

Rulemaking Docket 58-0102-1802

Revision of Recreation Use and Criteria and Adoption of Aquatic Life Criteria for Three Toxics

Discussion Paper #1

Introduction

This rulemaking is being initiated to update Idaho's aquatic life criteria to include numeric criteria for three toxic substances (Acrolein, Carbaryl, and Diazinon) and to revise Idaho's recreation use and associated criteria. These revisions were identified as a high priority in Idaho's 2017 Triennial Review of Water Quality Standards.

Idaho is pursuing this rulemaking in order to comply with federal requirements to consider EPA recommended §304(a) criteria for acrolein, carbaryl, diazinon, *Escherichia coli*, and enterococci (40 CFR 131.20).

In addition, we are pursuing collapsing the two recreation use subcategories, primary contact recreation (PCR) and secondary contact recreation (SCR), into a single recreation use (REC).

Aquatic Life Criteria for Three Toxic Substances

Currently, Idaho does not have aquatic life criteria for acrolein, carbaryl, and diazinon, although EPA has issued new recommended aquatic life criteria for these toxic substances.

Acrolein

Idaho does not currently have aquatic life criteria for acrolein. In 2003, EPA developed a risk assessment of the use of acrolein as an aquatic herbicide and its potential effects on listed salmon and steelhead evolutionary significant units (ESUs) for California and a portion of southern Oregon (Turner and Erickson 2003). EPA concluded that the aquatic herbicide use of acrolein would either not adversely affect or have no effect on the region's ESUs. EPA indicated they would produce similar analyses for listed salmon and steelhead ESUs that occur in Oregon, Washington, and Idaho (Turner and Erickson 2003), which have yet to be published. In 2009, EPA added acrolein to the §304(a) recommended water quality criteria.

EPA §304(a) recommended criteria and Idaho WQS comparison.

Criteria Version	CMC (µg/L) ^a	CCC (µg/L) ^a
Idaho WQS	—	—
EPA §304(a)	3	3

a. See definitions of Acute Criteria (CMC) and Chronic Criteria

(CCC) (IDAPA 58.01.02.010).

Carbaryl

Idaho does not currently have aquatic life criteria related to carbaryl. NOAA National Marine Fisheries Service issued a BiOp in 2009 on the effects of EPA's proposed registration of pesticide products containing the active ingredient carbaryl on endangered species, threatened species, and critical habitat that has been designated for those species. Although the proposed uses of carbaryl pesticide products may lead to individual fitness level consequences for Snake River spring/summer-run Chinook Salmon, exposure is not expected to occur at a frequency that would cause effects at the population level (NOAA 2009). In 2012, EPA added carbaryl to the §304(a) recommended water quality criteria.

EPA §304(a) recommended criteria and Idaho WQS comparison.

Criteria Version	CMC (µg/L) ^a	CCC (µg/L) ^a
Idaho WQS	—	—
EPA §304(a)	2.1	2.1

a. See definitions of Acute Criteria (CMC) and Chronic Criteria (CCC) (IDAPA 58.01.02.010).

Diazinon

Idaho does not currently have aquatic life criteria related to diazinon. In 2005, EPA added diazinon to the §304(a) recommended water quality criteria.

EPA §304(a) recommended criteria and Idaho WQS comparison.

Criteria Version	CMC (µg/L) ^a	CCC (µg/L) ^a
Idaho WQS	—	—
EPA §304(a)	0.17	0.17

a. See definitions of Acute Criteria (CMC) and Chronic Criteria (CCC) (IDAPA 58.01.02.010).

Permitted Discharges

A search of the EPA ICIS database indicates that there are no individual NPDES permits for discharge of Acrolein, Carbaryl, or Diazinon in Idaho.

Application of these pesticides would be covered under the NPDES pesticide general permit (PGP). The PGP requires that all pesticides must be applied consistent with the label instructions and consistent with the conditions outlined in Idaho's §401 certification of the PGP. There are no §401 conditions specific to these three pesticides.

Summary

Adoption of the numeric §304(a) recommended criteria for acrolein, carbaryl, and diazinon will ensure that DEQ complies with federal regulations concerning consideration of EPA recommended criteria (40 CFR 131.20), and will provide additional protection for Idaho waters.

Recreation Use and Criteria

Overview

Recreational use protection is based on (1) *bacteria criteria*, which protect humans from sickness due to possible exposure to pathogens, indicated by the presence of certain fecal indicator bacteria in higher than acceptable concentrations, and (2) *toxic substance criteria*, which are 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 refer to primary and secondary contact recreation. A list of characteristic activities is provided to distinguish the two subcategories of recreational use, based on the likelihood of ingesting water. This distinction relates only to exposure to bacteria and dates 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. In practice, primary contact recreation would include all the activities associated with secondary contact recreation, in addition to activities (such as swimming) that would include full immersion and a higher likelihood of incidental ingestion of water. The current criterion is 126 cfu/100ml for *E. coli* regardless of this distinction.

Recreation Use Designations

Since there is no difference in the bacteria criteria or the toxic substances criteria applicable to primary and secondary contact recreation uses, as discussed below, there seems to be no value in maintaining a distinction between primary and secondary contact recreation.

Idaho's current recreation use designation (IDAPA 58.01.02.100.02) is as follows:

100. Surface Water Use Designations.

Waterbodies are designated in Idaho to protect water quality for existing or designated uses. The designated use of a waterbody does not imply any rights to access or ability to conduct any activity related to the use designation, nor does it imply that an activity is safe. For example, a designation of primary or secondary contact recreation may occur in areas where it is unsafe to enter the water due to water flows, depth or other hazardous conditions. Another example is that aquatic life uses may be designated in areas that are closed to fishing or access is not allowed by property owners. Wherever attainable, the designated beneficial uses for which the surface waters of the state are to be protected include:

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.

Bacteria Criteria

Idaho's current bacteria criteria (IDAPA 58.01.02.251) are as follows:

251. SURFACE WATER QUALITY CRITERIA FOR RECREATION USE DESIGNATIONS.

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.

In 2000, DEQ adopted EPA's 1986 recommended *E. coli* criterion as a single criterion. That criterion is a geometric mean of 126 colony-forming units (cfu) per 100 milliliters (mL) based on 5 samples taken in a 30-day period, as stated in the rule language above. This criterion applies regardless of whether a water body is assessed for primary or secondary contact recreation (i.e., irrespective of the likelihood of ingesting water during recreational activity).

DEQ does still look at single sample values. EPA's 1986 bacteria criteria recommendations included use of 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. EPA advised that 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 (EPA 1986). The SSM values (used to indicate 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 SSM, which was statistically correlated with rates of illness. The SSM is associated with the probability that the geometric mean, *in the data set the criterion was developed from*, would exceed the criterion. EPA's 1986 guidance document cautions: "These single sample maximum levels should be recalculated for individual areas if significant differences in log standard deviations occur." Thus, Idaho was cautious in adopting SSMs and adopted them only as trigger values for additional sampling 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. Similar to an SSM, a single STV exceedance would not alone result in a criterion violation. However, a frequency of STV exceedances greater than 10% of the 30-day sampling interval would represent a criterion exceedance, even if the geometric mean criterion is not exceeded. This approach makes more sense statistically than the previous SSMs.

Comparison of Idaho Bacteria Criteria with EPA's 2012 §304(a) Recommended Criteria

Idaho's current criteria are expressed only as geometric means, with SSM "trigger values" that initiate additional sampling. The criteria only use *E. coli* as an indicator of fecal contamination and are based on an illness rate of 36 illnesses per 1,000 primary recreational users.

In contrast, EPA's 2012 recommended recreational water quality criteria consist of both a geometric mean and an STV, include criteria for both *E. coli* and enterococci as indicators of fecal contamination in fresh waters, and provide two illness rates for consideration, with either rate considered protective of primary contact recreation.

The following table illustrates the differences between Idaho's current criteria and EPA's 2012 recommended criteria (Table 1).

Table 1. Comparison of current Idaho Recreational Use Criteria and EPA's 2012 recommended criteria.

Indicator	Current Idaho Criteria (cfu/100 mL)			EPA 2012 Recommended Criteria (cfu/100 mL)			
				Illness Rate of 36/1,000 Users		Illness Rate of 32/1,000 Users	
	Geometric Mean	SSM ^a	Geometric Mean	STV ^b	Geometric Mean	STV ^b	
<i>E. coli</i>	126	Secondary Contact	576	126	410	100	320
		Primary Contact	406				
		Public Swimming Beach	235				
Enterococci	—	—		35	130	30	110

^a The single sample maximum values (SSM) are *not* criteria, and exceedance of an SSM alone is not considered a criterion violation. Rather, these are considered "trigger values" that initiate additional sampling.

^b Greater than 10% frequency of exceedance of the statistical threshold value (STV) in a 30-day period would be a violation even if the geometric mean criterion wasn't violated over the same period.

Enterococci

Consideration of enterococci criteria as included in EPA's 2012 §304(a) recommendation is necessary to comply with federal requirements for consideration of EPA recommended criteria (40 CFR 131.20). Enterococci were more directly related to incidences of gastrointestinal illnesses than *E. coli* based on the dataset used to derive the 2012 §304(a) criteria. In addition, rapid analytical techniques for enterococci are currently being developed. By adopting enterococci criteria, Idaho will be in a position to easily integrate any advances to improve sampling logistics (for example, extended holding times and field preservation to allow for monitoring and assessment of more remote waters, and rapid notification of affected swimming beaches and recreational facilities).

Addition of the enterococci criteria as included in EPA's 2012 §304(a) would allow dischargers and DEQ staff conducting monitoring to choose either *E. coli* or enterococci as indicators of human pathogens; while both criteria would apply, either alone would be considered sufficient for determining support of recreational uses.

Statistical Threshold Values

DEQ will also consider the adoption of statistical threshold values (STV) as criteria. The STV is a concentration that is not to be exceeded more frequently than 10% of valid samples collected in a 30-day period. The STV can be used as the basis of water quality based effluent limits (WQBEL) and for TMDL targets for non-continuous or episodic discharges.

Toxic Substances Criteria

The human health criteria for toxic substances are also applicable to recreation use. These criteria make no distinction in likelihood of water ingestion but rather are based on exposure to toxic substances through the possibility of consuming contaminated fish and other aquatic organisms 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 as to which subcategory of recreational use the toxic substance criteria apply. Practically speaking, it makes no difference which subcategory we say is impaired because the same toxic substances criteria apply to both recreational use subcategories.

Draft Rule

The draft rule proposes to collapse the recreational use subcategories in Subsections 100.02.a and 100.02.b into a single recreation use. The proposed revisions to Idaho Water Quality Standards are as follows:

100. Surface Water Use Designations.

Waterbodies are designated in Idaho to protect water quality for existing or designated uses. The designated use of a waterbody does not imply any rights to access or ability to conduct any activity related to the use designation, nor does it imply that an activity is safe. For example, a designation of ~~primary or secondary contact~~ recreation may occur in areas where it is unsafe to enter the water due to water flows, depth or other hazardous conditions. Another example is that aquatic life uses may be designated in areas that are closed to fishing or access is not allowed by property owners. Wherever attainable, the designated beneficial uses for which the surface waters of the state are to be protected include:

02. Recreation (REC). Water Quality Appropriate for recreational uses in or on the water where ingestion of small quantities of raw water or consumption of fish may occur. These activities may include, but are not limited to, swimming, fishing, boating, and wading.

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.~~

In addition, the draft rule proposes to update the criteria for recreation use designations in subsection 251 by adding reference to the numeric Fish Only toxic substances criteria in Subsection 210.01.b, and adopting the enterococci geometric mean criterion and the *E. coli* and enterococci STV as proposed in EPA's 2012 §304(a). The proposed revisions to Idaho Water Quality Standards are as follows:

251. SURFACE WATER QUALITY CRITERIA FOR RECREATION USE DESIGNATIONS.

01. **Toxics Criteria.** Waters designated for recreation must meet the Fish Only water quality criteria set forth in Subsection 210.01.b.

02. **Fecal Indicators.** Waters designated for recreation must meet criteria for indicator organisms of fecal contamination. Either of the following indicator criterion would be considered sufficient for determining compliance with the fecal indicator criteria:

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

~~aj.~~ Geometric Mean Criterion. ~~Waters designated for primary or secondary contact recreation are n~~Not to contain E. coli bacteria in concentrations exceeding a geometric mean of one hundred twenty-six (126) E. coli organisms colony forming units (CFU) 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; and

~~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.

ii. **Statistical Threshold Value (STV).** No greater than ten percent (10%) of valid samples collected over a thirty (30) day period are to contain E. coli bacteria in concentrations exceeding an STV of four hundred and ten (410) E. coli CFU per one hundred (100) ml; or

b. **Enterococci.** Waters designated for ~~contact~~ recreation are not to contain enterococci bacteria, used as indicators of human pathogens, in concentrations exceeding:

i. Geometric Mean Criterion. Not to contain enterococci bacteria in concentrations exceeding a geometric mean of thirty-five (35) enterococci CFU 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; and

ii. Statistical Threshold Value (STV). No greater than ten percent (10%) of valid samples collected over a thirty (30) day period are to contain enterococci bacteria in concentrations exceeding an STV of one hundred and thirty (130) enterococci CFU per one hundred (100) ml.

Summary

Since there is no difference in the geometric mean bacteria criteria or the toxic substances criteria applicable to primary and secondary contact recreation uses, there seems to be no value in maintaining a distinction between primary and secondary contact recreation. Collapsing the use to just recreation could save some confusion and debate and simplify future monitoring and assessment. DEQ 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. Monitoring protocols can specify that summer sampling is what is relevant to waterborne recreational activities. The addition of enterococci as an indicator of human pathogens will provide optional methods for determination of recreational use support and will enable Idaho to take advantage of future technological advances in monitoring and analysis. Although both criteria would apply, monitoring of either *E. coli* or enterococci would be considered appropriate for determining support of recreational uses and compliance with WQS.

References

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