

Water Quality Policy 1-11 Revisions for Bacteria Draft Revisions without Track Changes

Public Review April 1 – 30, 2020

*The following are draft updates to [Water Quality Policy 1-11](#) to address new bacteria water quality standards that were adopted for the water contact recreation use in January 2019. Because the water contact indicators have changed from fecal coliform to *E. coli* in fresh waters and enterococci in marine waters, it was decided that the bacteria policy should be split into two sections to address the water contact recreation use and shellfish harvesting use separately.*

To assist the reader, the draft updates below are shown without track changes. The full text of Policy 1-11 in track changes, as well as other information, [can be viewed on our website](#).

2A.1. Bacteria – Shellfish Harvesting

Designated Use:	Shellfish harvesting
Numeric Criteria:	WAC 173-201A-210 (2)(b)
Narrative Standards:	WAC 173-201A-260 & -300
Unit of Measure:	Number of colony forming units (CFU) or most probable number (MPN) per 100mL

Assessment Information and Data Requirements

The state water quality standards for bacteria rely on fecal coliform data to protect shellfish harvesting in marine waters.

The bacterial indicators for shellfish harvesting uses include provisions for determining compliance based on a two-part criteria. The criteria are not met if either component is exceeded:

1. A “*geometric mean component*” with a specified magnitude value that is not to be exceeded.
2. A “*ten-percent exceedance component*” which is a magnitude value that is not to be exceeded by more than 10 percent of all samples within a given time period (or any single sample when less than ten sample values exist).

Ecology will apply the appropriate indicator criteria to datasets resulting from a monitoring design that represents general ambient conditions. The criteria are expressed in a manner to be compared to a distributed sample dataset. Sampling that solely targets known periods of elevated bacteria levels is not representative of the general condition of an AU, as it may result in an artificially inflated proportion of samples that exceed the criteria. Therefore, Ecology will

remove monitoring data from the evaluation when the intention of the monitoring is to target high bacteria levels.

For all bacteria data evaluated in the WQA, Ecology will use only one value per AU per day. For all waterbody types, an arithmetic mean value will be calculated from multiple samples collected on the same day from a single station within an AU to represent the daily value. This averaging helps reduce the effects of sample variability inherent in determining ambient bacteria concentrations at the time of sampling. When sample values are available from multiple stations within an AU on the same day, the station with the highest (average) value will be used as the daily value. This will help ensure the influence of bacteria sources upon a portion of an AU (e.g. a downstream portion of a stream reach) is not obscured by averaging values from a station on a different portion of the AU (e.g. an upstream portion of an stream reach) that is not influenced by the same sources. Samples with non-detect values will be assigned the method detection limit. When the detection limit is not available, a value of 2 CFU/100mL will be assigned.

Ecology will group the data for each AU by individual water year, which extends from October 1 through September 30 of the following calendar year. Ecology will calculate a single geometric mean for the entire water year (and critical period if applicable) and determine the percentage of samples exceeding the *ten-percent exceedance component* for the entire water year. A minimum of five data collection events is required to calculate a geometric mean value for marine shellfish harvesting bacteria criteria. No minimum sample size is required to evaluate the *ten-percent exceedance component* of the criterion.

Where sufficient information is available, Ecology may also define a specified critical period or season in which the criteria need to be met for shellfish harvesting, based on WAC173-201A, sections 200(2)(b)(i)&(210)(3)(b)(i). This time period may be defined through a TMDL study or a seasonal analysis that brackets specific months or seasons in which bacteria levels are more prone to exceed criteria. Where a critical period has been identified, Ecology will assess bacteria for the critical period and the entire water year.

Ecology may also use agency advisories to assess the support of designated uses. Specific details on category determinations for shellfish classification standards are included at the end of the Category Determinations section below.

Analysis of Fecal Coliform Data in Fresh Water for Shellfish Harvesting

Fecal coliform data is considered an alternative indicator for water contact recreations until 12/31/2020. Ecology will continue to assess fecal coliform data collected after 2020 in fresh water in order to determine compliance with load allocations under a Total Maximum Daily Load (TMDL) that is developed for the protection of downstream shellfish harvesting use.

For purposes of delisting waters, freshwater AUs that drain directly to marine waters within a TMDL boundary may require monitoring of both fecal coliform and *E. coli* bacterial indicators to determine attainment of both recreation and shellfish harvesting uses. Consult with a regional TMDL lead for information regarding the re-evaluation of AUs that have a fecal coliform TMDL.

Category Determinations

More recent data outweighs older data in qualifying an AU for a given category. For example, if the AU qualifies for Category 5 based on earlier years but are followed by subsequent years that qualify for Category 1, then Ecology will place the AU in Category 1. The exception is years showing no exceedances but have insufficient number of sample values to meet the Category 1 requirements; these insufficient datasets will not outweigh prior years that qualify for another category.

Category determinations based on agency advisories are described at the end of this section.

Category 5

Ecology will place an AU in Category 5 when:

- The *geometric mean component* of the criterion is exceeded in any water year.

OR

- The *ten-percent exceedance component* of the criterion is exceeded within a single water year and at least two samples exceed the associated criterion magnitude during that water year.

Category 4

Ecology will place an AU in Category 4A when EPA has approved a TMDL for bacterial indicators associated with shellfish harvesting.

Ecology will place an AU in Category 4B when an alternative pollution control program (meeting the requirements in Section 1F) is actively addressing the associated problem affecting the designated use.

Category 3

Ecology will place an AU in Category 3 when the available data are insufficient for any other category determination. This information will be maintained in Ecology's WQA database for future use. As additional data and information become available in future listing cycles, Ecology will again assess all available data to update the category determination according to this policy.

Category 2

Ecology will place an AU in Category 2 when a water year does not meet the *ten-percent exceedance component* of the applicable criterion but only one sample in the water year exceeds the magnitude of this criterion component.

Category 1

Ecology will place an AU in Category 1 in one of two ways:

The *geometric mean* and the *ten percent exceedance components* of the criteria are met in each of two water years, based on ten or more samples from each of those years.

- If any critical period has been identified by Ecology, the criteria must also be met during this period.

- The two years qualifying for Category 1 do not need to be consecutive as long as there is no year between them in which the criterion is not met. The two years do not need to be the two most recent as long as there is no subsequent year in which the criteria are not met.

OR

Ecology will place an AU in Category 1 based on data from a single water year when the following circumstances are met:

- The AU has an approved TMDL (Category 4A) or alternative pollution control program (Category 4B) that is being actively implemented.
- Ecology has defined a critical period for the AU during which:
 - There are at least five sample values from the critical period.
 - The data meet the *geometric mean* and the *ten-percent exceedance components* of the criteria, and/or the applicable TMDL targets, whichever is more stringent.
- The qualifying year does not have to be the most recent year provided that there are no more recent data for which the criteria are not met.

In some cases, Ecology will retain an AU in Category 4A when the criteria are attained if further work is needed to achieve associated water quality goals. For example, an AU may be meeting criteria, but may not yet be meeting TMDL load allocations necessary to support downstream uses. See Part 1, Section Category 4A: Has a TMDL Approved by EPA, for more information on assessment of data within a TMDL boundary.

Category Determinations Based on Agency Health Advisories

Category Determinations using Department of Health Shellfish Program Data

The [Washington Department of Health \(WDOH\) classifies shellfish](#) growing areas based on their sanitary conditions under the direction of the U.S. Food and Drug Administration (FDA). The WDOH classification methods are derived from the [National Shellfish Sanitation Program \(NSSP\) Guide for the Control of Molluscan Shellfish](#). The bacteriological quality of marine water samples collected from an approved growing area must satisfy both parts of the following NSSP standard. The concentration of fecal coliform bacteria, the indicator organisms, is not to exceed:

- A geometric mean of 14 organisms per 100mL; and
- The estimated 90th percentile cannot exceed 43 organisms per 100 mL if sampling under the systematic random sampling plan. If sampling where point sources of pollution may impact the growing area, not more than 10 percent of the samples can exceed 43 organisms per 100 mL.

Generally, WDOH uses a minimum of 30 samples for determining compliance with the geometric mean criterion and may include several years of data. However, in accordance with the surface water quality standards, Ecology assesses the ambient bacteriologic conditions of commercial and recreational shellfish harvesting area based on a maximum 12 months duration for calculating a geometric mean [WAC 173-201A-210(2)(b)(ii)].

This differing temporal range (several years vs. one year) for determining compliance with the geometric mean criterion, may in some cases, create a disparity between WDOH and Ecology

impairment decisions. Furthermore, when assessing data for Conditionally Approved growing areas, WDOH removes data collected under specific conditions such as storm events. Ecology includes these data when collected in the course of a random sampling plan. Sampling designed to target high bacteria levels are not used to assess ambient conditions.

As allowed by the surface water quality standards, shellfish growing areas approved for unconditional shellfish harvest using the WDOH assessment methods, may be considered fully supporting the shellfish harvesting use. In accordance with this provision, Ecology will consult with WDOH on WQA determinations that use WDOH shellfish program sampling data. In the event of a discrepancy between the WQA impairment status and WDOH shellfish sanitation classification for an AU, Ecology will defer to WDOH and administratively modify the WQA as necessary to align with WDOH classifications.

Helpful Documents

- EAP030 (Publication #18-03-239) – Collection of Fecal Coliform Bacteria Samples in Surface Waters
- EAP034 (Publication #17-03-207) – Collection, Processing, and Analysis of Stream Samples
- EAP092 (Publication #18-03-210) – Beach Program Bacteria Sampling

2A.2. Bacteria – Water Contact Recreation

Designated Use:	Water contact recreation
Numeric Criteria:	WAC 173-201A-200 (2)(b) WAC 173-201A-210 (3)(b)
Narrative Standards:	WAC 173-201A-260 & -300
Unit of Measure:	Number of colony forming units (CFU) or most probable number (MPN) per 100mL

Assessment Information and Data Requirements

The state water quality standards for bacteria to protect for water contact recreation were updated in January 2019 to align with nationally recommended criteria. The newly adopted bacteria criteria rely on the following indicators to protect water contact recreation:

- Fresh water: *Escherichia coli* (*E. coli*) and fecal coliform¹
- Marine water: Enterococci and fecal coliform¹

The bacterial indicators water contact recreation include provisions for determining compliance based on a two-part criteria. The criteria are not met if either component is exceeded:

1. A “*geometric mean component*” with a specified magnitude value that is not to be exceeded.
2. A “*ten-percent exceedance component*” which is a magnitude value that is not to be exceeded by more than 10 percent of all samples within a given time period (or any single sample when less than ten sample values exist).

Ecology will apply the appropriate indicator criteria to datasets resulting from a monitoring design that represents general ambient conditions. The criteria are expressed in a manner to be compared to a distributed sample dataset. Sampling that solely targets known periods of elevated bacteria levels is not representative of the general condition of an AU, as it may result in an artificially inflated proportion of samples that exceed the criteria. Therefore, Ecology will remove monitoring data from the evaluation when the intention of the monitoring is to target high bacteria levels.

For all bacteria data evaluated in the WQA, Ecology will use only one value per AU per day. For all waterbody types, an arithmetic mean value will be calculated from multiple samples collected on the same day from a single station within an AU to represent the daily value. This averaging helps reduce the effects of sample variability inherent in determining ambient bacteria concentrations at the time of sampling. When sample values are available from multiple stations within an AU on the same day, the station with the highest (average) value will be used as the daily value. This will help ensure the influence of bacteria sources upon a portion of an AU (e.g.

¹ Water quality standards for fresh water and marine contact recreation allow use of fecal coliform as an alternate bacterial indicator through 12/31/2020, in order to allow laboratories adequate time to transition to methods that analyze for *E. coli* and enterococci. .

a downstream portion of a stream reach) is not obscured by averaging values from a station on a different portion of the AU (e.g. an upstream portion of a stream reach) that is not influenced by the same sources. Samples with non-detect values will be assigned the method detection limit. When the detection limit is not available, a value of 2 CFU/100mL will be assigned.

Ecology will group data for each AU by individual water year (October 1 through September 30 of the following calendar year). Within each water year, data will be compared to the criteria in three-consecutive-month periods (i.e. Jan./Feb/March, Feb/March/April, etc.), as well as separately for any applicable critical period. In accordance with the numeric criteria, a minimum of three data collection events within a three-month period are required to calculate a geometric mean value for fresh and marine water contact recreation bacteria criteria. No minimum sample size is required to evaluate the *ten-percent exceedance component* of the criterion for any of the designated uses.

Where sufficient information is available, Ecology may also define a specified critical period or season in which the criteria need to be met for water contact recreation, based on WAC173-201A, sections 200(2)(b)(i)&(210)(3)(b)(i). This time period may be defined through a TMDL study or a seasonal analysis that brackets specific months or seasons in which bacteria levels are more prone to exceed criteria. Where a critical period has been identified, Ecology will assess bacteria for the critical period and the entire water year.

Analysis of Fecal Coliform Data for Water Contact Recreation

Fecal coliform data is considered an alternative indicator for water contact recreations until 12/31/2020. If both fecal coliform and primary indicator data are available for a waterbody, the data will be assessed separately and independent category determinations will be made for each parameter. Ecology will not assess fecal coliform data after 2020, unless fecal coliform data is needed to determine compliance with load allocations under a Total Maximum Daily Load (TMDL). Consult with a regional TMDL lead for information regarding the re-evaluation of AUs that have a fecal coliform TMDL.

Category Determinations

More recent data outweighs older data in qualifying an AU for a given category. For example, if the AU qualifies for Category 5 based on earlier years but are followed by subsequent years that qualify for Category 1, then Ecology will place the AU in Category 1. The exception is years showing no exceedances but have insufficient number of sample values to meet the Category 1 requirements. These insufficient datasets will not outweigh prior years that qualify for another category.

Category 5

Ecology will place an AU in Category 5 when:

- The *geometric mean component* of the criterion is exceeded within a single water year (i.e. for any three-month period).

OR

- The *ten-percent exceedance component* of the criterion is exceeded within any three-month period in a single water year and at least two samples exceed the associated criterion magnitude during that water year.

Category 4

Ecology will place an AU in Category 4A when EPA has approved a TMDL for bacterial indicators associated with water contact recreation.

Ecology will place an AU in Category 4B when an alternative pollution control program (meeting the requirements in Section 1F) is actively addressing the associated problem affecting the designated use.

Category 3

Ecology will place an AU in Category 3 when the available data are insufficient for any other category determination. This information will be maintained in Ecology's WQA database for future use. As additional data and information become available in future listing cycles, Ecology will again assess all available data to update the category determination according to this policy.

Category 2

Ecology will place an AU in Category 2 when the data exceed the *ten-percent exceedance component* of the criteria, but the AU does not qualify for Category 5.

Category 1

Ecology will place an AU in Category 1 in one of two ways:

The data meet both the *geometric mean* and *ten-percent exceedance components* of the criteria in each of two water years, under the following conditions:

- In each of the two water years, there must be enough samples to calculate at least one geometric mean for October through March and one for April through September. The *ten percent exceedance component* must be met for all three-month periods with data available, regardless of sample size.
- For AUs where Ecology has identified one or more critical periods, the data must also meet the criteria or approved TMDL load allocation in that period.
- The two years qualifying for Category 1 do not need to be consecutive as long as there is no year between them in which the criterion is not met. The two years do not need to be the two most recent as long as there is no subsequent year in which the criteria are not met.

OR

Ecology may place an AU in Category 1 based on data from a single water year where the AU has an approved TMDL (Category 4A) or an actively implemented alternative pollution control program (Category 4B) under the following conditions:

- Ecology has defined a critical period for the AU for which:
 - There are at least three sample values from the critical period(s).
 - The data meet the *geometric mean* and the *ten percent exceedance components* of the criteria, and/or meet the applicable TMDL targets, whichever is more stringent.
- If data is available from outside the critical period, such data must also meet the *geometric mean and ten percent exceedance components* of the criteria.
- There are no more recent data for which the criteria are not met.

In some cases, Ecology will retain an AU in Category 4A when the criteria are attained if further work is needed to achieve associated water quality goals. For example, an AU may be meeting criteria, but may not yet be meeting TMDL load allocations necessary to support downstream uses. See Part 1, Section Category 4A: Has a TMDL Approved by EPA, for more information on assessment of data within a TMDL boundary.

Helpful Documents

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