WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

# Wyoming Surface Water Quality Standards

## Recreation Criteria

Triennial Review Stakeholder Group
April 22, 2021

# Outline

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Review of Water Quality Criteria Requirements
- Nationally Recommended Recreation Criteria
- Wyoming's Recreation Criteria
- Examples of Criteria from Other States
  - Narrative Criteria
  - Cyanotoxin Criteria
  - Frequency for Waterborne Pathogen Indicator Criteria
- Ideas for Potential Changes to Wyoming's Standards

# Surface Water Quality Standards

Designated Uses

Implementation

Water Quality Criteria

Antidegradation

# Water Quality Criteria

- Concentrations of pollutants or narrative statements to protect designated uses


# Water Quality Criteria: Clean Water Act

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

## 40 CFR 131.11

- Water quality criteria must protect the designated use


# Water Quality Criteria: Clean Water Act

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

## 40 CFR 131.11

- Water quality criteria can be based on
  - Clean Water Act Section 304(a) guidance*

*criteria for water quality that reflect the latest scientific knowledge


# Water Quality Criteria: Clean Water Act

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

## 40 CFR 131.11

- Water quality criteria can be based on
  - 304(a) guidance modified to reflect site-specific conditions


# Water Quality Criteria: Clean Water Act

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

## 40 CFR 131.11

- Water quality criteria can be based on
  - Other scientifically defensible methods


# Water Quality Criteria: Clean Water Act

## 40 CFR 131.11

- Water quality criteria can be
  - narrative criteria or criteria based on biomonitoring methods where numerical criteria cannot be established or to supplement numeric criteria


# Nationally Recommended Water Quality Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

## Summary of the Clean Water Act

### 33 U.S.C. §1251 et seq. (1972)

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters.

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained:

- EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges.
- Point sources are discrete conveyances such as pipes or man-made ditches.
  - Individual homes that are connected to a municipal system, use a septic system, or do not

**Quick Links**

- 2018 version of CWA from the U.S. Code (233 pp, 1.23 MB)

You may need a PDF reader to view some of the files on this page. See EPA's About PDF page to learn more

- The official text of the CWA continues to be available in the *United States Code* from the US Government Printing Office

**§ 1314. Information and guidelines**

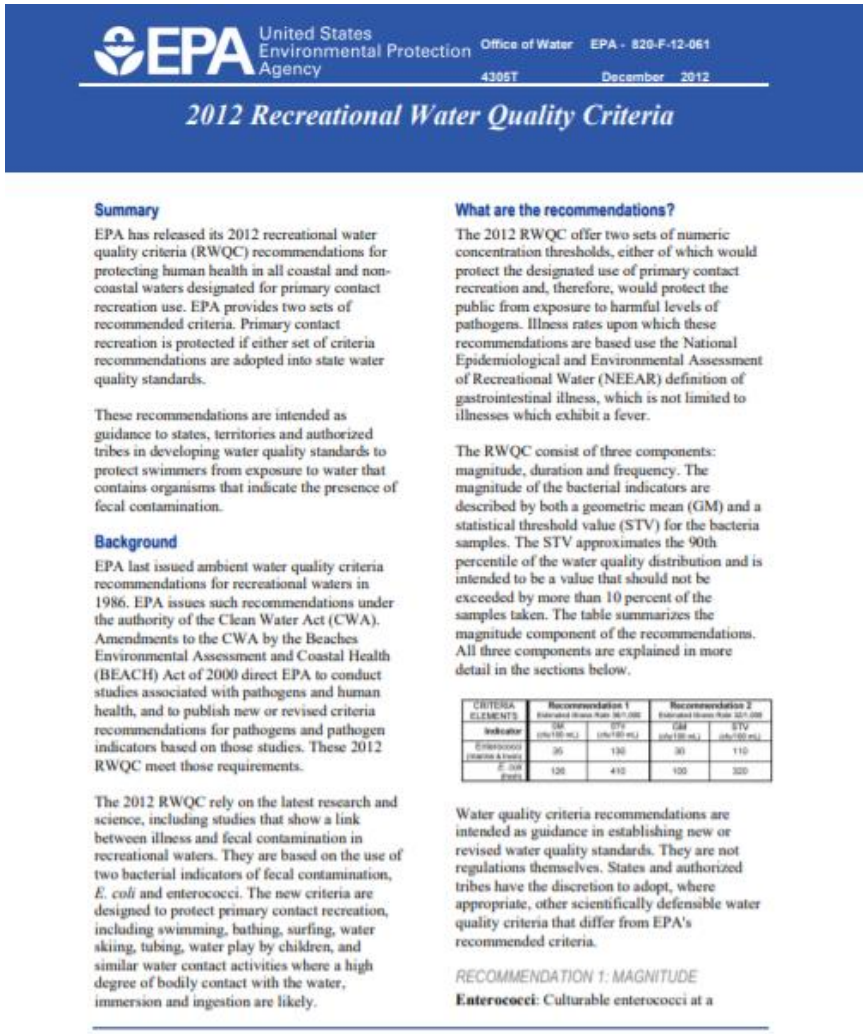
**(a) Criteria development and publication**

(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after October 18, 1972 (and from time to time thereafter revise) criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on biological community diversity, productivity, and stability, including information on the factors affecting rates of eutrophication and rates of organic and inorganic sedimentation for varying types of receiving waters.

(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after October 18, 1972 (and from time to time thereafter revise) information (A) on the factors necessary to restore and maintain the chemical, physical, and biological integrity of all navigable waters, ground waters, waters of the contiguous zone, and the oceans; (B) on the factors necessary for the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters

# Recreation Criteria: *E. coli* and Enterococci

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



EPA United States Environmental Protection Agency | Office of Water 4305T | EPA - 820-F-12-061 | December 2012

*2012 Recreational Water Quality Criteria*

**Summary**

EPA has released its 2012 recreational water quality criteria (RWQC) recommendations for protecting human health in all coastal and non-coastal waters designated for primary contact recreation use. EPA provides two sets of recommended criteria. Primary contact recreation is protected if either set of criteria recommendations are adopted into state water quality standards.

These recommendations are intended as guidance to states, territories and authorized tribes in developing water quality standards to protect swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination.

**Background**

EPA last issued ambient water quality criteria recommendations for recreational waters in 1986. EPA issues such recommendations under the authority of the Clean Water Act (CWA). Amendments to the CWA by the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 direct EPA to conduct studies associated with pathogens and human health, and to publish new or revised criteria recommendations for pathogens and pathogen indicators based on those studies. These 2012 RWQC meet those requirements.

The 2012 RWQC rely on the latest research and science, including studies that show a link between illness and fecal contamination in recreational waters. They are based on the use of two bacterial indicators of fecal contamination, *E. coli* and enterococci. The new criteria are designed to protect primary contact recreation, including swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely.

**What are the recommendations?**

The 2012 RWQC offer two sets of numeric concentration thresholds, either of which would protect the designated use of primary contact recreation and, therefore, would protect the public from exposure to harmful levels of pathogens. Illness rates upon which these recommendations are based use the National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) definition of gastrointestinal illness, which is not limited to illnesses which exhibit a fever.

The RWQC consist of three components: magnitude, duration and frequency. The magnitude of the bacterial indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for the bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken. The table summarizes the magnitude component of the recommendations. All three components are explained in more detail in the sections below.

Water quality criteria recommendations are intended as guidance in establishing new or revised water quality standards. They are not regulations themselves. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from EPA's recommended criteria.

*RECOMMENDATION 1: MAGNITUDE*

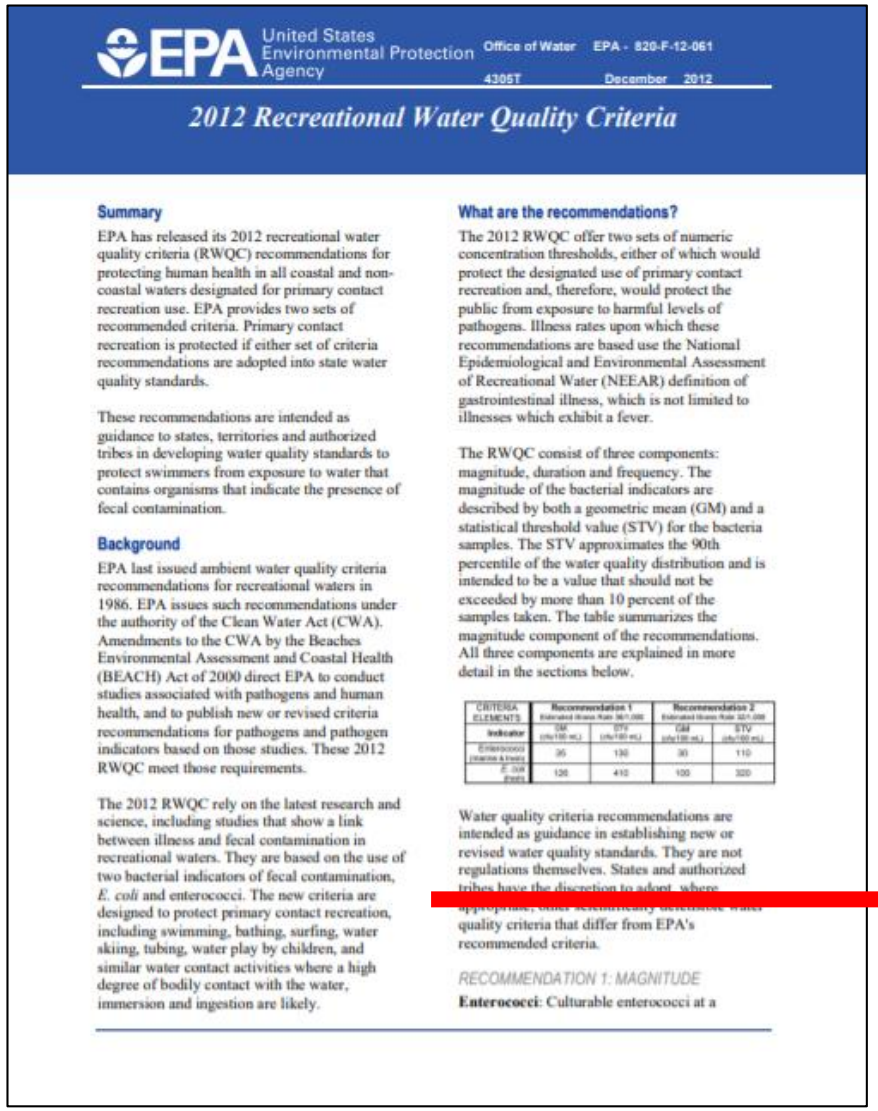
**Enterococci**: Culturable enterococci at a

- 2012 Nationally Recommended Criteria for *E. coli* and Enterococci

| CRITERIA ELEMENTS | Recommendation 1 Estimated Illness Rate 36/1,000 | | Recommendation 2 Estimated Illness Rate 32/1,000 | |
|---|---|---|---|---|
| **Indicator** | GM (cfu/100 mL) | STV (cfu/100 mL) | GM (cfu/100 mL) | STV (cfu/100 mL) |
| Enterococci (marine & fresh) | 35 | 130 | 30 | 110 |
| *E. coli* (fresh) | 126 | 410 | 100 | 320 |

# Recreation Criteria: *E. coli* and Enterococci

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



EPA United States Environmental Protection Agency | Office of Water 4305T | EPA - 820-F-12-061 | December 2012

## 2012 Recreational Water Quality Criteria

### Summary

EPA has released its 2012 recreational water quality criteria (RWQC) recommendations for protecting human health in all coastal and non-coastal waters designated for primary contact recreation use. EPA provides two sets of recommended criteria. Primary contact recreation is protected if either set of criteria recommendations are adopted into state water quality standards.

These recommendations are intended as guidance to states, territories and authorized tribes in developing water quality standards to protect swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination.

### Background

EPA last issued ambient water quality criteria recommendations for recreational waters in 1986. EPA issues such recommendations under the authority of the Clean Water Act (CWA). Amendments to the CWA by the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 direct EPA to conduct studies associated with pathogens and human health, and to publish new or revised criteria recommendations for pathogens and pathogen indicators based on those studies. These 2012 RWQC meet those requirements.

The 2012 RWQC rely on the latest research and science, including studies that show a link between illness and fecal contamination in recreational waters. They are based on the use of two bacterial indicators of fecal contamination, *E. coli* and enterococci. The new criteria are designed to protect primary contact recreation, including swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely.

### What are the recommendations?

The 2012 RWQC offer two sets of numeric concentration thresholds, either of which would protect the designated use of primary contact recreation and, therefore, would protect the public from exposure to harmful levels of pathogens. Illness rates upon which these recommendations are based use the National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) definition of gastrointestinal illness, which is not limited to illnesses which exhibit a fever.

The RWQC consist of three components: magnitude, duration and frequency. The magnitude of the bacterial indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for the bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken. The table summarizes the magnitude component of the recommendations. All three components are explained in more detail in the sections below.

| CRITERIA ELEMENTS | Recommendation 1 | | Recommendation 2 | |
|---|---|---|---|---|
| Indicator | GM (cfu/100 mL) | STV (cfu/100 mL) | GM (cfu/100 mL) | STV (cfu/100 mL) |
| Enterococci (marine & freshw.) | 35 | 130 | 30 | 110 |
| *E. coli* (fresh) | 126 | 410 | 100 | 320 |

Water quality criteria recommendations are intended as guidance in establishing new or revised water quality standards. They are not regulations themselves. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from EPA's recommended criteria.

*RECOMMENDATION 1: MAGNITUDE*

**Enterococci**: Culturable enterococci at a

- [2012 Nationally Recommended Criteria for *E. coli* and Enterococci]

The 2012 RWQC rely on the latest research and science, including studies that show a link between illness and fecal contamination in recreational waters. They are based on the use of two bacterial indicators of fecal contamination, *E. coli* and enterococci. The new criteria are designed to protect primary contact recreation, including swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely.

# Recreation Criteria: Cyanotoxins

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

EPA United States Environmental Protection Agency

Office of Water
EPA 822-F-19-001
May 2019

**Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin**

**Summary**

EPA has released national recommendations for the *Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories (AWQC/SA) for Microcystins and Cylindrospermopsin*. These recommended AWQC/SA accurately reflect the latest scientific knowledge on the potential human health effects from recreational exposure to these two cyanotoxins. Primary contact recreation is protected in water bodies at or below the recommended concentrations of microcystins and cylindrospermopsin.

These recommendations are intended as guidance to states, territories and authorized tribes to consider when developing water quality standards. Alternatively, these recommendations can be used as the basis of swimming advisories for notification purposes in recreational waters to protect the public. States, territories and authorized tribes may also wish to consider using these recommendations as both water quality criteria and swimming advisory values.

**Background**

Cyanobacteria, commonly called blue-green algae, are naturally-occurring photosynthetic bacteria found in freshwater and marine ecosystems. Under certain environmental conditions, such as elevated levels of nutrients, warmer temperatures, still water, and plentiful sunlight, cyanobacteria can rapidly multiply to form harmful algal blooms (HABs). HABs have been reported in ambient waters in all states. As the cyanobacteria multiply, some of the cells can produce toxic compounds, known as cyanotoxins, which can be harmful to human and animal health. Microcystins and cylindrospermopsin are two types of toxins produced by cyanobacteria.

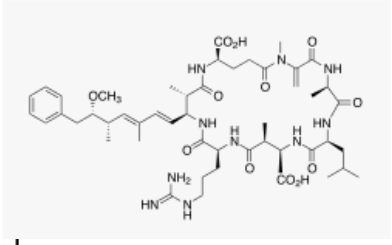
During a HAB, the toxin concentration can rapidly increase and may become elevated before a visible bloom is observed. Elevated cyanotoxin concentrations in surface waters can persist after the bloom fades, so human exposures can occur even after the visible signs of a bloom are gone or have moved downstream. Exposure to elevated-levels of microcystins can potentially lead to liver damage; the kidneys and liver appear to be the primary target organs for cylindrospermopsin toxicity.

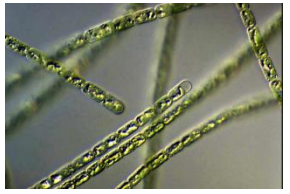
**What are EPA's recommendations?**

The recommended AWQC/SA for microcystins and cylindrospermopsin consist of three components—magnitude, duration and frequency--that are considered protective of human health in recreational waters. In developing these recommendations, EPA incorporated the existing peer-reviewed and published science on the adverse human health effects of these toxins, recreation-specific exposure parameters from the peer-reviewed scientific literature and EPA's Exposure Factors Handbook using established criteria methodologies. EPA derived these recommended values based on children's recreational exposures because children can be more highly exposed compared to other age groups. The recommendations are also protective of older age groups.

Water quality criteria recommendations are intended as guidance in establishing new or revised water quality standards. They are not regulations themselves. States and authorized tribes have the discretion to adopt other scientifically-defensible water quality criteria that differ from these recommendations. For use as swimming advisories, EPA envisions states and authorized tribes applying these recommendations in a similar manner as is currently done in their recreational water advisory programs.

- [2019 Nationally Recommended Criteria for Cyanotoxins Microcystins and Cylindrospermopsin]





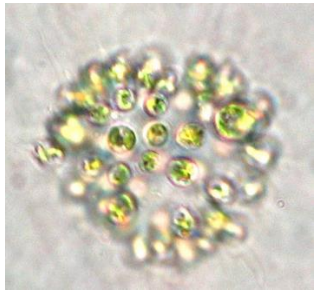
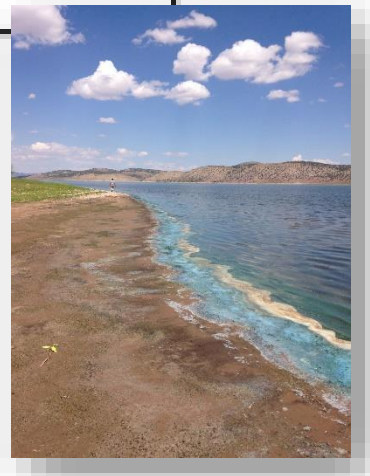


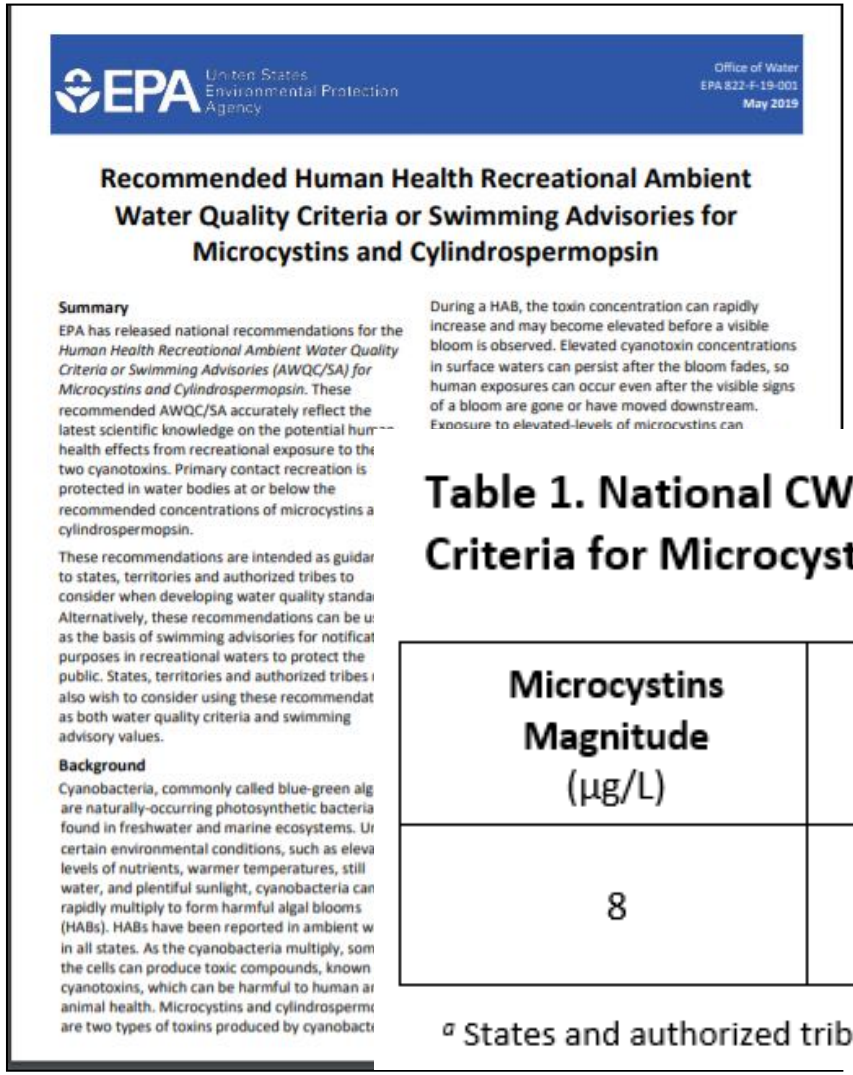
**Table. Recommended magnitude for cyanotoxins.**

| Microcystins | Cylindrospermopsin |
|---|---|
| 8 µg/L | 15 µg/L |



# Recreation Criteria: Cyanotoxins

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



EPA United States Environmental Protection Agency

Office of Water
EPA 822-F-19-001
May 2019

**Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin**

**Summary**

EPA has released national recommendations for the *Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories (AWQC/SA) for Microcystins and Cylindrospermopsin*. These recommended AWQC/SA accurately reflect the latest scientific knowledge on the potential hum health effects from recreational exposure to the two cyanotoxins. Primary contact recreation is protected in water bodies at or below the recommended concentrations of microcystins a cylindrospermopsin.

These recommendations are intended as guidar to states, territories and authorized tribes to consider when developing water quality standa Alternatively, these recommendations can be u as the basis of swimming advisories for notificat purposes in recreational waters to protect the public. States, territories and authorized tribes also wish to consider using these recommendat as both water quality criteria and swimming advisory values.

**Background**

Cyanobacteria, commonly called blue-green alg are naturally-occurring photosynthetic bacteria found in freshwater and marine ecosystems. U certain environmental conditions, such as eleva levels of nutrients, warmer temperatures, still water, and plentiful sunlight, cyanobacteria can rapidly multiply to form harmful algal blooms (HABs). HABs have been reported in ambient w in all states. As the cyanobacteria multiply, som the cells can produce toxic compounds, known cyanotoxins, which can be harmful to human a animal health. Microcystins and cylindrosperm are two types of toxins produced by cyanobact

During a HAB, the toxin concentration can rapidly increase and may become elevated before a visible bloom is observed. Elevated cyanotoxin concentrations in surface waters can persist after the bloom fades, so human exposures can occur even after the visible signs of a bloom are gone or have moved downstream. Exposure to elevated levels of microcystins can

- [2019 Nationally Recommended Criteria for Cyanotoxins Microcystins and Cylindrospermopsin]

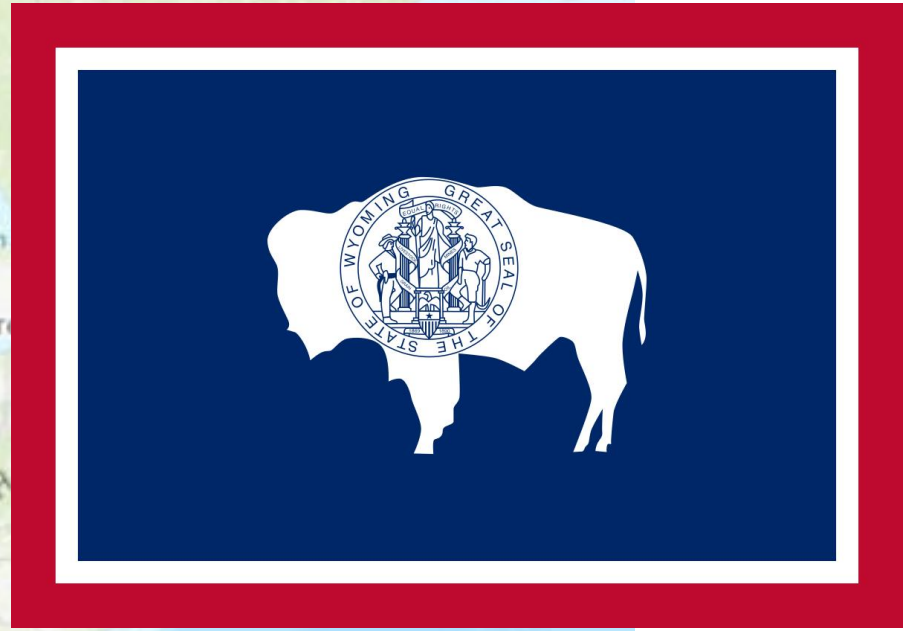
**Table 1. National CWA Section 304(a) Recommendations for Recreational Water Quality Criteria for Microcystins and Cylindrospermopsin[a]**

| Microcystins Magnitude (µg/L) | Cylindrospermopsin Magnitude (µg/L) | Duration | Frequency |
|---|---|---|---|
| 8 | 15 | 1 in 10-day assessment period across a recreational season | Not more than 3 excursions in a recreational season in more than one year[b] |

[a] States and authorized tribes can choose to adopt one or both criteria recommendations.

# Wyoming Water Quality Standards

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

(c) Single-sample Maximum Concentrations. During the summer recreation season, on all waters designated for primary contact recreation, the following single-sample maximum concentrations of *E. coli* bacteria shall apply:

(i) High use swimming areas - 235 organisms per 100 milliliters

(ii) Moderate full body contact - 298 organisms per 100 milliliters

(iii) Lightly used full body contact - 410 organisms per 100 milliliters

(iv) Infrequently used full body contact - 576 organisms per 100 milliliters

Single-sample maximum values may be used to post recreational use advisories in public recreation areas and to derive single-sample maximum effluent limitations on point source discharges. An exceedance of the single-sample maxima shall not be cause for listing a water body on the State 303(d) list or development of a TMDL or watershed plan. The appropriate recreational use category (i through iv, above) shall be determined by the administrator as needed, on a case by case basis. In making such a determination, the administrator may consider such site-specific circumstances as type and frequency of use, time of year, public access, proximity to populated areas and local interests.

- Primary Contact Waters, During the Summer Recreation Season (May 1 – September 30): 60-day geometric mean of *E. coli* not to exceed 126 organisms per 100 mL

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

(c) Single-sample Maximum Concentrations. During the summer recreation season, on all waters designated for primary contact recreation, the following single-sample maximum concentrations of *E. coli* bacteria shall apply:

(i) High use swimming areas - 235 organisms per 100 milliliters

(ii) Moderate full body contact - 298 organisms per 100 milliliters

(iii) Lightly used full body contact - 410 organisms per 100 milliliters

(iv) Infrequently used full body contact - 576 organisms per 100 milliliters

Single-sample maximum values may be used to post recreational use advisories in public recreation areas and to derive single-sample maximum effluent limitations on point source discharges. An exceedance of the single-sample maxima shall not be cause for listing a water body on the State 303(d) list or development of a TMDL or watershed plan. The appropriate recreational use category (i through iv, above) shall be determined by the administrator as needed, on a case by case basis. In making such a determination, the administrator may consider such site-specific circumstances as type and frequency of use, time of year, public access, proximity to populated areas and local interests.

- Secondary Contact Waters and Primary Contact Waters During the Winter Recreation Season (October 1 through April 30$^{th}$): 60-day geometric mean of *E. coli* not to exceed 630 organisms per 100 mL

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

(c) Single-sample Maximum Concentrations. During the summer recreation season, on all waters designated for primary contact recreation, the following single-sample maximum concentrations of *E. coli* bacteria shall apply:

(i) High use swimming areas - 235 organisms per 100 milliliters

(ii) Moderate full body contact - 298 organisms per 100 milliliters

(iii) Lightly used full body contact - 410 organisms per 100 milliliters

(iv) Infrequently used full body contact - 576 organisms per 100 milliliters

Single-sample maximum values may be used to post recreational use advisories in public recreation areas and to derive single-sample maximum effluent limitations on point source discharges. An exceedance of the single-sample maxima shall not be cause for listing a water body on the State 303(d) list or development of a TMDL or watershed plan. The appropriate recreational use category (i through iv, above) shall be determined by the administrator as needed, on a case by case basis. In making such a determination, the administrator may consider such site-specific circumstances as type and frequency of use, time of year, public access, proximity to populated areas and local interests.


- Single sample maxima for primary contact waters
  - Application determined by Administrator
  - Used to post recreational use advisories
  - Single sample for point sources

# Waterborne Pathogen Notification Process

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**WATERBORNE PATHOGEN PUBLIC NOTIFICATION PROCESS FOR RECREATIONAL WATERS**

The following process is intended to provide the Wyoming Department of Environmental Quality (WDEQ), Wyoming Department of Health (WDH), local officials, resource management agencies, and other cooperators with procedural guidelines should the presence of unsafe levels of waterborne pathogens be suspected or confirmed in publicly accessible surface waters (e.g., swimming beaches, streams flowing through parks and near recreation sites, etc.) used frequently for primary contact recreation during the primary recreation season (May 1 through September 30) in the State of Wyoming. Primary contact recreation typically involves activities where immersion and ingestion are likely and there is a high degree of bodily contact with the water, such as swimming, bathing, surfing, water skiing, tubing, water play by children, or similar water-contact activities[1]. Waterborne pathogens include, but are not limited to, bacteria such as *E. coli* O157:H7, *Legionella*, *Salmonella*, and *Shigella*; protozoa such as *Cryptosporidium or Giardia*; and viruses such as norovirus. Guidelines include: recommended monitoring and surveillance for the potential presence of illness-causing waterborne pathogens; *E. coli* concentrations and other conditions for issuing public health notices and cautions; and procedures for lifting public health notices and cautions. This process will be updated as new information becomes available. For information on recreational waterborne illnesses: https://www.cdc.gov/healthywater/swimming/oceans-lakes-rivers/visiting-oceans-lakes-rivers.html

| Steps | Action |
|---|---|
| **Step 1: Monitoring and Surveillance** | • WDEQ, conservation districts, resource management agencies, and other cooperators use established standard operating procedures[2] to monitor the quality of publicly accessible surface waters that are used frequently for recreation (i.e., swimming beaches, streams or rivers flowing through parks and near recreation sites, etc.). Monitoring will primarily use *E. coli* as an indicator of the presence of fecal contamination and illness-causing pathogens.<br>• WDH receives reports of illnesses potentially associated with waterborne pathogens and contact traces to determine whether a source can be identified. |
| **Step 2: Data Evaluation and Public Notifications** | • For surface waters that are not monitored at least every two weeks during the primary contact recreation season: if concentrations of *E. coli* exceed a geometric mean of **126 organisms per 100 mL**[3] during any consecutive 60-day period (based on a minimum of five samples) or have exceeded this threshold in the last 2 years, and the quality of the data has been confirmed, the monitoring entity will notify the WDH and WDEQ. WDH will notify local health officials so local health officials can coordinate notification of the public, including posting of NOTICE signs (template attached).<br>• For surface waters that are monitored at least every two weeks during the primary contact recreation season, if *E. coli* concentrations exceed **235 organisms per 100 mL**[1] and the quality of the data has been confirmed, the monitoring entity will notify the WDEQ and WDH. WDH will notify local health officials so local health officials can coordinate notification of the public, including posting of CAUTION signs (template attached). |

[1] Environmental Protection Agency Recommended Criteria: https://www.epa.gov/wqc/2012-recreational-water-quality-criteria
[2] Standard Operating Procedures: http://deq.wyoming.gov/wqd/gaqc/resources/manual/
[3] Water Quality Rules and Regulations, Chapter 1, Wyoming Surface Water Quality Standards, Section 27



# NOTICE

**There is a potential risk of pathogen-related illness associated with this waterbody.**

**Use caution when swimming or similar water contact activities** to minimize exposure to pathogens.

**Do not ingest** water without first boiling, filtering, or other treatments that will remove pathogens.

If you or your pet get sick after ingestion or contact with the water, call your doctor or veterinarian.

Posted by:_____

Date:_____

Phone:_____

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Wyoming Department of Health

# CAUTION

**Recent monitoring shows increased risk of pathogen-related illness associated with this waterbody.**

**Swimming and similar water contact activities are not recommended.**

**Do not ingest** water without first boiling, filtering, or other treatments that will remove pathogens.

If you or your pet get sick after ingestion or contact with the water, call your doctor or veterinarian.

Posted by:_____

Date:_____

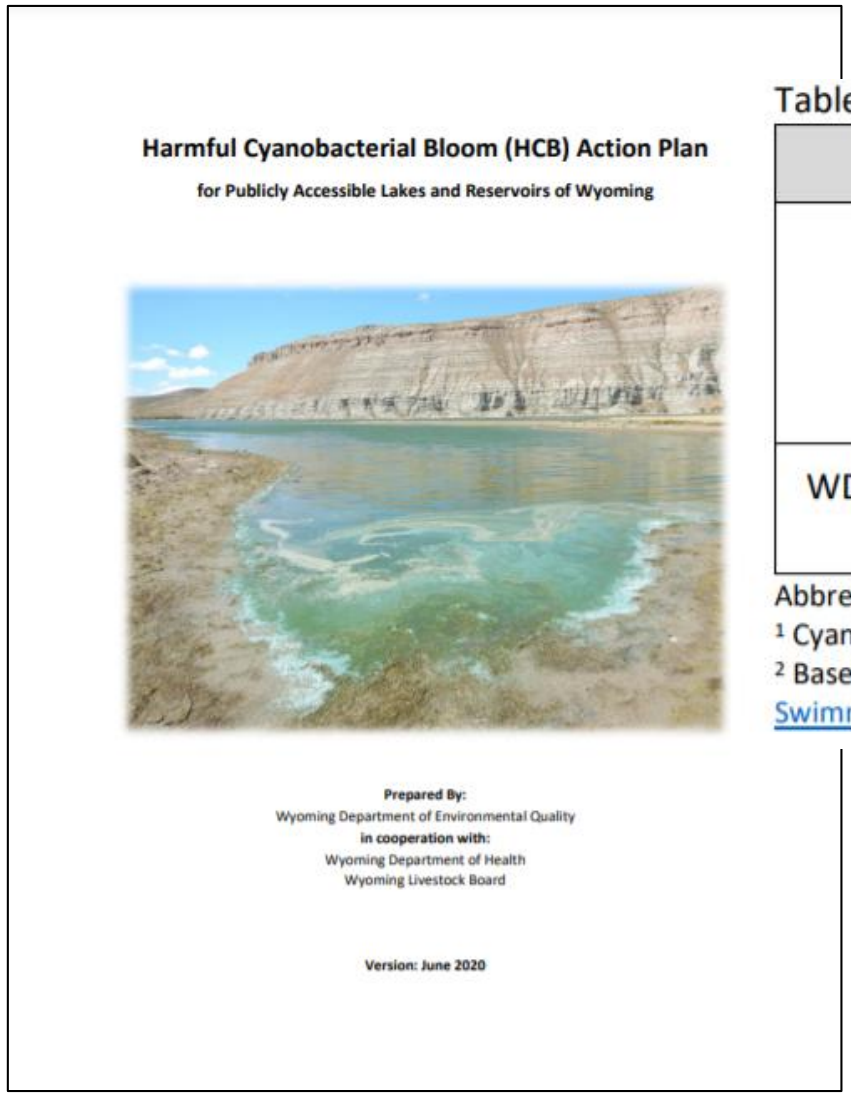
Phone:_____

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Wyoming Department of Health

# HCB Action Plan Cyanotoxin Thresholds

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



**Harmful Cyanobacterial Bloom (HCB) Action Plan**

**for Publicly Accessible Lakes and Reservoirs of Wyoming**



**Prepared By:**
Wyoming Department of Environmental Quality
**in cooperation with:**
Wyoming Department of Health
Wyoming Livestock Board

**Version: June 2020**

Table B. Cyanotoxin and cyanobacteria cell density thresholds for a recreational use.

| Threshold | Threshold Values | Responsive Action |
|---|---|---|
| Recreation | ≥ 8 µg/L total microcystins[1,2]<br>≥ 15 µg/L cylindrospermopsin[1,2]<br>≥ 20,000 cells/mL cyanobacteria<br>Other cyanotoxins or conditions determined by WDH | **Advisory** |
| WDH determines there is sufficient threat to public health to restrict use of an impacted area or an entire reservoir. | | **Closure** |

Abbreviations: WDH, Wyoming Department of Health; µg/L, micrograms per liter; cells/mL, cells per milliliter.

[1] Cyanotoxin thresholds (µg/L) represent total concentrations of all congeners.

[2] Based on US Environmental Protection Agency Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin.

# Chapter 1, Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 17. Taste, Odor and Color.** No Class 1, 2 or 3 waters shall contain substances attributable to or influenced by the activities of man that produce taste, odor and color or that would:

(a) Of themselves or in combination, impart an unpalatable or off-flavor in fish flesh;

(b) Visibly alter the natural color of the water or impart color to skin, clothing, vessels or structures;

(c) Produce detectable odor; or

(d) Directly or through interaction among themselves, or with chemicals used in existing water treatment processes, result in concentrations that will impart undesirable taste or odor to public water supplies.

# Chapter 1, Narrative Criteria for Recreation

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 13. Toxic Materials.** Except for those substances referenced in Sections 21(e) and (f) of these regulations, toxic materials attributable to or influenced by the activities of man shall not be present in any Wyoming surface water in concentrations or combinations which constitute "pollution".

# Chapter 1, Narrative Criteria for Recreation

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 13. Toxic Materials.** Except for those substances referenced in Sections 21(e) and (f) of these regulations, toxic materials attributable to or influenced by the activities of man shall not be present in any Wyoming surface water in concentrations or combinations which constitute "pollution".

(ix) "Pollution" means contamination or other alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity or odor of the waters or any discharge of any acid or toxic material, chemical or chemical compound, whether it be liquid, gaseous, solid, radioactive or other substance, including wastes, into any waters of the state which creates a nuisance or renders any waters harmful, detrimental or injurious to public health, safety or welfare, to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wildlife or aquatic life, or which degrades the water for its intended use, or adversely affects the environment. This term does not mean water, gas or other material which is injected into a well to facilitate production of oil, or gas or water, derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the state, and if the state determines that such injection or disposal well will not result in the degradation of ground or surface or water resources;

# Chapter 1, Narrative Criteria for Recreation

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 28. Undesirable Aquatic Life.** All Wyoming surface waters shall be free from substances and conditions or combinations thereof which are attributable to or influenced by the activities of man, in concentrations which produce undesirable aquatic life.

# Narrative Criteria Examples

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Narrative Criteria Examples

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Idaho Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**200. GENERAL SURFACE WATER QUALITY CRITERIA.**
The following general water quality criteria apply to all surface waters of the state, in addition to the water quality criteria set forth for specifically designated waters. (4-5-00)

**01. Hazardous Materials**. Surface waters of the state shall be free from hazardous materials in concentrations found to be of public health significance or to impair designated beneficial uses. These materials do not include suspended sediment produced as a result of nonpoint source activities. (8-24-94)

**02. Toxic Substances**. Surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses. These substances do not include suspended sediment produced as a result of nonpoint source activities. (8-24-94)

**03. Deleterious Materials**. Surface waters of the state shall be free from deleterious materials in concentrations that impair designated beneficial uses. These materials do not include suspended sediment produced as a result of nonpoint source activities. (8-24-94)

**04. Radioactive Materials**. (7-1-93)

**a.** Radioactive materials or radioactivity shall not exceed the values listed in the Code of Federal Regulations, Title 10, Chapter 1, Part 20, Appendix B, Table 2, Effluent Concentrations, Column 2. (8-24-94)

# Idaho Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**b.** Radioactive materials or radioactivity shall not exceed concentrations required to meet the standards set forth in Title 10, Chapter 1, Part 20, of the Code of Federal Regulations for maximum exposure of critical human organs in the case of foodstuffs harvested from these waters for human consumption. (7-1-93)

**05. Floating, Suspended or Submerged Matter**. Surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. This matter does not include suspended sediment produced as a result of nonpoint source activities. (8-24-94)

**06. Excess Nutrients**. Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. (8-24-94)

**07. Oxygen-Demanding Materials**. Surface waters of the state shall be free from oxygen-demanding materials in concentrations that would result in an anaerobic water condition. (7-1-93)

**08. Sediment**. Sediment shall not exceed quantities specified in Sections 250 and 252, or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Section 350. (4-5-00)

**09. Natural Background Conditions as Criteria**. When natural background conditions exceed any applicable water quality criteria set forth in Sections 210, 250, 251, 252, or 253, the applicable water quality criteria shall not apply; instead, there shall be no lowering of water quality from natural background conditions. Provided, however, that temperature may be increased above natural background conditions when allowed under Section 401. (3-30-07)

# Narrative Criteria Examples

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Missouri Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

(4) General Criteria. The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:

(A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly, or harmful bottom deposits or prevent full maintenance of beneficial uses;

(B) Waters shall be free from oil, scum, and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;

(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor, or prevent full maintenance of beneficial uses;

(D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life. However, acute toxicity criteria may be exceeded by permit in zones of initial dilution, and chronic toxicity criteria may be exceeded by permit in mixing zones;

(E) Waters shall maintain a level of water quality at their confluences to downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including waters of another state;

(F) There shall be no significant human health hazard from incidental contact with the water;

(G) There shall be no acute toxicity to livestock or wildlife watering;

(H) Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community;

(I) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment, and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to sections 260.200–260.247, RSMo;

# Narrative Criteria Examples

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Arizona Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**R18-11-108. Narrative Water Quality Standards**

**A.** A surface water shall not contain pollutants in amounts or combinations that:

1. Settle to form bottom deposits that inhibit or prohibit the habitation, growth, or propagation of aquatic life;
2. Cause objectionable odor in the area in which the surface water is located;
3. Cause off-taste or odor in drinking water;
4. Cause off-flavor in aquatic organisms;
5. Are toxic to humans, animals, plants, or other organisms;
6. Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses;
7. Cause or contribute to a violation of an aquifer water quality standard prescribed in R18-11-405 or R18-11-406; or
8. Change the color of the surface water from natural background levels of color.

**B.** A surface water shall not contain oil, grease, or any other pollutant that floats as debris, foam, or scum; or that causes a film or iridescent appearance on the surface of the water; or that causes a deposit on a shoreline, bank, or aquatic vegetation. The discharge of lubricating oil or gasoline associated with the normal operation of a recreational watercraft is not a violation of this narrative standard.

**C.** A surface water shall not contain a discharge of suspended solids in quantities or concentrations that interfere with the treatment processes at the nearest downstream potable water treatment plant or substantially increase the cost of handling solids produced at the nearest downstream potable water treatment plant.

**D.** A surface water shall not contain solid waste such as refuse, rubbish, demolition or construction debris, trash, garbage, motor vehicles, appliances, or tires.

**E.** A wadeable, perennial stream shall support and maintain a community of organisms having a taxa richness, species composition, tolerance, and functional organization comparable to that of a stream with reference conditions in Arizona.

# Examples from Other States

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Alabama Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**335-6-10-.05 General Conditions Applicable to All Water Quality Criteria.**

(1) The quality of any waters receiving sewage, industrial wastes or other wastes, regardless of their use, shall be such as will not cause the best usage of any other waters to be adversely affected by such sewage, industrial wastes or other wastes.

(2) Tests or analytical procedures to determine compliance or noncompliance with water quality criteria shall be in accordance with the methods specified in 40 CFR 136.3 (2003). Where other tests or analytical procedures are found to be more applicable and satisfactory, these may be used upon acceptance and approval by the Department.

(3) In making any tests or analytical determinations to determine compliance or noncompliance with water quality criteria, samples shall be collected in such manner and at such locations approved by a duly authorized representative of the Department as being representative of the receiving waters after reasonable opportunity for dilution and mixture with the wastes discharged thereto. Mixing zones, i.e., that portion of the receiving waters where mixture of effluents and natural waters take place, shall not preclude passage of free-swimming and drifting aquatic organisms to the extent that their populations are significantly affected.

(4) Natural waters may, on occasion, have characteristics outside of the limits established by these criteria. The criteria contained herein relate to the condition of waters as affected by the discharge of sewage, industrial wastes or other wastes, not to conditions resulting from natural forces.

(5) All waters, where attainable, shall be suitable for recreation in and on the waters during the months of May through October except that recreational use is not recommended in the vicinity of discharges or other conditions which the Department or the Department of Public Health does not control.

# Narrative Criteria Examples

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# Colorado Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**31.11 BASIC STANDARDS APPLICABLE TO SURFACE WATERS OF THE STATE**

All surface waters of the state are subject to the following basic standards; however, discharge of substances regulated by permits which are within those permit limitations shall not be a basis for enforcement proceedings under these basic standards:

(1) Except where authorized by permits, BMPs, 401 certifications, or plans of operation approved by the Division or other applicable agencies, state surface waters shall be free from substances attributable to human-caused point source or nonpoint source discharge in amounts, concentrations or combinations which:

(a) for all surface waters except wetlands;

(i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludges, mine slurry or tailings, silt, or mud; or

(ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or

(iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or

(iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or

(v) produce a predominance of undesirable aquatic life; or

(vi) cause a film on the surface or produce a deposit on shorelines; and

# Examples from Other States

- Idaho
- Missouri
- Arizona
- Alabama
- Colorado
- South Carolina

# South Carolina Narrative Criteria

10. Freshwaters are freshwaters suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses.

| **Quality Standards for Freshwaters** | |
|---|---|
| **ITEMS** | **STANDARDS** |
| a. Garbage, cinders, ashes, oils, sludge, or other refuse | None allowed. |
| b. Treated wastes, toxic wastes, deleterious substances, colored, or other wastes except those given in a. above. | None alone or in combination with other substances or wastes in sufficient amounts to make the waters unsafe or unsuitable for primary contact recreation or to impair the waters for any other best usage as determined for the specific waters which are assigned to this class. |

# Summary of Other States Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Most states have a general narrative criteria section that lists water quality goals
  - Surface waters shall be free from substances/pollution/materials/wastes that …..
    - Produce floating debris, scums, or other surface accumulations
    - Produce undesirable tastes, odors, colors
    - Cause films or deposits on shorelines
    - Cause undesirable aquatic life
    - Are toxic
    - Etc.

# Summary of Other States Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Many states have a general narrative criteria to protect designated/beneficial uses
  - Surface waters shall be free from substances/pollution/materials/wastes that …..
    - Make surface waters unsuitable for/are harmful to/prevent full maintenance of/impair designated/beneficial uses

# Summary of Other States Narrative Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- States also have narrative criteria protective of specific designated uses
  - Waters shall be free from substances/pollution/materials/wastes that…..
    - Make waters unsafe or unsuitable for recreation
  - Waters shall be suitable for recreation

# Cyanotoxin Criteria Other States

- South Dakota
- South Carolina

# South Dakota Draft Cyanotoxin Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**'4:51:01:50. Criteria for immersion recreation waters.** The criteria of parameters for immersion ecreation waters and their allowable variations that are not included under § 74:51:01:55 and \ppendix B, unless set under § 74:51:01:24, are as found in the following table and only apply May - September 30:

| Parameter | Criteria | Unit of Measure | Special Conditions |
|---|---|---|---|
| Dissolved oxygen as measured anywhere in the water column of a non-stratified water body, or in the epilimnion and metalimnion of a stratified water body | ≥ 5.0 | mg/L | daily minimum |
| *Escherichia coli* | ≤ 126 | /100 mL | geometric mean based on a minimum of 5 samples obtained during separate 24-hour periods for any 30-day period |
| | ≤ 235 | | in any one sample |
| Mycrocystin | 8 | µg/L | Not be exceeded in more than three 10-day assessment periods over the course of the recreation season |
| Cylindrospermopsin | 15 | µg/L | |

# South Carolina Cyanotoxin Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

9. The standards below protect the uses of Natural and Put, Grow, and Take trout waters.

| Quality Standards for Trout Waters | |
|---|---|
| **ITEMS** | **STANDARDS** |
| a. Garbage, cinders, ashes, oils, sludge, or other refuse | None allowed. |
| b. Treated wastes, toxic wastes, deleterious substances, colored, or other wastes except those given in a. above. | None alone or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in natural waters or stocked populations in put, grow, and take waters, or in any manner adversely affecting the taste, color, odor, or sanitary condition thereof |
| e. Dissolved oxygen. | Not less than 6 mg/L. |
| f. E. coli | Not to exceed a geometric mean of 126/100 mL based on at least four samples collected from a given sampling site over a 30 day period, nor shall a single sample maximum exceed 349/100 mL. |
| g. pH. | Between 6.0 and 8.0. |
| h. Temperature. | Not to vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses. |
| i. Turbidity. | Not to exceed 10 Nephelometric Turbidity Units (NTUs) or 10% above natural conditions, provided uses are maintained. |
| j. Total microcystins | Not to exceed 8 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 8 µg/L. |
| k. Cylindrospermopsin | Not to exceed 15 µg/L. For freshwater primary contact recreational use notifications and advisories samples shall not exceed 15 µg/L. |

# Cyanotoxin Thresholds Other States

- Utah

# Utah Cyanotoxin Advisory Thresholds

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Table 1:** UDOH/UDEQ Recommended HAB Advisory Thresholds

| Health Watch | | Warning Advisory | Danger Advisory |
|---|---|---|---|
| This is not a formal advisory level. Rather, these are indicators that a bloom may exist or may become more severe. Increased monitoring and surveillance are strongly recommended. Indicators may include:<br>• Visual reports<br>• Reports of animal or human illness<br>• Detection of cyanotoxins or toxigenic cyannobacterial cell density below thresholds<br>• Detectable levels should be defined using appropriate QA/QC procedures<br><br>Consider cautioning users of the waterbody depending on specifics of the event and waterbody. | **Toxigenic Cyanobacterial Cell Density (cells/mL)** [1, 2, 3] | 100,000 [A] | 10,000,000 |
| | **Microcystins (µg/L)** [1, 2] | 8 | 2,000 |
| | **Cylindrospermopsin (µg/L)** [3] | 15 [B] | |
| | **Anatoxin-a (µg/L)** [3, 4, 5] | 15 | 90 |
| | **Health Risks** [1, 2, 3] | Potential for long-term illness<br>Short-term effects (e.g., skin and eye irritation, nausea, vomiting, diarrhea) | Potential for acute poisoning<br>Potential for long-term illness<br>Short-term effects (e.g., skin and eye irritation, nausea, vomiting, diarrhea) |
| | **Recommended Actions** | Issue **WARNING** advisory to avoid primary contact recreation<br>Post **WARNING** signs<br>Sampling recommended at least weekly | Issue **DANGER** advisory to stay away from the waterbody<br>Post **DANGER** signs<br>Consider **CLOSURE**<br>Sampling recommended at least weekly |

[1] WHO, 1999. Toxic cyanobacteria in water.
[2] WHO, 2003. Guidelines for safe recreational water environments, Volume 1, Chapter 8: Algae and cyanobacteria in fresh water.
[3] EPA, 2019. Recommended human health recreational ambient water quality criteria or swimming advisories for microcystins and cylindrospermopsin.
[4] OHA, 2019. Oregon Health Authority. Recreational use public advisory guidelines: cyanobacterial blooms in freshwater bodies.
[5] CWQMC, 2016. California Water Quality Monitoring Council. Cyanobacteria guidance for recreational and related water uses (2016 update).
[A] Human symptoms have been reported between 5,000 – 100,000 cells ml (EPA 2019). At 5,000 – 100,000 cells/mL, LHDs should take into account contextual information and consider issuing an advisory.
[B] Data are sparse on where cylindrospermopsin advisory break points should be. Consult with UDEQ and UDOH as needed on this issue.

# Frequency for Waterborne Pathogen Indicator Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY


# Frequency for Fecal Indicator/Waterborne Pathogen Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Frequency requirements are generally a policy decision by states
- Informs how much data and information is necessary to evaluate attainment of surface water quality criteria
- If no frequency is included, it is unclear how much data is required to determine attainment
  - How much data is necessary to show a waterbody is no longer impaired
  - How much data is necessary to show a waterbody is impaired

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

(c) Single-sample Maximum Concentrations. During the summer recreation season, on all waters designated for primary contact recreation, the following single-sample maximum concentrations of *E. coli* bacteria shall apply:

(i) High use swimming areas - 235 organisms per 100 milliliters

(ii) Moderate full body contact - 298 organisms per 100 milliliters

(iii) Lightly used full body contact - 410 organisms per 100 milliliters

(iv) Infrequently used full body contact - 576 organisms per 100 milliliters

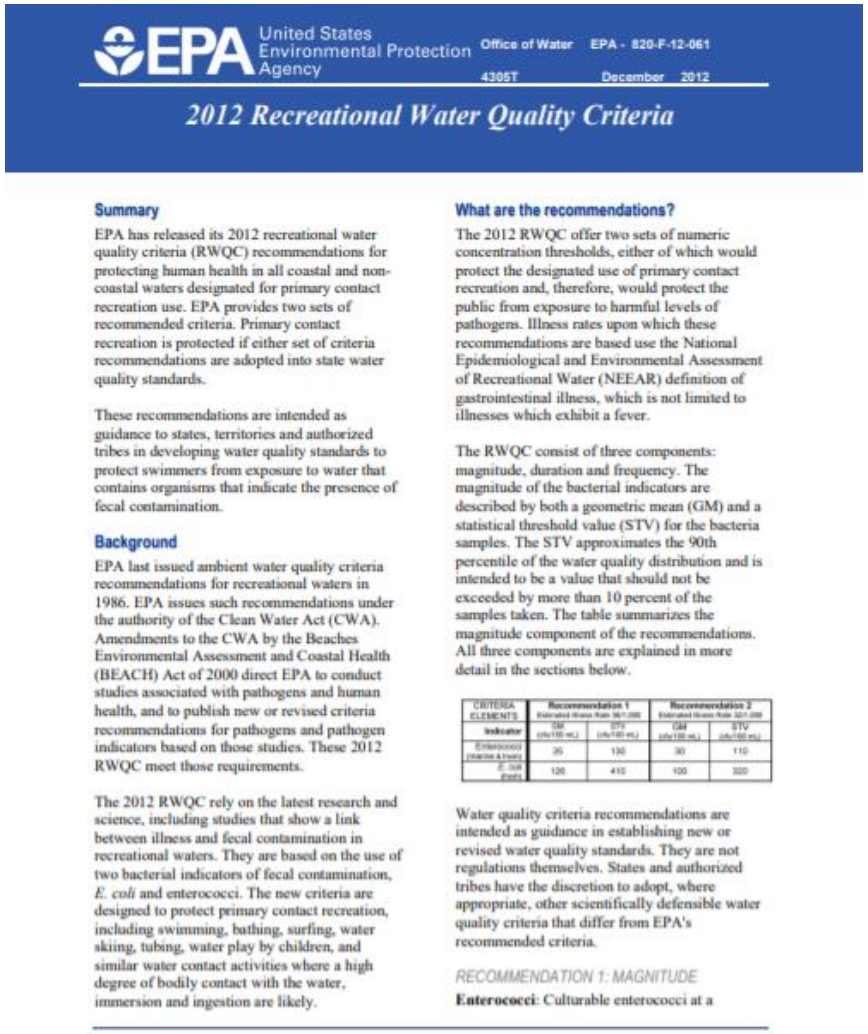
Single-sample maximum values may be used to post recreational use advisories in public recreation areas and to derive single-sample maximum effluent limitations on point source discharges. An exceedance of the single-sample maxima shall not be cause for listing a water body on the State 303(d) list or development of a TMDL or watershed plan. The appropriate recreational use category (i through iv, above) shall be determined by the administrator as needed, on a case by case basis. In making such a determination, the administrator may consider such site-specific circumstances as type and frequency of use, time of year, public access, proximity to populated areas and local interests.

- Primary Contact Waters, During the Summer Recreation Season (May 1 – September 30): 60-day geometric mean of *E. coli* not to exceed 126 organisms per 100 mL

- Secondary Contact Waters and Primary Contact Waters During the Winter Recreation Season (October 1 through April 30$^{th}$): 60-day geometric mean of *E. coli* not to exceed 630 organisms per 100 mL

# Recreation Criteria: *E. coli* and Enterococci

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



EPA United States Environmental Protection Agency | Office of Water 4305T | EPA - 820-F-12-061 | December 2012

*2012 Recreational Water Quality Criteria*

**Summary**

EPA has released its 2012 recreational water quality criteria (RWQC) recommendations for protecting human health in all coastal and non-coastal waters designated for primary contact recreation use. EPA provides two sets of recommended criteria. Primary contact recreation is protected if either set of criteria recommendations are adopted into state water quality standards.

These recommendations are intended as guidance to states, territories and authorized tribes in developing water quality standards to protect swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination.

**Background**

EPA last issued ambient water quality criteria recommendations for recreational waters in 1986. EPA issues such recommendations under the authority of the Clean Water Act (CWA). Amendments to the CWA by the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 direct EPA to conduct studies associated with pathogens and human health, and to publish new or revised criteria recommendations for pathogens and pathogen indicators based on those studies. These 2012 RWQC meet those requirements.

The 2012 RWQC rely on the latest research and science, including studies that show a link between illness and fecal contamination in recreational waters. They are based on the use of two bacterial indicators of fecal contamination, *E. coli* and enterococci. The new criteria are designed to protect primary contact recreation, including swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely.

**What are the recommendations?**

The 2012 RWQC offer two sets of numeric concentration thresholds, either of which would protect the designated use of primary contact recreation and, therefore, would protect the public from exposure to harmful levels of pathogens. Illness rates upon which these recommendations are based use the National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) definition of gastrointestinal illness, which is not limited to illnesses which exhibit a fever.

The RWQC consist of three components: magnitude, duration and frequency. The magnitude of the bacterial indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for the bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken. The table summarizes the magnitude component of the recommendations. All three components are explained in more detail in the sections below.

Water quality criteria recommendations are intended as guidance in establishing new or revised water quality standards. They are not regulations themselves. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from EPA's recommended criteria.

*RECOMMENDATION 1: MAGNITUDE*

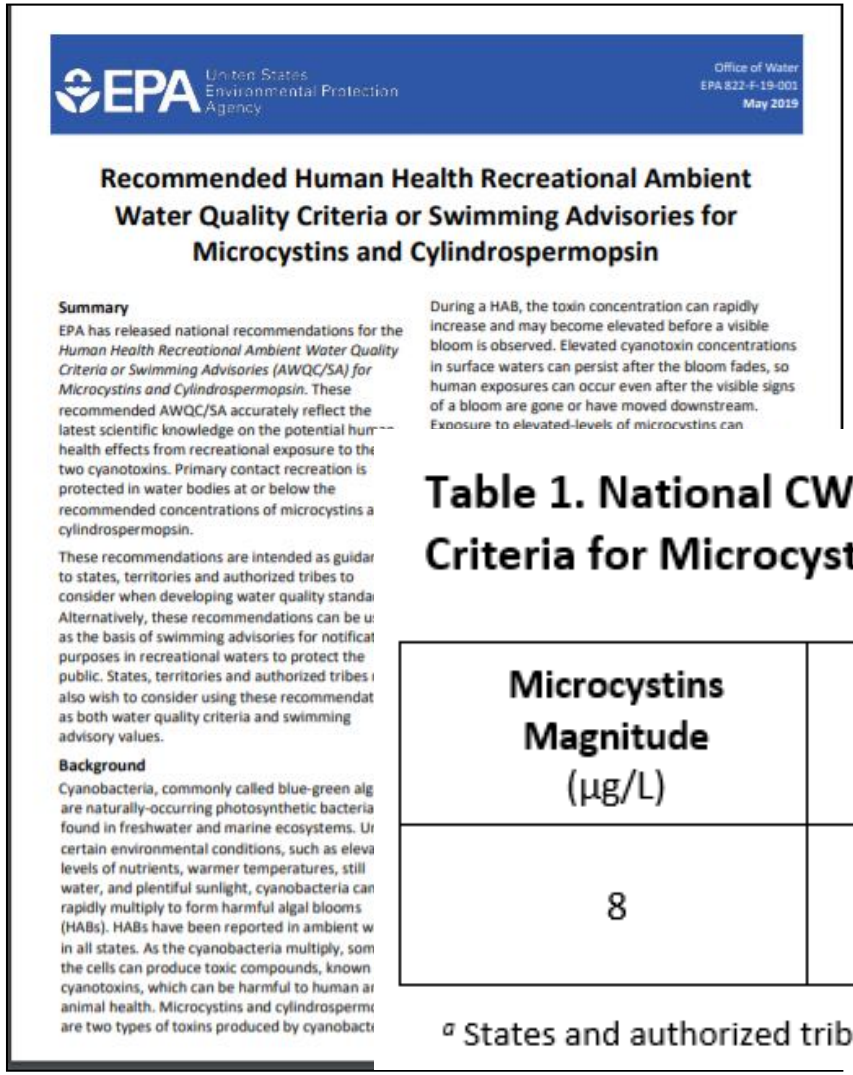
**Enterococci**: Culturable enterococci at a

- 2012 Nationally Recommended Criteria for *E. coli* and Enterococci

| CRITERIA ELEMENTS | Recommendation 1 Estimated Illness Rate 36/1,000 | | Recommendation 2 Estimated Illness Rate 32/1,000 | |
|---|---|---|---|---|
| **Indicator** | GM (cfu/100 mL) | STV (cfu/100 mL) | GM (cfu/100 mL) | STV (cfu/100 mL) |
| Enterococci (marine & fresh) | 35 | 130 | 30 | 110 |
| *E. coli* (fresh) | 126 | 410 | 100 | 320 |

# Recreation Criteria: Cyanotoxins

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



EPA United States Environmental Protection Agency

Office of Water
EPA 822-F-19-001
May 2019

**Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin**

**Summary**

EPA has released national recommendations for the *Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories (AWQC/SA) for Microcystins and Cylindrospermopsin*. These recommended AWQC/SA accurately reflect the latest scientific knowledge on the potential hum health effects from recreational exposure to the two cyanotoxins. Primary contact recreation is protected in water bodies at or below the recommended concentrations of microcystins a cylindrospermopsin.

These recommendations are intended as guidar to states, territories and authorized tribes to consider when developing water quality standa Alternatively, these recommendations can be u as the basis of swimming advisories for notificat purposes in recreational waters to protect the public. States, territories and authorized tribes also wish to consider using these recommendat as both water quality criteria and swimming advisory values.

**Background**

Cyanobacteria, commonly called blue-green alg are naturally-occurring photosynthetic bacteria found in freshwater and marine ecosystems. U certain environmental conditions, such as eleva levels of nutrients, warmer temperatures, still water, and plentiful sunlight, cyanobacteria can rapidly multiply to form harmful algal blooms (HABs). HABs have been reported in ambient w in all states. As the cyanobacteria multiply, som the cells can produce toxic compounds, known cyanotoxins, which can be harmful to human a animal health. Microcystins and cylindrosperm are two types of toxins produced by cyanobact

During a HAB, the toxin concentration can rapidly increase and may become elevated before a visible bloom is observed. Elevated cyanotoxin concentrations in surface waters can persist after the bloom fades, so human exposures can occur even after the visible signs of a bloom are gone or have moved downstream. Exposure to elevated levels of microcystins can

- [2019 Nationally Recommended Criteria for Cyanotoxins Microcystins and Cylindrospermopsin]

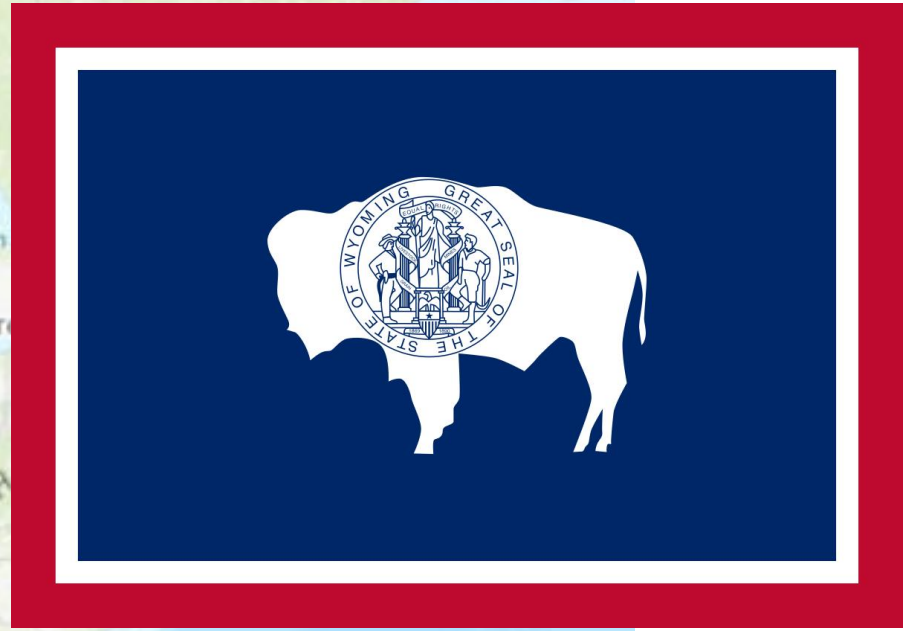
**Table 1. National CWA Section 304(a) Recommendations for Recreational Water Quality Criteria for Microcystins and Cylindrospermopsin[a]**

| Microcystins Magnitude (µg/L) | Cylindrospermopsin Magnitude (µg/L) | Duration | Frequency |
|---|---|---|---|
| 8 | 15 | 1 in 10-day assessment period across a recreational season | Not more than 3 excursions in a recreational season in more than one year[b] |

[a] States and authorized tribes can choose to adopt one or both criteria recommendations.

# Wyoming Water Quality Standards

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

# Ideas for Wyoming's Standards

- Conceptual, Chapter 1 and Other Documents
- Potential Implications

# Ideas for Potential Changes to Standards

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

(c) Single-sample Maximum Concentrations. During the summer recreation season, on all waters designated f ary contact recreation, t wing single-sample maximum concentrations of *E. coli* ba hall apply:

(i) High use ming areas - 2 anisms per 100 milliliters

(ii) Moderate fu contac organisms per 100 milliliters

(iii) Lightly used full act - 410 organisms per 100 milliliters

(iv) Infrequently use contact - 576 organisms per 100 milliliters

Single-sample maximum v may be to post recreational use advisories in public recreation areas and to derive sin mple max effluent limitations on point source discharges. An exceedance of t gle-sample m shall not be cause for listing a water body on the State 303(d) list elopment of a TM watershed plan. The appropriate recreational use category (i gh iv, above) shall be mined by the administrator as needed, on a case by cas In making such a deter n, the administrator may consider such site-specific circumstances as type and frequency of use, time of year, public access, proximity to populated areas and local interests.

- Remove Single Sample Maxima
  - Not water quality criteria
  - Not a water quality standard

# Ideas for Potential Changes to Standards

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Consolidate all narrative criteria
  - Include specific designated use/beneficial use protection criteria
  - Include “free from” criteria for specific conditions and pollutants

# Ideas for Potential Changes to Standards

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Surface waters of the state shall be free from pollution that…
  - Does not support beneficial uses, including, but not limited to
    - Floating, suspended solids, settleable solids, and turbidity
    - Tastes, odors, and colors
    - Wastes, toxic, and radioactive materials
    - pH
    - Oil and grease

# Ideas for Potential Changes to Standards

- Add cyanotoxin criteria to recreation criteria
- Primary contact recreation
  - During the recreation season, cylindrospermopsin concentrations shall not exceed 15 µg/L in three separate 10-day periods in more than one year of a three year period
  - During the recreation season, total microcystin concentrations shall not exceed 8 µg/L in three separate 10-day periods in more than one year of a three year period

# Ideas for Potential Changes to Standards

- Add frequency to *E. coli* criteria

**Section 27. *E. coli* Bacteria.**

(a) Primary Contact Recreation. In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.

in more than one year of a three-year period

(b) Secondary Contact Recreation. In all waters designated for secondary contact recreation and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.

in more than one year of a three-year period

# Potential Implications

- Improved clarity for narrative criteria
- Improved clarity for determining attainment of *E. coli* criteria
- Could evaluate attainment based on microcystin and cylindrospermopsin
- Updates to Assessment Methods for determining attainment of recreational uses
  - *E. coli* frequency
  - Cyanotoxins

# Chapter 1, Recreation Criteria

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY