

Watershed: Yuba River

Years Sampled: 2011-2014

Study Objectives:

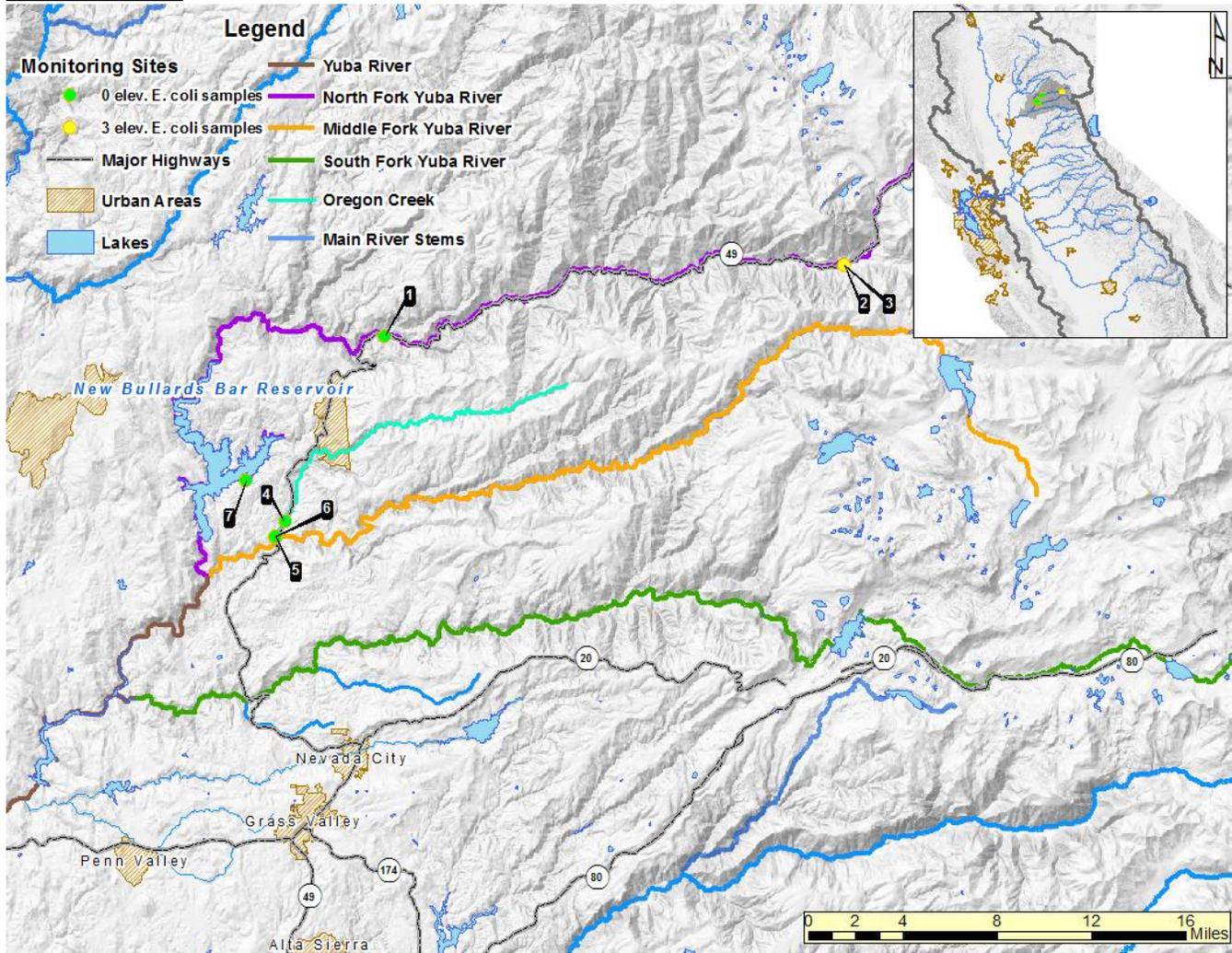
1. Is there any evidence that beneficial uses are being impacted, and if so, what are potential contributors?
2. Are there any noticeable regional, seasonal or trends observed in the water quality data?
3. What are pathogen concentrations at selected monitoring sites?

KEY STATISTICS

Number of sites sampled	7
Sampled by	Water Board Staff (Sac) South Yuba River Citizens League
Number of sites sampled for pathogens	3
Number of total samples	93
Sampling Frequency	2x/mo. (May-Sept.)
Assessment Threshold	320 MPN/100 mL

Message: One site has had one or more samples with elevated *E.coli* and no sites have tested positive for pathogens. Six 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
517NFYFCFC	1	YR, N Fork at Carlton Flat Campground	8.54	10.43	7.54	8.48	86.9	170.2	15.27	23.48	0.15	4.94
517NYRSRC	2	YR, N Fork in Sierra City	7.30	8.80	8.00	8.20	80.0	120.0	13.90	19.00	NR	NR
517NYRTRB	3	YR, N Fork tributary	8.10	9.20	7.70	8.20	100.0	120.0	10.10	12.20	0.15	0.15
517YUB001	4	Oregon Creek Swimming Hole	7.60	10.00	7.40	8.30	70.0	180.0	13.10	20.40	0.21	0.71
517YUB002	5	YR, M Fork at Oregon Creek	6.80	10.20	7.10	8.30	70.0	182.5	14.20	23.60	0.30	3.08
517YUB003	6	YR, M Fork above Oregon Creek	6.30	9.50	7.10	8.34	50.0	174.6	14.30	23.60	0.01	2.79
517YUB030	7	Bullards Bar Reservoir at Dark Day Canyon	7.62	8.80	7.57	8.06	84.1	98.8	22.52	26.94	3.72	30.10

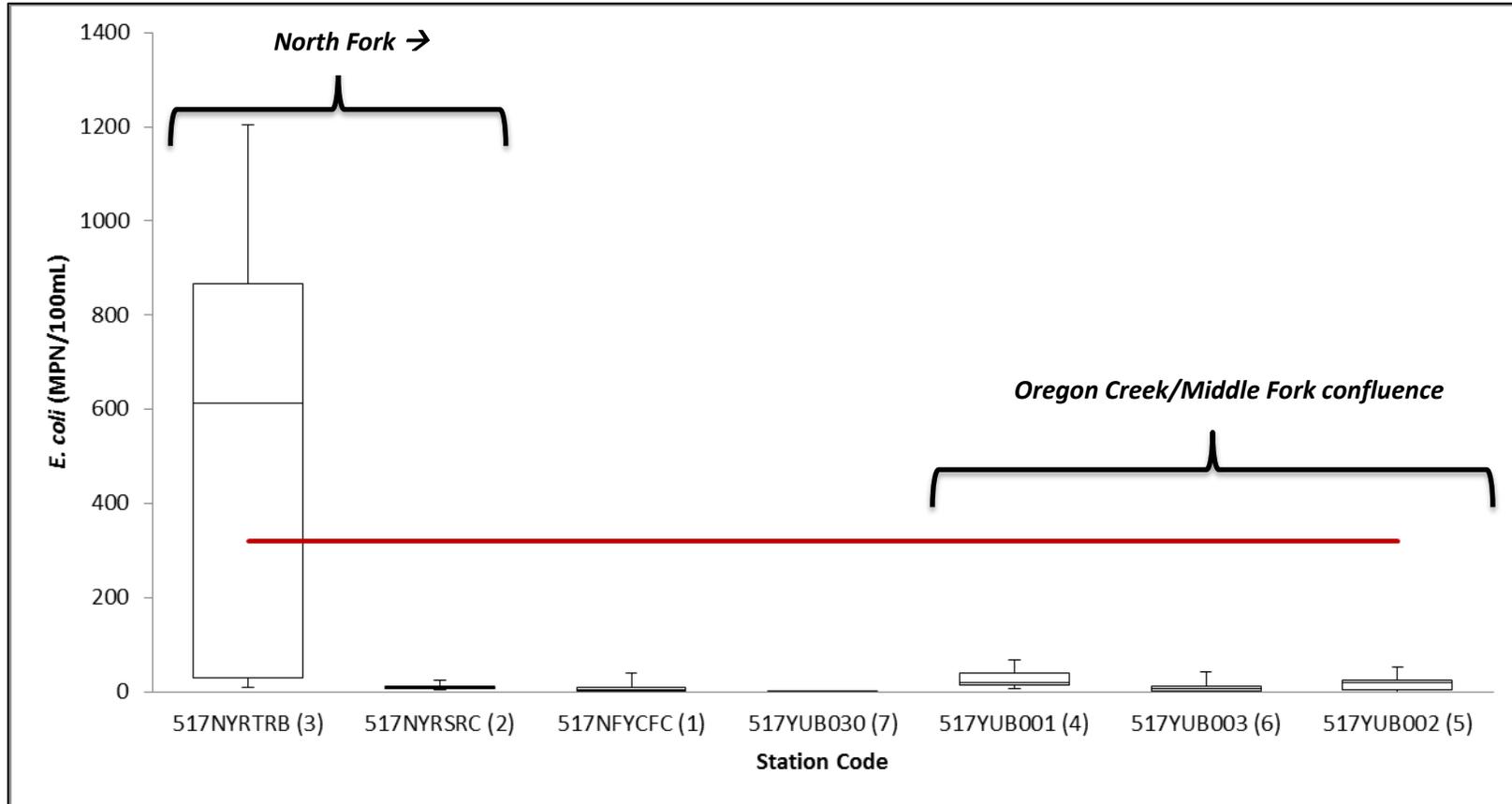
YB: Yuba River, N/M: North/Middle, NR: Not Recorded

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	8.0	1.0	40.4	17	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
2	12.0	6.3	24.6	5	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
3	544.3	9.6	1203.3	5	3	NA	0	0	NA	0	0	NA	0	0	NA	0	0
4	29.2	8.5	69.1	13	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0
5	18.2	1.0	53.8	17	0	NA	0	0	NA	0	0	Not Detected	1	0	Not Detected	1	0
6	11.4	<1.0	43.9	19	0	NA	0	0	NA	0	0	Not Detected	1	0	Not Detected	1	0
7	0.4	<1.0	2.0	9	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



3,2 = progressive DS flow along North Fork; 4,6,5 = 4 (Oregon Creek) and 6 (Middle Fork) flow to 5 (Middle Fork confluence)

WHAT IS THE MEASURE SHOWING?

Once the site of extensive hydraulic mining, the Yuba River is comprised of North, Middle, and South Forks which converge at Englebright Lake and empty into the Feather River. The North Fork collects drainage from Downieville before being impounded at New Bullards Bar Reservoir, an important source of hydroelectric power. The Middle Fork joins the main stem downstream; it is partly fed by the Oregon Creek tributary, a popular swimming hole. Field measurements for each site are shown in Table 1.

Results show that only 3 of 85 samples exhibited elevated levels of *E.coli*; they were located along the Yuba River at the North Fork Tributary (3) with a maximum value of 1203.3 MPN/100 mL (shown in Table 2). The percentage of contamination at the above sample locations is 3.5%; at the site specifically, this percentage is 60.0%. However, the sample size for this site is unrepresentatively small at 5 grab samples. There were no detections along any of the other sites (shown in Graph 1).

The watershed is primarily forest (Jin et al., 2013), yet potential non-point and urban sources are abundant. It is heavily utilized for recreational activities, and is home to numerous waterfowl and wildlife.

Three sites in the North/Middle Yuba River sub watershed were sampled for pathogenic *E. coli* O157:H7, *Cryptosporidium*, *Giardia*, and *Salmonella*. None of the sites tested positive for pathogens (shown in Table 2). There are currently no water quality objectives for these constituents.

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

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