

New California water contact recreation objectives for bacteria



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Data evaluation workgroup
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Old and confusing contact recreation objectives

	Geometric Mean cfu/100ml	Maximum Value cfu/100ml
Enterococcus (marine/estuarine)	35	104
Enterococcus (freshwater)	33	61
Fecal Coliform (freshwater)	200	400 (90 th percentile)
Total Coliform	240 (yearly median)	10,000
E. Coli (freshwater)	126	235



(Not quite official)

California contact recreation objectives

	6-week rolling geometric mean cfu/100ml	Monthly STV cfu/100ml
Marine/Estuarine (enterococcus)	30	110
Freshwater (E. Coli)	100	320

Notes:
Feb 6 State Board hearing postponed (open questions about applicability of EPA criteria to SoCal beaches)

Marine/Estuarine waters are those where the salinity greater than 1 ppt more than 5 percent of the time

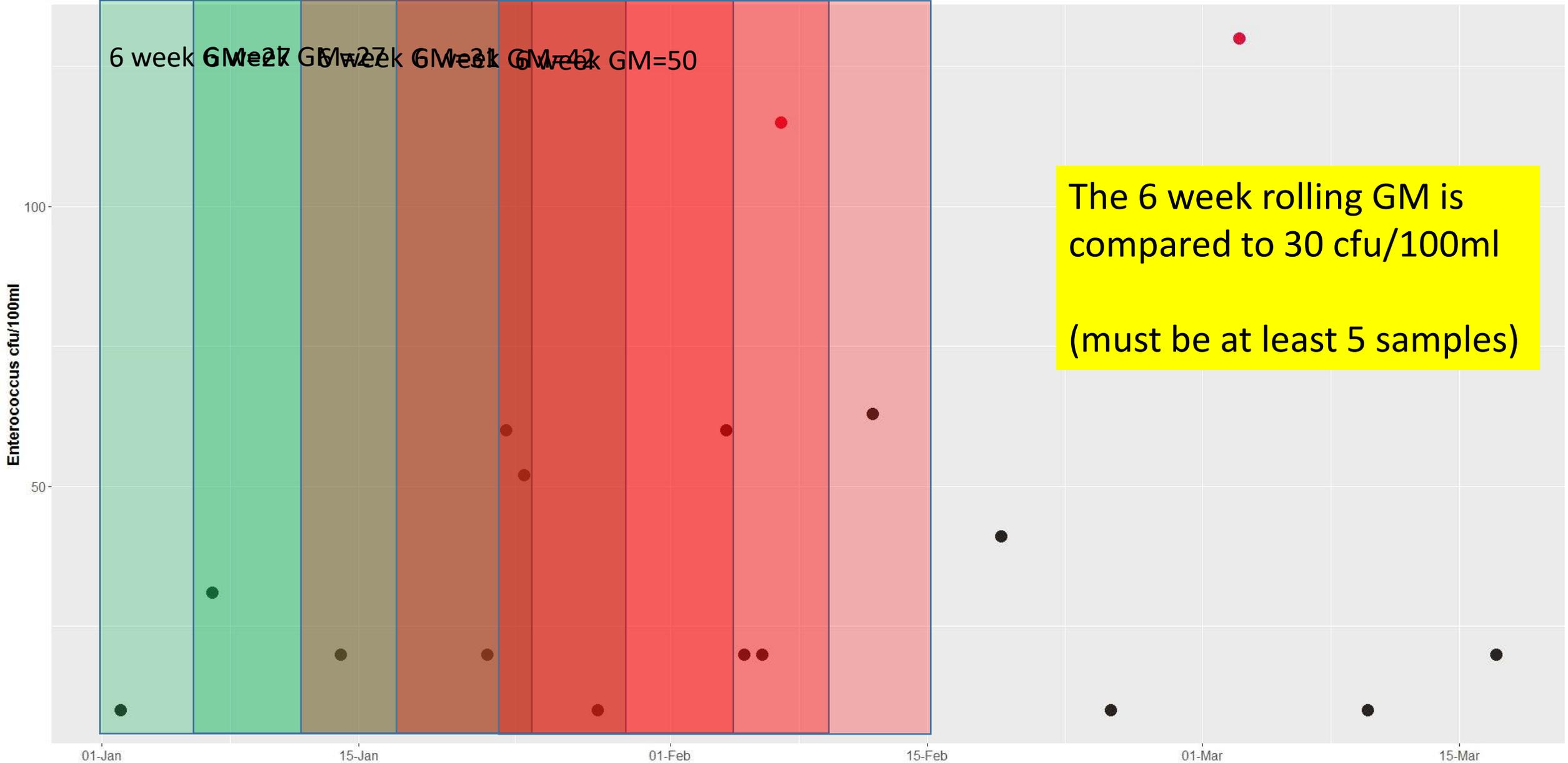
Freshwaters have salinity less than or equal to 1 ppt 95 percent or more of the time

The geometric mean is calculated on a 6 week rolling basis and must include at least 5 samples

STV=statistical threshold value. This objective means that not more than 10% of the individual samples collected within a month can exceed this value. ***Used for determining impairment only if there are not enough data to use geometric mean (typically this means that monitoring frequency does not result in 5 samples within 6-week period)***

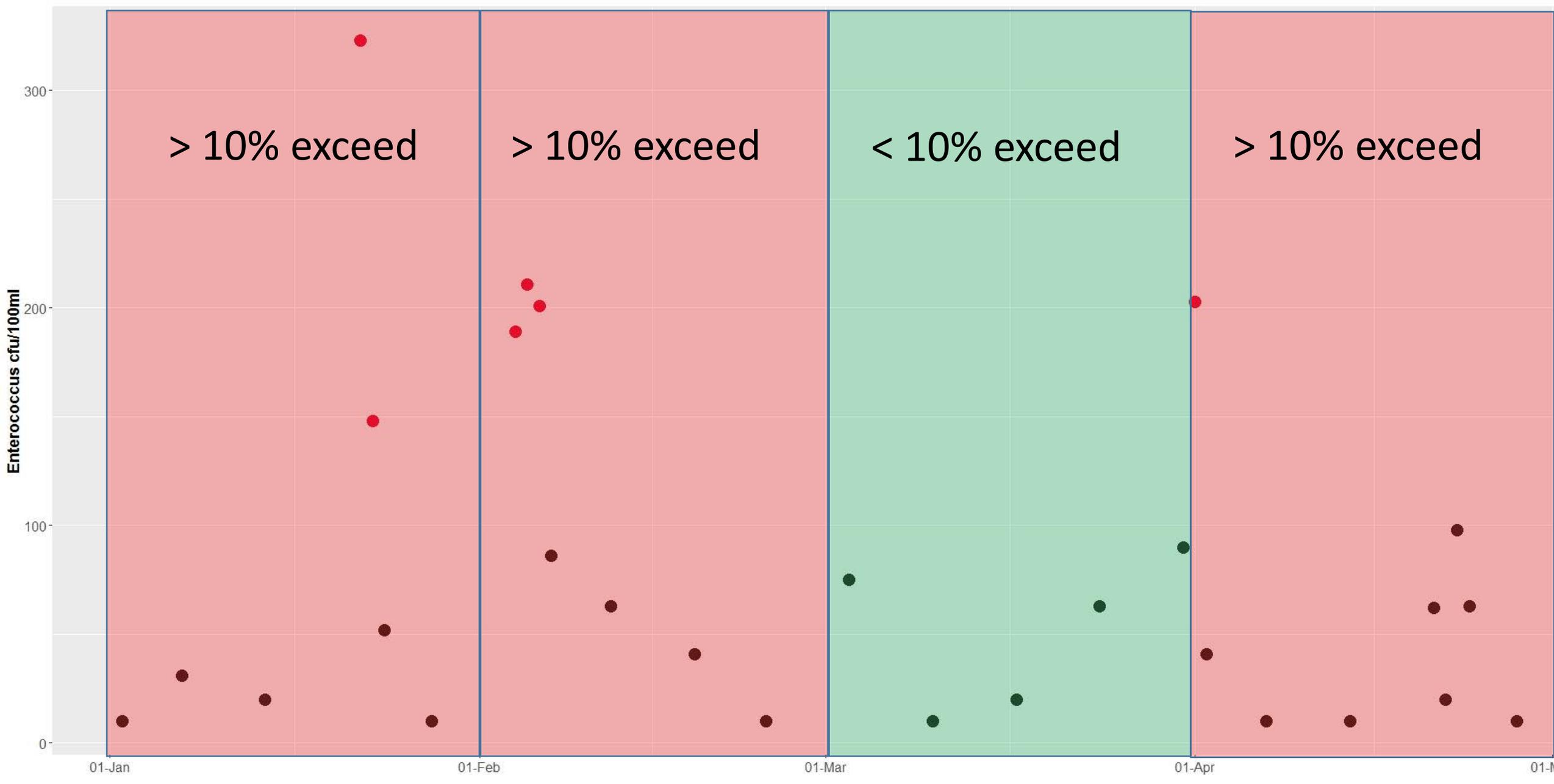
$$\textit{Geometric Mean} = \sqrt[n]{(a_1 a_2 a_3 \cdots a_n)}$$

Computing the 6 week rolling geometric mean (GM)





Computing the Monthly Statistical Threshold Value - STV



Determining Impairment using Listing Policy

https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/020315_8_amendment_clean_version.pdf

PUSUANT TO AB 411: THE MINIMUM NUMBER OF MEASURED EXCEEDANCES OF BACTERIAL STANDARDS FOR COASTAL BEACHES NEEDED TO PLACE A WATER SEGMENT ON THE SECTION 303(D) LIST **WHEN WATER QUALITY MONITORING WAS CONDUCTED APRIL 1 THROUGH OCTOBER 31.**

Null Hypothesis: Actual exceedance proportion \leq 4 percent.

Alternate Hypothesis: Actual exceedance proportion $>$ 19 percent.

The minimum effect size is 15%

*Application of the binomial test requires a minimum sample size of 22. The number of exceedances required using the binomial test at a sample size of 22 is extended to smaller sample sizes.

Sample Size	List if the number of exceedances are equal to or greater than
3-31	3*
32-41	4
42-52	5
53-62	6
63-72	7
73-82	8
83-92	9
93-102	10
103-113	11
114-123	12

De-Listing using Listing Policy

PUSUANT TO AB 411: THE MAXIMUM NUMBER OF MEASURED EXCEEDANCES OF BACTERIAL STANDARDS FOR COASTAL BEACHES ALLOWED TO REMOVE A WATER SEGMENT FROM THE SECTION 303(D) LIST **WHEN WATER QUALITY MONITORING WAS CONDUCTED APRIL 1 THROUGH OCTOBER 31.**

Null Hypothesis: Actual exceedance proportion \geq 19 percent.

Alternate Hypothesis: Actual exceedance proportion $<$ 4 percent.

The minimum effect size is 15%

The minimum samples size necessary to delist is 22

Sample Size	Delist if the number of exceedances are equal to or are less than
22-31	2
32-41	3
42-52	4
53-62	5
63-72	6
73-82	7
83-92	8
93-102	9
103-113	10
114-123	11



Questions?

