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Bacterial Water Quality Standards Status Report

BACTERIAL WATER QUALITY STANDARDS

FOR RECREATIONAL WATERS

(FRESHWATER AND MARINE WATERS)

STATUS REPORT

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The reader should consult the water quality standards of a particular state for exact regulatory language applicable to that state. Copies of state water quality standards may be obtained from the state's Water Pollution Control Agency or its equivalent.

Additional information may also be obtained from:

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Introduction

EPA's Beach Program

On May 23, 1997, EPA Administrator Carol Browner announced the U.S. Environmental Protection Agency's new Beaches Environmental Assessment, Closure, and Health (BEACH) Program. The goal of the BEACH program is to significantly reduce the risk of infection to users of the nation's recreational waters through improvements in recreational water programs, communication, and scientific advances. High levels of pathogens in recreational waters can increase human exposure through ingestion, inhalation, and body contact, thus increasing the risk of illness. Surveys and ongoing scientific studies continue to document the presence of, or the potential for, disease-carrying bacteria, viruses, and other pathogens present in local beach water, primarily from sewage and stormwater runoff.

Through its BEACH program, EPA is working to:

- Strengthen state, tribal, and local programs, including water quality standards;
- Develop and implement new tools to inform the public;
- Conduct research to improve the scientific basis for beach programs.

One specific focus of this program and the water quality standards program is to review and strengthen bacterial water quality standards.

Status Report

The purpose of the Status Report is to provide a brief overview of the bacterial water quality standards that have been adopted by states for their marine and fresh recreational waters in the United States. This report is based on consultations with EPA water quality standards coordinators. The report is accurate as of September 1997; however, there may be revisions to standards that are not reflected in this report. EPA will update the report periodically to reflect new information.

The following tables contain updated information on the bacterial water quality standards that have been adopted by states, territories, and tribes to protect human health from waterborne diseases within their jurisdictions. The information is presented in summary format for both states/territories and tribes. The standards are also described in more detail. The summary is organized first by EPA region, and then by state, territory, and tribe within each region.

For the precise regulatory language applicable to a particular state, the reader should consult the water quality standards of that state. Copies of state water quality standards may be obtained from the state's water quality management agency or its equivalent.

The reader should also note that these may not be the only guidelines or standards in effect for recreational waters in a particular location. It is not uncommon for a local health agency to develop and adopt site-specific guidelines as part of their public health codes. Although EPA is compiling a catalog of these guidelines, one should consult with the appropriate local health agency to obtain detailed information.

Water Quality Standards Background
In response to widespread public concern about the condition of our nation's waters, the United States Congress enacted landmark legislation in 1972. This statute, the Federal Water Pollution Control Act Amendments of 1972 (referred to as the Clean Water Act of 1972, or CWA), expanded and built upon existing laws designed to control and prevent water pollution. Successive amendments to the 1972 CWA (the Clean Water Act of 1977 and the Water Quality Act of 1987) have continued to strengthen the law to better protect our nation's waters.

Water quality standards are the cornerstone of a state's water quality management program. States, territories, and Indian tribes set water quality standards for waters within their jurisdictions. Water quality standards define a use for a waterbody and describe the specific water quality criteria to achieve that use. The water quality standards also contain antidegradation policies to protect existing water quality. These are the goals by which success is ultimately gauged for a given waterbody or watershed.

The water quality standards program is administered by the U.S. Environmental Protection Agency (EPA). Congress has mandated that EPA is responsible for providing water quality criteria recommendations, approving state-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance. Guidance for the development of standards by individual states, tribes, and territories is contained in the EPA documents *Water Quality Standards Handbook*, Second Edition (1983) and *Ambient Water Quality Criteria for Bacteria* (1986).

Fecal bacteria have been used as an indicator of the possible presence of pathogens in surface waters and the risk of disease, based on epidemiological evidence of gastrointestinal disorders from ingestion of contaminated surface water or raw shellfish. Contact with contaminated water can lead to ear or skin infections, and inhalation of contaminated water can cause respiratory diseases. The pathogens responsible for these diseases can be bacteria, viruses, protozoans, fungi, or parasites that live in the gastrointestinal tract and are shed in the feces of warm-blooded animals.

However, because of the difficulties in analyzing for and detecting the many possible pathogens or parasites, concentrations of fecal bacteria, including fecal coliforms, enterococci, and *Escherichia coli*, are used as the primary indicators of fecal contamination. The latter two indicators are considered to have a higher degree of association with outbreaks of certain diseases than fecal coliforms and were recommended as the basis for bacterial water quality standards in the 1986 *Ambient Water Quality Criteria for Bacteria* document (both for fresh waters, enterococci for marine waters). The standards are defined as a concentration of the indicator above which the health risk from waterborne disease is unacceptably high.

Prior to the 1986 revision to the National criterion, there were recommendations in the report of the National Technical Advisory Committee to the Secretary of the Interior, *Water Quality Criteria* (1967) and by EPA in *Quality Criteria for Water* (1976). Both of these documents were based on fecal coliforms and recommended that maximum densities not exceed geometric means of 200 organisms per 100 ml in recreational waters.

The 1986 criteria statement for bacteriological criteria follows:

EPA Criteria for Bathing (Full Body Contact)
Recreational Waters

Freshwater

Based on a statistically sufficient number of samples (generally not less than 5 samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities should not exceed one or the other of the following:[1]

E. coli	126 per 100 ml; or
Enterococci	33 per 100 ml.

No sample should exceed a one sided confidence limit (C.L.) calculated using the following as guidance:

Designated bathing beach	75% C.L.
Moderate use for bathing	82% C.L.
Light use for bathing	90% C.L.
Infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.4 as the log standard deviation for both indicators.

Marine Water

Based on a statistically sufficient number of samples (generally not less than 5 samples equally spaced over a 30-day period), the geometric mean of the enterococci densities should not exceed 35 per 100 ml.

No sample should exceed a one sided confidence limit using the following as guidance:

Designated bathing beach	75% C.L.
Moderate use for bathing	82% C.L.
Light use for bathing	90% C.L.
Infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.7 as the log standard deviation.

[1]Only one indicator should be used. The regulatory agency should select the appropriate indicator for its conditions.

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Bacterial Water Quality Standards - *Summary Information*

Summary of Bacterial Water Quality Standards for States and Territories Within EPA Regions

Region/State	Freshwater	Marine Water	Region/State	Freshwater	Marine Water
Region 1			**Region 2**		
CT	EN/FC/TC[1,2]	EN	NJ	EN/FC	EN/FC
ME	EC	EN	NY	FC/TC	FC/TC
MA	FC	FC	PR	•	EN/FC/TC
NH	EC	EN	VI	•	FC
RI	FC/TC	FC			
VT	EC	•			
Region 3			**Region 4**		
DE	EN	EN	AL	FC	FC
DC	FC	•	FL	FC	FC
MD	FC	FC	GA	FC	FC
PA	FC	•	KY	FC	•
VA	FC	FC	MS	FC	FC
WV	FC	•	NC	FC	FC
			SC	FC	FC
			TN	FC	•
Region 5			**Region 6**		
IL	FC	•	AR	FC	•
IN	EC	•	LA	FC	FC
MI	EC/FC	•	NM	FC	•
MN	FC	•	OK	EC/EN/FC	•
OH	EC/FC	•	TX	FC/EN	FC
WI	FC	•			

[1] FC = fecal coliforms; TC = total coliforms; EN = enterococci; EC = *Escherichia coli.*

[2] Many jurisdictions use both the 1986 indicator criteria and fecal coliforms; some continue to use total coliforms. Even if a state has the authority to use the 1986 indicators, it may use another indicator at its discretion.

Summary of Bacterial Water Quality Standards for States and Territories Within EPA Regions

Region/State	Freshwater	Marine Water	Region/State	Freshwater	Marine Water
Region 7			**Region 8**		
IA	FC	•	CO	FC	•
KS	FC	•	MT	FC	•
MO	FC	•	ND	FC	•
NE	FC	•	SD	FC	•
			UT	FC/TC	•
			WY	FC	•
Region 9			**Region 10**		
AZ	EC/FC	•	AK	FC	FC
CA	EC/EN/FC/TC[3]	EN/FC/TC	ID	FC	•
HI	FC	EN	OR	EC	FC
NV	EC/FC	•	WA	FC	FC
Amer. Samoa	FC	FC			
CNMI	EC/EN/FC	EN			
Guam	FC	FC			
Trust Territory	FC	EN/FC			

[3] California has 9 Regional Boards; some use the 1986 indicator criteria, whereas some use fecal coliforms and total coliforms entirely or for other purposes.

Summary of Bacterial Water Quality Standards for Tribes Within EPA Regions

Region/State	Tribe	Freshwater
Region 6		
NM	Isleta Pueblo	FC[1]
	Nambe Pueblo	FC
	Picuris Pueblo	FC
	Pojoaque Pueblo	FC
	Sandia Pueblo	FC
	San Juan Pueblo	FC
	Santa Clara Pueblo	FC
OK	Seminole Tribe	FC
Region 8		
CO	Southern Utes Tribe	FC
MT	Salish and Kootenai Tribes - *Flathead Tribes*	FC *(Adopted)*
	Assiniboine and Sioux Tribes - *Fort Peck Reservation*	EC *(Proposed)*
ND	Three Affiliated Tribes - *Fort Berthold Reservation*	FC *(Proposed)*
Region 9		
CA	Hoopa Valley Tribe	EC
Region 10		
WA	Chehalis Tribe	FC
	Colville Confederated Tribes	EN
	Puyallup Tribe	FC

[1] FC = fecal coliforms; TC = total coliforms; EN = enterococci; EC = *Escherichia coli.*

Narrative Summary (as of September, 1997)

For freshwaters, 37 states, the District of Columbia, and two trust territories still rely on the 1968 200 FC/100 mL water standard as their primary indicator for recreational waters:

- Alabama
- Arkansas
- California (some regions)
- Colorado
- District of Columbia
- Florida
- Hawaii
- Illinois
- Iowa
- Kansas
- Kentucky
- Louisiana
- Commonwealth of the Northern Marianna Islands
- Maryland
- Massachusetts
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Trust Territory
- Utah
- Virginia
- Wisconsin
- West Virginia
- Wyoming

Seven states and two territories have fecal and/or total coliform standards more stringent than 200 FC/ 100 mL and 1000 TC/100 mL:

- Alaska
- American Samoa
- California (some regions)
- Guam
- Idaho
- Illinois (Lake Michigan)
- Massachusetts
- Rhode Island
- Washington

Eleven states and one territory have adopted an *E. coli* standard for freshwater:

- Arizona
- California (San Francisco Bay, San Diego, and Colorado River Basin regions)
- Indiana
- Maine
- Commonwealth of the Northern Mariana Islands
- Michigan
- Nevada (Lake Tahoe and Humboldt River)
- New Hampshire
- Ohio
- Oklahoma
- Oregon
- Vermont

Six states, one tribe, and one territory use enterococci as a standard for freshwater:

- California (San Francisco Bay, San Diego, Colorado River Basin regions)
- Connecticut
- Delaware
- Commonwealth of the Northern Mariana Islands
- New Jersey
- Oklahoma
- Texas (Houston Ship Channel)
- Washington-Colville Confederated Tribes

Eight states and one territory use a combination of bacterial indicator standards:

California (*E. coli*, enterococci, fecal and total coliforms)
Connecticut (enterococci, fecal and total coliforms)
Ohio (*E. coli* and fecal coliforms)
Oklahoma (choice of *E. coli*, enterococci, or fecal coliforms)
Commonwealth of the Northern Mariana Islands (*E. coli* and enterococci)
Michigan (*E. coli* and fecal coliforms)
New Jersey (enterococci and fecal coliforms)
New York (fecal and total coliforms)
Rhode Island (fecal and total coliforms)

Twelve tribes use or have proposed using fecal coliform densities for evaluating freshwater quality, one uses enterococci, and two use or have proposed using *E. coli*.

Of those jurisdictions having marine water quality standards, 17 states and three trust territories use fecal coliforms:

Alabama
Alaska
American Samoa
California
Florida
Georgia
Guam
Louisiana
Maryland
Massachusetts
Mississippi
New Jersey
New York
North Carolina
Oregon
Rhode Island
South Carolina
Texas
Virgin Islands
Virginia
Washington

Six states and one territory use enterococci:

Connecticut
Delaware
Hawaii
Commonwealth of the Northern Mariana Islands
Maine
New Hampshire
New Jersey (1500 ft–3 mi from shoreline)

One state and two territories use a combination of fecal coliforms and enterococci:

California (San Diego Region, Shore)
Puerto Rico
Trust Territory

Six states and the District of Columbia have included provisions in which the numeric criteria for bacteria standards do not apply where CSOs and storm water discharges are likely to result in violations:

Delaware
District of Columbia
Iowa
Michigan
Missouri
North Carolina
Utah

Twenty-one states have seasonal standards, where the criteria apply only during the swimming season:

Alabama	Maine	North Dakota
Arkansas	Massachusetts	Oklahoma
Georgia	Michigan	Pennsylvania
Idaho	Minnesota	South Dakota
Indiana	Mississippi	Vermont
Iowa	Missouri	West Virginia
Kansas	Nebraska	Wyoming

Bacterial Water Quality Standards - *Detailed Overview*

Bacterial Water Quality Standards by EPA Region

			Freshwater		Marine	
Region	**State**	**Class**	**Primary**	**Secondary**	**Primary**	**Secondary**
Region 1	**Connecticut**	Class AA	100 TC			
			No single sample to exceed 500 TC. Class AA waters are not meant for contact recreation.			
		Class A/SA	33 EN	100 TC	33 EN	
			No single sample may exceed 61 EN. TC value is monthly moving average. No more than 10% of TC samples may exceed 500.			
		Class B/SB	33 EN	200 FC	33 EN	
			No single sample may exceed 61 EN. No more than 10% of FC single samples may exceed 400.			
	Comments:					
	Maine	Class AA & A/SA	(see note)		(see note)	
			Note: Bacteria content may be as naturally occurs.			
		Class B/SB	64 EC		8 EN	
			For season May 15–September 30. Class B may not exceed instantaneous level of 427 EC. Class SB may not exceed instantaneous level of 54 EN.			
		Class C/SC	142 EC		14 EN	
			For season May 15–September 30. Class C may not exceed instantaneous level of 949 EC. Class SC may not exceed instantaneous level of 94 EN.			
	Comments:					
	Massachusetts	Class A/SA	20 FC		200 FC	
			Primary freshwater value based on arithmetic mean. No more than 10% of FC samples may exceed 100 and 400, respectively. Marine value may be applied seasonally.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 1	**Massachusetts**	Class B/SB	200 FC		200 FC	
			No more than 10% of FC samples may exceed 400. Marine value may be applied seasonally.			
		Class C/SC		1000 FC		1000 FC
			No more than 10% of FC samples may exceed 2000.			
	Comments:					
	New Hampshire	Class A	47 EC		35 EN	
			No single sample may exceed 153 EC or 104 EN, respectively. For "beach," no single sample may exceed 88 EC. Based on minimum of 3 samples taken in a 60-day period.			
		Class B	126 EC		35 EN	
			No single sample may exceed 406 EC or 104 EN, respectively. Based on minimum of 3 samples taken in a 60-day period.			
		Class B (beaches)	47 EC			
			No single sample may exceed 88 EC. Based on minimum of 3 samples taken in a 60-day period.			
		Temporary Partial Use	(none)	(none)	(none)	(none)
	Comments:					
	Rhode Island	Class A/SA	100 TC 20 FC		70 TC 15FC	
			Primary values based on median. No more than 10% of TC samples may exceed 500 and 330, respectively. No more than 10% of FC samples may exceed 200 and 50, respectively.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 1	**Rhode Island**	Class B/SB	1000 TC		700 TC	
			Values based on median. No more than 20% and 10% of TC samples may exceed 2400 and 2300, respectively.			
			200 FC		50 FC	
			Values based on median. No more than 20% and 10% of FC samples may exceed 500 and 500, respectively.			
		Class C/SC	(see note)		(see note)	
			Note: None in concentrations that would impair any uses assigned to this class.			
	Comments:	*Marine FC criteria are guides pending further research.*				
	Vermont	Class A	18 EC			
		Class B	77 EC			
			Secretary may waive October 31–April 1.			
	Comments:					
Region 2	**New Jersey**	Saline Coastal (SC) Waters			50 FC	
		Within 1500 ft of Coastline	35 EN			
		Freshwater 2 (FW2)	200 FC			
			No more than 10% of FC samples may exceed 400.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 2	**New Jersey**	FW2 (cont.)	33 EN			
			No single sample may exceed 61 EN.			
		Saline Estuary 1 (SE1) and SC			200 FC	
			No more than 10% of FC samples may exceed 400.			
		1500 ft - 3 mi from shoreline			35 EN	
			No single sample may exceed 104 EN.			
		Saline Estuary 2 (SE2)				770 FC
		Saline Estuary 3 (SE3)				1500 FC
		Mainstem Delaware River and Delaware Bay:				
		Zones 1C, 1D, 1E, 6	200 FC			
		Zone 2	200 FC	770 FC		
			Primary RM 133.4–117.81; secondary RM 133.4–108.4			
		Zones 3,4		770 FC		
		Zone 5	200 FC	770 FC		
			Primary RM 59.5–48.2; secondary RM 78.8–59.5			
	Comments:					
	New York	Class AA	50 TC			
			Value based on median. No more than 20% of TC samples may exceed 240. Standards apply during periods of disinfection.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 2	**New York**	Class A	2400 TC 200 FC			
			TC value based on median. No more than 20% of TC samples may exceed 20,000.			
		Class B/SB	2400 TC 200 FC		2400 TC 200 FC	
			TC values based on median. No more than 20% of TC samples may exceed 5000.			
		Class C/SC	2400 TC 200 FC		2400 TC 200 FC	
			TC values based on median. No more than 20% of TC samples may exceed 5000.			
		Class D/SD	2400 TC 200 FC		2400 TC 200 FC	
			TC values based on median. No more than 20% of TC samples may exceed 5000. Criteria apply only to Class D waters. There are no bacterial criteria for Class SD waters. Class SD waters are not meant for recreational purposes.			
		Class I			10000 TC 2000 FC	
		Class A-Special (A-S)	1000 TC			
		Fresh Surface Water	200 FC			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 2	**Puerto Rico**	Class SA	(see note)			
			Note: May not be altered except by natural causes.			
		Class SB	35 EN 200 FC			
			35 EN for "intensely used waters"; otherwise, 200 FC. No more than 20% of FC samples may exceed 400.			
		Class SC	10,000 TC 2000 FC			
			No more than 20% of FC samples may exceed 4000.			
		Class SD	10,000 TC 2000 FC			
			No more than 20% of FC samples may exceed 4000.			
		Class SE	(see note)			
			Note: None of the parameters may be altered, except by natural causes.			
	Comments:					
	Virgin Islands	Class A	(see note)			
			Note: Existing natural conditions are not to be changed.			
		Class B	70 FC			
		Class C	100 FC			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 3	**Delaware**		100 EN†		100 EN†	
			The criteria are valid only under conditions characterized by the absence of rainfall-induced runoff. These values are Delaware's water quality standards.			
			193 EN†		155 EN†	
			These are Delaware's 1997 Recreational Water Quality Guidelines for bathing beaches. No single freshwater sample may exceed 360 EN. No single marine sample may exceed 2,212 EN, or 460 EN within one-half mile of Indian River Inlet.			
	Comments:	*†EPA has not yet approved these criteria.*				
	District of Columbia		200 FC†	1000 FC†		
			Numeric standard for FC, DO, turbidity, and unionized NH_3 do not apply for 24 hr following high flow conditions.			
	Comments:	*†EPA has not yet approved these criteria.*				
	Maryland		200 FC	200 FC	200 FC	200 FC
			No more than 10% of FC samples may exceed 400.			
	Comments:					
	Pennsylvania	Bac1	200 FC			
			Swimming season (May 1–September 30). 2000 FC applies during the rest of the year.			
		Bac 2		5000 FC		
			No more than 20% of samples may exceed 5000 FC. No more than 5% of samples may exceed 20,000 FC.			
		Bac 3		5000 FC		

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 3	**Pennsylvania**	Bac 4	770 FC			
			Delaware River from head of tide to Burlington Bristol Bridge.			
		Bac 5	200 FC			
			Delaware River from Burlington Bristol Bridge to Pennsylvania-Delaware line.			
	Comments:					
	Virginia		200 FC	200 FC	200 FC	200 FC
			Based on two or more samples over 30 days. No sample may exceed a maximum of 1000 FC.			
	Comments:					
	West Virginia	Categories A&C	200FC			
			No more than 10% of FC samples may exceed 400.			
		Ohio River (Category C)	2000 FC			
			For nonrecreation season November–April only.			
	Comments:					
Region 4	**Alabama**		200 FC	200 FC	100 FC	100 FC
			Primary applies year-round. Secondary applies for out of season (October–May). Out of season mean 2000 FC; 4000 FC sample maximum for freshwater and marine waters.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 4	**Florida**		200 FC		200 FC	
			No more than 10% FC samples may exceed 400; 800 FC on any one day. 1000 TC maximum for monthly average. No more than 20% of TC single samples may exceed 1000. 2400 TC maximum on any one day. Based on minimum of 10 samples.			
	Comments:					
	Georgia		200 FC	200 FC	100 FC	200 FC
			Primary applies year-round. Secondary applies for out of season (October–May). Out of season, 1000 FC; 4000 FC sample maximum. Based on minimum of 4 samples.			
	Comments:					
	Kentucky		200 FC	1000 FC		
			For May–October; no more than 20% of FC samples may exceed 400 and 2000, respectively. Out of season, secondary contact criteria used for primary waters.			
	Comments:					
	Mississippi	Recreation	200 FC		200 FC	
			No more than 10% of FC samples may exceed 400.			
		Fish & Wildlife	200 FC	2000 FC	200 FC	2000 FC
			No more than 10% of FC samples may exceed 400. From November to April, secondary applies and no more than 10% of FC samples may exceed 4000.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 4	**North Carolina**	Class SA (shellfishing)	14 FC			
			Based on median value. No more than 10% of FC samples may exceed 43 in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.			
		Class B/SB (Primary Recreation, Fresh\Tidal Salt)	200 FC		200 FC	
			No more than 20% of FC samples may exceed 400.			
		Class C/SC (Secondary Recreation, Fresh\Tidal Salt)		200 FC		200 FC
			No more than 20% of FC samples may exceed 400. Violations are expected immediately following periods of rainfall in segments where uncontrollable nonpoint source pollution prevents attainment.			
	Comments:					
	South Carolina	Class FW/SA	200 FC		200 FC	
			No more than 10% of FC samples may exceed 400.			
		Class SB				1000 FC
			No more than 20% of FC samples may exceed 2000.			
	Comments:					
	Tennessee	Recreation	200 FC			
			Based on minimum of 10 samples. No single FC sample may exceed 1000.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 4	**Tennessee**	Domestic Water Supply	1000 FC			
			Based on a minimum of 10 samples. No single FC sample may exceed 5000.			
		Fish & Wildlife	1000 FC			
			Based on a minimum of 10 samples. No single FC sample may exceed 5000.			
	Comments:					
Region 5	**Illinois**		200 FC			
			No more than 10% of FC samples may exceed 400.			
		Lake Michigan	20 FC			
	Comments:					
	Indiana		125 EC			
			For season April through October. May not exceed 235 EC.			
	Comments:					
	Michigan		130 EC 200 FC			
			May be exceeded if due to uncontrollable nonpoint sources. Primary standard can be temporarily suspended due to flood, accident, or emergencies that affect a sewer or wastewater treatment system. Can be suspended November 1–April 30.			
	Comments:	*The EC value is used for ambient monitoring; the FC value is used for assessing effluent discharges.*				

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 5	**Minnesota**	Class A	200 FC			
			No more than 10% of FC samples may exceed 400. Criterion applies only during the March 1–October 31 season.			
		Class B	200 FC			
			No more than 10% of FC samples may exceed 2000. Criterion applies only during the March 1–October 31 season.			
	Comments:					
	Ohio	Lake Erie & Ohio River Uses	200 FC 126 EC			
			No more than 10% of FC samples may exceed 400. No more than 10% of EC samples may exceed 235. Based on not less than 5 samples taken during any 30-day period.			
		Rest of state	1000 FC 126 EC	5000 FC 576 EC		
			No more than 10% of FC samples may exceed 2000 and 5000, respectively. No more than 10% of EC samples may exceed 298 [primary] and 576 [secondary].			
	Comments:	*Both Lake Erie and the Ohio River are designated as **bathing waters**. For each designation, at least one of the two bacterial standards (FC or EC) must be met. These criteria apply outside the mixing zone.*				
	Wisconsin		200 FC			
			No more than 10% of FC samples may exceed 400. Specific water segments have variances which allow 1000 FC.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 6	**Arkansas**		200 FC	1000 FC		
			No more than 10% of FC sample may exceed 400 and 2000, respectively. For extraordinary resource waters, primary standard always applies; for other waters, primary standard in effect April 1–September 30. Rest of year, secondary applies.			
	Comments:					
	Lousiana		200 FC	1000 FC	200 FC	1000 FC
			No more than 10% of FC samples may exceed 400 and 2000, respectively.			
	Comments:					
	New Mexico		200 FC	1000 FC		
			No single sample may exceed 400 FC or 2000 FC, respectively.			
		Select Segments:	100 FC			
			No single sample may exceed 200 FC			
	Comments:					
	Oklahoma		200 FC 126 EC 33 EN	Narrative		
			For May–September; rest of year, secondary narrative applies. No more than 10% of FC samples may exceed 400.			
	Comments:	*Adopted WQS to allow choice of FC, EC, EN.*				

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 6	**Texas**		200 FC	2000 FC	200 FC	2000 FC
			No more than 10% of samples may exceed 400 FC. If 10 or fewer samples collected, no single sample may exceed 400 FC and 4000 FC, respectively.			
		Houston Ship Channel	168 EN			
			No more than 10% of EN samples (if more than 10 samples) or a single sample (if fewer than 10 samples) may exceed 500. This criterion applies for two segments of the Houston Ship Channel.			
	Comments:	*Texas Department of Health uses most probable number (MPN) methodology; Texas Natural Resources Conservation Commission uses membrane filtration (MF) methodology.*				
Region 7	**Iowa**		200 FC			
			For April 1–October 31 season. Excepted when waters are materially affected by surface runoff, but FC levels downstream from discharge may not be >200 more than the background level upstream.			
	Comments:					
	Kansas		200 FC	2000 FC		
			No more than 10% of FC samples may exceed 400. Primary contact use applies April 1–October 31. Secondary applies year-round.			
	Comments:	*Classified surface waters may be excluded from the application of the numeric criteria for fecal coliform when stream flow exceeds 50% of the estimated 2-year flood flow.*				
	Missouri		200 FC			
			For periods when the stream or lake is not affected by storm water runoff. Applies April 1–October 30.			
	Comments:	*State applies FC WQC to designated losing streams also, but on a year-round basis.*				

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 7	**Nebraska**		200 FC			
			No more than 10% of FC samples may exceed 400. Applies May 1– September 30.			
	Comment:					
Region 8	**Colorado**		200 FC	2000 FC		
	Comments:					
	Montana	Class A	50 FC			
		Class B-E	200 FC			
			No more than 10% of FC samples may exceed 400.			
	Comments:					
	North Dakota		200 FC			
			Only during recreation season May 1–September 30.			
	Comments:					
	South Dakota		200 FC	1000 FC		
			No more than 20% of FC samples may exceed 200 and 1000, respectively. Any one FC sample may not exceed 400 and 2000, respectively. Criteria apply May 1–September 30.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 8	**Utah**	Class 2A	1000 TC 200 FC			
			Failure of stream to meet WQS when flow is unusually high is not a cause for action if discharger is meeting permit requirements.			
		Class 2B		5000 TC 200 FC		
	Comments:					
	Wyoming		200 FC	1000 FC		
			No more than 10% of FC samples may exceed 400 and 2000, respectively. For recreational season May 1 –September 30.			
	Comments:					
Region 9	**American Samoa**		100 FC		100 FC	
			No more than 10% of FC samples may exceed 200.			
	Comments:					
	Arizona		130 EC	1000 FC		
			Single sample maximum of 580 EC in primary. No more than 10% of FC samples may exceed 400 and 2000, respectively. Limits of 200 FC also apply to secondary waters that are effluent-dominated.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 9	**California**	North Coastal Region	50 FC		50 FC	
			No more than 10% of FC samples may exceed 400.			
		SF Bay Region	200 FC 240 TC	2000 FC	200 FC 240 TC	2000 FC
			No more than 10% of FC samples may exceed 400.			
			33 EN† 126 EC†			
			†Maximum EN and EC limits vary by level of use.			
		Central Coast Region	200 FC	2000 FC	200 FC	2000 FC
			No more than 10% of FC samples may exceed 400.			
		Los Angles Region	200 FC	2000 FC	200 FC	2000 FC
			No more than 10% of FC samples may exceed 400.			
		Central Valley Region	200 FC			
			No more than 10% of FC samples may exceed 400.			
		Folsom Lake:	100 FC			
			No more than 10% of FC samples may exceed 200.			
		Lahontan Region (Eagle Lake, Susan River, Lake Tahoe)	20 FC			
			No more than 10% of FC samples may exceed 400.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 9	**California**	Colorado River Basin Region	200 FC 33 EN 126 EC	630 EC 165 EN		
			No more than 10% of FC samples may exceed 400. Also maximum limits for EN and EC vary by level of use.			
		Santa Ana Region	200 FC	2000 FC	200 FC	2000 FC
			No more than 10% of FC samples may exceed 400; 100 TC maximum in lakes and streams designated as domestic water supply.			
		San Diego Region	200 FC 33 EN 126 EC	2000 FC	200 FC 35 EN	2000 FC
		Ocean Plan			1000 TC 200 FC	
			No more than 20% of TC samples may exceed 1000 in bays and estuaries. No more than 10% of FC samples may exceed 400.			
		Shore			24 EN	
			12 EN mean over 6 months.			
	Comments:					
	Hawaii		200 FC		7 EN†	
			Inland: based on minimum of 10 samples. No more than 10% of FC samples may exceed 400. †Marine: based on minimum of 5 samples.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 9	**Guam**	M1/S1/Shellfish	(see note)		(see note)	
			Note: TC may not be increased from natural conditions at any time.			
		M2/S2	70 FC		70 FC	
			Values based on arithmetic mean. No FC samples may exceed 400 at any time.			
		M3/S3	200 FC		200 FC	
			Values based on arithmetic mean. No FC sample may exceed 400 at any time.			
	Comments:	*All Guam standards based on a minimum of 4 samples.*				
	Common-wealth of the Northern Mariana Islands	All waters	200 FC		200 FC	
			No FC samples may exceed 400 at any time.			
		Class AA			35 EN	
		Class 1	33 EN 125 EC		35 EN	
		Class A			125 EN	
		Class 2	90 EN 300 EC			
	Comments:	*All Mariana Islands standards based on a minimum of 5 samples.*				

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 9	**Nevada**	Class A and B	200 FC			
			No more than 10% of FC samples may exceed 400.			
		Waters not listed below	200 FC	1000 FC		
			More stringent of the following: For 1000 FC, no more than 20% of samples may exceed 2400 FC. Annual geometric mean FC concentration may not exceed characteristics of natural conditions by more than 200 FC, nor 400 FC in a single sample. For primary, no more than 10% of FC samples may exceed 400.			
		Lake Tahoe and Tributaries and Humboldt River Basin	126 EC			
			Lake Tahoe also has FC limits between 5 and 32 (median) for offshore and undeveloped lake shore. Humboldt River Basin has single value of 406 EC.			
	Comments:					
	Trust Territory	Classes AA and 1 (shellfish)	70 FC		70 FC	
			Values based on median. No FC single sample may exceed 230.			
		Classes AAand A			33 EN	
			No EN single sample may exceed 60.			
		Classes A, B, and 2	200 FC		200 FC	
			No FC single sample may exceed 400.			
	Comments:	*All Trust Territory standards based on a minimum of 10 samples.*				

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 10	**Alaska**		100 FC	200 FC	100 FC	200 FC
			No more than 1 sample, or 10% of the samples if there are more than 10 samples, may exceed 200 FC and 400 FC for both freshwater and marine, primary and secondary, respectively.			
	Comments:	*Alaska designates all waters for all uses, and the most stringent criteria must be used. Therefore, for freshwater, the drinking water use criterion of 20 FC usually drives most NPDES permit actions, 303(d) listings, and TMDL development. For marine waters, the most stringent bacterial criterion is for the seafood processing use = 20 FC (no more than 10% of the samples may exceed 40 FC). Even though Alaska has 100 FC/200 FC as its recreation criteria, more stringent criteria for other use categories take precedence.*				
	Idaho		50 FC	200 FC		
			No more than 10% of FC samples may exceed 200 and 400, respectively. May not exceed 500 and 800, respectively, at any time. Levels apply during season May 1–September 30 for primary only; secondary applies all other times.			
	Comments:					
	Oregon		126 EC		14 FC	
			No freshwater single sample may exceed 406 EC. No more than 10% of FC marine samples may exceed 43. For estuarine waters other than shellfish growing, same criterion as freshwater criterion. For estuarine waters with shellfish, same criterion as marine.			
	Comments:					

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 10	**Washington**	Class AA (extraordinary)	50 FC		14 FC	
			No more than 10% of FC samples may exceed 100 and 43, respectively.			
		Class A (excellent)	100 FC		14 FC	
			No more than 10% of FC samples may exceed 200 and 43, respectively.			
		Class B (good)		200 FC		100 FC
			No more than 10% of FC samples may exceed 400 and 200, respectively. Only designated for secondary contact.			
		Class C (fair)				200 FC
			No more than 10% of FC samples may exceed 400. Only designated for secondary contact.			
		Lake Class	50 FC			
			No more than 10% of FC samples may exceed 100.			
	Coleville Conf. Tribes	Class I (extraordinary)	8 EN			
			No single sample may exceed 35 EN.			
		Class II (excellent)	16 EN			
			No single sample may exceed 75 EN.			
		Class III (good)		33 EN		
			No single sample may exceed 150 EN. Only designated for secondary contact.			
		Lake Class		33 EN		
			No single sample may exceed 150 EN.			

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.

Bacterial Water Quality Standards by EPA Region

Region	State	Class	Freshwater Primary	Freshwater Secondary	Marine Primary	Marine Secondary
Region 10	**Washington** (Coleville Conf. Tribes)	Class IV (special resource waters)	(see note)			
			Note: May not exceed natural conditions. Applies for both primary and secondary waters.			
	Comments:	*Chehalis and Puyallup tribal water quality standards are identical to Washington's standards for bacteria.*				

Sources: U.S. Environmental Protection Agency, Regional Offices and Office of Science and Technology, Standards and Applied Science Division.

Notes: EN = enterococci; EC = *Escherichia coli* (*E. coli*); FC = fecal coliforms; TC = total coliforms. All numbers indicate the number of microorganisms per 100 mL not to be exceeded, based on the geometric mean of not less than 5 samples taken over a 30-day period, unless otherwise noted.