

**Lac du Flambeau Water Quality Standards  
January 2015**

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## **\*\* Lac du Flambeau Water Quality Standards**

### ***100. Purpose and Need.***

- A. The purpose of these water quality standards is to protect, conserve, and enhance the water resources of the Lac du Flambeau Indian Reservation (“Reservation”) for the health and welfare of present and future generations. In order to accomplish this, the Lac du Flambeau Band of Lake Superior Chippewa Indians (“Tribe”) must prescribe minimum water quality requirements for waters located within the Reservation that will, among other things, ensure compliance with sections 303 and 518 of the Clean Water Act and are consistent with provisions of 40 CFR 130.3 and 40 CFR 131.
- B. The Reservation was established and defined pursuant to the *Treaty of 1854 between the United States and the Chippewa Indians of Lake Superior and the Mississippi*, dated September 30, 1854 (10 Stat. 1109). The water resources of the Reservation represent a unique resource that can best be managed by the Tribe. Water quality standards are necessary in order to define and protect a broad range of significant uses, including uses that are specific to protect both the Tribe’s cultural heritage and the unique features of the Reservation environment.

### ***101. Territory Covered.***

The provisions of these water quality standards shall apply to all surface waters within the exterior boundaries of the Reservation. The land description is as follows: Beginning at the section corner common to sections 4 & 5, T. 41 N., R. 6 E., & sections 32 & 33, T. 42 N. R. 6 E. 4th P.M.; thence west on the township a distance of twelve miles to the NW corner of section 4, T. 41 N., R. 4 E., thence south one mile; thence east one mile; thence south one mile; thence west one mile; thence south four miles to the SW corner of section 33, T. 41 N., R. 4 E.; thence east on the township line to the NW corner of section 3, T. 40 N., R. 4 E.; thence six miles more or less to the SW corner of section 34, T. 40 N., R. 4 E.; thence east on the township line nine miles to the NW corner of section 6, T. 39 N., R. 6 E.; thence south to the SW corner of said section 6; thence east two miles to the SE corner of section 5, T. 39 N., R. 6 E.; thence north to the SE corner of section 32, T. 40 N., R. 6 E.; thence continuing north a distance of six miles more or less to the township line; thence west one quarter mile more or less to the SE corner of section 32, T. 41 N., R. 6 E.; thence due north to the point of beginning.

### ***102. Applicability, Administration, and Amendment of Water Quality Standards.***

- A. The Lac du Flambeau Water Quality Standards are applicable to all waters within the exterior boundaries of the Reservation, located in the counties of Vilas, Iron, and Oneida, in the State of Wisconsin.
- B. The Water Quality Standards represent water quality goals and, among other things, shall be used for establishing any water quality based effluent limitations for any activity requiring a

permit under the Clean Water Act (33 U.S.C. 1251 et seq.) that may result in a point source discharge into any of the waters on the Reservation.

- C. Changes and revisions to this document including amendments to these standards shall proceed in the following manner:
- (1) Review to these standards shall, at a minimum, be conducted once every three years.
  - (2) Proposed modifications shall be made public and a public hearing shall be conducted.
  - (3) The proposed modifications, after public review and hearings, must be approved via resolution by the Lac du Flambeau Tribal Council.
  - (4) Any modification(s), once approved by Tribal Council, will be submitted to the U.S. EPA for approval.

### ***103. Definitions.***

- A. “Acute toxicity” means the ability of a substance to cause severe biological harm or death after a single exposure or dose. Also, any poisonous effect resulting from a single short-term exposure to a toxic substance.
- B. “Ammonia” is un-ionized  $\text{NH}_3$ , and ionized  $\text{NH}_4$
- C. “Antidegradation Demonstration” means a demonstration, by any entity seeking to lower water quality in high quality waters, that they have considered pollution prevention alternatives, enhanced treatment analysis, important social or economic development analysis, and special provisions for remedial actions.
- D. “Assimilative Capacity” is the increment of water quality (in terms of concentration), during the appropriate critical conditions(s), that is better than the applicable numeric criterion.”
- E. “Averaging period” is the period of time over which the receiving water concentration is averaged for comparison with criteria concentrations. This specification limits the duration of concentrations above the criteria.
- F. “Background conditions” means the biological, chemical, and physical conditions of a water body, upstream from the discharge under consideration or natural conditions estimated from reference sites.
- G. “Best Management Practices” means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the Reservation. BMPs also include but are not limited to treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or wastewater disposal, or drainage from raw material storage.
- H. “Bioaccumulation” is the net accumulation of a substance by an organism as a result of uptake from all environmental sources.
- I. “Bioaccumulative chemicals of concern (BCCs)” means any chemical that has the potential to cause adverse effects after release to surface waters due to bioaccumulation in aquatic organisms (the bioaccumulation factor must be greater than 1000, after considering metabolism and other physicochemical properties).

- J. “Biological integrity” is the condition of the aquatic community inhabiting unimpaired water bodies of a specified habitat as measured by community structure and function
- K. “Carcinogenic” means a substance that causes an increased incidence of benign or malignant neoplasms, or substantially decreases the time to develop neoplasms, in animals or humans.
- L. “Chronic toxicity” means the capacity of a substance to cause long-term poisonous health effects in humans, animals, fish and other organisms.
- M. “Council” or “Tribal Council” means the Lac du Flambeau Tribal Council.
- N. “Criteria” are elements of the tribe's water quality standards expressed as constituent concentrations, levels, or narrative statements, representing a quality of water necessary to support a particular use.
- O. “Criteria continuous concentration” (CCC) is the EPA national water quality criteria recommendation for the highest concentration of a toxicant or an effluent to which aquatic community can be exposed indefinitely without causing unacceptable effect.
- P. “Criteria maximum concentration” (CMC) is the EPA national water quality criteria recommendation for the highest concentration of a toxicant or an effluent to which an aquatic community can be exposed for a brief period of time without causing an acute effect.
- Q. “Critical resource area” means an area that encompasses or supports critical resources such as wild rice, Walleye/Trout/Sturgeon spawning habitat, cultural sites, or endangered/threatened species.
- R. “Department” or “Tribal Natural Resource Department” means the Lac du Flambeau Tribal Natural Resource Department.
- S. “Designated uses” are those uses specified in these water quality standards for each water body or segment, whether or not they are being attained.
- T. “Effluent limitation” means any restriction imposed by the Department or other permitting agency on quantities, discharge rates, and concentrations of “pollutants” as a condition for permitting a discharge to a surface water.
- U. “Epilimnion” (noun), “Epilimnetic” (adjective) means that region of a body of water that extends from the surface to the thermocline and can be influenced by the wind. In a body of water that does not exhibit stratification, epilimnetic conditions may be present throughout the entire water column.
- V. “Exceptional Tribal Resource Water” means a waterbody designated by the Tribe as receiving a high level of protection against degradation of water quality because it has a high level of cultural, recreational or ecological significance.
- W. “Existing uses” are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.
- X. “Federal Permit” means any permit required by the federal government under the Clean Water Act.
- Y. “Hypolimnion” means the deepest zone in a thermally stratified body of water. It is fairly uniform in temperature.
- Z. “Maximum Contaminant Level (MCL)” means highest level of a contaminant that is allowed in drinking water under the Safe Drinking Water Act. MCLs are set as close to the Maximum Containment Level Goals (MCLG) as feasible using the best available analytical and treatment technologies and taking cost into consideration. MCLs are enforceable standards.

- AA. “Mixing zone” means a limited area or volume of water where initial dilution of a discharge takes place; and where chronic numeric water quality criteria (determined from a suitable reference site) can be exceeded but acutely toxic conditions are prevented from occurring.
- BB. “Natural” means water quality/quantity present prior to human produced influences such as point source pollution. Reference conditions or paleoecology studies are used to determine water quality and quantity of natural conditions.
- CC. “NH<sub>3</sub>-N” or “Ammonia” means total Ammonia (ionized and un-ionized forms). If Ammonia value is entirely ionized or entirely un-ionized, it will be specified as such.
- DD. “Non-Thermal Discharge” means effluent with a temperature the same as the temperature of the receiving water.
- EE. “No Observable Adverse Effect Level (NOAEL)”: An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control; some effects may be produced at this level, but they are not considered as adverse, or as precursors to adverse effects. In an experiment with several NOAELs, the regulatory focus is primarily on the highest one, leading to the common usage of the term NOAEL as the highest exposure without adverse effects.
- FF. “Ordinary High Water Mark” means the highest point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, presence of aquatic vegetation, or other easily recognized characteristic.
- GG. “Outstanding Tribal Resource Water” means a waterbody designated by the Tribe as receiving the highest level of protection because it has the highest level of cultural, recreational or ecological significance. Generally, the water quality of an Outstanding Tribal Resource Water has not been significantly modified by human activities.
- HH. “Paleoecology” means the application of ecological concepts to fossil and sedimentary evidence to study the interactions of Earth surface, atmosphere, and biosphere in former times.
- II. “pH” means the negative logarithm of the hydrogen ion concentration.
- JJ. “Pollution” means man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water.
- KK. “Point source” means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.
- LL. “Primary contact recreation” means activities where a person would have direct contact with water to the point of complete submergence, including but not limited to skin diving, swimming, and water skiing.
- MM. “Reservation” means the Lac du Flambeau Indian Reservation of Lac du Flambeau Band of Lake Superior Chippewa Indians.
- NN. “Reference conditions” describes the characteristics of water body segments least impaired by human activities. Reference conditions can be used to describe attainable biological or habitat conditions for water body segments with common watershed/catchment characteristics within defined geographical regions.

- OO. “Secondary contact recreation” means activities where a person's skin may come into direct contact with the water, but generally without complete submergence. Examples include wading or fishing.
- PP. “Surface water” means all waters of the Reservation under the Clean Water Act which are above the surface of the ground including but not limited to lakes, ponds, streams, rivers, springs, and wetlands.
- QQ. “Temperature” means water temperature expressed in degrees Centigrade (C).
- RR. “Thermal Discharge” means any discharge that varies in temperature from the natural temperature conditions found in the waterbody at the time said waterbody is receiving the discharge.
- SS. “Thermocline” means that region in a thermally stratified body of water in which the drop in temperature equals or exceeds 1° C per meter. This is also called the Metalimnion.
- TT. “TKN” Total Kjeldahl nitrogen is the sum of free-ammonia and organic nitrogen compounds
- UU. “Tribal waters,” “Reservation Waters,” or “Waters of the Reservation” means all surface waters within the exterior boundaries of the Reservation.
- VV. “Tribe” means the Lac du Flambeau Band of Lake Superior Chippewa Indians.
- WW. “Turbidity” means the clarity of water expressed as Nephelometric turbidity units (NTU) and measured with a calibrated turbidimeter.
- XX. -“Use Attainability Analysis (UAA)” is a structured scientific assessment of the factors affecting the attainment of uses specified in section 104. The factors to be considered in such an analysis include the physical, chemical, biological, and economic use removal criteria described in EPA's water quality standards regulation (40 CFR 131.10(g)(1)-(6)). Under 40 CFR 131.10(g) tribes may remove a designated use which is not an existing use, as defined in § 131.3, or establish sub-categories of a use if the Tribe can demonstrate that attaining the designated use is not feasible because:
- Naturally occurring pollutant concentrations prevent the attainment of the use; or
  - Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
  - Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
  - Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
  - Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
  - Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.
- YY. -“Water Quality-Based Effluent Limit (WQBEL)” is a value determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g. aquatic life, human health, and wildlife) for a specific point source to a specific receiving water for a given pollutant.

- ZZ. “Wetlands” means waters of the Reservation under the Clean Water Act that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to, swamps, marshes, and bogs.

#### ***104. Designated Uses.***

The following are designated uses that apply to the various surface waters on the Reservation (Table I lists water bodies and their designated uses; all unnamed waters are protected at a minimum designated use for Fish and Aquatic Life and Water Contact):

- A. *The waters of the Reservation (excluding wetlands) shall be classified as falling into one or more of the following use categories:*
- (1) *Fish and Aquatic Life.* Water quality necessary to support a balanced aquatic life community, and to protect gathering of aquatic resources for food, medicinal, or crafting purposes.
  - (2) *Water Contact.* Supports primary contact (submergence or probable ingestion) and secondary contact (skin in direct contact but not to the point of submergence or ingestion), for the protection of recreation, ceremonies, and cultural activities.
  - (3) *Wildlife Protection.* Water quality necessary to support the propagation and maintenance of wildlife that utilize aquatic resources as a food source.
  - (4) *Wild Rice.* Supporting wild rice habitat for sustainable growth and consumption.
  - (5) *Water Supply.* Supports the use of water for industrial, agricultural, or aquacultural purposes.
  - (6) *Drinking Water Supply.* Supports water for potable use.
  - (7) *Cool Water Fishery.* Supports the existence of cool-water fishery communities.
  - (8) *Cold Water Fishery.* Supports the existence of cold-water fishery communities.
  - (9) *Navigation.* Supports the movement of water craft.

At the boundary between surface waters of different designated uses, the water quality criteria necessary to protect the more sensitive use or uses shall apply.

- B. *Designated Uses that apply to wetlands:*

- (1) *Fish and Aquatic Life.* Water quality necessary to support a balanced aquatic life community, and to protect the gathering of aquatic resources for food, medicinal, or crafting purposes.
- (2) *Water Contact.* Secondary contact (skin in direct contact but not to the point of submergence or ingestion), for the protection of recreation, ceremonies, and cultural activities.
- (3) *Wildlife Protection.* Water quality necessary to support the propagation and maintenance of wildlife that utilize aquatic resources as a food source.
- (4) *Wild Rice.* Supporting wild rice habitat for sustainable growth and consumption.

(5) *Water Supply*. Supports the use of water for industrial, agricultural, or aquacultural purposes.

At the boundary between wetlands of different designated uses, the water quality criteria necessary to protect the more sensitive use or uses shall apply.

### ***105. Criteria.***

The following are narrative and numeric criteria that apply to any action or activity subject to the Clean Water Act that affects the surface waters on the Reservation:

All narrative standards will be implemented using methodologies and procedures acceptable under 40 CFR Part 131.

#### ***A. General Water Quality Criteria.***

All Reservation waters (including wetlands), except as otherwise noted, shall be free from pollutants that cause or contribute to the conditions described below:

- (1) Substances dispersed in Reservation waters causing objectionable deposits on the shore or in the bed of a waterbody in such amounts as to interfere with designated uses or existing uses on waters of the Reservation.
- (2) Floating or submerged debris, oil, scum or other substance in such amounts as to interfere with designated uses and existing uses on waters of the Reservation.
- (3) Substances producing color, odor, taste or unsightliness in such amounts as to interfere with designated uses and existing uses on waters of the Reservation.
- (4) Toxic substances shall not be present in concentrations that are toxic or harmful to human, animal, plant or aquatic life, or in quantities that interfere with the normal propagation, growth and survival of the sensitive indigenous aquatic biota (limited exceptions may be granted to these prohibited conditions but then only within designated mixing zones). For toxic substances lacking published criteria, Bioassay data for sensitive indigenous test species/life stages may be used to determine compliance with this narrative standard.
- (5) Water quality that limits the growth and propagation of native vegetation.
- (6) Toxic, radioactive (except those regulated under the atomic energy act (AEA) of 1954, as amended (42 U.S.C. 2011 et seq.), nonconventional, or deleterious material concentrations that have public health significance, or that may cause acute or chronic toxic conditions to the aquatic biota, or that may adversely affect designated uses.
- (7) Conditions that produce undesirable or nuisance aquatic life.



*B. Additional General Water Quality Criteria.*

(1) Bacteriological Criteria protect waters for human contact. Water contact use is divided into two subcategories (Primary and Secondary) based upon frequency of use. The following bacteria criteria apply to each subcategory: –

(a) For lakes and rivers that are used for swimming or submergence bacteriological density shall not exceed a monthly geometric mean of 126 *Escherichia coli* per 100 ml, or a single sample maximum of 235 cfu *Escherichia coli* /100 ml.

(b) Intermittent streams and streams surrounded by sedge meadows, shallow lakes surrounded by floating sedge and peat mats, wetlands and bogs that are infrequently used for swimming or submergence due to highly stained waters, extensive vegetation, and deep mucky substrates that create dangerous conditions for swimming; for these waters the bacteriological density shall not exceed a monthly geometric mean of 206 cfu *Escherichia coli* per 100 ml, or a single sample maximum of 940 cfu *Escherichia coli* /100 ml.

(2) Dissolved oxygen--Dissolved oxygen shall not be less than 5.0 mg/L for lakes and rivers. Waters exhibiting stratification may have oxygen levels below 5.0 mg/L in the thermocline and hypolimnion. In waters that have been determined to have a Cold Water Fishery Use, the dissolved oxygen shall not be less than 8 mg/L when and where early life stages of cold water fish occur.

(3) Temperature--No measurable variation from natural conditions described by data collected by the Tribe from reference conditions-except within a mixing zone. In no case will human-introduced heat be permitted when the maximum temperature specified for the water body (66 degrees Fahrenheit for cold water fisheries and 82 degrees Fahrenheit for cool water fisheries) would thereby be exceeded.

(4) pH-- No measurable variation from natural conditions described by data collected by the Tribe from reference conditions-except within a mixing zone.

*C. Biological Criteria.*

(1) All waters of the Reservation shall maintain a natural diverse biological community; therefore aquatic life shall be as it naturally occurs.

(2) The overall biological community may not be adversely affected by the discharge of water for industrial, municipal, or agricultural purposes, or by the discharge of pollutants to the water.

(3) Natural hydrological conditions necessary to support the biological and physical characteristics naturally present in wetlands shall be protected to prevent significant adverse impacts on.

(A) Water currents, erosion or sedimentation patterns;

- (B) Natural water temperature variations;
- (C) The chemical, nutrient and dissolved oxygen regime of the wetland;
- (D) The normal movement of aquatic fauna;
- (E) The pH of the wetland; and
- (F) Normal water levels or elevations.

*D. Water Quality Criteria for the protection of Wildlife.*

(1) Pollutants shall not be found in Reservation waters at or exceeding concentrations that result in adverse effects to the Reservation's wildlife populations.

(2) The following numeric wildlife criteria shall not be exceeded in Reservation waters:

<u>Substance</u>	<u>Criteria</u>
DDT & Metabolites	1.1 E-5 µg/L
Mercury	1.3 E-3 µg/L
Polychlorinated Biphenyls	1.2 E-4 µg/L
2,3,7,8 TCDD	3.1 E-9 µg/L

*E. Water Quality Criteria for the protection of Aquatic life.*

Freshwater aquatic life should be protected if the following conditions are satisfied for the temperature, T, and pH of the waterbody:

(1) The one-hour average concentration of total ammonia nitrogen (in mg TAN/L) does not exceed, more than once every three years on the average, the CMC (acute criterion) calculated using the following equations.

Where salmonid fish (cold water) are present:

$$CMC = MIN \left( \left( \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}} \right), \left( 0.7249 \times \left( \frac{0.0114}{1 + 10^{7.204 - pH}} + \frac{1.6181}{1 + 10^{pH - 7.204}} \right) \times (23.12 \times 10^{0.036 \times (20 - T)}) \right) \right)$$

Or where salmonid fish are not present:

$$CMC = 0.7249 \times \frac{0.0114}{1 + 10^{7.204 - pH}} + \frac{1.6181}{1 + 10^{pH - 7.204}} \times MIN(51.93, 23.12 \times 10^{0.036 \times (20 - T)})$$

(2) The thirty-day rolling average concentration of total ammonia nitrogen (in mg TAN/L) does not exceed, more than once every three years on the average, the CCC (chronic criterion) calculated using the following equation.

$$CCC = 0.8876 \times \left( \frac{0.0278}{1 + 10^{7.688 - pH}} + \frac{1.1994}{1 + 10^{pH - 7.688}} \right) \times (2.126 \times 10^{0.028 \times (20 - MAX(T, 7))})$$

(3) In addition, the highest four-day average within the 30-day averaging period should not be more than 2.5 times the CCC (e.g., 2.5 x 1.9 mg TAN/L at pH 7 and 20°C or 4.8 mg TAN/L) more than once in three years on average.<sup>1</sup>

*F. Water Quality Criteria for the protection of Wild rice.*

(1) Natural hydrological conditions necessary to support the biological and physical characteristics naturally present in waters shall be protected to prevent significant adverse impacts to wild rice.

(2) The following wild rice criteria shall be met in Reservation waters:

- (A) Natural erosion or sedimentation patterns;
- (B) Natural sedimentation rates;
- (C) Natural water temperature variations; and
- (D) Sulfate less than 10 mg/L.

*G. Toxic Pollutant Criteria.*

The following numeric criteria and conditions shall apply to all waters of the Reservation:

- (1) Numeric Criteria for the protection of aquatic life and human health: Table 2, 3, and 4
  - (a) For toxic substances that are carcinogenic, human health criteria were developed using a maximum individual lifetime risk to human health of 1 in 10<sup>-6</sup>(unitless), and
  - (b) For toxic substances that bioaccumulate criteria were developed using a fish consumption rate of 32 g/day, and
  - (c) For toxic substances that are noncarcinogenic, a maximum individual lifetime risk of No Observable Adverse Effect Level (NOAEL) to human health was used, or
  - (d) Acute or chronic toxicity to aquatic biota, fish or wildlife
- (2) Other Toxic Substances

Where numeric criteria for a toxic substance are not established by these standards, the Department may establish such criteria consistent with EPA's Water Quality Standards Handbook, or the most recent Clean Water Act section 304(a) guidance for development of criteria. In establishing such limits, the Department shall give consideration to the potential for bioaccumulation as well as any antagonistic or synergistic relationship that may exist between the constituents being discharged and

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<sup>1</sup> <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/upload/AQUATIC-LIFE-AMBIENT-WATER-QUALITY-CRITERIA-FOR-AMMONIA-FRESHWATER-2013.pdf>

the concentration of other constituents in the receiving waters or their associated underlying sediments.

*H. Modification of Criteria.*

(1) The Department may promulgate revised or site-specific criteria for human health or aquatic life following 40 C.F.R. § 131.11, and § 131.20 as necessary to reflect new scientific data or conditions specific to a given site or water body following the Water Quality Standards Handbook or more recent Clean Water Act 304(a) guidance published by EPA. Such modifications to water quality criteria shall assure that all designated and existing uses are protected and that water quality standards continue to be attained.

(2) The department may promulgate a site-specific criterion to protect Federally listed threatened or endangered species that may be more stringent than the specific use or toxic pollutant table indicates.

*L. Best Management Practice.*

(1) Pollutants are not allowed to be drained or discharged into waters of the Reservation without control or treatment with Best Management Practices approved by the Department and sufficient to meet all criteria.

**106. Antidegradation.**

*A. Policy.*

This Antidegradation Policy shall be applicable to any action or activity requiring compliance under the Clean Water Act with regard to any source of pollutants. The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary degradation from pollution sources is prevented, and to protect, maintain, and enhance existing surface water quality to protect all existing and designated uses. The Antidegradation Policy consists of the following tiers (waterbodies are classified by the Tribe according to these tiers in Table 1 of these standards):

Tier (1) For each Tier 1 body of water, water quality sufficient to preserve all existing and designated uses shall be maintained. All discharges into a Tier 1 waterbody shall comply with section 106B(1). Tier 1 protections provide a baseline level of protection applicable to all surface waters of the Reservation.

Tier (2) For each Tier 2 body of water, the existing water quality of the waterbody is of a higher quality than necessary to maintain existing or designated uses, and that water quality shall be maintained, unless the Tribe makes a finding to the contrary, under section 106B(2).

Tier (2.5) Each Tier 2.5 body of water constitutes an Exceptional Tribal Resource Water, with a high level of cultural, recreational or ecological significance. For each Tier 2.5 body

of water, water quality is of a higher quality than necessary to maintain existing or designated uses, and that water quality shall be maintained, unless the Tribe makes a finding to the contrary under section 106(B)(3).

- Tier (3) Each Tier 3 body of water constitutes an Outstanding Tribal Resource Water, with the highest level of cultural, recreational or ecological significance. In each Tier 3 body of water, water quality is of a higher quality than necessary to maintain existing or designated uses, and that water quality shall be maintained, consistent with section 106B(4).

In those cases where potential water quality impairments associated with a thermal discharge are involved, such as for those waters identified as having a *Cold or Cool Water Fishery Use*, no measurable temperature difference attributable to human activities may be observed. The Antidegradation policy and implementing method shall be consistent with section 316 of the Clean Water Act.

*B. Implementation.*

The Department will administer the Antidegradation Policy. For each proposed discharge that may impact the water quality of a waterbody, prior to the issuance of any permit, there shall be full satisfaction of the intergovernmental coordination and public participation requirements of the Tribe's continuing planning process. In addition, the specific requirements for each Tier shall be met.

- 1) *Tier (1) Protection.*
  - (a) Prior to the issuance of any permit with new or expanded discharges under the Clean Water Act that would authorize a discharge that may degrade a waterbody with a Tier 1 classification, the applicant for a permit shall demonstrate, to the Department's satisfaction, that the resulting water quality in the receiving water will be sufficient to protect existing uses and that ambient water quality shall conform to the narrative and numeric water quality criteria in these Water Quality Standards.
  - (b) During the development of a draft federal permit, the Tribe will work with EPA and the applicant for a permit to insure that data for the waterbody and proposed discharge is reviewed and, for any data gaps, monitoring requirements will be required to ensure that existing uses are protected. Following issuance of a permit, the permittee will be required to provide monitoring data or other information about the waterbody to ensure the existing uses are protected.
  - (c) The Department will review the data and will perform site inspections to further ensure protection of existing uses.
- 2) *Tier (2) Protection of Tribal Resource Waters.*
  - (a) Prior to the issuance of any permit with new or expanded discharges under the Clean Water Act that would authorize a discharge that may degrade a waterbody with a Tier 2 classification, the applicant for the permit shall demonstrate, to the Department's satisfaction:

- 1) the proposed lowering of water quality is necessary to accommodate important social or economic development on or near the Reservation,
- 2) the resulting water quality will be sufficient to protect existing uses,
- 3) cost effective pollution control methods have been implemented or do not exist,
- 4) cost-effective and reasonable best management practices have been implemented, and
- 5) there will be achieved the highest statutory and regulatory requirements for new and existing pollution sources.

(b) An Antidegradation Demonstration will be required for any significant (more than 10% of assimilative capacity) lowering of water quality. Only a de minimis lowering of water quality, not to exceed 10% of assimilative capacity with a cumulative cap of 10%, will be permitted without an Antidegradation Demonstration. No de minimis determinations are allowed for BCCs. All discharges containing BCCs will be required to go through the full Antidegradation Demonstration procedures. Economic and social factors shall also be considered as part of the decision.

(c) If a permit is granted, the permit holder shall provide monitoring data or other information about the waterbody. The Department will review the data and will perform site inspections to further ensure protection of existing uses.

3) *Tier ( 2.5) Protection of Exceptional Tribal Resource Water.*

(a) Prior to the issuance of any permit with new or expanded discharges under the Clean Water Act that would authorize a discharge that may degrade a waterbody with a Tier 2.5 classification, the applicant for the permit shall demonstrate, to the Department's satisfaction:

- 1) the proposed lowering of water quality is necessary to accommodate important social or economic development on or near the Reservation,
- 2) discharges will not exceed ambient water quality levels at the location of the discharge and will not exceed water quality criteria,
- 3) cost effective pollution control methods have been implemented or do not exist,
- 4) cost-effective and reasonable best management practices have been implemented,
- 5) there will be achieved the highest statutory and regulatory requirements for new and existing pollution sources, and
- 6) no increased loads of bioaccumulative chemicals of concern ("BCCs") shall be discharged.

(b) If a permit is granted, the permit holder shall provide monitoring data or other information about the waterbody. The Department will review the data and will perform site inspections to further ensure protection of existing uses.

4) *Tier ( 3) Protection of Outstanding Tribal Resource Waters.* New or expanded discharges to OTRW's or to tributaries of an OTRW that may degrade the OTRW are prohibited with the following exceptions:

- (a) Short-term, temporary (no more than 6 months) lowering of water quality;
- (b) Maintenance of existing roads, bridges, dams, and similar structures with the assurance from the applicant that best management practices will be implemented for short-term, temporary lowering of water quality; and
- (c) Response actions undertaken by the Tribe to alleviate a release into the environment of hazardous substances, pollutants or contaminants which may pose an imminent and substantial danger to public health or welfare.
- (d) Existing discharges within an OTRW or adjacent to an OTRW, as of the date of EPA approval of these water quality standards, are allowed to remain and to be maintained. Any expansion or significant modification of structures or discharges related to the allowable exemptions listed above will not be allowed without prior written approval of the Department.

### ***107. Specific water body classifications.***

Specific classifications for surface waters of the Reservation (including Designated Uses and Antidegradation Classifications) are set forth in Table 1.

#### ***A. General Provisions.***

General provisions applying to surface water bodies not specifically classified under Table 1 are as follows:

- (1) All named waters, including wetlands, not specified under an Antidegradation classification are classified as *Tribal Resource Water* (Tier 2).
- (2) All unnamed waterbodies including wetlands, at a minimum, are classified as Tier 1 and assigned the following designated uses (until such a time that additional uses are identified): Water Contact, Wildlife Protection, Wild Rice, Fish and Aquatic life, and Water Supply.
- (3) For the purposes of these Water Quality Standards, ponds that have been created for the purpose of wastewater management or aquaculture production are not considered to be "waters of the tribe." Any discharge associated with these created ponds to a water of the tribe must comply with all applicable provisions of these Water Quality Standards.
- (4) A Designated Use classification may be added but may not be removed without a Use Attainability Analysis.

#### ***B. Compliance.***

The Tribe may, on a case-by-case basis, certify discharges for a permit under section 401 of the Clean Water Act at the time of permit issuance or modification, in a manner that allows inclusion of

a compliance schedule, in accordance with 40 CFR 122.47. Such compliance schedule will be for the purpose of providing a permittee with a reasonable time period to make treatment facility modifications necessary to comply with water quality based permit limitations. Compliance schedules shall specify milestone dates so as to measure progress toward final compliance at the earliest practicable time.

## ***108. Mixing Zones.***

In conjunction with the issuance of section 402 permits, mixing zones in the waters on the Reservation will be determined on a case-by-case basis. The size of such mixing zones and the in-zone water quality in such mixing zones shall be consistent with procedures and guidelines in EPA's *Water Quality Standards Handbook* and the *Technical Support Document for Water Quality Based Toxics Control* and subsequent updates of the handbook and technical support documents.

### ***A. Non-Thermal Discharges***

(1) It is the goal of these water quality standards, wherever possible, that all surface waters within the Reservation shall be protected and designated uses attained. Permits may establish a mixing zone applicable to the non-thermal component of the point source discharge authorized by such permit. Mixing zones for the purpose of allowing dilution in setting Water Quality-Based Effluent Limits (WQBEL), however, may be granted on a case-by-case basis for certain, limited areas where organisms will not be exposed to toxicants in the discharge for unacceptable periods of time, and where, after implementing all cost effective and feasible pollution controls and best management practices, it is still not possible to comply with the applicable water quality criteria without allowing for a limited area of mixing of the effluent in the receiving water. In all such cases, mixing zones shall be as small as possible, and in no case may a mixing zone be established that will:

- (a) Substantially interfere with the migratory routes, natural movements, survival, reproduction, or growth, or increase the vulnerability to predation, of any representative aquatic species;
- (b) Include critical spawning habitat, or nursery areas of any representative aquatic species;
- (c) Include a public water supply intake;
- (d) Include a recognizable public swimming area;
- (e) Fail to maintain a continuous zone of passage that meets water quality criteria for free-swimming and drifting organisms;
- (f) Constitute a distance more than one-hundred meters from the point of discharge unless a mixing zone study is conducted consistent with A(2);
- (g) Impair critical resource areas;
- (h) Encompass more than one quarter of the cross-sectional area of the receiving water at design flow;
- (i) Adversely affect water quality in downstream jurisdictions;
- (j) Result in a dilution of more than 10 times for a discharge into a pond or lake;
- (k) Adversely affect the biological integrity of the receiving water as a whole;



- (l) Include an Outstanding or Exceptional Tribal Resource Water;
  - (m) Include an important cultural ceremonies area;
  - (n) Threaten endangered or threatened species or species habitat;
  - (o) Contain any bioaccumulative chemical of concern in the discharge; and
  - (p) Include the following in-zone conditions:
    - (1) Substances in concentrations that will cause acutely toxic conditions to aquatic life;
    - (2) Substances in concentrations that settle to form objectionable deposits;
    - (3) Floating debris, oil, scum, and other material in concentrations that form nuisances;
    - (4) Substances in concentrations that produce objectionable color, odor, taste, or turbidity; and
    - (5) Substances in concentrations that produce undesirable aquatic life or result in a dominance of nuisance species.
- (2) A mixing zone study may be conducted by the discharger but must contain the following information in order to receive a waiver of (A)(1)(f):
- (a) Information defining the actual boundaries (where the water quality standards are met) of the mixing zone in question; and
  - (b) Whole effluent toxicity (WET) as defined as “the aggregate toxic effect of an effluent measured directly by an aquatic toxicity test” [54 FR 23868 at 23895; June 2, 1989] sampling at the edge of the mixing zone.
- (3) When establishing a mixing zone, the EPA shall require that the concentration of pollutants in the zone beyond the area of initial mixing not exceed at any time the CMC, or CCC for any representative aquatic species.
- (4) Whole effluent toxicity (WET) as defined as “the aggregate toxic effect of an effluent measured directly by an aquatic toxicity test” [54 FR 23868 at 23895; June 2, 1989] may be required of permittee.
- (5) Outfalls must be placed and designed to insure rapid mixing and optimal plume direction.

## *B. Thermal Discharges*

- (1) EPA may establish a mixing zone applicable to the thermal component of the point source discharge authorized by such permit. A thermal mixing zone to permit dilution and cooling of a waste heat discharge shall be considered a region in which organism response to temperature is time-dependent. Exposure to temperatures in a thermal mixing zone shall not cause an irreversible response that results in deleterious effects to the wildlife and aquatic life representative of the receiving waters. The daily average temperature in a thermal mixing zone at the point nearest to the discharge that is accessible to the resident aquatic organisms shall not exceed the temperature established by the EPA on a case-by-case basis. The temperature will be established by background data or from reference conditions.

(2) Thermal mixing zone size limitations shall be established by the proposed discharger and approved by the EPA pursuant to paragraph (B)(3) of this subsection on a case-by-case basis for all point source discharges subject to permit. The analytical methods for determining mixing zones are those set forth in paragraph (A)(3) of the preceding subsection.

(3) No thermal mixing zone shall:

- (a) Substantially interfere with the migratory routes, natural movements, survival, reproduction, or growth, or increase the vulnerability to predation, of any representative aquatic species;
- (b) Interfere with or prevent the recovery of an aquatic community or species population that could reasonably be expected to recover;
- (c) Include a public water supply intake; or
- (d) Include a recognizable public swimming area.
- (e) Fail to include a continuous zone of passage that meets water quality criteria for free-swimming and drifting organisms;
- (f) Constitute a distance more than one-hundred meters from the point of discharge unless a mixing zone study is conducted consistent with A(2).
- (g) Encompass more than one quarter of the cross-sectional area of the receiving water at design flow;
- (h) Adversely affect water quality in downstream jurisdictions;
- (i) Result in a dilution of more than 10 times for a discharge into a pond or lake;
- (j) Adversely affect the biological integrity of the receiving water as a whole;
- (k) Include an Outstanding or Exceptional Tribal Resource Water;
- (l) Include important cultural ceremonies area;
- (m) Threaten endangered or threatened species or species habitat;

(4) Any point source thermal discharge must be in a location, and have the capacity, design, and construction of cooling water intake structures, to meet the best technology available for minimizing adverse environmental impacts.

(5) For all waters defined as Outstanding or Exceptional Tribal Resource Waters, and for all waters classified as having a *Cold Water Fishery Use*, no thermal mixing zone shall be permitted.

## **109. Certification.**

The Department will administer a Water Quality Certification Program for activities requiring a permit or license in accordance with Section 401 of the Clean Water Act and the implementing regulations at 40 CFR 121. For any activity that involves a discharge to waters of the Reservation the Department will determine whether the proposed activity complies with Tribal Water Quality Standards and certify each discharge accordingly. The U.S. Army Corps of Engineers Section 404 Dredge and Fill Permits, EPA National Pollutant Discharge Elimination System (NPDES) permits, and Federal Energy Regulatory Commission licenses are examples of federal regulatory programs that require Tribal Water Quality Certification under the Clean Water Act before federal permits or

licenses can be issued. Applicants shall request Tribal Water Quality Certification from the Tribe by sending a written application to the Department following procedures in section 106(B) Antidegradation Implementation.

### ***110. Variances***

**A.** Variances - Variance procedures shall be consistent with 40 CFR §131.13 and §132, Appendix F, Procedure 2, *Variances from Water Quality Standards for Point Sources*.

Table 1. Specific Waterbody Antidegradation Classification and Designated Uses											
<b>WATERBODIES</b>	Outstanding Tribal Resource Water	Exceptional Tribal Resource Water	Fish and Aquatic Life Use	Water Contact Use	Wildlife Use	Wild Rice Use	Water Supply Use	Drinking Water Use	Cool Water Fishery Use	Cold Water Fishery Use	Navigation
Bear River (1 <sup>st</sup> Bridge to Reservation Boundary)	X		X	X	X	X	X	X	X		X
Big Springs (Sec. 25, T40NR4E)	X		X	X	X		X	X		X	
Bills Lake		X	X	X	X		X		X		X
Birch Lake		X	X	X	X		X		X		X
Black Lake	X		X	X	X		X				X
Bobidosh Lake		X	X	X	X		X		X		X
Bog Lake (SE SE Sec. 31, T40NR6E)		X	X	X	X		X				X
Bolton Lake		X	X	X	X		X	X	X		X
Broken Bow Lake		X	X	X	X		X	X			X
Buckskin Lake			X	X	X		X	X	X		X
Chewalah Lake		X	X	X	X	X	X				X
Clear Lake (Sec. 2 T39NR4E)		X	X	X	X		X		X		X
Corn Lake, Great		X	X	X	X		X				X
Corn Lake, Little "Least/Lesser"		X	X	X	X		X				X
Cranberry Lake	X		X	X	X		X	X			X
Crawling Stone Lake, Big		X	X	X	X		X	X	X		X
Crawling Stone Lake, Little		X	X	X	X		X	X	X		X
Crescent Lake		X	X	X	X		X				X
Crooked Lake, Big		X	X	X	X		X		X		X
David Lake		X	X	X	X		X				X
Doud Lake	X		X	X	X		X				X
Eagle Lake	X		X	X	X		X				X
Ellerson Lake, Middle		X	X	X	X		X				X

Ellerson Lake, West		X	X	X	X		X				X
Elsie Lake "Boundary Lake"		X	X	X	X		X				X
Fat Lake		X	X	X	X		X		X		X
Fence Lake		X	X	X	X		X	X	X		X
Flambeau Lake			X	X	X	X	X	X	X		X
Gene Lake	X		X	X	X		X				X
Gresham Creek		X	X	X	X	X	X				X
Green Lake (NW NW Sec. 19, T41R6E)		X	X	X	X		X				X
Grey Lake		X	X	X	X		X		X		X
Gunlock Lake		X	X	X	X		X	X	X		X
Haskell Lake		X	X	X	X	X	X	X	X		X
Headflyer Lake (Sec. 19, T41NR5E)		X	X	X	X		X				X
Highway Lake (NW NW Sec. 19 T41NR5E)		X	X	X	X		X				X
Horsehead Lake (SE SW Sec. 9 T40NR5E)		X	X	X	X		X				X
Hutton's Creek		X	X	X	X		X				X
Ike Walton Lake		X	X	X	X	X	X	X	X		X
Johnson Springs	X		X	X	X		X			X	X
Lily Lake (SE SW Sec 35 T40NR5E)		X	X	X	X		X				X
Little Ten Lake		X	X	X	X		X				X
Little Trout Lake	X		X	X	X	X	X	X	X		X
Lodge Lake "L. Rice" (NW NW Sec. 8, T41NR6E)		X	X	X	X		X				X
Long (Interlaken) Lake			X	X	X		X	X	X		X
Lost Lake (Sect. 1, T41NR4E)	X		X	X	X		X				X
Lucy Lake		X	X	X	X		X				X
Marland's Lake (Sec. 13, T40NR4E)			X	X	X		X				X
Mindys Lake (Sec. 8 T40NR5E)		X	X	X	X		X				X
Minette Lake		X	X	X	X		X				X
Mishonagon Creek	X		X	X	X	X	X			X	X
Mitten Lake		X	X	X	X		X	X			X
Monk's Lake (Sec. 13, T40NR5E)		X	X	X	X		X				X

Moss Lake			X	X	X		X	X	X		X
Moving Cloud Lake		X	X	X	X		X				X
Mud Creek		X	X	X	X		X				X
Munnomin (Jesse, Duck) Lake	X		X	X	X	X	X				X
Muskesin Lake		X	X	X	X		X		X		X
Negani (Hegani) Lake	X		X	X	X		X				X
Patterson Lake		X	X	X	X		X				X
Placid Twin Lake (North)		X	X	X	X		X		X		X
Placid Twin Lake (South)		X	X	X	X		X		X		X
Plummer Lake		X	X	X	X		X	X	X		X
Pokegema Lake			X	X	X	X	X		X		X
Poupart Lake		X	X	X	X		X		X		X
Prairie Lake (NE SW Sec. 13 T40NR4E)		X	X	X	X		X				X
Raven Lake		X	X	X	X		X				X
Reservation Line Lake	X		X	X	X		X	X			X
Ross Allen Lake		X	X	X	X		X				X
Sand Lake, Little		X	X	X	X		X		X		X
Scott Lake (Sec. 22, T40N, R4E)		X	X	X	X		X				X
Shishebogama Lake		X	X	X	X		X	X	X		X
Signal Lake		X	X	X	X		X		X		X
Snort Lake (Sec. 5 T41N, R6E)		X	X	X	X		X				X
Spring Creek	X		X	X	X		X			X	X
Spring Lake "Jerms"		X	X	X	X		X				X
Squirrel Lake		X	X	X	X		X		X		X
Statenaker Lake "Hollow"		X	X	X	X		X		X		X
Stearns Lake "Hourglass"		X	X	X	X		X	X	X		X
Sugarbush "Hidden Lake" (NW NW Sec. 17, T41NR5E)		X	X	X	X		X				X
Sugarbush Creek		X	X	X	X	X	X				X
Sugarbush Lake, Little		X	X	X	X		X	X	X		X
Sugarbush Lake, Lower		X	X	X	X		X	X	X		X

Sugarbush Lake, Middle		X	X	X	X		X	X	X		X
Sugarbush Lake, Upper		X	X	X	X		X	X	X		X
Sunfish Lake		X	X	X	X		X		X		X
Tank Lake	X		X	X	X		X				X
Thomas Lake	X		X	X	X	X	X				X
Tippecanoe Lake		X	X	X	X		X	X	X		X
Tomahawk River		X	X	X	X	X	X	X			X
To-To Tom Lake		X	X	X	X		X		X		X
Toulash Lake		X	X	X	X		X		X		X
Trout River		X	X	X	X	X	X	X	X		X
Warrior Lake		X	X	X	X		X				X
White Sand Lake		X	X	X	X		X	X	X		X
Whitefish Lake "Cattail Lake" (Sec. 34 T40N5R)		X	X	X	X		X		X		X
Wild Rice Lake	X		X	X	X	X	X	X	X		X
Wishow Lake		X	X	X	X		X				X
Wyandock Lake		X	X	X	X		X				X
Zee Lake	X		X	X	X		X				X

Table 2. Priority Pollutant Water Quality Criteria

Priority Pollutant	CAS Number	Freshwater		Human Health for the consumption of				FR Cite/ Source
		CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism		Organism Only		
				(µg/L)		(µg/L)		
1,1,2,2-Tetrachloroethane	79345			1.62E-01	B,C	2.19E+00	B,C	65FR66443
1,1,2-Trichloroethane	79005			5.73E-01	B,C	8.53E+00	B,C	65FR66443
1,1-Dichloroethylene	75354			3.21E+02		3.91E+03		68FR75510
1,2,4-Trichlorobenzene	120821			2.48E+01		3.84E+01		68FR75510
1,2-Dichlorobenzene	95501			3.33E+02		7.08E+02		68FR75510
1,2-Dichloroethane	107062			3.77E-01	B,C	2.00E+01	B,C	65FR66443
1,2-Dichloropropane	78875			4.90E-01	B,C	7.96E+00	B,C	65FR66443
1,2-Diphenylhydrazine	122667			3.13E-02	B,C	1.10E-01	B,C	65FR66443
1,2-Trans-Dichloroethylene	156605			1.37E+02	Z	5.54E+03		68FR75510
1,3-Dichlorobenzene	541731			2.48E+02		5.27E+02		65FR66443
1,3-Dichloropropene	542756			3.40E-01	C	1.15E+01	C	68FR75510
1,4-Dichlorobenzene	106467			4.96E+01		1.05E+02		68FR75510
2,3,7,8-TCDD (Dioxin)	1746016			2.77E-09	C	2.80E-09	C	65FR66443
2,4,6-Trichlorophenol	88062			9.36E-01	B,C	1.33E+00	B,C ,U	65FR66443
2,4-Dichlorophenol	120832			6.36E+01	B,U	1.61E+02	B,U	65FR66443
2,4-Dimethylphenol	105679			2.80E+02	B	4.66E+02	B,U	65FR66443
2,4-Dinitrophenol	51285			6.84E+01	B	2.92E+03	B	65FR66443
2,4-Dinitrotoluene	121142			1.06E-01	C	1.85E+00	C	65FR66443
2-Chloronaphthalene	91587			6.62E+02	B	8.66E+02	B	65FR66443
2-Chlorophenol	95578			5.57E+01	B,U	8.16E+01	B,U	65FR66443
2-Methyl-4,6-Dinitrophenol	534521			1.25E+01		1.55E+02		65FR66443
3,3'-Dichlorobenzidine	91941			1.30E-02	B,C	1.56E-02	B,C	65FR66443
4,4'-DDD	72548			1.70E-04	B,C	1.70E-04	B,C	65FR66443
4,4'-DDE	72559			1.20E-04	B,C	1.20E-04	B,C	65FR66443
4,4'-DDT	50293	1.10E+00	G,ii	1.00E-03	G,aa,ii	1.20E-04	B,C	65FR31682, 65FR66443



Table 2. Priority Pollutant Water Quality Criteria

Priority Pollutant	CAS Number	Freshwater		Human Health for the consumption of						FR Cite/ Source
		CMC (acute) (µg/L)		CCC (chronic) (µg/L)		Water + Organism		Organism Only		
								(µg/L)	(µg/L)	
Acenaphthene	83329					4.31E+02	B,U	5.42E+02	B,U	65FR66443
Acrolein	107028					1.23E+02		1.59E+02		65FR66443
Acrylonitrile	107131					4.38E-02	B,C	1.35E-01	B,C	65FR66443
Aldrin	309002	3.00E+00	G			2.72E-05		2.76E-05	B,C	65FR31682
alpha-BHC	319846					1.80E-03	B,C	2.67E-03	B,C	65FR66443
alpha-Endosulfan	959988	2.20E-01	G,Y	5.60E-02	G,Y	3.95E+01	B	4.86E+01	B	65FR31682, 65FR66443
Anthracene	120127					7.09E+03	B	2.19E+04	B	65FR66443
Antimony	7440360					5.51E+00	B	3.50E+02	B	65FR66443
Arsenic	7440382	3.40E+02	A,D,K	1.50E+02	A,D,K	1.17E-02	C,M,S	2.84E-02	C,M,S	65FR31682
Asbestos	1332214						I			57FR60848
Benzene	71432					5.87E-01	B,C	7.65E+00	B,C	65FR66443
Benzidine	92875					6.34E-05	B,C	1.09E-04	B,C	65FR66443
Benzo(a) Anthracene	56553					3.24E-03	B,C	9.99E-03	B,C	65FR66443
Benzo(a) Pyrene	50328					3.24E-03	B,C	9.99E-03	B,C	65FR66443
Benzo(k) Fluoranthene	207089					3.24E-03	B,C	9.99E-03	B,C	65FR66443
beta-BHC	319857					6.31E-03	B,C	9.35E-03	B,C	65FR66443
beta-Endosulfan	33213659	2.20E-01	G,Y	5.60E-02	G,Y	3.95E+01	B	4.86E+01	B	65FR31682, 65FR66443
Bis(2-Chloroethyl) Ether	111444					2.87E-02	B,C	2.88E-01	B,C	65FR66443
Bis(2-Chloroisopropyl) Ether	108601					1.35E+03	B	3.54E+04	B	65FR66443
Bis(2-Ethylhexyl) PhthalateX	117817					8.12E-01	C	1.20E+00	B,C	65FR66443
Bromoform	75252					4.18E+00	C	7.38E+01	B,C	65FR66443
Butylbenzyl PhthalateW	85687					9.18E+02	B	1.06E+03	B	65FR66443
Cadmium	7440439	2.00E+00	D,E,K,bb	2.50E-01	D,E,K,bb					EPA-822-R-01-001 EPA-820-R-12-007 (April 2012)
Carbaryl	63-25-2	2.1		2.1						

Table 2. Priority Pollutant Water Quality Criteria

Priority Pollutant	CAS Number	Freshwater		Human Health for the consumption of		FR Cite/ Source	
		CMC (acute)	CCC (chronic)	Water + Organism	Organism Only		
		(µg/L)	(µg/L)	(µg/L)	(µg/L)		
Carbon Tetrachloride	56235			2.07E-01 B,C	8.97E-01 B,C	65FR66443	
Chlordane	57749	2.40E+00 G	4.30E-03 G,aa	4.41E-04 B,C	4.43E-04 B,C	65FR31682, 65FR66443	
Chlorobenzene	108907			1.20E+02 Z,U	8.50E+02 U	68FR75510	
Chlorodibromomethane	124481			3.93E-01 B,C	6.94E+00 B,C	65FR66443	
Chloroform	67663			5.41E+00 C,P	9.56E+01 C,P	62FR42160	
Chromium (III)	16065831	5.70E+02 D,E,K	7.40E+01 D,E,K			EPA820/B-96-001	
Chromium (VI)	18540299	1.60E+01 D,K	1.10E+01 D,K			65FR31682	
Chrysene	218019			3.24E-03 B,C	9.99E-03 B,C	65FR66443	
Copper	7440508	1.30E+01 D, E,K,cc	9.00E+00 D, E,K,cc	U		65FR31682	
Cyanide	57125	2.20E+01 K,Q	5.20E+00 K,Q	1.38E+02 jj	1.38E+02 jj	EPA820/B-96-001, 57FR60848	
Dibenzo(a,h)Anthracene	53703			3.24E-03 B,C	9.99E-03 B,C	65FR66443	
Dichlorobromomethane	75274			5.33E-01 B,C	9.41E+00 B,C	65FR66443	
Dieldrin	60571	2.40E-01 K	5.60E-02 K,O	2.89E-05 B,C	2.93E-05 B,C	65FR31682, 65FR66443	
Diethyl PhthalateW	84662			1.29E+04 B	2.40E+04 B	65FR66443	
Dimethyl PhthalateW	131113			2.22E+05	6.08E+05	65FR66443	
Di-n-Butyl PhthalateW	84742			1.44E+03 B	2.46E+03 B	65FR66443	
Endosulfan Sulfate	1031078			3.95E+01 B	4.86E+01 B	65FR66443	
Endrin	72208	8.60E-02 K	3.60E-02 K,O	3.25E-02	3.31E-02	65FR31682, 68FR75510	
Endrin Aldehyde	7421934			1.63E-01 B	1.65E-01 B,H	65FR66443	
Ethylbenzene	100414			4.38E+02	1.17E+03	68FR75510	
Fluoranthene	206440			7.22E+01 B	7.61E+01 B	65FR66443	
Fluorene	86737			9.46E+02 B	2.92E+03 B	65FR66443	
gamma-BHC (Lindane)	58899	9.50E-01 K		6.82E-01	1.01E+00	65FR31682,	

Table 2. Priority Pollutant Water Quality Criteria

Priority Pollutant	CAS Number	Freshwater		Human Health for the consumption of		Organism Only		FR Cite/ Source
		CMC (acute) (µg/L)		CCC (chronic) (µg/L)		Water + Organism (µg/L)		
Heptachlor	76448	5.20E-01	G	3.80E-03	G,aa	4.32E-05	B,C	68FR75510 65FR31682, 65FR66443
Heptachlor Epoxide	1024573	5.20E-01	G,V	3.80E-03	G,V,aa	2.13E-05	B,C	65FR31682, 65FR66443
Hexachlorobenzene	118741					1.56E-04	B,C	65FR66443
Hexachlorobutadiene	87683					4.30E-01	B,C	65FR66443
Hexachlorocyclopentadiene	77474					3.93E+01	U	68FR75510
Hexachloroethane	67721					1.05E+00	B,C	65FR66443
Ideno(1,2,3-cd)Pyrene	193395					3.24E-03	B,C	65FR66443
Isophorone	78591					3.44E+01	B,C	65FR66443
Lead	7439921	6.50E+01	D,E,bb,gg	2.50E+00	D,E,bb,gg			65FR31682
Mercury	7439976	1.40E+00	D,K,hh	7.70E-01	D,K,hh			62FR42160
Methyl Bromide	74839					4.62E+01	B	65FR66443
Methyl Chloride	74873							65FR31682
Methylene Chloride	75092					4.60E+00	B,C	65FR66443
Methylmercury (mg/kg)	22967926					-		EPA823-R-01-001
Nickel	7440020	4.70E+02	D,E,K	5.20E+01	D,E,K	4.00E+02	B	65FR31682
Nitrobenzene	98953					1.67E+01	B	65FR66443
N-Nitrosodimethylamine	62759					6.86E-04	B,C	65FR66443
N-Nitrosodi-n-Propylamine	621647					4.91E-03	B,C	65FR66443
N-Nitrosodiphenylamine	86306					2.25E+00	B,C	65FR66443
Pentachlorophenol	87865	1.90E+01	F,K	1.50E+01	F,K	2.48E-01	B,C	65FR31682, 65FR66443
Phenol	108952					2.05E+04	B,U	65FR66443
Polychlorinated Biphenyls (PCBs)				1.40E-02	N, aa	3.50E-05	B,C,N	65FR31682, 65FR66443

Table 2. Priority Pollutant Water Quality Criteria

Priority Pollutant	CAS Number	Freshwater			Human Health for the consumption of					FR Cite/ Source
		CMC (acute) (µg/L)		CCC (chronic) (µg/L)		Water + Organism		Organism Only		
						(µg/L)		(µg/L)		
Pyrene	129000					7.09E+02	B	2.19E+03	B	65FR66443
Selenium	7782492		L,R,T	5.00E+00	T	1.63E+02	Z	2.28E+03		62FR42160, 65FR31682
Silver	7440224	3.20E+00	D,E,G							65FR31682
Tetrachloroethylene	127184					5.91E-01	C	1.80E+00	C	65FR66443
Thallium	7440280					1.67E-01		2.56E-01		68FR75510
Toluene	108883					1.20E+03	Z	8.18E+03		68FR75510
Toxaphene	8001352	7.30E-01		2.00E-04	aa	1.51E-04	B,C	1.52E-04	B,C	65FR31682, 65FR66443
Trichloroethylene	79016					2.37E+00	C	1.64E+01	C	65FR66443
Vinyl Chloride	75014					2.45E-02	C,kk	1.34E+00	C,kk	68FR75510
Zinc	7440666	1.20E+02	D,E,K	1.20E+02	D,E,K	5.99E+03	U	1.40E+04	U	65FR31682

#### **TABLE KEY AND TABLE DEFINITIONS**

*	unless otherwise noted
**	MFL = million fibers per liter
(c)	carcinogen
(PAH)	Polynuclear Aromatic Hydrocarbon
(E)	represents "times ten raised to the power"

#### **Footnotes for Priority Pollutants**

A This water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (PDF) (74 pp., 3.2 MB) (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.

B This criterion has been revised to reflect The Environmental Protection Agency's  $q1^*$  or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

C This criterion is based on carcinogenicity of 10<sup>-6</sup> risk.

D Freshwater criteria for metals are expressed in terms of the dissolved metal in the water column. The water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria (PDF)," (49 pp., 3MB) October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center and 40CFR§131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble- Conversion Factors for Dissolved Metals.

E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following:  $CMC (dissolved) = \exp\{mA [\ln(hardness)] + bA\}$  (CF), or  $CCC (dissolved) = \exp\{mC [\ln (hardness)] + bC\}$  (CF) and the parameters specified in Appendix B- Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent.

F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows:  $CMC = \exp(1.005(pH)-4.869)$ ;  $CCC = \exp(1.005(pH)-5.134)$ . Values displayed in table correspond to a pH of 7.8.

G This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (PDF) (153 pp., 7.3 MB) (EPA 440/5-80-019), Chlordane (PDF) (68 pp., 3.1 MB) (EPA 440/5-80-027), DDT (PDF) (175 pp., 8.3 MB) (EPA 440/5-80-038), Endosulfan (PDF) (155 pp., 7.3 MB) (EPA 440/5-80-046), Endrin (PDF) (103 pp., 4.6 MB) (EPA 440/5-80-047), Heptachlor (PDF) (114 pp., 5.4 MB) (EPA 440/5-80-052),

Hexachlorocyclohexane (PDF) (109 pp., 4.8 MB) (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines (PDF) (105 pp., 4.5 MB) . For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.

I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).

J This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.032 kg/day.

K This criterion is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

L The  $CMC = 1 / [(f1/CMC1) + (f2/CMC2)]$  where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 g/l and 12.82 g/l, respectively.

M EPA is currently reassessing the criteria for arsenic.

N This criterion applies to total pcbs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)

O The derivation of the CCC for this pollutant (Endrin) did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

P Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

Q This water quality criterion is expressed as g free cyanide (as CN)/L.

R This value for selenium was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303(c) aquatic life criterion. EPA is currently working on this criterion and so this value might change substantially in the near future.

S This water quality criterion for arsenic refers to the inorganic form only.

T This water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996- CMC or 0.922- CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.

U The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.

V This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

W Although EPA has not published a completed criteria document for butylbenzyl phthalate it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria. It is anticipated that industry intends to publish in the peer reviewed literature draft aquatic life criteria generated in accordance with EPA Guidelines. EPA will review such criteria for possible issuance as national WQC.

X There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.

Y This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

Z A more stringent MCL has been issued by EPA. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1-800-426-4791) for values.

aa This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (PDF) (153 pp., 7.3 MB) (EPA 440/5-80-019), Chlordane (PDF) (68 pp., 3.1 MB) (EPA 440/5-80-027), DDT (PDF) (175 pp., 8.3 MB) (EPA 440/5-80-038), Endrin (PDF) (103 pp., 4.6 MB) (EPA 440/5-80-047), Heptachlor (PDF) (114 pp., 5.4 MB) (EPA 440/5-80-052), Polychlorinated biphenyls (EPA 440/5-80-068), Toxaphene (EPA 440/5-86-006). This CCC is currently based on the Final Residue Value (FRV) procedure. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria. Therefore, the Agency anticipates that future revisions of this CCC will not be based on the FRV procedure.

bb This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (PDF) (105 pp., 4.5 MB) (Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (PDF) (74 pp., 3.2 MB) (EPA 440/5-84-033), Cadmium (EPA-822-R-01-001), Chromium (EPA 440/5-84-029), Copper (PDF) (150 pp., 6.2 MB) (EPA 440/5-84-031), Cyanide (PDF) (67 pp., 2.7 MB) (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87-003).

cc When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

dd The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field.

ee This water quality criterion was derived on page 43 of the mercury criteria document (PDF) (144 pp., 6.4 MB) (EPA 440/5-84-026, January 1985). Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

ff This water quality criterion was derived in Ambient Water Quality Criteria Saltwater Copper Addendum (Draft, April 14, 1995) and was promulgated in the Interim final National Toxics Rule (60FR22228-22237, May 4, 1995).

gg EPA is actively working on this criterion and so this water quality criterion may change substantially in the near future.

hh This water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

ii This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

jj This water quality criterion is expressed as total cyanide, even though the IRIS RFD we used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g.,  $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ ), this criterion may be over conservative.

kk This water quality criterion was derived using the cancer slope factor of 1.4 (LMS exposure from birth).



Table 3. Non-Priority Pollutant Water Quality Criteria

Non-Priority Pollutant	CAS Number	Freshwater		Human Health for the consumption of				FR Cite/ Source
		CMC (acute) (µg/L)		CCC (chronic) (µg/L)		Water + Organism (µg/L)	Organism Only (µg/L)	
Alkalinity	—			2.00E+04	F			Gold Book
Aluminum pH 6.5 – 9.0	7429905	7.50E+02	G,I	8.70E+01	G,I,L			53FR33178
Barium	7440393					1.00E+03	A	Gold Book
Chloride	16887006	8.60E+05	G	2.30E+05	G			53FR19028
Chlorine	7782505	1.90E+01		1.10E+01			C	Gold Book
Chlorophenoxy Herbicide (2,4,5,-TP)	93721					4.17E-01		Gold Book
Chlorophenoxy Herbicide (2,4-D)	94757					1.00E+02	A,C	Gold Book
Chlorpyrifos	2921882	8.30E-02	G	4.10E-02	G			Gold Book
Demeton	8065483			1.00E-01	F			Gold Book
Ether, Bis( Chloromethyl)	542881					7.92E-05	E,H,R	65FR66443
Guthion	86500			1.00E-02	F			Gold Book
Hexachlorocyclo-hexane-Technical	319868					1.23E-02	4.14E-02	Gold Book
Iron	7439896			1.00E+03	F	3.00E+02	A	Gold Book
Malathion	121755			1.00E-01	F			Gold Book
Manganese	7439965					5.00E+01	A,O	Gold Book
Methoxychlor	72435			3.00E-02	F	1.00E+02	A,C	Gold Book
Mirex	2385855			1.00E-03	F			Gold Book
Nitrates	14797558					1.00E+04	A	Gold Book
Nitrosamines	—					8.00E-04	1.24E+00	Gold Book
Dinitrophenols	25550587					6.83E+01	R	65FR66443
Nonylphenol	1044051	2.80E+01		6.60E+00				71FR9337
Nitrosodibutylamine, N	924163					6.12E-03	A,H,R	65FR66443
Nitrosodiethylamine, N	55185					8.00E-04	A,H	Gold Book

Table 3. Non-Priority Pollutant Water Quality Criteria

Non-Priority Pollutant	CAS Number	Freshwater				Human Health for the consumption of				FR Cite/ Source
		CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism		Organism Only				
				(µg/L)		(µg/L)				
Nitrosopyrrolidine, N	930552			1.64E-02	H,R	1.87E+01	H,R	65FR66443		
Diazinon	333415	1.70E-01	1.70E-01					71FR9336		
Parathion	56382	6.50E-02	J	1.30E-02	J			Gold Book		
Pentachlorobenzene	608935			8.00E-01	E,H,R	8.23E-01	E,R	65FR66443		
pH	—		6.5 – 9	F	5 – 9			Gold Book		
Phosphorus Elemental	7723140							Gold Book		
Solids Dissolved and Salinity	—			2.50E+05	A			Gold Book		
Sulfide-Hydrogen Sulfide	7783064		2.00E+00	F				Gold Book		
Tetrachlorobenzene,1,2,4,5-	95943			5.53E-01	E,R	5.83E-01	E,R	65FR66443		
Tributyltin (TBT)	—	4.60E-01	Q	7.20E-02	Q			69FR342		
Trichlorophenol,2,4,5-	95954			1.28E+03	B,E,R	1.99+03	B,E,R	65FR66443		
Aesthetic Qualities	—	SEE NARRATIVE STATEMENT §105								
Bacteria	—	SEE NARRATIVE STATEMENT §105								
Oxygen, Dissolved Freshwater		SEE NARRATIVE STATEMENT §105								
Ammonia	7664417	SEE NARRATIVE STATEMENT §105								
Oil and Grease	—	SEE NARRATIVE STATEMENT §105								
Solids Suspended and Turbidity	—	SEE NARRATIVE STATEMENT §105								
Temperature	—	SEE NARRATIVE STATEMENT §105								

### Footnotes for Non-priority pollutants

A This human health criterion is the same as originally published in the Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value is now published in the Gold Book.

B The organoleptic effect criterion is more stringent than the value presented in the non priority pollutants table.

C A more stringent Maximum Contaminant Level (MCL) has been issued by EPA under the Safe Drinking Water Act. Refer to drinking water regulations 40CFR141 or Safe Drinking Water Hotline (1-800-426-4791) for values.

D According to the procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, except possibly where a very sensitive species is important at a site, freshwater aquatic life should be protected if both conditions specified in Appendix C to the Preamble- Calculation of Freshwater Ammonia Criterion are satisfied.

E This criterion has been revised to reflect EPA's  $q1^*$  or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) used to derive the original criterion was retained in each case.

F The derivation of this value is presented in the Red Book (EPA 440/9-76-023, July, 1976).

G This value is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, PB85-227049, January 1985) and was issued in one of the following criteria documents: Aluminum (EPA 440/5-86-008); Chloride (EPA 440/5-88-001); Chloropyrifos (EPA 440/5-86-005).

H This criterion is based on carcinogenicity of  $10^{-6}$  risk.

I This value for aluminum is expressed in terms of total recoverable metal in the water column.

J This value is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (EPA-820-B-96-001). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the differences between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. No decision concerning this criterion was affected by any considerations that are specific to the Great Lakes.

K This criterion has been derived to reflect EPA's RfD, as contained in the Interim Drinking Water Health Advisory for Perchlorate as of December 2008 (EPA 822-R-08-25).

L There are three major reasons why the use of Water-Effect Ratios might be appropriate.

The value of 87  $\mu\text{g/l}$  is based on a toxicity test with the striped bass in water with pH = 6.5–6.6 and hardness <10 mg/L. Data in "Aluminum Water-Effect Ratio for the 3M Plant Effluent Discharge, Middleway, West Virginia" (May 1994) indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time.

In tests with the brook trout at low pH and hardness, effects increased with increasing concentrations of total aluminum even though the concentration of dissolved aluminum was constant, indicating that total recoverable is a more appropriate measurement than dissolved, at least when particulate aluminum is

primarily aluminum hydroxide particles. In surface waters, however, the total recoverable procedure might measure aluminum associated with clay particles, which might be less toxic than aluminum associated with aluminum hydroxide.

EPA is aware of field data indicating that many high quality waters in the U.S. contain more than 87 g aluminum/L, when either total recoverable or dissolved is measured.

M U.S. EPA. 1973. Water Quality Criteria 1972. EPA-R3-73-033. National Technical Information Service, Springfield, VA.; U.S. EPA. 1977. Temperature Criteria for Freshwater Fish: Protocol and Procedures. EPA-600/3-77-061. National Technical Information Service, Springfield, VA.

N U.S. EPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440/5-86-003. National Technical Information Service, Springfield, VA.

O This criterion for manganese is not based on toxic effects, but rather is intended to minimize objectionable qualities such as laundry stains and objectionable tastes in beverages.

Table 4. Organoleptic Effect Water Quality Criteria

Pollutant	CAS Number	(µg/L)	FR Cite/ Source
Acenaphthene	83329	20	Gold Book
Monochlorobenzene	108907	20	Gold Book
3-Chlorophenol	—	0.1	Gold Book
4-Chlorophenol	106489	0.1	Gold Book
2,3-Dichlorophenol	—	0.04	Gold Book
2,5-Dichlorophenol	—	0.5	Gold Book
2,6-Dichlorophenol	—	0.2	Gold Book
3,4-Dichlorophenol	—	0.3	Gold Book
2,4,5-Trichlorophenol	95954	1	Gold Book
2,4,6-Trichlorophenol	88062	2	Gold Book
2,3,4,6-Tetrachlorophenol	—	1	Gold Book
2-Methyl-4-Chlorophenol	—	1800	Gold Book
3-Methyl-4-Chlorophenol	59507	3000	Gold Book
3-Methyl-6-Chlorophenol	—	20	Gold Book
2-Chlorophenol	95578	0.1	Gold Book
Copper	7440508	1000	Gold Book
2,4-Dichlorophenol	120832	0.3	Gold Book
2,4-Dimethylphenol	105679	400	Gold Book
Hexachlorocyclopentadiene	77474	1	Gold Book
Nitrobenzene	98953	30	Gold Book
Pentachlorophenol	87865	30	Gold Book
Phenol	108952	300	Gold Book
Zinc	7440666	5000	45 FR79341

### Conversion Factors for Dissolved Metals

Metal	CMC	CCC
Arsenic	1	1
Cadmium	$1.136672 - [(\ln \text{ hardness})(0.041838)]$	$1.101672 - [(\ln \text{ hardness})(0.041838)]$
Chromium III	0.316	0.86
Chromium VI	0.982	0.962
Copper	0.96	0.96
Lead	$1.46203 - [(\ln \text{ hardness})(0.145712)]$	$1.46203 - [(\ln \text{ hardness})(0.145712)]$
Mercury	0.85	0.85
Nickel	0.998	0.997
Selenium	—	—
Silver	0.85	—
Zinc	0.978	0.986

### Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent

Chemical	$m_A$	$b_A$	$m_C$	$b_C$	Freshwater Conversion Factors (CF)	
					CMC	CCC
Cadmium	1.0166	-3.924	0.7409	-4.719	$1.136672 - [(\ln \text{ hardness})(0.041838)]$	$1.101672 - [(\ln \text{ hardness})(0.041838)]$
Chromium III	0.819	3.7256	0.819	0.6848	0.316	0.86
Copper	0.9422	-1.7	0.8545	-1.702	0.96	0.96
Lead	1.273	-1.46	1.273	-4.705	$1.46203 - [(\ln \text{ hardness})(0.145712)]$	$1.46203 - [(\ln \text{ hardness})(0.145712)]$
Nickel	0.846	2.255	0.846	0.0584	0.998	0.997
Silver	1.72	-6.59	—	—	0.85	—
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

$$\text{CMC (dissolved)} = \exp\{m_A [\ln(\text{hardness})] + b_A\} \text{ (CF)} \quad \text{CCC (dissolved)} = \exp\{m_C [\ln(\text{hardness})] + b_C\} \text{ (CF)}$$

Note: Unless otherwise noted, Human Health and Aquatic Life Criteria are taken from 2006 National Recommended Water Quality Criteria: 2006 table (4304T) and recalculated using 304(a) methodology based on a total fish consumption rate of 0.032 kg/day

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Water & Organisms = Values which are calculated based upon a lifetime exposure via consumption of drinking water (2 liters per day) and contaminated aquatic organisms (0.034 kg per day).

Organisms Only = Same as above without drinking water

MCL = Maximum Contaminant Level (National Primary Drinking Water Standards)

As new criteria documents for toxic substances are published by U.S. Environmental Protection Agency, these will automatically become incorporated into and made a part of this section and the numeric criteria established by U.S. EPA shall equally apply. Numeric criteria for carcinogens will reflect a risk level of one in a million. For specific segments where the above criteria may need to be recalculated using appropriate species or water quality factors, the Lac du Flambeau Tribal Council may, after public participation and U.S. EPA approval, adopt site specific criterion modifications.

NOTE: Standard method for metals will be total recoverable all Aquatic Life Criteria are Total Recoverable.