2: E. coli and Pathogen Results

Map #	E. coli (MPN/100ml)					Cryptosporidium (cysts/L)			Giardia (oocysts/L)			Salmonella (MPN/100mL)			E.Coli O157:H7 (Presence/Absence)		
	Mean	Min	Max	Count	>320	Max Result	Count	(+)	Max Result	Count	(+)	Max Result	Count	(+)	Result	Count	(+)
1	344.8	344.8	344.8	1	1	NA	0	0	NA	0	0	NA	0	0	NA	0	0
2	60.2	60.2	60.2	1	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
3	12.1	12.1	12.1	1	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
4	36.8	36.8	36.8	1	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
5	14.2	1.0	39.9	30	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
6	16.1	1.0	85.5	33	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
7	32.7	5.2	143.9	33	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
8	11.9	<1.0	124.6	30	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
9	31.7	4.1	178.5	36	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
10	47.3	5.2	248.1	8	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
11	34.3	2.0	261.3	29	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0

E.coli - Highlighted Cells: Exceeds EPA Guideline of 320 MPN/100ml  
 Pathogens - (+): positive result, Highlighted Cells: positive results, NA: Not Applicable

Graph 1: E Coli Results



1,2,3,4 = progressive DS flow along Mariposa Creek; 8,6,7,9,5,11,10 = progressive DS flow along San Joaquin River (below Millerton Lake)

**WHAT IS THE MEASURE SHOWING?**

Running mid-center into the San Joaquin Valley from the Sierra Nevada, the San Joaquin River drains and irrigates a significant portion of Californian agriculture. Beyond Fresno, the stream hooks north from an initially southwest trending flow, eventually emptying into the Sacramento-San Joaquin River Delta. Sample sites in the San Joaquin watershed are spread throughout the cities of Mariposa, Madera, Kerman, Friant, and Fresno. Field measurements for each site are shown in Table 1.

Results show that only 1 of 203 samples exhibited elevated levels of *E. coli*, or 0.5%; it was located along Mariposa Creek at 4<sup>th</sup> Street (1) with a value of 344.8 MPN/100 mL. While this site has an average result above the recommended EPA guideline (320 MPN/100 mL), its sample size is unrepresentatively small at 1 grab sample. There were no detections downstream of this site or along the main stem (shown in Graph 1).

The watershed is primarily cultivated crops (Jin et al., 2013), and potential non-point and urban sources are abundant.

No sites in the San Joaquin watershed were sampled for pathogens.

**WHY THIS INFORMATION IS IMPORTANT?**

In 2012, the USEPA amended recreational water quality guidelines for human health under the Clean Water Act, specifying the standard threshold value (STV) for the indicator bacteria *E. coli* as 320 colony-forming units (CFU) per 100 milliliters (mL). The STV represents the 90% percentile of the water quality distribution, beyond which the water body is not recommended for recreation (Nappier & Tracy, 2012).

*E. coli* is an indicator of potential fecal contamination and risk of illness for those exposed to water (e.g. when swimming). Since *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern, the data collected from this study provide more information on pathogen indicators as well as specific water-borne pathogen concentrations to better assess their impact on the beneficial use of recreation and to identify potential contributors by sub watershed.

**WHAT FACTORS INFLUENCE THE MEASURE?**

*E. coli* and specific water-borne pathogens can come from human or animal waste and may be highly mobile and variable in flowing streams. In addition to human recreational use, the presence of pathogens in water may be the result of cattle grazing, wildlife, urban and agricultural runoff, or sewage spills. The physical condition of the watershed may also influence pathogen measurements, however in this study field measurements (temperature, SC, DO, turbidity and pH) were variable between sites and it is unclear if these constituents had an effect on the *E. coli* or pathogen measurements.

**TECHNICAL CONSIDERATIONS:**

- Data available at: CEDEN
- *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern.
- Public reports and fact sheets are available at:  
[http://www.waterboards.ca.gov/centralvalley/water\\_issues/water\\_quality\\_studies/surface\\_water\\_a mbient\\_monitoring/swamp\\_regionwide\\_activities/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_a mbient_monitoring/swamp_regionwide_activities/index.shtml)

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