

## Chapter NR 102

WATER QUALITY STANDARDS FOR  
WISCONSIN SURFACE WATERS

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**History:** Chapter NR 102 as it existed on September 30, 1973 was repealed and a new chapter NR 102 was created, effective October 1, 1973.

POLICY STATEMENT WITH REFERENCE TO  
CHAPTERS NR 102 TO NR 104

## Preamble

Water quality standards are statements of the characteristics of a water which must be maintained to make it suitable for specified uses. The standards, when applied to specific waters, such as a lake or stretch of river, are meaningful for achieving, maintaining or upgrading, and documenting the quality of the water. In addition to the water quality standards, other measures may be implemented to control pollution of surface waters.

The standards are based on available scientific knowledge and are the present goal. The ultimate goal shall be to permit use of all the water resources of the state for multiple purposes including aesthetic, agriculture, aquatic and wildlife, industry, potable water supply, hydro-power, navigation, and recreation.

It is the purpose of these rules to designate the uses for which the various waters of Wisconsin shall be maintained and protected; to prescribe the water quality required to sustain the designated uses; and to indicate methods to implement, achieve, and maintain the prescribed water quality. The department of natural resources will determine what must be done in each case to obtain the necessary water quality and the time schedule which may be set realistically to achieve it. As technology permits, classification of waters will be reevaluated to reflect these advances.

The Federal Water Pollution Control Act of 1965 required that each state adopt water quality criteria and a plan for applying them to interstate waters within the state. Standards for interstate waters were adopted and became effective on June 1, 1967.

Chapter 144, Stats., authorizes and directs the adopting of rules setting standards of water quality. It recognizes that different standards may be required for different waters or portions thereof. The intent is set forth: "... standards of quality shall be such as to protect the public interest, which includes the protection of the public health and welfare and the present and prospective future use of such waters for public and private water supplies, propagation of fish and aquatic life and wildlife, domestic and recreational purposes, and agricultural, commercial, industrial and other legitimate uses. In all cases where the potential uses of water are in conflict, water quality standards shall be interpreted to protect the general public interest." Standards for intrastate waters were adopted and became effective on September 1, 1968.

In establishing such standards, consideration has been given to their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other legitimate uses.

The objective of the Federal Water Pollution Control Act Amendments of 1972 is to restore and maintain the chemical, physical and biological integrity of the nation's waters. In order to achieve this objective, it is the national goal that the discharge of pollutants into navigable waters be eliminated by 1985. Furthermore, it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. The amendments further require the establishment of water quality standards for all waters consistent with the applicable requirements of the Act.

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Present and possible uses of interstate waters or sections therein have been determined with respect to: municipal, industrial, cooling, irrigation, wildlife and stock water supply; tolerant, facultative and intolerant fishery; whole and partial body contact; aesthetics, hydro-power, commercial shipping and waste assimilation. The standards and water use designations are subject to revisions as more data and information become available.

**Implementation**

Wisconsin legislation requires the formulating, periodic updating and carrying out of long-range comprehensive plans to guide the development, management, and protection of water resources. Statutes authorize issuance and adoption of rules with regard to available systems, and methods and means for preventing and abating water pollution. Penalties are provided for not complying with the law, rules, permits and orders. Assessments for fish damages and fines will continue to be used to curb discharges of deleterious substances and to handle intermittent pollution problems. A permit program in conformity with Section 402 (b) Federal Water Pollution Control Act Amendments of 1972 is being initiated, and when adopted will be used to implement effluent requirements and the water quality standards. Wisconsin has been systematically making pollution surveys and monitoring the surface water quality of all surface waters. Funds have been made available for this purpose.

State and federal financial assistance programs encourage municipalities to construct new or improved pollution prevention and abatement facilities. Legislation provides that industry may acquire land by condemnation for construction of waste disposal facilities. Tax laws permit writing off waste treatment plant construction costs in the year of expenditure and exemption of these facilities from real estate tax.

**NR 102.01 Definitions.** (1) "Mean tolerance level (TL<sub>m</sub>)" means the concentration of a substance at which there is a 50% mortality rate of bio-assay test organisms in a stated exposure time.

(2) "Mixing zone" means a region in which a discharge of different characteristics than the receiving water is in transit and progressively diluted from the source to the receiving system.

(3) "Natural conditions" means the normal daily and seasonal variations in climatic and atmospheric conditions, and the existing physical and chemical characteristics of a water or the course in which it flows.

(4) "Natural temperature" means the normal existing temperature of a surface water including daily and seasonal changes outside the zone of influence of any artificial inputs.

(5) "Resource management" means the application of control techniques to enhance or preserve a surface water in accordance with statutory provisions and in the general public interest.

(6) "Sanitary survey" means a thorough investigation and evaluation of a surface water including bacteriological sampling to determine the extent and cause of any bacterial contamination.

(7) "Surface waters" means all natural and artificial named and unnamed lakes and all naturally flowing streams within the boundaries of the state, but not including cooling lakes, farm ponds and facilities constructed for the treatment of wastewaters (the term waters as used in this chapter means surface waters).

(8) "Unauthorized concentrations of substances" means pollutants or other chemicals introduced into surface waters without prior permit or knowledge of the department, but not including accidental or unintentional spills.

(9) "Best practicable control technology" means that level of treatment established by the department under s. 147.04 (2)

(a), Stats., for categories and classes of point sources to be achieved by not later than July 1, 1977.

(10) "Best available control technology" means that level of treatment established by the department under s. 147.04 (2) (b) 1., Stats., for categories and classes of point sources to be achieved by not later than July 1, 1983.

**History:** Cr. Register, September, 1973, No. 213, eff. 10-1-73.

**NR 102.02 Categories of standards.** (1) **GENERAL.** To preserve and enhance the quality of waters, standards are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all waters including the mixing zone and the effluent channel meet the following conditions at all times and under all flow conditions:

(a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.

(b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.

(c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.

(d) Substances in concentrations or combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

(2) **REVISED STANDARDS.** It should be recognized that these standards will be revised as new information or advancing technology indicate that revisions are in the public interest. Water used for hydropower and commercial shipping depends mainly on quantity, depth and elevation; consequently, no specific quality standards for these uses have been prepared.

(3) **STANDARDS FOR FISH AND AQUATIC LIFE.** Except for natural conditions, all waters classified for fish and aquatic life shall meet the following criteria:

(a) **Dissolved oxygen:** Except for waters classified as trout streams in Wisconsin Trout Streams, Publication 213-72, the dissolved oxygen content in surface waters shall not be lowered to less than 5 mg/l at any time.

(b) **Temperature:** 1. There shall be no temperature changes that may adversely affect aquatic life.

2. Natural daily and seasonal temperature fluctuations shall be maintained.

3. The maximum temperature rise at the edge of the mixing zone above the existing natural temperature shall not exceed 5° F for streams and 3° F for lakes.



4. The temperature shall not exceed 89° F for warm water fish.

(c) pH: The pH shall be within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.

(d) Unauthorized concentrations of substances are not permitted that alone or in combination with other materials present are toxic to fish or other aquatic life. The determination of the toxicity of a substance shall be based upon the available scientific data base. References to be used in determining the toxicity of a substance shall include, but not be limited to:

1. "Quality Criteria for Water". EPA-440/9-76-003. United States Environmental Protection Agency, Washington, D. C., 1976, and

2. "Water Quality Criteria 1972". EPA-R3-73-033. National Academy of Sciences, National Academy of Engineering. United States Government Printing Office, Washington, D.C., 1974.

3. Questions concerning the permissible levels, or changes in the same, of a substance, or combination of substances, of undefined toxicity to fish and other biota shall be resolved in accordance with the methods specified in "Water Quality Criteria 1972", "Standard Methods for the Examination of Water and Wastewater", 14th Edition, 1975 (American Public Health Association, New York) or other methods approved by the department of natural resources.

(e) Streams classified as trout waters by the department of natural resources (Wisconsin Trout Streams, Publication 213-72) shall not be altered from natural background by effluents that influence the stream environment to such an extent that trout populations are adversely affected.

1. There shall be no significant artificial increases in temperature where natural trout reproduction is to be protected.

2. Dissolved oxygen in classified trout streams shall not be artificially lowered to less than 6.0 mg/1 at any time, nor shall the dissolved oxygen be lowered to less 7.0 mg/1 during the spawning season.

3. The dissolved oxygen in great lakes tributaries used by stocked salmonids for spawning runs shall not be lowered below natural background during the period of habitation.

(4) STANDARDS FOR RECREATIONAL USE. A sanitary survey and/or evaluation to assure protection from fecal contamination is the chief criterion in determining the suitability of a surface water for recreational use. In addition, the following bacteriological guidelines are set forth:

(a) The membrane filter fecal coliform count shall not exceed 200 per 100 ml as geometric mean based on not less than 5 samples per month, nor exceed 400 per 100 ml in more than 10% of all samples during any month.

(5) STANDARDS FOR PUBLIC WATER SUPPLY. In addition to the standards for fish and aquatic life and recreational use, waters used as a public water supply shall meet the following criteria at sites where water is withdrawn for treatment and distribution as a potable water:



(a) Dissolved solids. Not to exceed 500 mg/1 as a monthly average value, nor exceed 750 mg/1 at any time.

(b) The intake water supply will be such that by appropriate treatment and adequate safeguards it will meet the Public Health Service Drinking Water Standards 1962.

Note: Copies of Public Health Service Drinking Water Standards. 1962 are available for inspection at the office of the department of natural resources, secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

(c) Concentrations of other constituents must not be hazardous to health.

History: Cr. Register, September, 1973, No. 213, eff. 10-1-73; am. (3), Register, December, 1977, No. 264, eff. 1-1-78.

**NR 102.03 Guidelines for application of standards. (1) INTERPRETATION.** It is the goal of the department of natural resources that, wherever attainable, surface waters in Wisconsin shall provide for the protection and propagation of fish and aquatic life and provide for recreational uses in and on the water by July 1, 1983. The surface water quality criteria and use classifications set forth herein are the standards to be achieved by July 1, 1977. In those cases where the water quality currently conforms to the criteria set forth in this chapter, such waters shall be maintained at that or a higher quality. In those cases where the criteria are not currently being met, because of inadequate waste treatment or insufficient stream flow, waste control measures must be employed to satisfy the criteria in accordance with the stated objectives. This includes treatment better than best practicable control technology where required to meet the criteria. At this time, variances are provided from the surface water quality criteria where existing conditions (natural background, combined sewers, sludge banks, insufficient stream flow, etc.) are such that the criteria may not be met by applying technology beyond best practicable treatment. It is anticipated that the application of best available control technology will achieve the 1983 water quality goals of the department in all surface waters. If the 1983 water quality goal cannot be achieved by the application of the best available control technology, more stringent control measures may be required to attain and maintain the stated criteria without variance. However, if it is determined that there is no reasonable relationship between the economic and social cost of achieving such limitations, including any economic and social dislocation in any affected community or communities, and the social and economic benefits to be obtained by achieving such water quality, variances from the 1983 water quality criteria goal shall be provided.

(2) **ANTIDegradation.** No waters of the state shall be lowered in quality unless it has been affirmatively demonstrated to the department that such a change is justified as a result of necessary economic and social development, provided that no new or increased effluent interferes with or becomes injurious to any assigned uses made of or presently possible in such waters.

(3) **Streamflow.** Water quality standards will not be maintained under all natural occurrences of flow, temperature or other water quality characteristics. The design of water quality related effluent limitations or other management practices shall be based upon:

(a) The average minimum 7-day low streamflow which occurs once in 10 years (7-day  $Q_{10}$ ); or,

(b) In the case of dissolved oxygen and wherever sufficient data on streamflow and temperature are available, by application of a 0.274% level of nonattainment. This is equivalent to an expected nonattainment of the dissolved oxygen criterion of one day per year.

(4) MIXING ZONES. Water quality standards must be met at every point outside of a mixing zone. The size of the mixing zone cannot be uniformly prescribed, but shall be based on such factors as effluent quality and quantity, available dilution, temperature, current, type of outfall, channel configuration and restrictions to fish movement. As a guide to the delineation of a mixing zone, the following shall be taken into consideration:

(a) Limiting mixing zones to as small an area as practicable, and conforming to the time exposure responses of aquatic life.

(b) Providing passageways in rivers for fish and other mobile aquatic organisms.

(c) Where possible, mixing zones being no larger than 25% of the cross-sectional area or volume of flow of the stream and not extending more than 50% of the width.

(d) For contaminants other than heat, the 96-hour  $TLM$  to indigenous fish and fish food organisms not being exceeded at any point in the mixing zone.

(e) Mixing zones not exceeding 10% of a lake's total surface area.

(f) Mixing zones not interfering with spawning or nursery areas, migratory routes, nor mouths of tributary streams.

(g) Mixing zones not overlapping, but where they do, taking measures to prevent adverse synergistic effects.

(h) Restricting the pH to values greater than 4.0 s.u. and to values less than 11.0 s.u. at any point in the mixing zone for the protection of indigenous fish and fish food organisms.

(5) EXEMPTIONS. The thermal mixing zone provisions of this chapter are not applicable to municipal waste and water treatment plants, to vessels, or to discharges to enclosed harbors.

(6) RESOURCE MANAGEMENT EXEMPTIONS. Application of chemicals for water resource management purposes in accordance with statutory provisions is not subject to the requirements of the standards except in case of water used for public water supply.

(7) ANALYTICAL PROCEDURES. Methods of sample preservation and analysis shall conform with "Standard Methods for the Examination of Water and Wastewater", 13th Edition, 1971, prepared and edited by the American Public Health Association, American Waterworks Association and Water Pollution Control Federation, or by other methods acceptable to the department of natural resources and not contrary to the requirements of the federal government. The criteria in the Radiation Pro-

tection Code, s. HSS157.15 Wis. Adm. Code shall apply to the disposal and permissible concentrations of radioactive substances.

Note: Copies of the above publications are available for inspection at the office of the department of natural resources, secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from American Public Health Association, Inc., 1790 Broadway, New York, N.Y. 10019.

History: Cr. Register, September, 1973, No. 213, eff. 10-1-73; renum. (5) and (6) to be (6) and (7), cr. (5), Register, July, 1975, No. 235, eff. 8-1-75; r. and recr. (3), Register, August, 1981, No. 308, eff. 9-1-81; correction in (7) made under s. 13.93 (2m) (b) 7, Stats., cr. (4) (h), Register, September, 1984, No. 345, eff. 10-1-84.

**NR 102.04 Enforcement.** Financial assistance, industrial incentives, increased surveillance, orders, and permits will be means used to achieve and maintain the adopted water quality standards. Reasonable time schedules to comply with orders and permit conditions depend on the circumstances. All municipal sewage treatment plants shall provide a minimum of secondary treatment and effluent disinfection. Communities with a population of 2,500 and over in the Lakes Michigan and Superior basins shall achieve an 85% reduction of phosphorus on an annual basis, and there shall be a commensurate removal from industrial wastes containing more than 2 mg/l of total phosphorus and having an annual phosphorus discharge greater than 8,750 pounds. Any wastewater discharger—regardless of population, volume or type of waste discharge, or geographic location—may be required to remove excess amounts of phosphorus where such discharges are causing overfertilization of surface waters. A permit program is being initiated in accordance with the Federal Water Pollution Control Act Amendments of 1972 regarding treatment and monitoring requirements for waste discharges to waters of the state. All industrial plants discharging wastes to surface waters are required to provide, as a minimum, an effluent quality established in accordance with the Federal Water Pollution Control Act Amendments of 1972.

**History:** Cr. Register, July, 1975, No. 235, eff. 8-1-75.

**NR 102.05 Lake Michigan and Lake Superior thermal standards.** For Lake Michigan and Lake Superior the following thermal standards are established so as to minimize effects on the aquatic biota in the receiving waters.

(1) (a) Thermal discharges shall not raise the receiving water temperature more than 3°F above the existing natural temperature at the boundary of mixing zones established in paragraphs (b) and (c).

(b) 1. The mixing zone for a shoreline thermal discharge shall be the area included within the perimeter of a rectangular figure extending 1,250 feet in both directions along the shoreline from the outfall and 1,250 feet into the lake.

2. The mixing zone for an offshore thermal discharge shall be the area within a 1,000-foot radius circle with its center at the point of discharge.

(c) The department may, upon request from the owner of a source of thermal discharge, adjust the boundaries of the mixing zone established in paragraph (b) for that source. In no case may any mixing zone so established include an area greater than 72 acres nor may it include more than 2,800 feet of shoreline.

(2) In addition to the limitation set forth in subsection (1), but excepting the Milwaukee Harbor, Port Washington Harbor and the mouth of the Fox River, thermal discharges to Lake Michigan shall not raise the temperature of the receiving waters at the boundary of the established mixing zone above the following limits:

January-----	45°F	June-----	70°
February-----	45°	July-----	80°
March-----	45°	August-----	80°
April-----	55°	September-----	80°
May-----	60°	October-----	65°



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November ----- 60°      December ----- 50°

**History:** Cr. Register, September, 1973, No. 213, eff. 10-1-73; r. and recr. Register, July, 1975, No. 235, eff. 8-1-75.

**NR 102.06 Mississippi river thermal standards.** In addition to the standards for fish and aquatic life, the monthly average of the maximum daily temperature in the Mississippi river outside the mixing zone shall not exceed the following limits:

January-----	40°F	July-----	84°
February-----	40°	August-----	84°
March-----	54°	September-----	82°
April-----	65°	October-----	73°
May-----	75°	November-----	58°
June-----	84°	December-----	48°

**History:** Cr. Register, July, 1975, No. 235, eff. 8-1-75.

**NR 102.07 Review of thermal standards.** (1) Whenever the owner of any source of thermal discharges that existed on or before July 31, 1975, in compliance with department guidelines and after opportunity for public hearing, can demonstrate to the satisfaction of the department that the mixing zone established pursuant to this chapter is more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the receiving water, the department may:

(a) Impose a mixing zone with respect to such thermal discharge that will assure the protection and propagation of such a population, or

(b) Exempt such thermal discharge from the thermal requirements of this chapter provided this exemption will not endanger the propagation of such a population.

(2) Any owner desiring a review pursuant to NR 102.07 (1) shall submit a demonstration to the department no later than June 30, 1976. The department shall reach a decision no later than December 31, 1976.

(3) In the event the owner fails to make a satisfactory demonstration pursuant to NR 102.07 (1), the department shall establish a compliance date for the thermal component to be achieved no later than July 1, 1979.

(4) Whenever the owner of any source of thermal discharges that commenced on or after August 1, 1975, in compliance with department guidelines and after opportunity for public hearing, can demonstrate to the satisfaction of the department that the mixing zone established pursuant to this chapter is more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the receiving water, the department may:

(a) Impose a mixing zone with respect to such thermal discharge that will assure the protection and propagation of such a population, or

(b) Exempt such thermal discharge from the thermal requirements of this chapter provided this exemption will not endanger the propagation of such a population.



(5) In the event an owner fails to make a satisfactory demonstration pursuant to NR 102.07 (4), the discharge shall be in compliance with the thermal requirements of this chapter upon commencement of the discharge.

(6) The department may require the reduction of thermal discharges or the size and configuration of a mixing zone if it finds that environmental damage is imminent or existent.

**History:** Cr. Register, July, 1975, No. 235, eff. 8-1-75; am. Register, February, 1977, No. 254, eff. 3-1-77.

