

**Recreational Water Quality Criteria (RWQC) – DEQ RAP Meeting for Human Health Criteria Monitoring
Background and Discussion Points for Regulatory Advisory Panel (RAP) Consideration**

Monday June 13, 2016

EPA Beach Monitoring & Notification Grant

- Federal program to implement beach monitoring and notification programs in coastal states (Beach Act of 2000).
- The Beach Act requires states to adopt EPA criteria within 36 months (Dec 2015)
- EPA has requested a schedule of adoption and implementation plan for Beach Action Values (BAVs) within 60 days of the issuance of 2017 beach grant funds (~Dec 2016)
- VDH/OEpi grant recipient since 2004, provides partial salary support of 4 FTE and 1 Wage in OEpi/DEE, seasonal support to 6 health districts
- Grant cycle Dec 1 – Nov 30; Virginia award ~\$260,000 annually

Existing Action Level for Advisories and Closures

- Enterococci criteria 104 cfu/ml used to issue beach advisories and closures, embedded in current adopted bacteria criteria

Currently Adopted Bacteria Criteria				
Criteria Elements	Illness Rate 8/1000		Illness Rate 19/1000	
Indicator	***Geomean cfu/100ml	**SSM cfu/100ml (75%ile)	***Geomean cfu/100ml	**SSM cfu/100ml (75%ile)
Enterococci	-	-	35	104*
E. coli	126	235	-	-

*Criteria used for beach monitoring and notification ** Single Sample Maximum (SSM) allows 10% excursion frequency***Geomean calculated with a minimum of 4 samples in a calendar month

2012 EPA Recreational Water Quality Criteria

- EPA released the 2012 RWQC recommendations as a means of protecting human health for all coastal and non-coastal waters designated for primary contact recreation use.
- Recommendations are guidance for states to develop and adopt their own WQs, based on information gathered from epidemiological studies which relate fecal indicator bacteria and gastrointestinal illness.
- States may select Recommendation 1 or 2, and corresponding Beach Action Value (BAV). Both options are protective of human health.

2012 EPA Nationally Recommended Recreational Bacteria Criteria						
Criteria Elements	Recommendation 1: Illness Rate 36/1000			Recommendation 2: Illness Rate 32/1000		
	Geomean cfu/100ml	*STV cfu/100ml (90%ile)	BAV cfu/100ml	Geomean cfu/100ml	*STV cfu/100ml (90%ile)	BAV cfu/100ml
Enterococci	35	130	70	30	110	60
E. coli	126	410	235	100	320	190

Duration and Frequency: The waterbody geomean should not be greater than the selected geomean magnitude in any 30-day interval. There should not be greater than a 10% excursion frequency of the selected STV magnitude in the same 30-day interval. *STV=Statistical threshold value

- EPA will allow up to a 90-day data window for calculation of a geometric mean.
- The 2012 illness rates were based on 2010 epidemiological study, which included a new definition of gastrointestinal illness (GII) from that of the 1989 criteria.
- The 1989 criteria, based on epidemiological studies in the 80s, defined GII as coinciding with fever. The 2012 case definition for illness did not include fever as a symptom. Viral GIIs are common with recreational water exposures, but are not typically accompanied by fever.
- The redefinition of GII increased the risk illness rates in the 2012 criteria.
- EPA also generated criteria for quantitative polymerase chain reaction (qPCR) method in 2012 for enterococci. Culture methods require 24 hours for results, while the qPCR rapid method results are available within ~6hrs.

2012 EPA Nationally Recommended Recreational Bacteria Criteria						
Criteria Element	Illness Rate 36/1000			Illness Rate 32/1000		
	Geomean cce/100ml	STV cfu/100ml (90%ile)	BAV cce/100ml	Geomean cfu/100ml	STV cfu/100ml (90%ile)	BAV cfu/100ml
Enterococcus spp - qPCR ^a	470	2,000	1,000	300	1,280	640

Duration and Frequency: The waterbody GM should not be >the selected GM magnitude in any 30-day interval. There should not be a > 10% excursion frequency of selected STV magnitude in the same 30-day interval. ^aEPA Enterococcus spp. Method 1611 for qPCR (U.S.EPA, 2012b)

- EPA provided info and recommendations for states to adopt for enterococcus spp., measured by qPCR method 1611.
- EPA instructed states to evaluate PCR performance in the waters it would be used prior to developing new or revised criteria for qPCR, due to concerns of interference.
- VA contract with HRSD (2011) to evaluate qPCR at Virginia Beach beaches, where an interference rate of ~18% was observed at ocean side monitoring sites.
- Additional testing for interference and comparisons of qPCR with culture method for a season would be necessary to ensure a 1:1 ratio of results between the two methods, before recommending for Virginia promulgation.

Challenges of adopting new criteria:

- Conversion from the “old” to “new” E.coli risk rate and criteria is straightforward. Enterococci conversion is unclear, due to the incorporation of data collected from 2010 epidemiological studies using qPCR.
- Either recommendation will be difficult to communicate to the public, due to perception the criteria is being relaxed.
- In actuality, the criteria are providing more accurate illness rates based on the new case definition of GII, and the STVs utilize the correct value for 90%ile of the geometric mean.

BAVs:

- The BAVs for the 1 and 2 recommendations are based on the 75%ile water quality distribution, chosen because the 1986 SSM criteria were the observed 75%ile. The 2012 STV criteria is set to the 90%ile. BAVs were developed to provide a more protective level for beach notification.
- No epidemiological studies have been done to demonstrate the statistical relationship between the FIBs and GII for the 2012 BAV levels. MD, SC, NH, NJ have submitted alternative BAV justifications for their current beach notification value, which typically correspond to their current enterococci standard (104cfu/100ml).
- Only NH’s justification has been approved by EPA.
- The analysis required to support alternative BAV justification is 99% complete for VA. Includes retrospective analysis of beach monitoring and notification data.
- The analysis evaluates questions such as “How many more notifications would we have had at the 60/70 BAV levels than the 104?” and “Of those instances, how many of those resamples would have also required notification?”
- Retrospective analysis suggests a significant increase in notifications, but on average nearly all beaches would have advisories lifted following the resample. NO epidemiological study has validated the need for the 60/70 BAV levels.
- EPA does not require states to include BAVs or alternative BAVs in state criteria.
- Providing the implementation of an alternative BAV which is not adopted in state criteria can be maintained at a local level, it may be best to separate beach monitoring and notification levels from the state criteria.
- VDH plans to complete the alternative BAV justification letter and submit for EPA approval prior to Dec 2016, along with the updated Virginia criteria adoption schedule to be in compliance with EPA Beach grant requirements.