Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

Chapter 583

Nutrient Criteria for Class AA, A, B, and C Fresh Surface Waters

SUMMARY: This Chapter establishes nutrient criteria for Class AA, A, B, and C fresh surface waters of the State of Maine. Nutrient enrichment can cause negative environmental impacts to surface waters—such as algal blooms, low dissolved oxygen concentrations, excessive growths of filamentous algae or bacteria, and generation of cyanotoxins—or affect the resident biological community. The Department of Environmental Protection (Department) will use the methods described in this Chapter to make decisions about attainment of designated and existing uses of aquatic life support, habitat, and recreation in and on the water of surface waters established in the State's water quality classification system (38 M.R.S. §§ 464-470). This Chapter also sets forth a framework to identify and establish site-specific phosphorus and other nutrient criteria through additional rulemaking.

- 1. Purpose and applicability. This Chapter establishes nutrient criteria for Class AA, A, B, and C fresh surface waters to assess and protect the designated and existing uses of aquatic life support, habitat, and recreation in and on the waters as described in 38 M.R.S. §§ 464 and 465. This Chapter also provides related implementation policy and sets forth a framework to identify and establish site-specific nutrient criteria for such waters through additional rulemaking. This Chapter does not apply to Class GPA waters. Also, this Chapter does not apply to Class AA, A, B, and C wetlands that usually lack aboveground water from June through September. (See Appendix 1)
- 2. Definitions. The following terms are defined for purposes of this Chapter as follows:
 - August median flow means the median of all the daily arithmetic mean stream flows in August. August median flow may be calculated from river gauge measurements or estimated based on drainage area size and proportion of the drainage area underlain by sand and gravel aquifers and is subject to Department approval.

Chlorophyll *a* (Chl *a*) means a particular kind of photosynthetic pigment of algae and plants.

- **Class** means the statutory classification (*i.e.*, AA, A, B, C) assigned to fresh surface waters as set forth in 38 M.R.S. § 465.
- **Critical ambient conditions** means conditions in a waterbody that are conducive to the expression of the adverse effects of nutrient enrichment, such as low flow or water level, warm temperatures, or other conditions as determined by the Department.
- **Geometric mean** means the average value that signifies the central tendency of the set of numbers by taking the root of the product of their values. Geometric mean = $(x_1 \cdot x_2 \cdot ... \cdot x_n)^{1/n}$
- **Impoundments** means riverine waters upstream of a dam classified as AA, A, B, or C, and not classified as GPA, where the surface elevation is approximately the same as found at the dam.

- **Nutrient** means any chemical that an organism requires to live and grow, including phosphorus, nitrogen, carbon, and other essential and trace elements.
- **Percent nuisance algal cover** means the percent of stream and river substrate covered by filamentous algae and periphyton mats. Percent nuisance algal cover is calculated by adding the percent of substrate covered by filamentous algae greater than 1 centimeter (cm) long and the percent of substrate covered by periphyton mats greater than 1 millimeter (mm) thick.
- Periphyton means a layer of algae, bacteria, and fungi growing on a substrate within a waterbody.
- **Phaeophytin** means a byproduct of chlorophyll degradation formed when chlorophyll loses its central magnesium molecule.
- Phytoplankton means algae suspended in the water column.
- **ppb** means parts per billion, which is equivalent to micrograms per liter (μ g/L).
- **Reasonable potential** means the results of a reasonable potential analysis conducted by the permitting authority that indicate that a discharge causes, has a reasonable potential to cause, or contributes to an in-stream excursion above narrative or numeric criteria within a State water quality standard, pursuant to Chapter 523, § 5(d), Waste Discharge License Conditions.
- **Response indicators** means the two methods in this Chapter of measuring the amount of algae in a waterbody, including water column chlorophyll *a* and percent nuisance algal cover.

Season means the period from June through September in a calendar year.

- **Seasonal geometric mean of water column chlorophyll** *a* means a geometric mean of multiple measurement of chlorophyll *a* that were collected at different times during a season.
- **Sewage fungus** means visible growths of aquatic bacteria and fungi associated with organic pollution, excluding iron and manganese bacteria.
- **Spatial geometric mean of water column chlorophyll** *a* means a geometric mean of multiple measurements of chlorophyll *a* that were collected at different locations in an impoundment. This calculation may include data collected at different times during a season.

TP means total phosphorus.

- **Turbid** means that the water is not clear or transparent due to small organic and inorganic particles suspended in the water.
- **Wadeable stream** means a perennial or intermittent stream in which most of the wetted channel is safely wadeable by a person during baseflow conditions.

Waterbody type means a kind of waterbody based on size, geomorphology, movement of water, and substrate type, such as a wadeable stream with rocky bottom, wadeable stream with unconsolidated substrate, impoundment, and non-wadeable river.

3. Nutrient criteria. The Department will use the nutrient criteria in Table 1 to protect and maintain the designated and existing uses of aquatic life support, habitat, and recreation in and on the water of Class AA, A, B, and C fresh surface waters, excluding wetlands that usually lack aboveground water from June through September. The nutrient criteria apply from June through September. Site-specific TP values established in section 5 will be substituted for and supersede default TP values for the statutory classes of fresh surface waters set forth in Table 1. Site-specific values for non-TP nutrients established in section 5 must be attained in addition to TP values. Determinations of attainment or nonattainment of nutrient criteria are based on all data collected during a season.

When reasonable potential exists for TP or another nutrient, the applicable values in Table 1 or section 5 will be used to determine appropriate nutrient limits in Maine Pollutant Discharge Elimination System (MEPDES) permits or National Pollutant Discharge Elimination System (NPDES) permits for interstate waters.

- **A. Total phosphorus (TP)** (μg/L, ppb). The geometric mean of total phosphorus (TP) concentrations in Class AA, A, B, and C waters may not exceed the corresponding TP values in Table 1 during a season.
- **B. Response indicators.** The following response indicators serve to protect the designated and existing uses of aquatic life support, habitat, and recreation in and on the waters described in 38 M.R.S. §§ 464 and 465. The response indicators apply to all Class AA, A, B, and C waters regulated by this Chapter, unless otherwise specified below.
 - (1) Percent nuisance algal cover. Percent nuisance algal cover in Class AA, A, B, and C wadeable stream and river segments with rocky substrate may not exceed the corresponding values in Table 1. This indicator is restricted to wadeable segments of streams and rivers with rocky substrate. Percent nuisance algal cover will be computed by adding the percent of substrate covered by filamentous algae greater than 1 cm long and the percent of substrate covered by periphyton mats greater than 1 mm thick.
 - (2) *Water column chlorophyll a* ($\mu g/L$, *ppb*). This indicator is a measurement of phytoplankton in the water and will be based on measurements of chlorophyll *a* that have not been adjusted for phaeophytin. Water column chlorophyll *a* in Class AA, A, B, and C waters may not exceed the corresponding values in Table 1.
 - (3) *Sewage fungus*. This indicator includes visible growth of aquatic bacteria and fungi associated with enrichment of organic materials. This indicator excludes growth of iron and manganese bacteria. There must not be visible patches of sewage fungus in Class AA, A, B, and C waters.

Table 1. Nutrient Criteria for Class AA, A, B, and C surface waters

Waterbody Type	Table
Class AA, A, B, and C wadeable stream and river segments with rocky substrate	Table 1a
Class AA, A, B, and C impoundments	Table 1b
Other Class AA, A, B, and C waters ^a	Table 1c

a Excluding Class AA, A, B, and C wetlands that usually lack aboveground water from June through September.

Table 1a. Nutrient criteria for Class AA, A, B, and C wadeable stream and river segments with rocky substrate

		Statutory Class			
Nutrient criteria ^a		AA & A	В	С	
	Nutrient Indicators				
	Total Phosphorus	\leq 19.0 µg/L (ppb) TP ^b	\leq 30.0 µg/L (ppb) TP ^b	\leq 44.0 µg/L (ppb) TP ^b	
	Other Site- Specific Parameters	See section 5.			
	Response Indicators				
	Percent Nuisance Algal Cover ^c	≤ 19.0	≤ 24.0	≤ 35.0	
	Sewage Fungus ^c	No visible patches of sewage fungus			

a Attainment of these criteria will be assessed according to the decision framework in section 4.

b Geometric mean of TP in a season. Site-specific TP values established in section 5 supersede default TP values for the statutory classes. Site-specific values for other non-TP nutrients established in section 5 must also be attained in addition to applicable TP values.

c This indicator must meet the specified conditions during the entire season.

Table 1b. Nutrient criteria for Class AA, A, B, and C impoundments

		Statutory Class			
Nutrient criteria ^a		AA & A	В	С	
	Nutrient Indicators				
	Total Phosphorus	\leq 19.0 µg/L (ppb) TP ^b	\leq 30.0 µg/L (ppb) TP ^b	\leq 44.0 µg/L (ppb) TP ^b	
	Other Site-				
	Specific	See section 5.			
	Parameters				
	Response Indicators				
	Water Column Chl <i>a</i> (µg/L, ppb) ^b	Spatial geometric mean ≤ 6.0 and no value > 8.0	Spatial geometric mean ≤ 8.0 and no value > 10.0	Spatial geometric mean ≤ 8.0 and no value > 10.0	
	Sewage Fungus ^c	No visible patches of sewage fungus			

Chapter 583: Nutrient Criteria for Class AA, A, B, and C Fresh Surface Waters

- a Attainment of these criteria will be assessed according to the decision framework in section 4.
- b Spatial geometric mean of TP in a season. Site-specific TP values established in section 5 supersede default TP values for the statutory classes. Site-specific values for other non-TP nutrients established in section 5 must also be attained in addition to applicable TP values.
- c This indicator must meet the specified conditions during the entire season.

Table 1c. Nutrient criteria for other Class AA, A, B, and C surface waters

		Statutory Class			
Nutrient criteria ^a		AA & A	В	С	
	Nutrient Indicators				
	Total Phosphorus	\leq 19.0 µg/L (ppb) TP ^b	\leq 30.0 µg/L (ppb) TP ^b	\leq 44.0 µg/L (ppb) TP ^b	
	Other Site-				
	Specific	See section 5.			
	Parameters				
	Response Indicators				
	Water				
	Column	Seasonal mean ≤ 6.0	Seasonal mean ≤ 8.0	Seasonal mean ≤ 8.0	
	Chl a				
	$(\mu g/L, ppb)^b$				
	Sewage Fungus ^c	No visible patches of sewage fungus			

a Attainment of these criteria will be assessed according to the decision framework in section 4.

b Geometric mean of TP in a season. Site-specific TP values established in section 5 supersede default TP values for the statutory classes. Site-specific values for other non-TP nutrients established in section 5 must also be attained in addition to applicable TP values.

c This indicator must meet the specified conditions during the entire season.

4. Implementation. The Department will use the following decision framework (Figure 1) to determine if nutrient criteria are attained. The Department may divide fresh surface waters into segments that are evaluated independently based on factors such as changes in statutory class or changes in habitat or waterbody characteristics. Failure to meet any of the response indicators is sufficient to determine that a waterbody does not attain nutrient criteria. The Department may decide to not assess a given response indicator where water conditions would preclude observations (e.g., high turbidity, high color, deep water).

Figure 1. Decision framework

	Seasonal geometric mean TP	Seasonal geometric mean TP
	concentration is less than or equal to	concentration is greater than the
	the applicable value in Table 1 or an	applicable value in Table 1 or an
	established site-specific value	established site-specific value
	AND	AND/OR
	If the waterbody has a site-specific	If the waterbody has a site-specific
	value for a non-TP nutrient	value for a non-TP nutrient
	established in section 5, the seasonal	established in section 5, the seasonal
	geometric mean concentration of the	geometric mean concentration of the
	non-TP nutrient is less than or equal	non-TP nutrient is greater than the
	to the site-specific value for the non-	site-specific value for the non-TP
	TP nutrient	nutrient
		В.
All applicable response	А.	Nutrient Criteria Are Attained
indicators meet the	Nutrient Criteria Are Attained	Department may conduct a study to
values in Table 1		develop a site-specific TP value as
		described in section 4(B)
One or more of the	С.	
applicable response	Does Not Attain Nutrient Criteria	D.
indicators do not meet	Department may conduct a study to	Does Not Attain Nutrient Criteria
the values in Table 1	develop a site-specific value for a	
the values in Table 1	nutrient as described in section 4(C)	

A. Figure 1, A. Nutrient Criteria are Attained

(1)Nutrient criteria are attained if:

- (a) the seasonal geometric mean TP concentration is less than or equal to the applicable value in Table 1 or an established site-specific value;
- (b) the seasonal geometric mean concentration of a non-TP nutrient is less than or equal to the applicable site-specific value for a non-TP nutrient established in section 5; and
- (c) all applicable response indicators attain the values for the assigned class in Table 1.

B. Figure 1, **B.** Nutrient Criteria Are Attained

- (1) Nutrient criteria are attained if:
 - (a) the seasonal geometric mean TP concentration is greater than the applicable value in Table 1 or an established site-specific value AND/OR the seasonal geometric mean concentration of a non-TP nutrient is greater than the applicable site-specific value for a non-TP nutrient established in section 5; and
 - (b) all applicable response indicators attain the values for the assigned class in Table 1.
- (2) The Department may conduct or request further assessment of TP concentrations, other nutrients, and response indicators to determine if a site-specific TP value is warranted. The study may be initiated and paid for by the Department and/or another entity. Study plans must be approved by the Department in coordination with the U.S. Environmental Protection Agency and meet data requirements in section 4(E). If the Department determines that a sitespecific TP value is warranted, the Department will propose to amend this Chapter pursuant to section 5.
 - (a) Study to establish a site-specific TP value. The study must include TP and applicable response indicator data pursuant to Table 1, for at least one year during critical ambient conditions (e.g., below August median flow and warm temperatures). Unless otherwise specified by the Department, monitoring must occur between June 1 and September 30. Monitoring frequency should be at least monthly for TP and all applicable response indicators. The Department may require additional years of monitoring and may require additional habitat and water quality measurements, such as nitrogen concentrations. Any relevant data meeting the data requirements of section 4.E and collected within 5 years prior to initiation of the study must be considered in the study. The study must also evaluate the potential for adverse impact due to nutrient enrichment of downstream waterbodies or segments. The study may also investigate if mitigating factor(s) are present that limit algal and plant growth or chemically or physically bind phosphorus, so it is not readily available to plants and algae.
 - (b) Interpretation of study results.
 - (i) Does not attain response indicator values. The waterbody does not attain nutrient criteria (C or D in Figure 1) if the Department determines that data collected during the study do not meet one or more applicable response values in Table 1.
 - (ii) Site-specific TP value. If a seasonal geometric mean of TP concentrations in a waterbody exceeds the applicable Table 1 TP value, but the Department determines that the waterbody consistently attains all applicable response indicator values of the assigned class (*see* Table 1) during the study, then the waterbody attains nutrient criteria and the Department may propose to establish a site-specific TP value for the waterbody greater than the applicable value in Table 1, pursuant to section 5. Once established, the Department will substitute and use the site-specific TP value for decisions regarding attainment of nutrient criteria for that waterbody. The applicable TP value in Table 1 remains in effect until a new site-specific value is established. At

least one year of data obtained during critical ambient conditions (*e.g.*, below August median flow, warm temperatures) must be considered before the Department will propose to establish a new site-specific TP value. A site-specific TP value may not be greater than the geometric mean TP concentration measured in the study.

- (c) *Considerations for site-specific TP values.* The Department will consider the following factors when determining whether a site-specific TP value is appropriate and when deciding whether to propose to establish a site-specific TP value pursuant to section 5.
 - (i) The risk of any applicable response indicators not meeting applicable values. For example, the Department will consider whether a response indicator is already close to an applicable value and examine the ambient conditions with respect to applicable response indicators in previous years.
 - (ii) Natural environmental conditions mitigating the impact of phosphorus enrichment and the risk of those conditions changing. For example, natural limiting factors can reduce light availability (*e.g.*, shade, turbidity, water color), bind phosphorus (*e.g.*, clay, dissolved organic carbon, and aluminum hydroxide can make phosphorus unavailable for plant growth), or reduce habitat quality for algae (*e.g.*, fine substrate, high water velocity).
 - (iii)The risk of adversely affecting downstream waterbodies by establishing a sitespecific TP value greater than the applicable value in Table 1.
- (d) Qualification. The Department may propose to reduce an established site-specific TP value if the Department determines that environmental conditions or mitigating factors have changed and the established site-specific value is no longer sufficiently protective or appropriate based on the above considerations. An established site-specific value may be removed or replaced pursuant to section 5. The new site-specific TP value must be less than the established site-specific value. If a site-specific nutrient value is removed from section 5, the applicable value in Table 1 applies to that site.

C. Figure 1, C. Does Not Attain Nutrient Criteria

- (1) Nutrient criteria are not attained if:
 - (a) the seasonal geometric mean TP concentration is less than or equal to the applicable value in Table 1 or an established site-specific value;
 - (b) the geometric mean concentration of a non-TP nutrient is less than or equal to the applicable site-specific value for a non-TP nutrient established in section 5; and
 - (c) one or more response indicators do not attain the values for the assigned class in Table 1.
- (2) Also, nutrient criteria are not attained if:

- (a) one or more response indicators do not attain the values for the assigned class in Table 1; and
- (b) there is insufficient data to determine if the seasonal geometric mean TP concentration (or an applicable non-TP nutrient) is less than or equal to the values assigned in Table 1 or a site-specific value.
- (3) If the Department determines that a nutrient caused or contributed to non-attainment of nutrient criteria, then it may conduct a study like the study outlined in section 4(B)(2) to establish a site-specific value for such nutrient. The provisions of section 4(B)(2) would apply to the Department's assessment of and decision to propose to establish any such sitespecific nutrient value. If such a site-specific nutrient value is established pursuant to section 5, it would be included in the nutrient criteria for that waterbody to achieve attainment of water quality standards.

D. Figure 1, D. Does Not Attain Nutrient Criteria

- (1) Nutrient criteria are not attained if:
 - (a) the seasonal geometric mean TP concentration is greater than the applicable value from Table 1 or an established site-specific value, or the seasonal geometric mean concentration of a non-TP nutrient is greater than the applicable site-specific value for a non-TP nutrient established in section 5; and
 - (b) one or more response indicators in a waterbody do not attain the values for the assigned class in Table 1 OR there is insufficient data to determine that one or more of the response indicators in a waterbody attain the values of the assigned class in Tables 1.

NOTE: **Listing waterbodies that do not attain nutrient criteria** (identified in section 4(C) or 4(D) of this Chapter). The Department will follow the listing methodology in the biennial Integrated Water Quality Monitoring and Assessment Report (Federal Clean Water Act §§ 303(d), 305(b), and 314). The listing methodology is available for review during the public comment period for each report. When phosphorus enrichment is accompanied by another factor that contributes to non-attainment, the Department may list more than one cause of impairment.

E. Data requirements

(1) Responsibility for sampling. The Department, or its agents, generally conducts sampling for the purpose of making decisions on the attainment of designated uses or maintenance of existing uses. The Department may request or require an applicant for, or holder of, a waste discharge license, water quality certification, or other Department-issued license to conduct sampling of effluent and ambient conditions. The Department's request or requirement for monitoring and sampling may be based on the classification goal of the water, attainment status, existing water quality information, past performance of existing controls for point and nonpoint sources of pollution, the nature, magnitude, and variability of the activity relative to the affected water, or other factors at the discretion of the Department. Sampling must be performed by qualified persons based on considerations such as relevant education, training, and experience. Outside entities must submit sampling plans to the Department for review and acceptance by the Department before collecting data.

NOTE: **Data collection.** All data collection must follow protocols and quality assurance procedures approved by the Department.

- (2) Sampling. The Department will use best professional judgment to determine the amount of nutrient and response indicator data necessary to meet data quality objectives to make an attainment decision. The Department will, in its discretion, determine the appropriate number, timing, and frequency of samples required to evaluate attainment of the nutrient criteria for a particular waterbody by considering relevant factors and information, including without limitation, the type of waterbody being sampled, knowledge of past water quality, applicability of response indicators, and potential variation in response indicator values.
- (4) Data quality. The Department will evaluate the quality of data to ensure that data are representative of ambient conditions and are suitable for analysis. Data from outside sources may be used if the Department determines them to be of sufficient quantity and quality based on consideration of factors such as the training and expertise of the people that collected the data, standard operating procedures, quality assurance and quality control practices, and other documentation. The Department may require additional sampling if it determines that data from an outside source is insufficient.
- **5. Established site-specific nutrient values.** If the Department determines that a site-specific value for TP or another nutrient is warranted, the Department will propose to amend this Chapter to add the site-specific value to section 5 through agency rulemaking. The amended Chapter will be submitted to the U.S. Environmental Protection Agency (EPA) for approval. The amended Chapter will become effective and the site-specific nutrient value will be established, subsequent to EPA approval.

AUTHORITY:

38 M.R.S. §§ 341-D(1-C), 341-H, and 464(5)

APA EFFECTIVE DATE:

EFFECTIVE DATE: This rule will become effective upon the approval of the U.S. Environmental Protection Agency, pursuant to 40 CFR part pursuant to 40 CFR § 131.21.

Appendix 1

NOTE: Waterbodies classified as GPA or AA, A, B, or C

Waterbody	GPA ¹	AA, A,	Covered by
		B, or	Chapter
		C ²	583
Great ponds and natural lakes and ponds less than 10 acres in size.	Х		
Impoundments of rivers that are defined as great ponds pursuant to			
section 480-B are classified as GPA or as specifically provided in			
sections 467 and 468.			
Wetlands associated with Class GPA waters	X		
Streams and rivers (non-Class GPA fresh surface waters)		Х	Х
Wetlands associated with Class AA, A, B, or C streams, rivers, or		Х	Х
impoundments			
Class AA, A, B, or C wetlands that usually lack aboveground water		Х	
from June through September (e.g., fen, raised bog)			
1 28 M D S & 465 A			

¹ 38 M.R.S. § 465-A ² 38 M.R.S. § 465