

Idaho Department of Environmental Quality

**Revisions to Recreational Criteria
Rulemaking Docket No. 58-0102-1802**

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Outline

- Background
- Idaho's Current Criteria
- Overview of EPA Recommendation
- Idaho Data on *E. coli*
- Rulemaking Summary and Proposed Criteria
- Comparison to Current Criteria



Background

- EPA drafts §304(a) criteria recommendations
- Federal regulations require states to consider §304(a) recommendations as part of triennial review (40 CFR 131.20)
 - EPA published revised §304(a) recommendations for recreational criteria in 2012



Background

- 2014 Triennial Review: consideration of revised §304(a) criteria identified as medium priority (rulemaking after 2017)
- 2017 Triennial Review: consideration of revised §304(a) criteria identified as high priority
 - Also: three numeric aquatic life criteria for toxic substances (Acrolein, Diazinon, and Carbaryl)



Idaho's Current Recreational Uses and Criteria

- Uses

- Different use subcategories based on likelihood of ingestion of raw water
 - Primary Contact Recreation – swimming, etc.
 - Secondary Contact Recreation – boating, wading, etc.

- Criteria

- Based on EPA's 1986 §304(a) recommendation
- *E. coli* as fecal indicator bacteria (FIB)



Idaho's Current Recreational Criteria

- Expressed as geometric mean from at least 5 samples over 30 days
 - 126 cfu/100 mL
- Single Sample Maximum “trigger values” (SSM)

Recreation use subcategory	Single Sample Maximum (cfu/100 mL)
Secondary Contact Recreation	576
Primary Contact Recreation	406

$$\text{Geometric mean} = \sqrt[n]{x_1 \cdot x_2 \dots x_n}$$



Idaho's Current Recreational Criteria

- SSM values *are not* criteria; the only criterion under current standards is the geometric mean concentration
– 126 cfu/100 mL

Recreation use subcategory	Single Sample Maximums (cfu/100 mL)	Geometric mean criterion (cfu/100 mL)
Secondary Contact Recreation	576	126
Primary Contact Recreation	406	126



Idaho's Current Recreational Criteria

- One fecal indicator bacteria (*E. coli*)
- One magnitude, regardless of use subcategory (126 cfu/100 mL)
- Duration and Frequency
 - Geometric mean of five samples collected over 30 days
- Different Single Sample Maximum monitoring triggers for use subcategories



EPA's 2012 §304(a) recommendation

- Numeric criteria for two fecal indicator bacteria (FIB)
 - *E. coli*
 - Enterococci
- Criteria based on relationship of concentrations of FIB to rates of illness
- Provides two sets of criteria based on illness rates of recreational users:
 - 36/1000
 - 32/1000



Why enterococci?

- The relationship of enterococci concentrations to illness is direct (*E. coli* criteria derived based on relationship to enterococci)
- Advances in technology should make monitoring for enterococci more practical (longer holding times)



EPA's 2012 §304(a) recommendation

Indicator	Illness Rate of 36/1,000 users		Illness Rate of 32/1,000 users	
	Geometric Mean	STV*	Geometric Mean	STV*
<i>E. Coli</i> (cfu/100 mL)	126	410	100	320
Enterococci (cfu/100 mL)	35	130	30	110

*Greater than 10% frequency of exceedance of the statistical threshold value (STV) in a 30-day period would be a violation



EPA's 2012 §304(a) recommendation

- Statistical Threshold Values (STV) are based on the distribution of FIB concentrations associated with geometric mean criteria
 - STV value in EPA's recommendation is the 90th percentile of the distribution that would result in a geometric mean at the criterion
 - For *E. coli* =126 cfu/100 mL



EPA's 2012 §304(a) recommendation

- ~ 10% of the time, a single *E. coli* sample result >410 cfu/100 mL wouldn't be associated with a corresponding exceedance of the 30-day geomean criterion of 126 cfu/100 mL
 - 90% of the time, a single sample result > 410 *would* correspond to geomean exceedance



EPA's 2012 §304(a) recommendation

- Both indicators, and both geometric mean and Statistical Threshold Value (STV) magnitudes, are independently applicable
 - No preference for geometric mean over STV, or of *E. coli* over enterococci



30-day duration

- Current Idaho Criteria and EPA's 2012 §304(a) criteria have a 30-day duration component
 - EPA considers 30-days to be the optimal duration period



30-day duration

- Current Idaho Criteria and EPA's 2012 §304(a) criteria have a 30-day duration component
 - Collecting representative samples for longer durations (such as 90 days) would require additional monitoring and logistical costs



30-day duration

- Current Idaho Criteria and EPA's 2012 §304(a) criteria have a 30-day duration component
 - Inclusion of minimum monitoring requirements in Idaho Water Quality Standards ensures that decisions are based on samples that represent the full duration period



Idaho *E. coli* data



- Does the relationship of Statistical Threshold Values to geometric mean from the EPA §304(a) recommendation represent Idaho conditions?
- Reviewed readily available *E. coli* data from DEQ regions
 - Collected for surface water assessments, TMDLs, and 5-year review purposes

STV and Geomean

- 332 geomeans from sites throughout Idaho
 - Calculated from 5 samples collected ~weekly
- 258 sets had at least one sample that exceeded the Primary Contact SSM trigger of 406 cfu/100 mL
- 231 sets resulted in calculated geomean concentrations that exceeded 126 cfu/100 mL



STV and Geomean

- 89.5% of the time, when an *E. coli* sample exceeded the PCR Single Sample Maximum (406 cfu/100 mL), the subsequent geometric mean of 5 samples over thirty days exceeded the *E. coli* criterion of 126 cfu/100 mL.



STV and Geomean

- 74 geomeans calculated where no single sample ever exceeded 406 cfu/100 mL
- 12 geomeans exceeded the criterion of 126 cfu/100 mL, despite never having a single sample exceed the Primary Contact Recreation SSM trigger



STV and Geomean

- 16% of the time, *E. coli* geometric means calculated from 5 samples collected over thirty days exceeded the criterion, despite never having a single sample that exceeded the Primary Contact Recreation SSM trigger (406 cfu/100 mL)



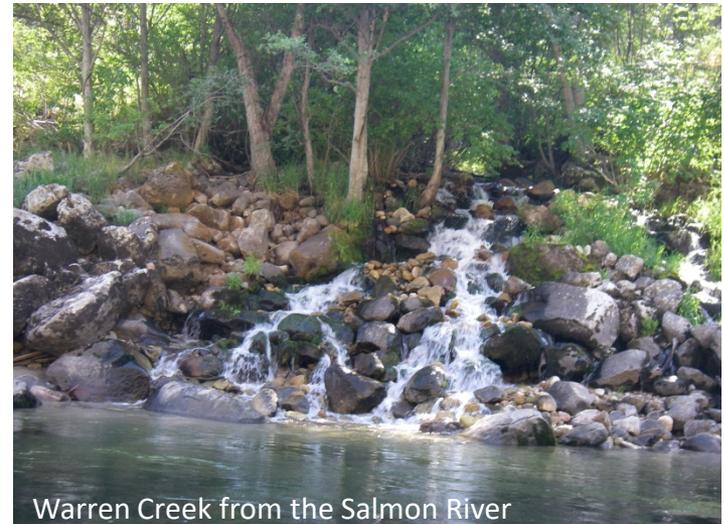
STV and Geomean

- Idaho *E. coli* data confirm that the relationship of the STV to the geomean from EPA's §304(a) recommendation is consistent with what is found in Idaho
- While using single sample STV's alone could result in a 10.5% "false positive" error rate, this represents a balance with "false negative" errors (16%)



STV and Geomean

- STV *is not* an instantaneous criterion
- Only a violation if $>10\%$ of samples collected over 30 day period exceed STV criterion
 - Error rates would be much lower than expected from a single sample



Warren Creek from the Salmon River

Rulemaking Summary and Proposed Rule

- Two negotiated rulemaking meetings:
 - May 31 and June 28, 2018
- Includes new aquatic life criteria for 3 toxic substances (acrolein, carbaryl, and diazinon)
- Initially proposed collapsing PCR and SCR subcategories into single REC use category
 - Based on comments, chose to maintain distinction



Rulemaking Summary and Proposed Rule

- Proposed criteria includes:
 - Both *E. coli* and enterococci as FIB
 - Makes clear that either would be considered appropriate for assessing compliance
 - Units expressed as “counts/100 mL” to clarify that multiple laboratory methods are appropriate



Rulemaking Summary and Proposed Rule

- Proposed criteria includes:
 - Includes both geometric mean criteria and STV
 - Includes both duration and frequency components
 - Includes minimum monitoring requirements to ensure data are representative of conditions throughout 30 day duration



Proposed Criteria

	Enterococci		<i>E. Coli</i>	
	Geomean*	STV	Geomean*	STV
Magnitude (counts per 100mL)	35	130	126	410
Duration (days)	30	30	30	30
Frequency	—	10%	—	10%

***Minimum of 5 samples collected over 30 days**



Comparison

Current

- Only *E. coli*
- Geometric mean criterion only
- Different monitoring triggers (SSM) for different use subcategories

Proposed

- *E. coli* and enterococci
- Geometric mean and Statistical Threshold Value (STV) criteria for both use subcategories



Comparison

- Currently, Single Sample Maximum triggers are used as reporting requirements for NPDES permits
 - For waters where the reporting requirement is based on the secondary contact trigger, this change could result in lower concentrations
 - Currently, 21 of 136 permits
 - Geometric mean criterion would not change



Questions?



South Fork Payette River

