

7050.0150 DETERMINATION OF WATER QUALITY, BIOLOGICAL AND PHYSICAL CONDITIONS, AND COMPLIANCE WITH STANDARDS.

Subpart 1. **Policy and scope.** The intent of the state is to protect and maintain surface waters in a condition which allows for the maintenance of all existing beneficial uses. The condition of a surface water body is determined by its physical, chemical, and biological qualities. The agency shall determine an exceedance of water quality standards or an impaired condition based on pollution of the waters of the state from point and nonpoint sources that has resulted in degradation of the physical, chemical, or biological qualities of the water body to the extent that attainable or previously existing beneficial uses are actually or potentially lost.

The narrative water quality standards in subpart 3 prescribe the qualities or properties of surface waters that are necessary for the protection of designated public uses and benefits. If the narrative standards in this part are exceeded, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses of the waters of the state.

Subparts 5 to 7 list factors the commissioner will use to determine if surface waters are in compliance with applicable narrative standards in subpart 3. Determination of compliance with the narrative standards will be made for individual water bodies on a case-by-case basis.

Subp. 2. **Other standards preserved.** The requirements of this part are in addition to the application of other narrative or numeric water quality standards in this chapter. If the requirements of this part conflict with any other narrative or numeric standard in this chapter, the more stringent standard applies.

Subp. 3. **Narrative standards.** For all Class 2 waters, the aquatic habitat, which includes the waters of the state and stream bed, shall not be degraded in any material manner, there shall be no material increase in undesirable slime growths or aquatic plants, including algae, nor shall there be any significant increase in harmful pesticide or other residues in the waters, sediments, and aquatic flora and fauna; the normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters.

Subp. 4. **Definitions.** For the purposes of this part, the following terms have the meanings given them.

A. "122-day ten-year low flow" or "122Q₁₀" means the lowest average 122-day flow with a once in ten-year recurrence interval. A 122Q₁₀ is derived using the same methods used to derive a 7Q₁₀, and the guidelines regarding period of record for flow

data and estimating a $7Q_{10}$ apply equally to determining a $122Q_{10}$, as described in part 7050.0130, subpart 3.

B. "Altered materially," "material increase," "material manner," "seriously impaired," and "significant increase," as used in subparts 3, 5, and 6, mean that pollution of the waters of the state has resulted in degradation of the physical, chemical, or biological qualities of the water body to the extent that attainable or previously existing beneficial uses are actually or potentially lost.

C. "Chlorophyll-a" means a pigment in green plants including algae. The concentration of chlorophyll-a, expressed in weight per unit volume of water, is a measurement of the abundance of algae.

D. "Ecoregion" means an area of relative homogeneity in ecological systems based on similar soils, land use, land surface form, and potential natural vegetation.

E. "Eutrophication" means the increased productivity of the biological community in water bodies in response to increased nutrient loading. Eutrophication is characterized by increased growth and abundance of algae and other aquatic plants, reduced water clarity, reduction or loss of dissolved oxygen, and other chemical and biological changes. The acceleration of eutrophication due to excess nutrient loading from human sources and activities, called cultural eutrophication, causes a degradation of lake quality and possible loss of beneficial uses.

F. "Fish and other biota" and "lower aquatic biota" mean the aquatic community including, but not limited to, game and nongame fish, minnows and other small fish, mollusks, insects, crustaceans and other invertebrates, submerged or emergent rooted vegetation, suspended or floating algae, substrate-attached algae, and microscopic organisms. "Other biota" includes aquatic or semiaquatic organisms that depend on aquatic systems for food or habitat such as amphibians and certain wildlife species.

G. "Hydraulic residence time" means the time water resides in a basin or, alternately, the time it would take to fill the basin if it were empty.

H. "Impaired water" or "impaired condition" means a water body that does not meet applicable water quality standards or fully support applicable beneficial uses, due in whole or in part to water pollution from point or nonpoint sources, or any combination thereof.

I. "Index of biological integrity" or "IBI" means an index developed by measuring attributes of an aquatic community that change in quantifiable and predictable ways in response to human disturbance, representing the health of that community.

J. "Lake" means an enclosed basin filled or partially filled with standing fresh water with a maximum depth greater than 15 feet. Lakes may have no inlet or outlet, an inlet or outlet, or both an inlet and outlet.

K. "Lake morphometry" means the physical characteristics of the lake basin that are reasonably necessary to determine the shape of a lake, such as maximum length and width, maximum and mean depth, area, volume, and shoreline configuration.

L. "Mixing status" means the frequency of complete mixing of the lake water from surface to bottom, which is determined by whether temperature gradients are established and maintained in the water column during the summer season.

M. "Measurable increase" or "measurable impact" means a change in trophic status that can be discerned above the normal variability in water quality data using a weight of evidence approach. The change in trophic status does not require a demonstration of statistical significance to be considered measurable. Mathematical models may be used as a tool in the data analysis to help predict changes in trophic status.

N. "Natural causes" means the multiplicity of factors that determine the physical, chemical, or biological conditions that would exist in a water body in the absence of measurable impacts from human activity or influence.

O. "Normal fishery" and "normally present" mean the fishery and other aquatic biota expected to be present in the water body in the absence of pollution of the water, consistent with any variability due to natural hydrological, substrate, habitat, or other physical and chemical characteristics. Expected presence is based on comparing the aquatic community in the water body of interest to the aquatic community in representative reference water bodies.

P. "Nuisance algae bloom" means an excessive population of algae that is characterized by obvious green or blue-green pigmentation in the water, floating mats of algae, reduced light transparency, aesthetic degradation, loss of recreational use, possible harm to the aquatic community, or possible toxicity to animals and humans. Algae blooms are measured through tests for chlorophyll-a, observations using a Secchi disk, and observations of impaired recreational and aesthetic conditions by the users of the water body, or any other reliable data that identifies the population of algae in an aquatic community.

Q. "Readily available and reliable data and information" means chemical, biological, and physical data and information determined by the commissioner to meet the quality assurance and quality control requirements in subpart 8, that are not more than ten years old from the time they are used for the assessment. A subset of data in the ten-year period, or data more than ten years old can be used if credible scientific evidence shows that these data are representative of current conditions.

R. "Reference water body" means a water body least impacted by point or nonpoint sources of pollution that is representative of water bodies in the same ecoregion

or watershed. Reference water bodies are used as a base for comparing the quality of similar water bodies in the same ecoregion or watershed.

S. "Reservoir" means a body of water in a natural or artificial basin or watercourse where the outlet or flow is artificially controlled by a structure such as a dam. Reservoirs are distinguished from river systems by having a hydraulic residence time of at least 14 days. For purposes of this item, residence time is determined using a flow equal to the $122Q_{10}$ for the months of June through September, a $122Q_{10}$ for the summer months.

T. "Secchi disk transparency" means the average water depth of the point where a weighted white or black and white disk disappears when viewed from the shaded side of a boat, and the point where it reappears upon raising it after it has been lowered beyond visibility. The Secchi disk measures water clarity and is usually used in lakes.

U. "Shallow lake" means an enclosed basin filled or partially filled with standing fresh water with a maximum depth of 15 feet or less or with 80 percent or more of the lake area shallow enough to support emergent and submerged rooted aquatic plants (the littoral zone). It is uncommon for shallow lakes to thermally stratify during the summer. The quality of shallow lakes will permit the propagation and maintenance of a healthy indigenous aquatic community and they will be suitable for boating and other forms of aquatic recreation for which they may be usable. For purposes of this chapter, shallow lakes are differentiated from wetlands and lakes on a case-by-case basis. Wetlands are defined in part 7050.0186, subpart 1a.

V. "Summer-average" means a representative average of concentrations or measurements of nutrient enrichment factors, taken over one summer growing season from June 1 through September 30.

W. "Transparency tube" means a graduated clear plastic tube, 24 inches or more in length by 1-1/2 inches in diameter, with a stopper at the bottom end, the inside surface of which is painted black and white. The tube is filled with water from a surface water; the water is released through a valve at the bottom end until the painted surface of the stopper is just visible through the water column when viewed from the top of the tube. The depth of water at the point of initial visibility is the transparency. The transparency tube measures water clarity and is usually used in rivers and streams.

X. "Trophic status or condition" means the productivity of a lake as measured by the phosphorus content, algae abundance, and depth of light penetration.

Y. "Water body" means a lake, reservoir, wetland, or a geographically defined portion of a river or stream.

Subp. 5. **Impairment of waters due to excess algae or plant growth.** In evaluating whether the narrative standards in subpart 3, which prohibit any material increase in undesirable slime growths or aquatic plants including algae, are being met, the

commissioner will use all readily available and reliable data and information for the following factors of use impairment:

- A. representative summer-average concentrations of total phosphorus and total nitrogen measured in the water body throughout the summer growing season;
- B. representative summer-average concentrations of chlorophyll-a measured in the water body throughout the summer growing season;
- C. representative measurements of light transparency in the water body, as measured with a Secchi disk in lakes or a transparency tube in rivers and streams, throughout the growing season; and
- D. any other scientifically objective, credible, and supportable factor.

A finding of an impaired condition must be supported by data showing elevated levels of nutrients in item A, and at least one factor showing impaired conditions resulting from nutrient over-enrichment in items B and C. The trophic status data described in items A to D must be assessed in light of the magnitude, duration, and frequency of nuisance algae blooms in the water body; and documented impaired recreational and aesthetic conditions observed by the users of the water body due to excess algae or plant growth, reduced transparency, or other deleterious conditions caused by nutrient over-enrichment.

Assessment of trophic status and the response of a given water body to nutrient enrichment will take into account the trophic status of reference water bodies; and all relevant factors that affect the trophic status of the given water body appropriate for its geographic region, such as the temperature, morphometry, hydraulic residence time, mixing status, watershed size, and location. The factors in this subpart apply to lakes, shallow lakes, and reservoirs and, where scientifically justified, to rivers, streams, and wetlands.

Subp. 6. **Impairment of biological community and aquatic habitat.** In evaluating whether the narrative standards in subpart 3, which prohibit serious impairment of the normal fisheries and lower aquatic biota upon which they are dependent and the use thereof, material alteration of the species composition, material degradation of stream beds, and the prevention or hindrance of the propagation and migration of fish and other biota normally present, are being met, the commissioner will consider all readily available and reliable data and information for the following factors of use impairment:

- A. an index of biological integrity calculated from measurements of attributes of the resident fish community, including measurements of:
 - (1) species diversity and composition;
 - (2) feeding and reproduction characteristics; and
 - (3) fish abundance and condition;

B. an index of biological integrity calculated from measurements of attributes of the resident aquatic invertebrate community, including measurements of:

- (1) species diversity and composition;
- (2) feeding characteristics; and
- (3) species abundance and condition;

C. an index of biological integrity calculated from measurements of attributes of the resident aquatic plant community, including measurements of:

- (1) species diversity and composition, including algae; and
- (2) species abundance and condition;

D. a quantitative or qualitative assessment of habitat quality, determined by an assessment of:

(1) stream morphological features that provide spawning, nursery, and refuge areas for fish and invertebrates;

(2) bottom substrate size and variety;

(3) variations in water depth;

(4) sinuosity of the stream course;

(5) physical or hydrological alterations of the stream bed including excessive sedimentation;

(6) types of land use in the watershed; and

(7) other scientifically accepted and valid factors of habitat quality; and

E. any other scientifically objective, credible, and supportable factors.

A finding of an impaired condition must be supported by data for the factors listed in at least one of items A to C. The biological quality of any given surface water body will be assessed by comparison to the biological conditions determined for a set of reference water bodies which best represents the most natural condition for that surface water body type within a geographic region.

Subp. 7. **Impairment of waters relating to fish for human consumption.** In evaluating whether the narrative standards in subpart 3, which prevent harmful pesticide or other residues in aquatic flora or fauna, are being met, the commissioner will use the residue levels in fish muscle tissue established by the Minnesota Department of Health to identify surface waters supporting fish for which the Minnesota Department of Health recommends a reduced frequency of fish consumption for the protection of public health. A water body will be considered impaired when the recommended consumption frequency is less than one meal per week, such as one meal per month, for any member of the

population. That is, a water body will not be considered impaired if the recommended consumption frequency is one meal per week, or any less restrictive recommendation such as two meals per week, for all members of the population. The impaired condition must be supported with measured data on the contaminant levels in the indigenous fish.

Subp. 8. **Determination of compliance.** In making tests or analyses of the waters of the state, sewage, industrial wastes, or other wastes to determine compliance with the standards and water quality condition, samples shall be collected in a manner and place, and of such type, number, and frequency as may be considered necessary by the agency from the viewpoint of adequately reflecting the condition of the waters, the composition of the effluents, and the effects of the pollutants upon the specified uses. The samples shall be collected, preserved, and analyzed following accepted quality control and quality assurance methods, and according to the procedures in Code of Federal Regulations, title 40, part 136. The agency may accept or may develop other methods, procedures, guidelines, or criteria for collecting and analyzing samples and measuring water quality characteristics. The commissioner will retain a record of all impairment decisions using the factors in this part, including all supporting data, for a minimum of eight years.

Statutory Authority: *MS s 115.03; 115.44; L 2005 1Sp1 art 2 s 151*

History: *9 SR 913; 15 SR 1057; 18 SR 2195; 27 SR 1217; 31 SR 1168; 32 SR 1699*

Published Electronically: *April 1, 2008*