

Recreational Use and Criteria

Rules

Surface Water Use Designations (IDAPA 58.01.01.100)

02. Recreation:

- a. *Primary contact recreation (PCR): water quality appropriate for prolonged and intimate contact by humans or for recreational activities when the ingestion of small quantities of water is likely to occur. Such activities include, but are not restricted to, those used for swimming, water skiing, or skin diving.*
- b. *Secondary contact recreation (SCR): water quality appropriate for recreational uses on or about the water and which are not included in the primary contact category. These activities may include fishing, boating, wading, infrequent swimming, and other activities where ingestion of raw water is not likely to occur.*

Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use (IDAPA 58.01.02.210)

01. Criteria for Toxic Substances. The criteria of Section 210 apply to surface waters of the state as follows.

- a. *Columns B1, B2, and C2 of the following table apply to waters designated for aquatic life use.*
- b. *Column C2 of the following table applies to waters designated for recreation use.*
- c. *Column C1 of the following table applies to waters designated for domestic water supply use.*

Surface Water Quality Criteria for Recreation Use Designations (IDAPA 58.01.02.251)

01. E. Coli Bacteria. Waters designated for recreation are not to contain E.coli bacteria, used as indicators of human pathogens, in concentrations exceeding:

- a. Geometric Mean Criterion. Waters designated for primary or secondary contact recreation are not to contain E. coli bacteria in concentrations exceeding a geometric mean of one hundred twenty-six (126) E. coli organisms per one hundred (100) ml based on a minimum of five (5) samples taken every three (3) to seven (7) days over a thirty (30) day period.*
- b. Use of Single Sample Values. A water sample exceeding the E. coli single sample maximums below indicates likely exceedance of the geometric mean criterion, but is not alone a violation of water quality standards. If a single sample exceeds the maximums set forth in Subsections 251.01.b.i., 251.01.b.ii., and 251.01.b.iii., then additional samples must be taken as specified in Subsection 251.01.c.:*
 - i. For waters designated as secondary contact recreation, a single sample maximum of five hundred seventy-six (576) E. coli organisms per one hundred (100) ml; or*
 - ii. For waters designated as primary contact recreation, a single sample maximum of four hundred six (406) E. coli organisms per one hundred (100) ml; or*
 - iii. For areas within waters designated for primary contact recreation that are additionally specified as public swimming beaches, a single sample maximum of two hundred thirty-five (235) E. coli organisms per one hundred (100) ml. Single sample counts above this value should be used in considering beach closures.*
- c. Additional Sampling. When a single sample maximum, as set forth in Subsections 251.01.b.i., 251.01.b.ii., and 251.01.b.iii., is exceeded, additional samples should be taken to assess compliance with the geometric mean E. coli criteria in Subsection 251.01.a. Sufficient additional samples should be taken by the Department to calculate a geometric mean in accordance with Subsection 251.01.a. This provision does not require additional ambient monitoring responsibilities for dischargers.*

Discussion

Recreational use protection is based on 1) *bacteria criteria*, protecting human health from sickness due to possible exposure to human pathogens, indicated by the presence of certain fecal indicator bacteria in higher than acceptable concentrations, and 2) *toxic substance criteria*, based on possible adverse health effects due to greater than acceptable exposure to toxic substances from consumption of fish or other organisms that live in water and take up contaminants into their tissue.

Idaho's use categories for designation of recreational use still refer to primary and secondary contact recreation. A list of characteristic activities is provided to distinguish the two subcategories of recreational use that are based on the likelihood of ingestion of water. This relates only to exposure to bacteria and the distinction is archaic, dating back to 1999 when Idaho had fecal coliform as an indicator of fecal contamination. At that time, there were two distinctly different criteria values for the two recreational use subcategories.

Since adoption in 2000 of EPA's 1986 recommended *E. coli* criterion as our fecal bacteria indicator, Idaho has had only a single criterion. That criterion is a geometric mean of 126 cfu / 100ml based on 5 samples in a thirty-day period, as stated in the rule language above. This criterion applies regardless of whether a waterbody is designated primary or secondary contact recreation, i.e. irrespective of likelihood of the ingestion of water during recreational activity.

What about single sample values? EPA's 1986 bacteria criteria recommendations included single sample maximums (SSMs). These SSMs were derived from upper confidence limits for single sample results in the data set that was used to calculate the 5-sample geometric means that were then related to reported rates of gastrointestinal illness. In the 1986 criterion document (EPA, 1986), EPA advised states could adopt and use the SSMs as indicators of different probabilities that the geometric mean criterion would be exceeded if a full 5-sample set of data was obtained. The different values of SSM – that is, different probabilities of the geometric mean exceeding the criterion based on one sample – could be used to reflect different risk tolerances based on likelihood of human exposure.

The most important thing to know about the 1986 criterion is that it was the geometric mean, not the SSMs, which were statistically correlated with rates of illness. Secondly, and often misunderstood, is that a lower SSM is associated with lower confidence the geometric mean, *in the data set the criterion was developed from*, would be exceeded. EPA's guidance document cautions, "These single sample maximum levels should be recalculated for individual areas if significant differences in log standard deviations occur." In other words, your results may differ. Generally speaking we expect they would, though typically we lack sufficient data to know. Thus, Idaho was cautious in its adoption of the single sample maximums and adopted them only as trigger values for additional sampling in order to confirm an actual exceedance of the geometric mean criterion, not as actionable criteria by themselves.

EPA revised its recommended bacteria criteria in late 2012 (EPA 2012). The geometric mean criterion for *E. coli* remains as the fundamental criterion for fresh waters. However, EPA recast the SSMs as statistical threshold values (STVs), more faithfully reflecting their statistical basis. An important distinction with STVs versus SSMs is that a STV is not a never to be exceeded

value. Rather an STV can be exceeded, is expected to be exceeded, in a set fraction of the samples collected. For example, if the STV is based on 90% confidence limits about the geometric mean then the STV is expected to be exceeded in 5% of the samples collected. This makes more sense statistically than the previous SSMs, but also requires frequent sampling to make a practical difference.

EPA's 2012 bacteria recommendations are something Idaho will consider when it moves forward with updates to its criteria to protect recreational use.

Often overlooked in evaluation of recreational use support are the human health criteria for toxic substances that are also applicable to this use. These criteria make no distinction in likelihood of ingestion of water but rather are based on exposure to toxic substances through the possibility of consuming fish and other aquatic organism living in the water. However, because we still have the holdover of a split recreational use, primary or secondary contact, there is sometimes confusion and debate over which sub-category of recreational use the toxic substance criteria apply to. For integrated reporting purposes Idaho has taken the stance that exceedance of the human health toxic substances criteria is an impairment of secondary contact recreation, since fishing is mentioned as part of the existing secondary contact recreational use description. Practically speaking it makes no difference which subcategory we say is impaired; the impairment is the same, as there is only one set of toxics criteria to protect recreational use.

Since there is no real difference in the underlying bacteria criteria applicable to recreational use, and the toxics criteria make no distinction as to likelihood of ingestion of water, there seems to be little if any value to maintaining a distinction between primary and secondary contact recreation. Collapsing the use to just recreation could save some confusion and debate, as well as simplify future monitoring and assessment. We could still apply SSMs or STVs to indicate the need to advise the public as to the safety of swimming at designated public swimming beaches.

Idaho would also like to correct the language in paragraph 01(a) of §210 to clarify that the column C2 toxic substances criteria apply only to recreational use and not to protection of aquatic life uses. The C2 reference is a carryover from the national toxics rule that does not make sense in Idaho's beneficial use structure.

References

- 1) USEPA 1986. Ambient Aquatic Life Water Quality Criteria for Bacteria – 1986. EPA440/5-84-002. US EPA. Office of Water. Washington, DC. 24 pp.
- 2) USEPA 2012. Recreational Water Quality Criteria. 820-F-12-058. US EPA. Office of Water. Washington, DC. 68 pp.