



Supplementary Materials

Regional Assessment of Human Fecal Contamination in Southern California Coastal Drainages

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Table S1. Sampling summary. Sites are listed approximately from north to south as shown in the map. Column headings n.HF183, n.Ent, %>104, %>10,400 refer to the number of samples analyzed for HF183, the number of samples analyzed for *Enterococcus* spp., % of samples with greater than 104 *Enterococcus* per 100 mL and % of samples with greater than 10,400 *Enterococcus* per 100 mL. Some samples were not analyzed for enterococci due to lab errors.

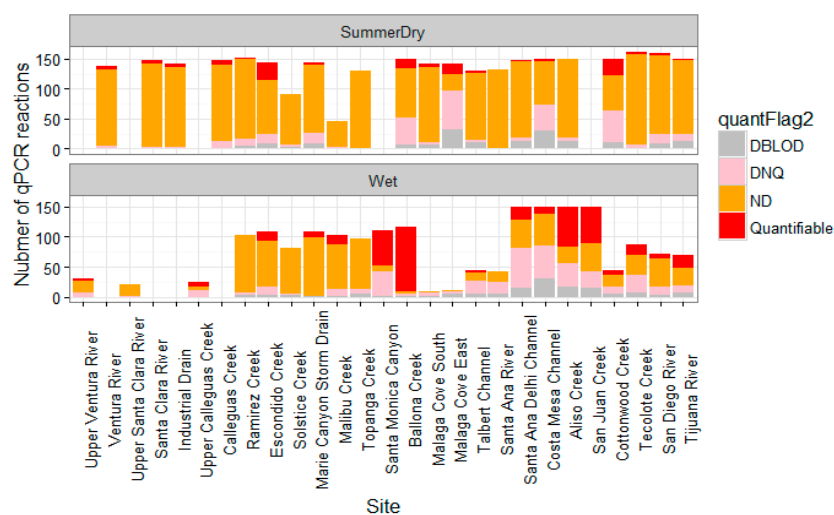
Site	Summer dry				Wet			
	n.HF183	n.Ent	% >104	% >10,400	n.HF183	n.Ent	% >104	% >10,400
Upper Ventura River	-	-	-	-	10	-	-	-
Ventura River	46	-	-	-	-	-	-	-
Upper Santa Clara River	-	-	-	-	7	-	-	-
Santa Clara River	49	-	-	-	-	-	-	-
Industrial Drain	47	-	-	-	-	-	-	-
Upper Calleguas Creek	-	-	-	-	8	-	-	-
Calleguas Creek	49	-	-	-	-	-	-	-
Ramirez Creek	51	51	92	0	34	34	94	0
Escondido Creek	48	48	98	29	36	36	97	25
Solstice Creek	30	30	40	0	27	27	70	0
Marie Canyon Storm Drain	48	48	100	2	36	36	100	0
Malibu Creek	15	15	20	0	34	34	65	0
Topanga Creek	43	43	30	0	32	32	69	0
Santa Monica Canyon	-	-	-	-	37	37	100	24
Ballona Creek	50	50	62	0	39	39	74	13
Malaga Cove South	47	47	53	0	3	3	100	0
Malaga Cove East	47	47	87	0	4	4	100	0
Talbert Channel	43	43	84	2	15	15	100	33
Santa Ana River	44	44	64	0	14	14	93	64
Santa Ana Delhi Channel	49	49	45	0	50	50	98	38
Costa Mesa Channel	50	50	100	10	50	50	86	32
Aliso Creek	50	50	48	0	50	50	98	18
San Juan Creek	-	-	-	-	50	50	94	32
Cottonwood Creek	50	50	86	2	15	15	87	27
Tecolote Creek	54	54	91	2	29	27	100	33
San Diego River	53	53	45	4	24	24	92	8
Tijuana River	50	50	10	2	23	22	55	5
Overall	1013	822	67	3	627	599	88	19

(B) Wet weather	Site ranking position										
	Site ²	n.spl ¹	amp1	amp2	amp3	lod1	lod2	lod3	lodAvg	AvgPois	AvgLod
Marie Canyon Storm Drain	36	1.5	2	4	2	4	4	4	4	1	4
Solstice Creek	27	1.5	1	1.5	1	1	1.5	1.5	3	3	1
Ramirez Creek	34	3	3	1.5	3	2	1.5	1.5	2	2	2
Topanga Creek	32	4	4	3	4	3	3	3	4	4	3
Malibu Creek	34	5	5	6	5	6	5	6	5	5	5
Escondido Creek	36	6	6	5	6	5	7	5	6	6	7
San Diego River	24	7	7	7	7	7	6	7	7	7	6
Tijuana River	23	8	10	10	9	10	11	11	14	14	14
Santa Ana River	14	9	11	9	10	11	8	8	8	8	8
Talbert Channel	15	10	13	15	14	13	14	15	10	10	10
San Juan Creek	50	11	14.5	14	13	14.5	15	14	15	15	15
Tecolote Creek	29	12	9	12	12	12	13	12	12	12	13
Costa Mesa Channel	50	14	12	11	11	8	10	9	9	9	9
Santa Ana Delhi Channel	50	14	14.5	13	15	14.5	12	13	13	13	12
Cottonwood Creek	15	14	8	8	8	9	9	10	11	11	11
Santa Monica Canyon	37	16	17	17	17	17	17	17	17	17	17
Aliso Creek	50	17	16	16	16	16	16	16	16	16	16
Ballona Creek	39	18	18	18	18	18	18	18	18	18	18

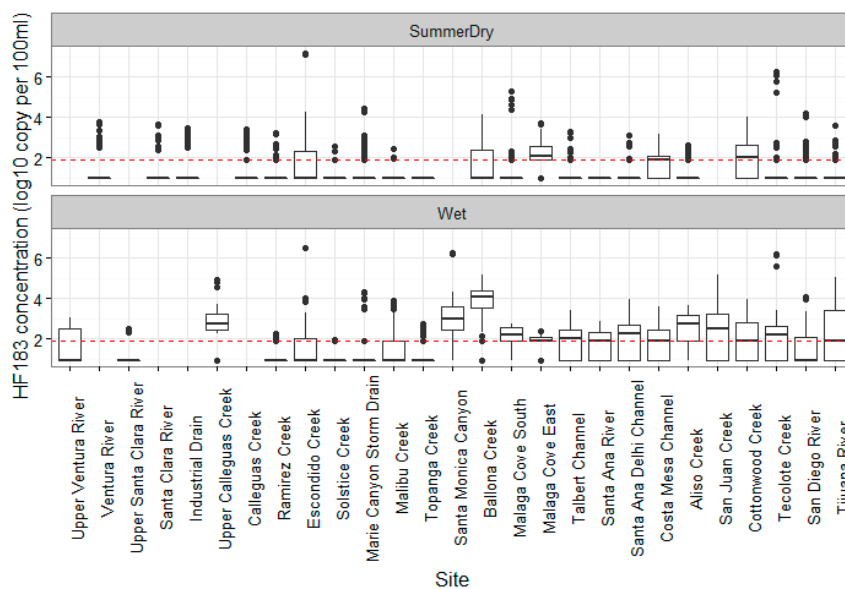
¹ The number of samples at each site is denoted by n.spl, and sites with 10 or fewer samples are excluded. Each sample had n = 3 qPCR technical replicates; ² Sites are sorted from lowest to highest ranking position (i.e., having the least to having the most human fecal contamination) based on the “amp1” frequency definition.

Table S4. Site rank contrast under wet vs. dry weather, as ranked by frequency or site average concentration. Sites are sorted from left to right by frequency of detection under dry weather conditions. Frequency of HF183 detection is defined as % samples with HF183 detection, and HF183 is said to be detected in a sample if HF183 is detected in any of the three qPCR replicates. Sites are sorted by ranking positions under dry weather.

Site	Rank by frequency		Site	Rank by Site average concentration	
	Dry	Wet		Dry	Wet
Santa Ana River	1.5	9	Santa Ana River	1.5	8
Topanga Creek	1.5	4	Topanga Creek	1.5	4
Malibu Creek	3	5	Malibu Creek	3	5
Tecolote Creek	4	11	Tecolote Creek	4	12
Solstice Creek	5	1.5	Solstice Creek	5	3
Talbert Channel	6	10	Ramirez Creek	6	2
Ramirez Creek	7	3	Aliso Creek	7	15
Aliso Creek	8	15	San Diego River	8	7
San Diego River	9	7	Talbert Channel	9	10
Santa Ana Delhi Channel	10	13	Santa Ana Delhi Channel	10	13
Marie Canyon Storm Drain	11	1.5	Tijuana River	11	14
Tijuana River	12	8	Marie Canyon Storm Drain	12	1
Escondido Creek	13	6	Ballona Creek	13	16
Ballona Creek	14	16	Escondido Creek	14	6
Costa Mesa Channel	15	13	Costa Mesa Channel	15	9
Cottonwood Creek	16	13	Cottonwood Creek	16	11



(a)



(b)

Figure S1. HF183 results distribution for dry and wet weather: (a) number of qPCR results in each quantification category, (b) HF183 concentrations (ND and DBLOD substituted with $\frac{1}{2}$ and one of the limit of detection for the purpose of plotting). The dotted red line in (b) indicates the limit of detection. Note that empty spaces along the x-axis indicate that the site was not sampled during the given weather condition.

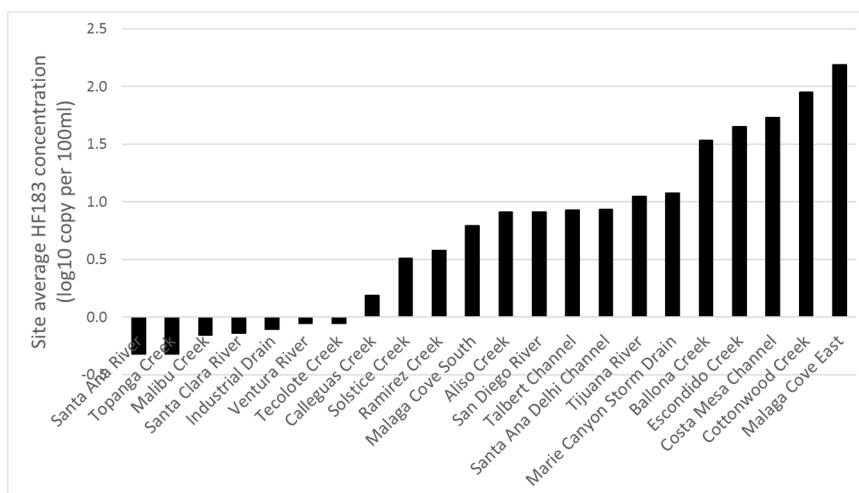


Figure S2. Site average HF183 concentration in log₁₀ copies per 100 mL by site for summer dry weather. The site average is calculated by the Poisson approach as described in the Appendix section.

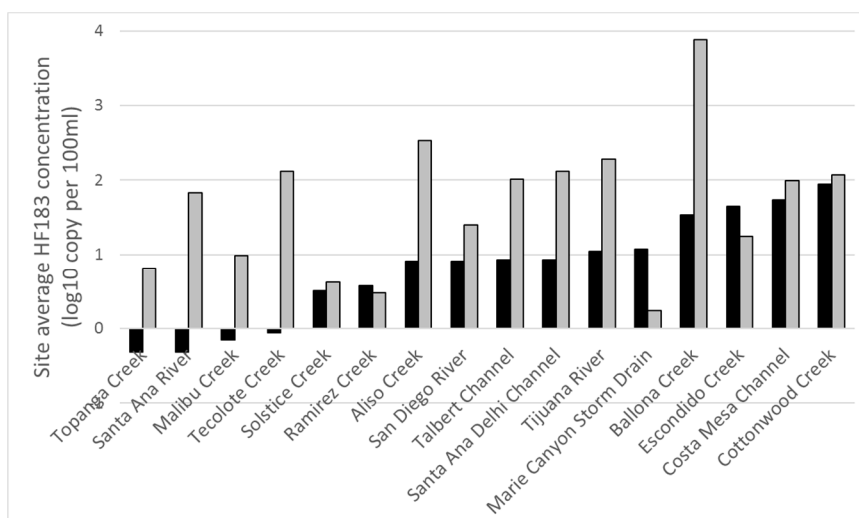


Figure S3. Site average HF183 concentration in log₁₀ copies per 100 mL by site in wet (grey bars) versus dry (black bars) weather conditions. The site average is calculated by the Poisson approach as described in the Appendix section. Sites are sorted from left to right by site average concentration under dry weather conditions.

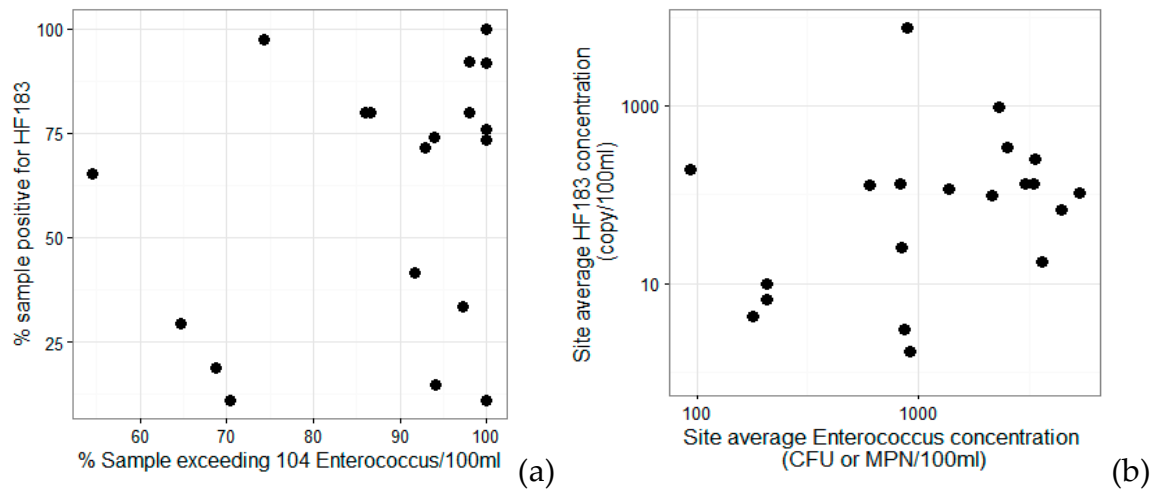


Figure S4. Ranking site by HF183-based metrics vs. *Enterococcus*-based metrics during wet weather: (a) Frequency of HF183 positive versus frequency of *Enterococcus* exceedance; (b) site average HF183 concentration versus site average *Enterococcus* concentration. HF183-based metrics are as defined in Figure 3. The frequency of *Enterococcus* exceedance is defined as % samples with more than 104 *Enterococcus* spp. per 100 mL. The site average concentration of *Enterococcus* spp. is defined as the geomean at the site.