KEWEENAW BAY INDIAN COMMUNITY TRIBAL SURFACE WATER QUALITY REGULATIONS

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Chapter 1: General Provisions

Section 1.1 Authority, Purpose, and Intent

The Keweenaw Bay Indian Community (KBIC) is a federally recognized Indian Tribe exercising inherent sovereign authority over its members and its territories, and has a Reservation created by the 1854 Treaty with the Chippewa, 10 Stat. 1109. The Community is organized pursuant to the provisions of the Indian Reorganization Act of 1934, 48 Stat. 984, 25 U.S.C § 476. Pursuant to that Act, the Community has adopted a Constitution and Bylaws which were duly approved by the Secretary of the United States Department of the Interior on December 17, 1936. Under the Community's Constitution, all executive and legislative powers are vested in a twelve-member Tribal Council. Article VI, Section 1(a) of the Constitution empowers the Tribal Council, "to protect and preserve the tribal property, wildlife and natural resources of the Community." In addition, Article VI, Section 1 (n) of the Constitution empowers the Tribal Council, "to promulgate and enforce ordinances which are intended to safeguard and promote the peace, safety, morals, and general welfare of the KBIC by regulating the conduct of trade and the use and disposition of property upon the Reservation."

The KBIC Tribal Water Quality Regulations provide the basis for all water management decisions and activities that affect Waters of the Reservation (WOR) including but not limited to point-source permitting and the physical alteration of water bodies, including wetlands. In addition, they recognize, protect, and provide for the sacred relationship that exists between the Ojibwa people of KBIC, their waters, and all life.

These regulations ensure compliance with section 303 and fulfilment of section 518 of the Clean Water Act to regulate water quality and quantity, and activities that affect water quality, quantity, and uses for the Reservation. They also ensure compliance with the anti-degradation goals of section 101 of the Clean Water Act. They are designed to meet or exceed the minimum requirements set by EPA in 40 CFR Parts 131 and 132 for Tribes and States in the Great Lakes Region under the Great Lakes Initiative. The tribal intent is to establish water quality requirements applicable to all WOR. The standards and requirements found (within this enactment) are intended to protect the public health and welfare; to restore, enhance, and conserve the chemical, physical, and biological integrity of our waters; and to protect the natural resources of KBIC for present and future generations.

Section 1.2 Territory Covered

These regulations shall apply to surface waters listed in or on Table 3.3.1 that are located within the exterior boundaries of the L'Anse Indian Reservation, including waters with reaches flowing

through the Reservation, and shall be used as the basis for water quality requirements applicable to all facilities, practices, and activities which may affect the quality and quantity of WOR. These standards shall be the primary basis by which all water quality based effluent limits will be established for point sources that affect any WOR. Appendix C is a map of the L'Anse Indian Reservation.

Notwithstanding the jurisdictional boundary, the Clean Water Act demands that upstream NPDES dischargers outside of the exterior boundaries of the Reservation comply with KBIC's downstream standards.

Section 1.3 Review and Amendment

1.3.1 Three-Year Review: At least once every three years, the Tribe shall hold public hearings for the purpose of reviewing these standards and, as appropriate, amend these standards.

1.3.2 Review and Amendment Generally: Notwithstanding Section 1.3.1, these regulations may be subject to amendment or modification at such time or as the need arises.

1.3.3 Public Participation and EPA Approval: Any potential modification of water quality standards shall be subject to public participation consistent with the requirements of 40 CFR 131.20 and 40 CFR 25. In addition, any amendments adopted by KBIC shall be submitted to the US EPA Region 5 Regional Administrator for review and approval.

Section 1.4 Severability

Should any provision(s) of these regulations be declared invalid or unconstitutional for any reason, the remainder of these regulations shall not be affected thereby.

Chapter 2: Definitions

Section 2.0 Definitions

The following definitions apply in this Regulation. Terms not defined in this section have the meaning given by the Clean Water Act and EPA implementing regulations.

***Acute*:** Effects due to short-term exposure.

***Acute toxicity*:** Concurrent and delayed adverse effect(s) that results from an acute exposure and occurs within any short observation period which begins when the exposure begins, may extend beyond the exposure period, and usually does not constitute a substantial portion of the life span of the organism. Criteria intended to protect against acute toxicity will be applied based on a 1-hour average.

***Adverse effect*:** Any deleterious effect to organisms due to exposure to a substance. This includes effects which are or may become debilitating, harmful, or toxic to the normal functions of the organism, but does not include non-harmful effects such as tissue discoloration alone or the induction of enzymes involved in the metabolism of the substance.

***Ambient conditions*:** Natural concentration of water quality constituents prior to mixing of either point or nonpoint source load of contaminants.

***Anthropogenic*:** Caused by or related to human actions either directly or indirectly.

***Background conditions*:** All loadings that: (1) flow from upstream waters into the specified watershed, waterbody or waterbody segment for which a TMDL, WLA in the absence of a TMDL or preliminary WLA for the purpose of determining the need for a WQBEL is being developed; (2) enter the specified watershed, waterbody or waterbody segment through atmospheric deposition or sediment release or resuspension; or (3) occur within the watershed, waterbody or waterbody segment as a result of chemical reactions.

***Bioaccumulation*:** The net accumulation of a substance by an organism as a result of uptake from all environmental sources.

***Bioaccumulation factor (BAF)*:** The ratio in liters per kilogram (L/kg) of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, where both the organism and its food are exposed and the ratio does not change substantially over time.

***Bioaccumulative chemical of concern (BCC)*:** BCCs include, but are not limited to, the pollutants identified as BCCs in 40 CFR Part 132, Table 6A, as amended. Any chemical that has the potential to cause adverse effects which, upon entering the surface waters, by itself or as its

toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor greater than 1,000, after considering metabolism and other physicochemical properties that might enhance or inhibit bioaccumulation. Chemicals with half-lives of less than eight weeks in the water column, sediment, and biota are not BCCs. The minimum BAF information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the BSAF methodology. The minimum BAF information needed to define an inorganic chemical, including an organometal, as a BCC is either a field-measured BAF.

***Carcinogen*:** A substance which causes an increased incidence of benign or malignant neoplasms in animals or humans, or substantially decreases the time to develop neoplasms.

***Chemical of concern*:** A chemical on EPA's list of pollutants that are the focus of the Great Lakes Water Quality Initiative identified in 40 CFR Part 132 Table 6, as amended. The pollutants on this list are categorized as either bioaccumulative chemicals of concern (BCCs) or pollutants that are not bioaccumulative chemicals of concern.

***Chronic toxicity*:** The highest concentration of a toxicant, whole effluent, or mixture that an aquatic organism can be exposed for a relatively long period without causing an adverse effect.

***Clean Water Act (CWA*):** The Clean Water Act, means the Federal Water Pollution Control Act (Pub. L. 92-500, as amended, (33 U.S.C. 1251 et seq,)). Regulates discharges of pollutants quality standards for surface waters into waters of the US.

***Control document*:** Any authorization issued by the appropriate permitting authority to any source of pollutants to waters under its jurisdiction and which specifies conditions under which the source is allowed to operate.

***Congener*:** Refers to a group of compounds that vary in the number of substituents and/or the configuration of these substituents, but share a basic chemical structure.

***Contaminant*:** A harmful chemical or biological substance which can be incorporated into, onto, or be ingested by aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment; or an anthropogenic input that alters any physical, biological or chemical property of the water.

***Criteria*:** Element of the Community's water quality standards, expressed as constituent concentrations or levels, or as a narrative statement, representing a quality of water that supports a particular use. When criteria are met, water quality will protect the designated use.

Criterion continuous concentration (CCC): Is an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The CCC averaging period is four days.

Criterion maximum concentration (CMC): Is an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The CMC averaging period is one hour.

***Critical habitat*:** A specific geographic area occupied by a species that is listed in accordance with the provisions of section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management consideration or protection.

***Degradation*:** Lowering of the existing quality of the WOR including, but not limited to, the chemical, physical, and biological characteristics and values associated with WOR. Undesirable changes in the beds and banks of WOR that constitute degradation include, but are not limited to, objectionable deposits, changes in the shore lands, changes in wetland vegetation, local ecology, and bank stability.

***Design flow*:** The stream flow that represents an anticipated daily discharge, upstream from the source but still protects aquatic life, human health, or wildlife. Design flow shall be used for the purpose of calculating waste load allocation for various criteria types found in 40 CFR 132, Appendix F, Procedure 3.E.1.

***Designated uses*:** Those uses specified in water quality standards for each waterbody or segment whether or not such uses are being attained.

***Discharge(s)*:** Water, regardless of whether or not the discharge results in a measurable increase in the concentration in the receiving water. Any addition of any wastewater or pollutant is considered a discharge, even if the concentration in the effluent is less than or equal to the background conditions. Also, any addition of any pollutant or combination of pollutants to water, regardless of whether or not the discharge results in a measurable increase in the concentration in the receiving water.

***Discharger(s)*:** Any person, business, legal entity, or other party who engages in activities resulting in a discharge into WOR.

***Dissolved solids*:** Refers to the amount of materials dissolved in water and is commonly expressed as a concentration in terms of milligrams per liter (mg/L).

***Drainage basin*:** A waterbody and the land area that drains to one stream, lake or river.

***E. coli or Escherichia coli*:** A specific bacterium used as an indicator of fecal (pathogen) pollution in fresh water environments, expressed as colony forming units (cfu) per 100 milliliters.

***Effluent*:** Refers to a wastewater discharge from a point source to the WOR.

***Effluent limitations*:** Any restriction imposed by the Keweenaw Bay Indian Community, EPA, and/or other federal entity, on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources intoWOR.

***Endangered or threatened species*:** Those species that are listed as endangered or threatened under section 4 of the Endangered Species Act.

***EPA and USEPA*:** The United States Environmental Protection Agency.

***Epilimnion*:** If a lake is deep enough, the water stratifies into layers created by the differing temperature and density of the water. The upper warmer, lighter layer is referred to as the epilimnion. The cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

***Existing uses*:** Those water and water-related uses by the Ojibwa peoples actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.

***Geometric Mean (GM)*:** The Nth root of the product of N numbers. Alternatively, the geometric mean can be calculated by adding the logarithms of N numbers, dividing the sum by N, and taking the antilog of the quotient. The geometric mean of two numbers is the square root of the product of the two numbers, and the geometric mean of one number is that number. Either natural (base e) or common (base 10) logarithms can be used to calculate geometric means as long as they are used consistently within each set of data, i.e., the antilog used must match the logarithm used.

***Great Lakes System*:** All the streams, rivers, lakes, and other waterbodies within the drainage basin of the Great Lakes within the United States.

***Hydric*:** Water saturated.

***Hypolimnion*:** If a lake is deep enough, the water stratifies into layers created by the differing temperature and density of the water. The upper warmer, lighter layer is referred to as the epilimnion. The cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

***Loading*:** The addition of a substance to a waterbody.

***Micrograms per liter (ug/l)*:** Equivalent to 10^{-9} kilograms per liter; may also be referred to as parts per billion (ppb).

***Milligrams per liter (mg/l)*:** Equivalent to 10^{-6} kilograms per liter; may also be referred to as parts per million (ppm).

***Natural biological community*:** The characteristic/expected biological community for a water body absent human-induced impacts to WOR.

***Non-bioaccumulative Chemical of Concern (Non-BCC)*:** A chemical not listed as a BCC in 40 CFR Part 132 Table 6B.

***Nonpoint source pollution*:** Pollution sources that are diffuse and do not have a single point of origin and are introduced into WOR, from a nonspecific outlet. The pollutants are generally carried by runoff, including urban runoff. Sources of pollution that are regulated under the NPDES program are not considered nonpoint source pollution.

***Numeric criteria*:** A quantified expression of the concentrations representing a quality of water that supports a particular use.

***Organoleptic effects*:** Non-toxicity based criteria effects affecting or involving a sense organ such as that of taste, smell, or sight, which make water and edible aquatic life unpalatable but non-toxic to humans.

***Permit*:** A legal authorization or license which regulates activity within the L'Anse Reservation and is issued by the Community or other appropriate permitting authority.

***Permitting authority*:** Regulatory authority relative to issuance of permits pursuant to the CWA lies with the Environmental Protection Agency, until such time as permitting authority maybe delegated by the EPA to the Keweenaw Bay Indian Community. For on-reservation activities, EPA is the permitting authority for NPDES permits and Army Corps of Engineers (ACoE) is the permitting authority for CWA Section 404 permits. For off reservation activities, Michigan Environmental, Great Lakes, and Energy (EGLE) is the permitting authority for both NPDES permits and Section 404 permits. Consistent with Section 401 of the CWA, no federal permit or license may be issued unless the Tribe certifies that the activity will comply with all applicable criterion.

***Point source*:** Any discernable, confined and discrete conveyance from which wastewater is or may be discharged to the WOR that may include, but is not limited to, a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other watercraft from which pollutants are or may be discharged.

***Pollutant*:** Shall mean dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into WOR.

***Pollution*:** Shall mean a man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

***Receiving waters*:** The waters or watercourse of the Reservation into which an effluent is or may be discharged.

***The Reservation*:** Refers to the L'Anse Indian Reservation. A map of the established exterior boundaries of the L'Anse Indian Reservation can be found in Appendix C.

***Statistical threshold value (STV)*:** The approximation of the 90th percentile of the water quality distribution, intended to be a value that should not be exceeded by more than 10 percent of the samples taken.

***Surface water*:** All water above the surface of the ground within the boundaries of the L'Anse Reservation including but not limited to lakes, ponds, reservoirs, artificial impoundments, streams, rivers, springs, seeps, and wetlands.

***Thermocline*:** If a lake is deep enough, the water stratifies in to layers created by the differing temperature of the water which alters its density. The upper, warmer, less dense layer is referred to as the epilimnion. The lower, cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

***Tribal Council*:** Twelve members of an elected governing body of the KBIC. This body is empowered with authority and jurisdiction over KBIC which is dictated by the Constitution and Bylaws of the KBIC.

***Tributary*:** A river, stream, or creek inlet flowing into a larger waterbody.

***Trophic level*:** This refers to the position of a species within a food chain or food web. For example, the lowest trophic level are plants. The second trophic level are the herbivores. The third trophic level are carnivores that feed on herbivores. The fourth trophic level are carnivores that feed on carnivores.

***Turbidity*:** The clarity of water expressed as nephelometric turbidity units (NTU) and measure with a calibrated turbidity meter.

***Uptake*:** The acquisition of a substance from the environment by an organism as a result of any active or passive process.

***Urban runoff*:** Storm water from city streets and adjacent domestic or commercial properties, construction and other surface disturbance sites, parking lots and other impermeable surfaces. It is one of the means by which terrestrial pollutants are conveyed to receiving waters.

***Water quality standards variance*:** A time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the WQS variance.

***Wastewater*:** Wastewater is water from any combination of, but not limited to, domestic, industrial, commercial, or agricultural activities and any sewer inflow or sewer infiltration. It can contain physical, chemical, and biological pollutants.

***Water column*:** The pelagic/open water in a body of water that is measured from the surface to the bottom sediments.

***Waters of the Reservation (WOR)*:** Such accumulations of water, surface and/or underground, natural or artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon the L'Anse Reservation. The term does not include any pond, reservoir or facility-built water body for reduction or control of pollution or cooling of water prior to discharge unless the discharge therefrom causes or threatens to cause water pollution. This definition includes, but is not limited to; inland lakes, rivers, streams, creeks, wetlands, impoundments, and open drains and all other surface waterbodies of water within the boundaries of the Reservation.

***Wetlands or wetland ecosystems*:** Transitional lands between terrestrial, aquatic systems and isolated wetlands where the water table is usually at or near the surface or the land is covered by shallow water. It includes those areas 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 hydric soil conditions. Wetlands generally include swamps, marshes, bogs, muskegs, fens, and similar areas.

***Whole Effluent Toxicity*:** An aggregate toxic effects on aquatic organisms from all pollutants in a facility's wastewater.

***Wild rice (Zizania palustris / aquatica*):** A tall, aquatic grass which produces an edible grain native to the regional areas of Canada and the northern United States. The harvesting, propagation, and protection of wild rice are of significant cultural value to KBIC.

Chapter 3: Designated Uses and Affected Waterbodies

Section 3.1 Designated Uses

Designated uses are assigned to individual waterbodies in order to protect water quality appropriate for each use. All waters are assigned a designated use but not all designated uses listed below apply to all waterbodies within or that flow into KBIC's borders.

3.1.1 Cold and Cool Water Aquatic Life (CW1 and CW2)

This designated use is intended to provide for the protection and propagation of aquatic life that are characteristic of relatively cold or cool water or areas which serve as spawning or nursery habitat or areas of overwintering for any cold or cool water aquatic communities.

For example:

Cold/Cool water fish that are typical to this region include, but are not limited to:

Cold Water (CW1)

- Trout and salmon (salmonids),
- Whitefishes (lake whitefish, cisco (commonly known as lake herring), deep-water chubs, etc.), and
- Burbot, Lake Sturgeon, a variety of forage species (sucker, redhorse)

Cool Water (CW2)

- Percids (walleye, yellow perch, logperch, etc.), and
- Smallmouth bass, a variety of forage species (bullhead, sucker, common carp, black crappie, etc.)

Aquatic life uses are intended to protect the entire aquatic community, not just fish. A designation of the CW1 and CW2 uses will be based on an overall evaluation of the biological community that a waterbody can feasibly support. These lists are provided just for convenience/illustrative purposes.

3.1.2 Warm Water Aquatic Life (WW)

This designated use is intended to provide for the protection and propagation of aquatic life that are characteristic of warm water aquatic environments or serve as spawning or nursery habitat for warm water aquatic communities.

For example:

Warm water fish that are typical of this region include, but are not limited to:

Warm Water (WW)

- largemouth bass, rock bass, various panfish (bluegill, pumpkinseed, sunfish, etc.), and various minnow (Cyprinidae) species.

Aquatic life uses are intended to protect the entire aquatic community, not just fish. A designation of the WW use will be based on an overall evaluation of the biological community that a waterbody can feasibly support. This list is provided just for convenience/illustrative purposes.

3.1.3 Wetlands (T)

This designated use is for areas on the landscape where water meets the land and is either permanent or seasonal, natural or artificial, inundated or saturated, by surface water or ground water. At a duration and frequency that is sufficient to create anaerobic conditions resulting in hydric soils. These environments support a prevalence of vegetation that is adapted for life in aquatic or saturated soils. These areas are referred to as; swamps, marshes, wet meadows, vernal pools, muskegs, bogs, fens, shrub thickets, floodplain, etc.

3.1.4 Wildlife Use (W)

This designated use if for waters that support or could potentially support wildlife.

3.1.5 Recreational Use, Primary Contact (R1) and Secondary Contact (R2)

A. Primary Contact (R1): This designated use is for WOR that support or could potentially support recreational use which involves direct contact with water to the point of complete submersion and involves the risk of incidental ingestion of water in quantities sufficient to pose a potential health risk. These uses include swimming, water-skiing, surfing, skin/scuba diving, or any other activity which will most likely lead to immersion of the head into said waterbody.

B. Secondary Contact (R2): This designated use is for WOR that support or could potentially support recreational use of any waterbody where direct contact may but need not occur and does not normally involve immersion including the head or the incidental ingestion of water. These uses include boating, fishing, sailing, hiking, wading, hunting, trapping, or any other activity that would not likely lead to complete immersion into said waterbody.

3.1.6 Ceremonial, Religious, Spiritual Use, or Cultural Use (SC)

Water-based activities essential to maintaining the Tribe's cultural heritage, including but not limited to ceremony, subsistence fishing, hunting and harvesting. This use includes primary and secondary contact

3.1.7 Wild Rice (WR)

This designated use is for streams, lakes, or impoundments or portions thereof, presently, historically, or that have potential to support the sustainable growth and safe consumption of wild rice (*Zizania palustris* or manoomin).

3.1.8 Navigational Use (N)

This designated use is for the water quality that is adequate for navigation in and on the water.

3.1.9 Agricultural and/or Industrial Use (A)

This designated use if for WOR that support or could potentially support the water quality for agricultural purposes including irrigation of crops, aquaculture, poultry, livestock watering, grazing, farming, ranching, and the support of vegetation. It also provides for the use of water for industrial cooling and processing purposes.

Table 3.1.1 Numeric and Narrative Reference to Chapter 4 by Designated Use, also see Appendix A for Calculations for Human Health Criteria

The designated uses are supported by the numeric and narrative criteria provided in the table below. For example, cold and cool water aquatic life criteria are associated with the numeric criteria in table 4.6.2, and narrative criteria in sections 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.7 and 4.3.8.

Designated Use	Numeric by Table	Narrative by Section
Cold and Cool Water Aquatic Life	4.6.2	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6 4.3.7
Warm Water Aquatic Life	4.6.2	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.7
Wetland	4.6.2	4.3.1, 4.3.4
Wildlife Use	4.6.3	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8
Primary Contact	4.6.1	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8
Secondary Contact	4.6.1	4.3.1, 4.3.2, 4.3.3. 4.3.5,
Ceremonial, Religious, Spiritual and Cultural Use	4.6.1	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.8
Wild Rice	4.6.2.a	4.5
Navigational	-	4.3.1
Agricultural, Industrial	-	4.3.1, 4.3.7

Section 3.2 Downstream Protection

All surface waters shall maintain a level of water quality to downstream waters that provide for the attainment and maintenance of the WQS downstream as found in 40 CFR 131.10(b). Both numeric and narrative criteria apply to downstream protection, these numeric and narrative criteria have the same protections as upstream criterion.

Section 3.3 Affected Waters and Associated Designated Uses

The waters listed in Table 3.3.1 are those affected by the regulations of KBIC. As more than one designated use may apply to a given waterbody, the most restrictive criteria for one or more of those designated uses shall apply to that waterbody.

Table 3.3.1 Designated uses for KBIC waterbodies

Unless otherwise specified, all waters are designated as recreational use, aquatic life use, navigational and ceremonial, religious, spiritual, and cultural uses.

Waters	Designated Uses										Location
	CW1	CW2	WW	T	W	R	SC	WR	N	A	
Bishop Lake	Y	Y	Y		Y	R1 R2	Y	Y	Y	Y	50N 33W 13 50N 33W 24
Camp Creek	Y				Y	R1 R2	Y		Y	Y	51N 32W 25 51N 32W 36
Dakota Creek	Y			Y	Y	R1 R2	Y		Y	Y	51N 32W 26 51N 32W 25 51N 32W 27 51N 32W 35 51N 32W 36
Daults Creek	Y			Y	Y	R1 R2	Y		Y	Y	50N 33W 27 50N 33W 22 50N 33W 34 50N 33W 35
Denomie Creek	Y			Y	Y	R1 R2	Y		Y	Y	50N 33W 22 50N 33W 23 50N 33W 25 50N 33W 36 50N 32W 19
Gomanche Creek and its tributaries	Y			Y	Y	R1 R2	Y	Y	Y	Y	50N 33W 13 50N 33W 12 50N 32W 07 50N 32W 06 50N 32W 19 50N 33W 24 50N 32W 30

Waters	Designated Uses										Location
	CW1	CW2	WW	T	W	R	SC	WR	N	A	
Kalio Creek	Y				Y		Y		Y	Y	51N 32W 14 51N 32W 15

						R1 R2					51N 32W 21 51N 32W 22 51N 32W 23
Kelsey Creek	Y				Y	R1 R2	Y	Y	Y	Y	51N 33W 05 51N 33W 06 51N 33W 07 51N 33W 18
Laughs/Laws/Lost Lake			Y		Y	R1 R2	Y	Y	Y	Y	50N 32W 18
Linden Creek	Y				Y	R1 R2	Y		Y	Y	50N 33W 03 50N 33W 02 50N 33W 01 50N 33W 12 50N 33W 11
Little Carp River	Y			Y	Y	R1 R2	Y		Y	Y	51N 33W 19 51N 33W 30 51N 33W 20 51N 33W 17 51N 33W 16 51N 33W 09 51N 33W 10 51N 33W 31
Little Silver Creek	Y			Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 16 51N 32W 18 51N 32W 17 51N 32W 20 51N 32W 21 51N 32W 15 51N 32W 10

Waters	Designated Uses										Location
	CW1	CW2	WW	T	W	R	SC	WR	N	A	
Meadow Creek	Y				Y	R1 R2	Y		Y	Y	51N 32W 31 51N 32W 29 51N 32W 30 51N 32W 32 51N 33W 36 50N 33W 03
Mud Lakes and Sloughs			Y	Y	Y	R1 R2	Y	Y	Y	Y	51N 33W 10 51N 33W 15
Page(s) Creek	Y			Y	Y	R1 R2	Y		Y	Y	50N 32W 06 50N 32W 05 50N 32W 08 50N 32W 09 50N 32W 17
Pekala Creek	Y			Y	Y	R1 R2	Y	Y	Y	Y	50N 33W 22 50N 33W 27 50N 33W 26 50N 33W 35
Pequaming coastal sloughs and wetland			Y	Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 04 51N 32W 09
Pinery Lakes			Y	Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 32 50N 33W 02
Robillard Creek	Y	Y		Y	Y	R1 R2	Y	Y	Y	Y	50N 33W 14 50N 33W 15 50N 33W 23 50N 33W 24 50N 33W 13 50N 33W 25 50N 32W 30
Sand Point Sloughs			Y	Y	Y	R1 R2	Y	Y	Y	Y	51N 33W 23 51N 33W 26 51N 33W 27

Waters	Designated Uses										Location
	CW1	CW2	WW	T	W	R	SC	WR	N	A	
Silver River and its tributaries	Y	Y	Y	Y	Y	R1 R2	Y	Y	Y	Y	50N 32W 06 50N 32W 07 50N 32W 18
Silver River and its tributaries	Y	Y		Y	Y	R1 R2	Y	Y	Y	Y	50N 32W 17 50N 32W 16 50N 32W 21
Silver River and its tributaries	Y	Y		Y	Y	R1 R2	Y	Y	Y	Y	50N 32W 28 50N 32W 20 50N 32W 29
Silver River and its tributaries	Y			Y	Y	R1 R2	Y	Y	Y	Y	50N 32W 32 50N 32W 33 51N 32W 34
Silver River and its tributaries	Y			Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 35 51N 32W 27 51N 32W 28
Silver River and its tributaries	Y			Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 26 51N 32W 23 51N 32W 24
Silver River and its tributaries	Y			Y	Y	R1 R2	Y	Y	Y	Y	51N 32W 13 51N 31W 18 51N 32W 33

Waters	Designated Uses										Location
	CW1	CW2	WW	T	W	R	SC	WR	N	A	
Third Lake (including its inlet creek)			Y		Y	R1 R2	Y	Y	Y	Y	51N 32W 33
Unnamed #1 Creek into Huron Bay	Y			Y	Y	R1 R2	Y	Y	Y	Y	51N 31W 05
											51N 31W 06
											51N 32W 01
											51N 32W 12
Unnamed #2 Creek into Huron Bay	Y				Y	R1 R2	Y	Y	Y	Y	51N 31W 07
											51N 32W 11
											51N 32W 12
Unnamed #3 Creek into Huron Bay	Y				Y	R1 R2	Y	Y	Y	Y	51N 31W 07
											51N 32W 12

Chapter 4: Water Quality Standards and Criteria

Section 4.1 Legislative Intent and Interpretation of this Chapter

These standards are the minimum water quality requirements by which the WOR must meet.

Section 4.2 General Narrative Criterion

Pollutants shall not be present in concentrations that prevent the attainment of any designated use, cause or contribute to an adverse effect to human, plant, animal or aquatic life, or interfere with the normal propagation, growth, and survival of indigenous aquatic biota.

Section 4.3 Standards for Physical and Aesthetic Water Quality and Conventional Pollutants

4.3.1 Physical and Aesthetic Water Quality: The WOR shall be free of substances attributable to anthropogenic sources, that:

A. Settle to form objectionable deposits;

B. Float as debris, scum, oil, or other matter forming nuisances;

C. Produce objectionable color, odor, taste, or turbidity;

D. Cause injury to, are toxic to, or produce adverse physiological responses in humans, animals, or plants; and/or

E. Produce undesirable or nuisance aquatic life.

4.3.2 Dissolved Solids: At no time shall the specific conductance exceed the specific conductance which would occur if there were no change attributable to human activities. Additionally, if EPA publishes updated national recommended criteria for specific ions after these WQS become effective, they will immediately take effect and shall apply to all waters with an Aquatic Life designated use.

4.3.3 Organoleptic Substances: The WOR shall contain no taste-producing or odor-producing substances in concentrations that impair or may impair their use for a public or agricultural water supply source or as recreational water or impair the palatability of fish as measured by test procedures approved by EPA.

4.3.4 pH: For all waters with an aquatic life designated use, the pH shall be maintained within the range of 6.5 to 9.0, except where the background pH lies outside this range. Any artificially induced change in the natural pH shall not exceed 0.5 units of pH.

4.3.5 Nutrients: Nutrients entering WOR as a result of human activity shall be limited to prevent the nuisance growth of algae, macrophytes, fungi, or bacteria. Concentrations of phosphorus and nitrogen shall not exceed the following values (Appendix B):

> *Lakes and Reservoirs:* 14 µg/L of phosphorus as TP and 0.50 mg/L of nitrogen as TN, measured as the mean concentration during the period June 1 to September 15
>
> *Rivers and Streams:* 12 µg/L of phosphorus as TP and 0.38 mg/L of nitrogen as TN, measured as the median concentration during the period May 1 to October 31

The time periods for assessment correspond approximately to the period during which productivity is elevated in WOR, and the specification of the median for streams recognizes the greater inherent variability in water chemistry that occurs in flowing waters (vs. the mean for lakes). Exceedance of these criteria will be assessed based on a two-sided 80% confidence interval of the mean/median of the assessment data. If the lower confidence limit exceeds the applicable criterion, there is 90% certainty that the mean/median exceeds the criteria. This approach allows for some annual exceedances of the criteria during the assessment period.

4.3.6 Dissolved Oxygen: In WOR designated for aquatic life, the daily minimum Dissolved Oxygen (DO) shall not be less than 5 mg/L.. For WOR designated for cold water (CW1) aquatic life, the daily minimum DO shall not be less than 8 mg/L when and where early life stages of cold water fish occur. For stratified lakes, these criteria shall apply to the epilimnion. Average DO shall be maintained at a sufficient concentration to protect the naturally-ocurring biota,consistent with the General Narrative Criterion (Section 4.2).

4.3.7 Temperature: In WOR designated for aquatic life other than the cold water aquatic life use, no measurable change in temperature from other than natural causes shall be allowed that causes or contributes to an adverse effect to the natural biological community, and natural daily and seasonal temperature fluctuations shall be preserved. For those waters designated for cold water aquatic life, there shall be no measurable increase in temperature from other than natural causes.

4.3.8 Microorganisms: The following criteria shall apply to WOR designated for Primary Contact and Ceremonial, Religious, Spiritual Use or Cultural Use:

A. E. coli criteria: Geometric mean (GM) of 100 cfu per 100 mL and Statistical Threshold Value (STV) of 320 cfu per 100 mL measured using EPA Method 1603, or any other equivalent method that measures culturable E. coli.

B. The waterbody GM shall not be greater than the criterion in any 30-day interval. There should not be greater than a ten percent excursion frequency of the STV in the same 30-day interval.

Section 4.4 Radionuclides

Concentrations of radioactive pollutants shall not exceed the background concentration caused by naturally occurring materials.

Section 4.5 Criteria for the Protection of Wild Rice

Water quantity and quality that may limit the growth and propagation of, or otherwise cause or contribute to an adverse effect to wild rice shall be prohibited. The following criteria shall be met in WOR with a wild rice use designation:

A. Natural hydrological conditions supportive of the natural[1] biological community, including all flora and fauna, and physical characteristics naturally present in the waterbody shall be maintained;

B. Surface water quality shall be maintained at levels that prevent toxicity to wild rice.

Section 4.6 Criteria for the Protection of Human Health, Aquatic Life, and Wildlife

4.6.1 Numeric Criteria: Numeric criteria shall apply to all WOR in order to govern water management decisions and activities that affect WOR, and to protect and enhance water quality. The numeric criteria as set forth in Tables 4.6.1 – 4.6.3 have been established for different objectives, in particular, the protection of human health, aquatic life, and wildlife; further, both acute and chronic criteria apply.

Table 4.6.1 Numeric Criteria for the Protection of Human Health. Applicable to WOR designated as CW1, CW2, WW, C, or R.

Table 4.6.2 Aquatic Life Chronic and Acute Toxicity Values. Applicable to WOR designated as CW1, CW2, or WW.

Table 4.6.3 Water Quality Criteria for the Protection of Wildlife. Applicable to WOR designated as W.

4.6.2 Application Criteria Where More Than One Criterion Exists in the Tables: Levels of pollutants in the WOR shall not exceed the lowest applicable aquatic life, human health, or wildlife value where the applicability of a value is determined by the waters designated use.

4.6.2 A Pollutant For Which There Is No Numeric Criterion in the Tables: In the absence of an aquatic life, human health, or wildlife value for a given pollutant in Tables 4.6.1 – 4.6.3, values shall be derived in accordance with the methodology described in 40 CFR 132, Final

[1] "Natural" indicates the absence of human impacts

Water Quality Guidance for the Great Lakes Basin, as amended, except where updated exposure factors are available.

Table 4.6.1: Ambient water quality criteria for the protection of human health. Supporting calculations and inputs are provided in Appendix A. The following criteria shall not be exceeded over the long-term average of 30-days.

Chemical	Drinking Water[b] (ug/L)	Nondrinking Water (ug/L)
Benzene	3.96E-01	1.14E+00
Chlordane	1.57E-05	1.57E-05
Chlorobenzene	1.00E+02	2.31E+02
Cyanides	4.00E+00	1.42E+02
DDT	1.01E-06	1.01E-06
Dieldrin	5.31E-08	5.31E-08
2,4-Dimethylphenol	1.00E+02	7.19E+02
2,4-Dinitrophenol	1.00E+01	1.11E+02
Hexachlorobenzene	3.80E-06	3.80E-06
Hexachloroethane	1.44E-02	1.47E-02
Lindane	4.66E-01	4.67E-01
Mercury	1.31E-04	1.31E-04
Methylmercury	2.25E-02 [a]	2.25E-02 [a]
Methylene chloride	1.42E+01	9.53E+01
PCBs	9.94E-08	9.94E-08
2,3,7,8-TCDD	5.70E-11	5.70E-11
Toluene	5.70E+01	1.44E+02
Toxaphene	4.38E-05	4.39E-05
Trichloroethylene	2.80E-01	4.81E-01

[a] Methylmercury criteria are in units of mg/kg (meHg/tissue)

[b] Although no water bodies are currently designated as drinking water sources, these criteria are included here for potential future reference.

Table 4.6.2: Aquatic Life criteria for the protection and propagation of fish, shellfish, and wildlife. Values are consistent with national recommended criteria; see table notes for additional details. The CMC (4-day average) is a measure of chronic exposure. The CCC (1-hour average) is a measure of acute exposure.

Compound	Criterion Maximum Concentration (CMC) (µg/L)	Criterion Continuous Concentration (CCC) (µg/L)
Acrolein	3	3
Aldrin[a]	3	-
Alkalinity[b]	-	20000
alpha-Endosulfan[a,c]	0.22	0.056
Aluminum[d]	See Footnote d	
Ammonia	See Table 4.6.2.d	
Arsenic[e,f]	340	150
beta-Endosulfan[a,c]	0.22	0.056
Cadmium[f]	See Table 4.6.2.b	
Carbaryl	2.1	2.1
Chlordane[a]	2.4	0.0043
Chloride	860000	230000
Chlorine	19	11
Chlorpyrifos	0.083	0.041
Chromium (III)[f]	See Table 4.6.2.b	
Chromium (VI)[f]	16	11
Copper[f, g]	See Footnote g	
Cyanide[h]	22	5.2
Demeton	-	0.1
Diazinon	0.17	0.17
Dieldrin	0.24	0.056[a]
Endrin	0.086	0.036[h]
gamma-BHC (Lindane)	0.95	-
Guthion	-	0.01
Heptachlor[a]	0.52	0.0038
Heptachlor Epoxide[a,j]	0.52	0.0038
Iron	-	1000
Lead[f]	See Table 4.6.2.b	
Malathion	-	0.1
Methoxychlor	-	0.03
Mirex	-	0.001
Nickel[f]	See Table 4.6.2.b	
Nonylphenol	28	6.6
Parathion	0.065	0.013

Pentachlorophenol	$e^{1.005(pH) - 5.134}$	$e^{1.005 (pH) - 4.869}$
Selenium	See Table 4.6.2.c	
Silver[a,f]	See Table 4.6.2.b	
Sulfide-Hydrogen Sulfide	-	2
Toxaphene	0.73	0.0002
Tributyltin (TBT)	0.46	0.072
Zinc[f]	See Table 4.6.2.b	
4,4'-DDT[a]	1.1	0.001

a. These criteria are based on the 1980 criteria, which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines. For example, the 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.
b. The CCC of 20mg/L is a minimum value except where alkalinity is naturally lower, in which case the alkalinity cannot be lower than 25% of the natural level.
c. This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
d. Acute (CMC) and chronic (CCC) aluminum criteria values for a site shall be calculated using the 2018 Aluminum Criteria Calculator as established in EPA's Final Aquatic Life Ambient Water Quality Criteria for Aluminum 2018 (EPA 822–R–18–001).
e. This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic.
f. Criteria for these metals are expressed in terms of the dissolved metal in the water column. See Table 4.6.2.a for conversion factors.
g. Acute (CMC) and chronic (CCC) copper criteria for a site shall be developed using EPA's 2007 *Aquatic Life Ambient Freshwater Quality Criteria—Copper* (EPA–822–R–07–001), which incorporates use of the copper biotic ligand model (BLM).
h. These recommended water quality criteria are expressed as µg free cyanide per liter.
i. The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.
j. This value was derived from data for heptachlor and there was insufficient data to determine relative toxicities of heptachlor and heptachlor epoxide.

Table 4.6.2.a: Conversion Factors for Aquatic Life Dissolved Metals Criteria. May be applied to convert total recoverable concentrations to dissolved concentrations for application of metals criteria (Table 4.6.2).

Metal	CMC	CCC
Arsenic	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Chromium III	0.316	0.860
Chromium VI	0.982	0.962
Copper	0.960	0.960
Lead	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]
Nickel	0.998	0.997
Selenium	—	—
Silver	0.85	—
Zinc	0.978	0.986

Table 4.6.2.b: Parameters for Calculating Aquatic Life Dissolved Metals Criteria That Are Hardness-Dependent. Aquatic Life criteria (Table 4.6.2) for these metals are calculated using the equations and tabulated parameter values below. Formulae use the dissolved concentrations; the conversion factors provided may be used to convert from total recoverable to dissolved concentration.

Chemical	mA	bA	mC	bC	Conversion Factors (CF)	
					CMC	CCC
Cadmium	0.9789	-3.866	0.7977	-3.909	1.136672-[(*ln*hardness)(0.041838)]	1.101672-[(*ln*hardness)(0.041838)]
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Lead	1.273	-1.460	1.273	-4.705	1.46203-[(*ln*hardness)(0.145712)]	1.46203-[(*ln*hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	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

Hardness-dependent metals criteria are calculated using the following equations:

CMC (dissolved) = exp{mA [*ln*(hardness)]+ bA} (CF)

CCC (dissolved) = exp{mC [*ln*(hardness)]+ bC} (CF)

Table 4.6.2.c: Selenium Aquatic Life Criteria: Both fish-tissue based and water-based criteria are specified.

Criterion Element	Magnitude	Duration	Frequency
Fish Tissue[a] (Egg-Ovary)[b]	15.1 mg/kg dw	Instantaneous measurement[c]	Not to be exceeded
Fish Tissue[a] (Whole Body or Muscle)[d]	8.5 mg/kg dw or 11.3 mg/kg dw muscle (skinless, boneless filet)	Instantaneous measurement[c]	Not to be exceeded
Water Column[e] (Monthly Average Exposure)	1.5 µg/L in lakes 3.1 µg/L in river/streams	30 days	Not more than once in three years on average
Water Column[e] (Intermittent Exposure)[f]	$WQC_{int} = \frac{WQC_{30\text{-}day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$	Number of days/month with an elevated concentration	Not more than once in three years on average

a. Fish tissue elements are expressed as steady-state.
b. Egg/ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured.
c. Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.
d. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured.
e. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. Water column values are the applicable criterion element in the absence of steady-state condition fish tissue data.
f. Where *WQC30-day* is the water column monthly element, for either a lentic or lotic waters; *Cbkgrnd* is the average background selenium concentration, and *fint* is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).

Table 4.6.2.d: Ammonia Aquatic Life Criteria: Criteria are calculated as a function of ambient pH and temperature.

Mg Total Ammonia Nitrogen (TAN)/L	
Acute (CMC) equation	$$CMC = MIN\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{pH-7.204}}\right),\left(0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\times\left(23.12\times 10^{0.036\times(20-T)}\right)\right)\right)$$
Chronic (CCC) equation (30 – day rolling average) *	$$CCC = 0.8876\times\left(\frac{0.0278}{1+10^{7.688-pH}}+\frac{1.1994}{1+10^{pH-7.688}}\right)\times\left(2.126\times 10^{0.028\times(20-MAX(T,7))}\right)$$

Acute (CMC) and chronic (CCC) freshwater ammonia criteria were developed using EPA's 2013 *Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater* (EPA–822–R–13–001), which is hereby incorporated by reference. Illustrations, tables, and formulae used in the development of these equations can be found on pages 40-52 of the criteria document.

Criteria duration: the acute criterion is a one-hour average and the chronic criterion is a thirty-day rolling average. Criteria frequency: Not to be exceeded more than once in 3 years.

* Not to exceed 2.5 times the CCC as a 4-day average within the 30-days, *i.e.* 4.8 mg TAN/L at pH 7 and 20 ◦C. more than once in 3 years on average.

Table 4.6.3: Water Quality Criteria for the Protection of Wildlife: Water-quality criteria for the protection of wildlife (Tier I Great Lakes Wildlife Criteria, 40 CFR Part 132). Note that criteria for the protection of human health (Table 4.6.1) for these pollutants are more stringent.

Pollutant	Wildlife Chronic (ug/L)
DDT and metabolites	1.1E-5
Mercury (including methylmercury)	1.3 E-3
PCBs (as a class)	1.2E-4
2,3,7,8-TCDD (dioxin)	3.1E-9

Chapter 5: Antidegradation, Variances, Compliance Schedules, and Mixing Zones

Section 5.1 Antidegradation Policy

This antidegradation policy shall be applicable to any source (nonpoint or point) that is anticipated to result in new or increased loading of pollutants to surface WOR, on or after the date of EPA's approval of the KBIC water quality standards. New and existing point sources will achieve the highest regulatory requirements while nonpoint sources will be subject to all cost effective and reasonable best management practices. KBIC shall provide an opportunity for public involvement during the development and of any revisions of the implementation methods.

Tier 1 Policy:

Existing instream uses and the water quality necessary to protect designated uses shall be maintained and protected. Where designated uses of the waterbody are not attained, there shall be no lowering of the water quality with respect to the pollutant or pollutants that are causing the nonattainment. The level of water quality necessary to protect designated uses shall be maintained and protected at or above Tier 1.

Tier 2 Policy:

Lowering water quality has to be necessary to accommodate important economic or social development within the borders of KBIC and shall be subject to public participation. If it is demonstrated that there are no feasible or prudent alternatives to a lowering of water quality and the lower water quality is necessary to accommodate important tribal cultural, social and economic development on the Reservation then one or more practicable alternatives will be analyzed to determine what route a lowering in water quality is implemented and to prevent or lessen degradation. KBIC shall assure water quality is adequate to protect designated uses when degradation or lowering water quality is necessary. After one or more alternatives have been analyzed and it is decided that lowering is necessary, KBIC shall select one alternative to be implemented.

Outstanding Keweenaw Bay Indian Community Resource Waters (OKRW) are waterbodies that have water quality that is better than the numeric and narrative criteria. OKRW correspond to EPA's Tier 2 antidegradation policy. These waters shall be identified on a water body by water body basis as described in 40 CFR 131.12 (a)(2)(i). KBIC shall provide an opportunity for public involvement regarding decisions on protections of these waters and shall not exclude a water body from protections soley because water quality does not exceed levels necessary to support all designated uses.

All waters, including any portion flowing through, upstream reaches or within the exterior boundaries of the Reservation and that are not listed on Table 5.1.1 as Outstanding National Resource Waters (ONRWs) are designated OKRW.

Tier 3 Policy:

KBIC shall ensure, through the application of appropriate controls on pollutant sources, that water quality is maintained and protected for WOR identified by the KBIC as Outstanding National Resource Waters (ONRW)s and will not be subject to any lowering of water quality. These WOR have ceremonial, religious, spiritual and cultural uses that are important to the tribe's way of life. ONRWs are important for the cultivation of wild rice or have other special resource values. These WOR are considered to be of high quality and culturally important for the fisheries and ecosystems they support. WOR designated as ONRWs are shown on Table 5.1.1 in this section of these regulations. These WOR correspond to Tier 3 waters under the EPA's antidegradation policy. Although, temporary (i.e., weeks or months) lowering of water quality may be permitted, as determined on a case by case basis by KBIC. In those cases where a lowering of water quality is associated with a thermal discharge, the decision to allow such degradation shall be consistent with section 316 of the Clean Water Act. Waters that may be considered for designation as ONRW include, but are not limited to, water bodies that are recognized as:

A. Having exceptional recreational significance;

B. Having exceptional ecological significance;

C. Having other special environmental, recreational, or ecological attributes; or WOR whose designation as ONRW are reasonably necessary for the protection of other WOR so designated.

Table 5.1.1 Outstanding National Resource Waters

Waterbody	Location
Laugh's Lake	50N 32W 18
Mud Lakes and Sloughs	51N 33W 10 51N 33W 15
Pequaming Bay coastal wetland	51N 32W 04 51N 32W 09
Sand Point Sloughs	51N 33W 23 51N 33W 26 51N 33W 27
Silver River and tributaries	50N 32W 06 50N 32W 07 50N 32W 18 50N 32W 17 50N 32W 16 50N 32W 21 50N 32W 28 50N 32W 20 50N 32W 29 50N 32W 32 50N 32W 33 51N 32W 34 51N 32W 35 51N 32W 27 51N 32W 28 51N 32W 26 51N 32W 23 51N 32W 24 51N 32W 13 51N 31W 18 51N 32W 33

Section 5.2 Antidegradation Implementation Procedures

Section 5.2.1 Significant Lowering of Water Quality

A significant lowering of water quality occurs when there is a new or increased loading of any pollutant, either nonpoint sources or point sources for which there is a control document or reviewable action. After antidegradation is satisfied, a proposed control document will need to

be provided to KBIC and if the project is implemented through 401, the federal permitting authority. The control document will be reviewed by KBIC for compliance of the Tribe's water quality standards, after review the KBIC will decide to approve or deny the applicant. During the review process the public will be able to submit comments and the implementation methods shall be made available to the public there after. Situations that trigger a lowering of water quality include, but are not limited to:

A. Modification of an existing regulated facility operating under a current control document such that the production capacity of the facility is increased;

B. Construction of a new regulated facility or modification of an existing regulated facility such that a new or modified control document is required;

C. Addition of a new source of untreated or pretreated effluent containing or expected to contain any pollutant to an existing wastewater treatment works, whether public or private;

D. A request for an increased limit in an applicable control document;

E. Other deliberate activities that, based on the information available, could be reasonably expected to result in an increased loading of any pollutant to any waters of the Great Lakes System.

Changes in loading of any Chemical of Concern within the existing capacity and processes, and that are covered by the existing applicable control document, are not subject to an antidegradation review. Also, excluded from an antidegradation review are new effluent limits based on improved monitoring data or new water quality criteria or values that are not a result of changes in pollutant loading. As a result of any activity including, but are not limited to:

A. Normal operational variability;

B. Changes in intake water pollutants;

C. Increasing the production hours of the facility, (e.g., adding a second shift);

D. Increasing the rate of production

Section 5.2.2 Antidegradation Demonstration

Any entity seeking to lower water quality of any waterbody of the Reservation or seeking an increase in a discharge of any Chemical of Concern must first submit an antidegradation demonstration to KBIC for consideration. Also, an antidegradation demonstration is subject to public participation and a water quality assessment will be needed to assure that designated uses will be maintained and discharges will not exceed water quality criteria. If data for an antidegradation decision is not available or does not exist, activities that could potentially change water quality within KBIC's boundaries are subject to the entity being required to gather specified data and present it to the KBIC before the lowering of water quality can be allowed and before an increase of a discharge can occur. If a permit is granted, the discharger shall provide monitoring data to KBIC, which will then perform site inspections to ensure protection of designated uses. A regulated facility shall not undertake any deliberate action that would cause an increase in loading of any pollutant unless an antidegradation demonstration is provided to KBIC and the permitting authority. Also, KBIC shall approve or deny the lowering of water quality. No lowering of criteria shall occur unless an antidegradation demonstration is provided to KBIC and approved. The antidegradation demonstration shall include, but may not be limited, to the following:

A. **Pollution Prevention Alternative Analysis:** Identification of any pollution prevention alternatives and techniques that are available to eliminate or have a reduction in which the increased loading results in a lowering of water quality.

B. **Alternative or Enhanced Treatment Analysis:** Identification of alternative or enhanced treatment techniques that are available that would eliminate the lowering of water quality and their costs relative to the cost of treatment necessary to achieve the applicable effluent limitations.

C. **Important Social and Economic Development Analysis:** Identification of the social and economic development benefits to the area in which the waters are located that will be foregone if the lowering of water quality is not allowed.

D. **Special Provision for Remedial Actions:** Entities proposing remedial actions pursuant to the CERCLA, as amended, corrective actions pursuant to the Resource Conservation and Recovery Act, as amended, or similar actions pursuant to other Federal or Tribal environmental statutes may submit information to the KBIC that demonstrates that the action utilizes the most cost effective pollution prevention and treatment techniques available, and minimizes the necessary lowering of water quality of the antidegradation demonstration of subsection B and C of Section 5.2.2.

Section 5.3 Antidegradation Decision

If the KBIC determines that the antidegradation demonstration shows that lowering water quality is necessary to support important social and economic development in the area, and designated uses will be maintained and protected. The KBIC may authorize all or part of the proposed

lowering to occur through the establishment of conditions in the control document, unless the lowering would occur on an ONRW, in which case no lowering may be allowed. The control document shall include all conditions necessary to minimize or avoid the lowering of water quality based on the discharger's antidegradation demonstration. To avoid or minimize the lowering of water quality, an analysis of alternatives shall be needed to identify one or more practicable alternatives to avoid or minimize the lowering of water quality, that the KBIC shall select at least one of those alternatives for implementation.

Prior to the issuance of a decision, KBIC shall publish a notice in a local newspaper and provide a minimum forty-five consecutive day comment period. During this comment period, any tribal member or other interested persons may request a public hearing of such changes or revisions by KBIC. Upon approval of a public hearing request, KBIC shall by public notice in a local newspaper announce the date, time, and location of such public hearing and said public notice shall be published at least forty-five consecutive days prior to the public hearing. Any reports, documents, and data relevant to the discussion at the public hearing shall be made available at least thirty days before the hearing at the expense of KBIC.

Section 5.4 Variances

A variance is a time-limited designated use and criterion from any water quality standard in situations where it is infeasible to meet the criterion. Variances are used for point source dischargers that are for specific pollutant(s) or water quality parameter(s). These discharges are unable to meet Water Quality-based Effluent Limitations (WQBELs) for the national pollutant discharge elimination system (NPDES) permits. Pollutants or water quality parameters will need to be identified within waterbodies where the variance applies, before a variance can be granted as found in 40 CFR 131.14 and 40 CFR 132, Appendix F, Procedure 2. All water quality variances will be consistent with the federal regulations in 40 CFR 131 and 40 CFR 132.

A variance can only be used by the discharger requesting the variance and it only applies to the pollutant(s) specified in the variance. Variances do not modify the underlying water quality standard for the water body as a whole and will not exceed the term of the NPDES permit. The KBIC may consider granting a variance when:

A. Naturally occurring pollutant concentrations prevent the attainment of the criteria; or

B. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the criteria, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating Tribal water conservation requirements to enable uses to be met; or

C. Human caused conditions or sources of pollution prevent the attainment of the criteria and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

D. 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 criteria; or

E. 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 criteria; or

F. Controls more stringent than those required by sections 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

G. The discharger can show that the variance requested conforms to the requirements of the KBIC's antidegradation procedures

H. Characterize the extent of any increased risk to human health and the environment associated with granting the variance compared with compliance with criteria absent the variance, such that the KBIC is able to conclude that any such increased risk is consistent with the protection of the public health, safety and welfare

The discharger shall submit an application for a variance to the permitting authority. The permitting authority shall provide the application to KBIC. The discharger shall include all relevant information demonstrating that attaining the criterion is not feasible. Upon receipt of a application for a variance and after a decision regarding the variance, a public notice shall be issued.

90 days after the end of the public comment period, the KBIC shall issue a final decision on the variance request. The permitting authority shall establish and incorporate into the discharger's NPDES permit all conditions needed to implement the variance. Permit conditions shall be:

A. Compliance with an initial effluent limitation which, at the time the variance is granted, represents the level currently achievable by the discharger, and which is no less stringent than that achieved under the previous permit;

B. That reasonable progress be made toward attaining the water quality standards for the waterbody as a whole through appropriate conditions;

C. When the duration of a variance is shorter that the duration of a permit, compliance with an effluent limitation sufficient to meet the underlying water quality standards, upon the expiration of said;

D. A provision that allows the permitting authority to reopen and modify the permit based on KBIC's triennial water quality standards revisions to the variance. The KBIC shall deny a variance request if the discharger fails to make the demonstrations.

Section 5.5 Compliance Schedules

If granted, NPDES permits issued to a source or a discharger shall contain a compliance schedule. The KBIC authorizes the use of compliance schedules, on a case-by-case basis, for water quality-based effluent limits in NPDES permits, when appropriate, and consistent with 40 CFR 122.47, for new, recommencing, or existing dischargers to require compliance as soon as possible with WQBELs calculated to meet water quality standards issued. A compliance schedule must have an enforceable final effluent limitation and a date for its achievement.

A discharger may cease conducting regulated activity by terminating the direct discharge rather than continuing to meet permit requirements. If the discharger's compliance schedule exceeds one year from the date when the permit is issued, temporary requirements and dates will be needed. The dates needed for achievement shall not exceed one year unless the compliance schedule is for sewage sludge use and disposal, which shall be six months. Compliance reporting shall be completed no later than fourteen days following the temporary date. A NPDES discharger may cease conducting regulated activities by stopping direct discharge rather than continuing operation if:

A. If the discharger is undecided whether to cease conducting regulated activities, the permitting authority can modify the permit, which may be granted to contain a new or additional schedule. Both schedules shall lead to timely compliance or termination of regulated activities no later than a date which ensures sufficient time to comply with requirements but no longer than three years. A final decision by the discharger shall follow the schedule leading to compliance or termination of regulated activities.

B. The discharger decides to cease conducting regulated activities within the time given in the term of the permit that has already been issued, the permit may be modified to contain a new or additional schedule leading termination of activities. Permitted activities shall cease before non-compliance with any interim or final compliance schedule.

C. The discharger's decision to cease regulated activities due to firm public commitment that is satisfactory to KBIC

D. The discharger decides to cease conducting regulated activities before issuance of a permit's term will include the termination date. This may include a schedule leading to termination in a timely compliance with applicable requirements no later than three years.

Section 5.6 Mixing Zones

5.6.1 General Guidelines and Demonstration

A mixing zone is where an impact zone goes through an initial dilution process and may exceed water quality criteria without impairing the designated use for the water body as a whole. No dilution may be allowed outside of the mixing zone. A site-specific mixing zone that establishes the actual dilution may be permitted given the characteristics of a site. On a case by case basis, mixing zones for discharges of chemicals that are not bioaccumlative and are not listed in Table 6 (e.g., pollutants listed in Table 5 of Part 132) to the WOR as long as the waterbody as a whole still meets criterion. A mixing zone demonstration must:

A. Describe the amount of dilution occurring at the boundaries of the proposed mixing zone and the size, shape, and location of the area of mixing, including the manner in which diffusion and dispersion occur;

B. Document the substrate character and geomorphology within the mixing zone;

C. Show that the mixing zone does not extend to drinking water intakes;

D. Show that the mixing zone would not otherwise interfere with the designated uses of the receiving water or downstream waters;

E. Document background water quality concentrations;

F. Show that the mixing zone does not promote undesirable aquatic life or result in a dominance of nuisance species; and

G. Provide that by allowing additional mixing/dilution:

    a. Substances will not settle to form objectionable deposits;

    b. Floating debris, oil, scum, and other matter in concentrations that form nuisances will not be produced

    c. Objectionable color, order, taste or turbidity will not be produced

The mixing zone demonstration shall address the following factors:

A. Whether or not adjacent mixing zones overlap;

B. Whether organisms would be attracted to the area of mixing as a result of the effluent character;

C. Whether the habitat supports endemic or naturally occurring species

The mixing zone demonstration shall be based on the assumption that a pollutant does not degrade within the proposed mixing zone, unless:

A. Scientifically valid field studies or other relevant information demonstrate that degradation of the pollutant is expected to occur under the full range of environmental conditions expexted to be encountered;

B. Scientifically valid field studies or other relevant information address other factors that affect the level of pollutants in the water column including, but not limited to, resuspension of sediments, chemical speciation, and biological and chemical transformation

5.6.2 Mixing Zones: Non-bioaccumulative Chemicals of Concern

To the extent any mixing zone is considered by KBIC, it will be reviewed, and will need to be determined whether designated uses will be affected. Further, for approval by KBIC, dischargers of mixing zones must also show that:

A. Exposure in the mixing zone will not cause an irreversible response that results in deleterious effects to populations of aquatic life or wildlife.

B. The mixing zone will not prevent the passage of fish or fish food organisms in a manner that would result in adverse impacts on their immediate or future populations.

C. The mixing zone will not jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the Endangered Species Act, United States Code, Title 16, Section 1533, or result in the destruction or adverse modification of such species' critical habitat.

D. The mixing zone will not violate the provisions within this chapter regarding antidegradation.

E. The mixing zone will not result in a harm of the cultural resources of KBIC.

5.6.3 Mixing Zones: Bioaccumulative Chemicals of Concern

Notwithstanding the provisions of subsection 5.6.1, there shall be no mixing zones available for any discharges of BCCs, for example: BCFs or BAFs, which are greater than 1,000 as defined by 40 CFR Part 132 Table 6, also bacteria shall not be authorized, as defined by 40 CFR Part 132 Table 5, as amended, to the WOR effective upon the adoption of this Ordinance. New discharge include:

A. Discharges of BCCs to the WOR from a building, structure, facility or installation, the construction of which commences after the date this ordinance takes effect or
An expanded discharge from an existing discharger that commences after the date this ordinance takes effect.

Appendix A: Human Health Criteria Calculations

Human health criteria were established according to the methodology specified in 40 CFR Part 132, Water Quality Guidance for the Great Lakes System, using updated toxicological and bioaccumulation parameters where available, and incorporating exposure data specific to KBIC.

Criteria were developed for the following pollutants, which include those specified in Table 3 of 40 CFR 132 as well as total PCBs and methylmercury:

Chemical	Carcinogenic effects	Noncarcinogenic effects
Benzene	•	•
Chlordane	•	•
Chlorobenzene		•
Cyanides		•
DDT	•	•
Dieldrin	•	•
2,4-Dimethylphenol		•
2,4-Dinitrophenol		•
Hexachlorobenzene	•	•
Hexachloroethane	•	•
Lindane		•
Mercury		•
Methylmercury		•
Methylene chloride	•	•
PCBs	•	
2,3,7,8-TCDD	•	•
Toluene		•
Toxaphene	•	
Trichloroethylene	•	

Calculations were performed using the following equations for human cancer criteria (HCC) and human noncancer criteria (HNC) for all contaminants other than methylmercury, as defined in Appendix C of 40 CFR 132:

$$HCC = \frac{RAD \times BW}{WC + [(FC_{TL3})(BAF_{TL3}) + (FC_{TL4})(BAF_{TL4})]}$$

$$HNC = \frac{ADE \times BW \times RSC}{WC + [(FC_{TL3})(BAF_{TL3}) + (FC_{TL4})(BAF_{TL4})]}$$

Where RAD = risk associated dose (mg/kg/d)
ADE = acceptable daily exposure (mg/kg/d)
BW = bodyweight of average human (kg)
RSC = relative source contribution
WC = per capita water consumption (L/d)
FC_{TL3} = mean consumption of trophic level 3 fish (kg/d)
FC_{TL4} = mean consumption of trophic level 4 fish (kg/d)
BAF_{TL3}= bioaccumulation factor for trophic level 3 fish (L/kg)
BAF_{TL4}= bioaccumulation factor for trophic level 4 fish (L/kg)

And

$$RAD = \frac{Risk}{SF}$$

Where SF = cancer slope factor (mg/kg/d)
$Risk$ = incremental risk of developing cancer

The average human bodyweight (BW) was specified as 80 kg, and per capita drinking water consumption (WC) was specified as 2.4 L/d, consistent with EPA's 2015 updates to recommended Ambient Water Quality Criteria (AWQC) methodology. The relative source contribution (RSC) was specified as 0.8 (Great Lakes guidance) rather than 0.2 (updated 2015 value), to be consistent with the elevated fish consumption rates described below. For water bodies not designated as drinking water sources, WC was assumed to be 0.01 L/d. The acceptable incremental risk, *Risk*, was specified as 1 in 1 million (1×10^{-6}), consistent with recommendations in EPA's 2000 and 2015 methodology.

The methylmercury criterion was calculated according to the methodology set forth in EPA's 2001 Methylmercury Water Quality Criterion, modified to only consider trophic levels 3 and 4, for consistency with 40 CFR 132:

$$TRC = \frac{BW \times (ADE - RSC_{Hg})}{FC_{TL3} + FC_{TL4}}$$

Where ADE = acceptable daily exposure = 0.001 mg/kg/d
RSC_{Hg} = relative source contribution = 2.7×10^{-5} mg/kg/d

Chemical-specific inputs for HCC and HNC calculations were set to the most up to date values (from 2015 HH AWQC, or Appendix H in EPA-820-B-95-005 when updated values were not available), and are listed below:

Chemical	**SF** mg/kg/d	**ADE** mg/kg/d	**BAF_{TL3}** L/kg	**BAF_{TL4}** L/kg
Benzene	0.055	0.0005	4.5	5
Chlordane	0.35	0.0005	44,000	60,000
Chlorobenzene	-	0.0200	19	22
Cyanides	-	0.0006	1	1
DDT	0.34	0.0005	240,000	1,100,000
Dieldrin	16	0.00005	210,000	410,000
2,4-Dimethylphenol	-	0.0200	6.2	7
2,4-Dinitrophenol	-	0.0020	4.4	4.4
Hexachlorobenzene	1.02	0.0008	46,000	90,000
Hexachloroethane	0.04	0.0007	280	600
Lindane	-	0.0047	2,400	2,500
Mercury	-	0.00006	27,900	140,000
Methylene chloride	0.002	0.0060	1.5	1.6
PCBs	2 [a]	-	520,900	1,871,000
2,3,7,8-TCDD	75,000	1.3×10^{-9}	48,490	79,420
Toluene	-	0.0097	15	17
Toxaphene	1.1	-	6,600	6,300
Trichloroethylene	0.05	-	12	13

[a] Upper bound for high-risk/high-persistence mixtures (IRIS, CASN 1336-36-3)

Fish consumption rates (FC) were based on the results of a 2015 survey of fish consumption in the Keweenaw Bay Indian Community (KBIC, 2016). The intake rate chosen was the 95th

percentile of desired fish consumption across all respondents, excluding those who do not eat fish at all. Consistent with 40 CFR 132, 24% of fish consumed are assumed to be from trophic level 3 and 76% from trophic level 4. Consumption rates are summarized below:

FC (kg/d)	0.260
FC_{TL3} (kg/d)	0.062
FC_{TL4} (kg/d)	0.198

For chemicals with both carcinogenic and noncarcinogenic effects, the more protective (lower) value was selected as the criterion. The following table summarizes all calculated values for both drinking water (DW) and non-drinking water (NDW) designated water bodies, with bold indicating the minimum:

Chemical	**DW HCC (ug/L)**	**NDW HCC (ug/L)**	**DW HNC (ug/L)**	**NDW HNC (ug/L)**
Benzene	**3.96E-01**	**1.14E+00**	8.72E+00	2.50E+01
Chlordane	**1.57E-05**	**1.57E-05**	2.19E-03	2.19E-03
Chlorobenzene	-	-	**1.61E+02**	**2.31E+02**
Cyanides	-	-	**1.44E+01**	**1.42E+02**
DDT	**1.01E-06**	**1.01E-06**	1.38E-04	1.38E-04
Dieldrin	**5.31E-08**	**5.31E-08**	3.40E-05	3.40E-05
2,4-Dimethylphenol	-	-	**3.07E+02**	**7.19E+02**
2,4-Dinitrophenol	-	-	**3.61E+01**	**1.11E+02**
Hexachlorobenzene	**3.80E-06**	**3.80E-06**	2.48E-03	2.48E-03
Hexachloroethane	**1.44E-02**	**1.47E-02**	3.24E-01	3.29E-01
Lindane	-	-	**4.66E-01**	**4.67E-01**
Mercury	-	-	**1.31E-04**	**1.31E-04**
Methylene chloride	**1.42E+01**	**9.53E+01**	1.37E+02	9.15E+02
PCBs	**9.94E-08**	**9.94E-08**		
2,3,7,8-TCDD	**5.70E-11**	**5.70E-11**	4.44E-09	4.44E-09
Toluene	-	-	**9.27E+01**	**1.44E+02**
Toxaphene	**4.38E-05**	**4.39E-05**		
Trichloroethylene	**2.80E-01**	**4.81E-01**		

A final comparison was made between the calculated criteria and current National Recommended Water Quality Criteria (https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table). All calculated HCC are more protective than the national recommended values, and all calculated NDW HNC are more protective than the national recommended values. However, for the following chemicals, the national recommended values for DW HNC are more protective than those calculated using the above methodology:

Chemical	Calculated DW HNC (ug/L)	Recommended DW HNC (ug/L)
Benzene	8.72E+00	3.00E+00
Chlorobenzene	1.61E+02	**1.00E+02**
Cyanides	1.44E+01	**4.00E+00**
2,4-Dimethylphenol	3.07E+02	**1.00E+02**
2,4-Dinitrophenol	3.61E+01	**1.00E+01**
Methylene chloride	1.37E+02	4.00E+01
Toluene	9.27E+01	**5.70E+01**

For the noncarcinogenic chemicals (bold values in the table above), the more protective recommended values are adopted in place of the calculated value.

References

Part 132 – Water Quality Guidance for the Great Lake System. US CFR Title 40, Volume 24.

KBIC. (2016). Assessment of the Keweenaw Bay Indian Community's Fish Consumption. Prepared for KBIC by Asher Consulting and Ad Hoc Analytics. Jun 15, 2016.

U.S.EPA. (2015). Human Health Ambient Water Quality Criteria: 2015 Update. Office of Water. EPA 820-F-15-001.

U.S.EPA. (2016). Chemical-specific Inputs for EPA's 2015 Final Updated Human Health Ambient Water Quality Criteria. https://www.epa.gov/sites/production/files/2016-03/documents/summary_of_inputs_final_revised_3.24.16.pdf.

Appendix B: Numeric Nutrient Criteria Development

To establish appropriate numeric nutrient criteria, several approaches were considered: 1) Ecoregion-based criteria, 2) Local criteria based on extant KBIC monitoring data, and 3) Stressor-response models (lakes only). The results of these various approaches were then compared and evaluated using a weight-of-evidence approach to choose appropriate, location-specific numeric nutrient criteria.

Ecoregional approach

It has been shown that the 25th percentile of a given parameter in a sample of waterbodies can be considered to approximate reference conditions for that population (U.S. EPA 2000a; 2000b). This approach has been applied to monitoring datasets from nutrient ecoregions on a national scale, providing two sets (Aggregate and Level III ecoregions) of potential numeric criteria for KBIC (U.S. EPA 2000c; 2001). KBIC is located in Aggregate Ecoregion VIII, Nutrient Poor Largely Glaciated Upper Midwest and Northeast, and Level III region 50, Northern Lakes and Forests. Corresponding criteria are summarized in Table 1. There is generally quite good agreement between the criteria derived using the Level III and aggregate datasets.

Table 1. Applicable Ecoregional Criteria (USEPA 2000c; 2001)

	Aggregate Ecoregion VIII		Subregion 50	
	Lakes and Reservoirs	Rivers and Streams	Lakes and Reservoirs	Rivers and Streams
Total Phosphorus (TP), µg/L	8.0	10	9.69	12
Total Nitrogen (TN), mg/L	0.24	0.38	0.40	0.44

Local data approach

KBIC's existing monitoring data were used to calculate criteria using the recommended methodology (USEPA 2000a; 2000b). While ideally local criteria could be calculated by selecting a local set of reference (i.e., undisturbed) sites and calculating the 75th percentile of each parameter (USEPA 2000a; 2000b), there are not a sufficient number of water bodies within or near KBIC's boundary to do so. Therefore, the population-based 25th percentile approach was used, which is also the approach that was used to establish national Ecoregional Criteria (U.S. EPA 2000c; 2001; Table 1).

Monitoring data were compiled for phosphorus and nitrogen from 34 sampling locations on 25 water bodies (lakes n = 4 and streams n = 21). Sampling locations and names are provided in Table 2 and Figure 1. Data were from samples collected between May 2001 and September 2022. Some samples were analyzed for Total Nitrogen (TN), and some were analyzed only for Nitrate+Nitrite (NO_3+NO_2) and Total Kjeldahl Nitrogen (TKN). In the latter case TN was assumed to be equal to the sum of TKN and NO_3+NO_2. Values below the detection limit were set to 0.5*MDL.

Table 2. Monitoring stations included in this analysis.

Monitoring Location ID	Monitoring Location Name	Monitoring Location Type	Latitude	Longitude
BC1MS	Boyers Creek 1 Monitoring Station	River/Stream	46.74653	-88.48963
BL1MS	Bishop Lake 1 Monitoring Station	Lake	46.722956	-88.382038
BL2MS	Bella Lake 2 Monitoring Station	Lake	46.793213	-88.255778
BLC1MS	Black Creek 1 Monitoring Station	River/Stream	46.74653	-88.50776
CC1HD	Carp Creek 1 Headwaters	River/Stream	46.786	-88.56165
CC2NP	Carp Creek 2 Non-point	River/Stream	46.81157	-88.51918
CC3MO	Carp Creek 3 Mouth	River/Stream	46.83557	-88.48407
DC1MS	Dekota Creek 1 Monitoring Station	River/Stream	46.781136	-88.3241
DEC1MS	Denomie Creek 1 Monitoring Station	River/Stream	46.722494	-88.434379
FR1HD	Falls River 1 Headwaters	River/Stream	46.722536	-88.447295
GC1MS	Gomanche Creek 1 Monitoring Station	River/Stream	46.751136	-88.361879
HC1MS	Hazel Creek	River/Stream	46.75894	-88.50083
KC1HD	Kalio Creek 1 Headwaters	River/Stream	46.801501	-88.333095
LC2MO	Linden Creek 2 Mouth	River/Stream	46.75909	-88.44781
LD1MS	Lake Drainage 1 Monitoring Station	River/Stream	46.839431	-88.274538
LD2MS	Lake Drainage 2 Monitoring Station	River/Stream	46.851672	-88.330162
LL1MS	Laughs Lake 1 Monitoring Station	Lake	46.733972	-88.361036
LSC1HD	Little silver Creek 1 Headwaters	River/Stream	46.809285	-88.402056
LSC2MO	Little Silver Creek 2 Mouth	River/Stream	46.814429	-88.410606
LSC3MS	Little Silver Creek Monitoring Station	River/Stream	46.811914	-88.372101
MC1MS	Menge Creek 1 Monitoring Station	River/Stream	46.73321	-88.50549
MDC1MS	Mud Creek 1 Monitoring Site	River/Stream	46.82521	-88.4841
MWC1HD	Meadow Creek Headwaters	River/Stream	46.779292	-88.407953
PC1MS	Paiges Creek 1 Monitoring Station	River/Stream	46.755354	-88.343529
RC1MS	Roubillard Creek 1 Monitoring Staion	River/Stream	46.725798	-88.427863
SC1MS	Secret Creek 1 Monitoring Site	River/Stream	46.7454	-88.43456
SR1HD	Silver River 1 Headwaters	River/Stream	46.67275	-88.31516
SR2NP	Silver River 2 Non-Point	River/Stream	46.732595	-88.34085
SR3NP	Silver River 3 Non-Point(arvon road)	River/Stream	46.755354	-88.355464
SR4MO	Silver River 4 Mouth	River/Stream	46.804499	-88.316764
SR5MO	Silver River 5 Mouth	River/Stream	46.801501	-88.298088
TA1MS	Taylor Creek 1 Monitoring Site	River/Stream	46.70331	-88.44354
TC1MS	Tangen Creek 1 Monitoring Site	River/Stream	46.78564	-88.47886
TL1MS	Third Lake 1 Monitoring Station	Lake	46.774937	-88.375951

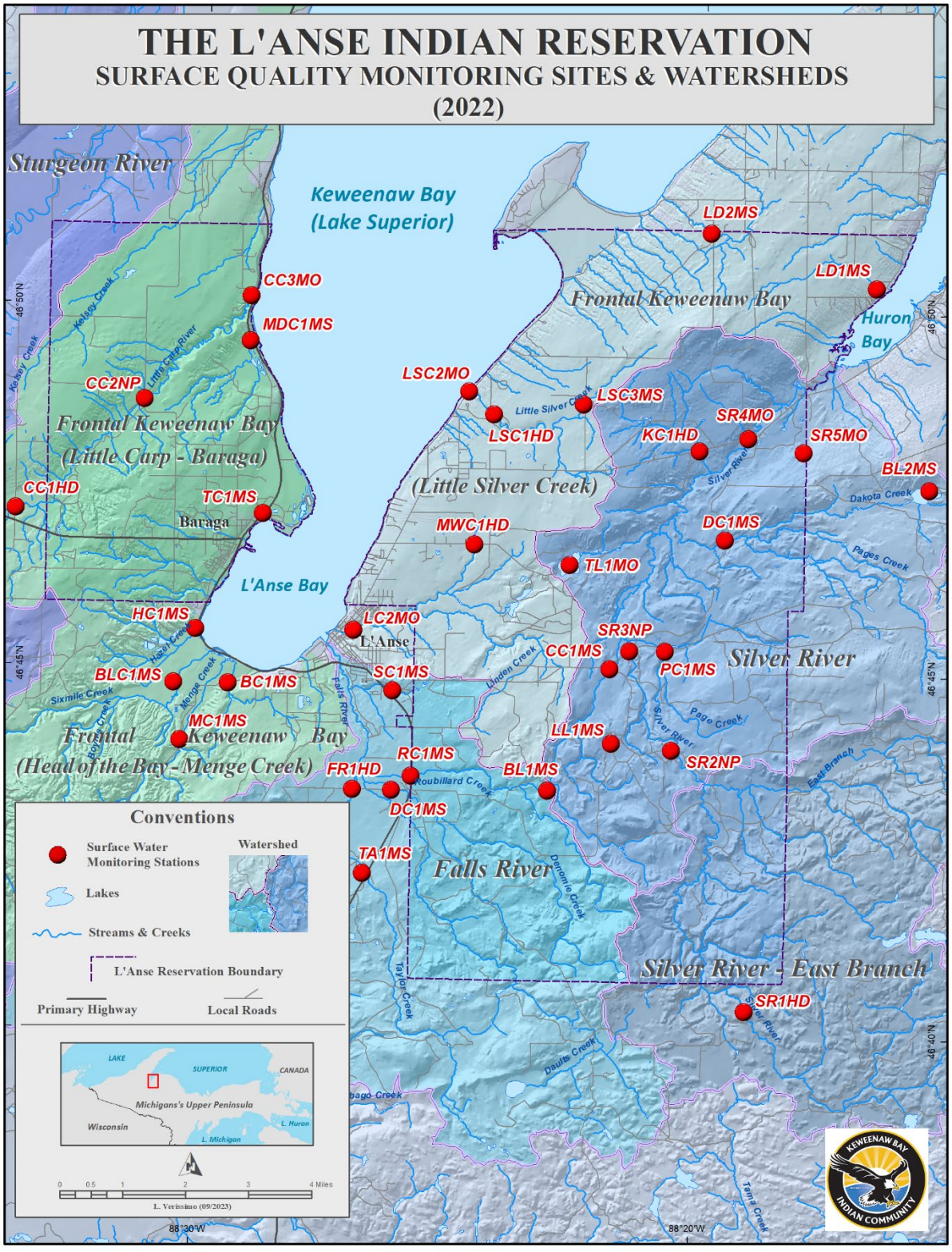
THE L'ANSE INDIAN RESERVATION
SURFACE QUALITY MONITORING SITES & WATERSHEDS
(2022)
Sturgeon River
Keweenaw Bay
(Lake Superior)
Frontal Keweenaw Bay
(Little Carp - Baraga)
Frontal Keweenaw Bay
(Little Silver Creek)
Frontal Keweenaw Bay
(Head of the Bay - Menge Creek)
Silver River
Silver River - East Branch
Falls River
L'Anse Bay
Huron Bay
Baraga
L'Anse
CC3MO
MDC1MS
CC2NP
CC1HD
TC1MS
LD2MS
LD1MS
LSC2MO
LSC3MS
LSC1HD
KC1HD
SR4MO
SR5MO
BL2MS
MWC1HD
DC1MS
TL1MO
HC1MS
LC2MO
SR3NP
CC1MS
PC1MS
BLC1MS
BC1MS
SC1MS
MC1MS
LL1MS
SR2NP
RC1MS
FR1HD
BL1MS
DC1MS
TA1MS
SR1HD
Kelsey Creek
Little Carp River
Little Silver Creek
Silver River
Dakota Creek
Pages Creek
Hatsy Creek
Sixmile Creek
Menge Creek
Falls River
Linden Creek
Page Creek
East Branch
Roubillard Creek
Dennonie Creek
Taylor Creek
Daults Creek
Tanna Creek
46°50'N
46°45'N
46°40'N
88°30'W
88°20'W
Conventions
Surface Water Monitoring Stations
Watershed
Lakes
Streams & Creeks
L'Anse Reservation Boundary
Primary Highway
Local Roads
LAKE SUPERIOR
CANADA
Michigans's Upper Peninsula
Wisconsin
L. Huron
L. Michigan
0 0.5 1 2 3 4 Miles
L. Verissimo (09/2023)
KEWEENAW BAY INDIAN COMMUNITY

Figure 1. Locations of sampling sites included in this analysis.

The methodology applied here was nearly identical to that applied to calculate the national Ecoregional Criteria (U.S. EPA 2000c; 2001; Table 1). However, the definition of seasons was modified to be compatible with KBIC's monitoring calendar, as shown in Table 3.

Table 3. "Season" definition

	Ecoregional Analysis[1]	**This Analysis**
Winter	November–March	January–April
Spring	April–May	May–June
Summer	June–August	July–September
Fall	September–October	October–December

[1] U.S. EPA 2000c; 2001

Full details of the methodology can be found in U.S. EPA (2000c; 2001). Briefly, the approach employed was:

1. Calculate the seasonal median of each parameter for each water body
2. Identify the 25th percentile of water body medians for each parameter and season
3. Calculate the Overall median of the four seasonal 25th percentiles for each parameter

The results are shown in Table 4 below.

Table 4. Results of analysis of KBIC data (Overall medians are the resulting criteria; n is the number of observations in each category)

	n	Winter	Spring	Summer	Fall	**Overall (median)**
Total Phosphorus (TP), µg/L						
Lakes and Reservoirs	156	11	16	13	12	**12**
Rivers and Streams	877	12	12	12	9	**12**
Total Nitrogen (TN), mg/L						
Lakes and Reservoirs	159	0.70	0.52	0.56	0.59	**0.57**
Rivers and Streams	885	0.37	0.33	0.28	0.31	**0.32**

U.S. EPA 2020 guidance approach

Recently published national nutrient criteria (USEPA, 2021) provide several more advanced statistical models developed using National Lakes Assessment (NLA) data to determine target chlorophyll concentrations and corresponding nutrient criteria. Several approaches are

provided for setting chlorophyll targets: zooplankton biomass, microcystin concentrations, and hypoxia. Because these standards will not be applied to dimictic lakes, the assumptions of the hypoxia approach are not valid. The zooplankton approach was not used because the models are highly sensitive to the slope threshold, a value for which we have no basis for estimating. However, the microcystin-based chlorophyll model (https://nsteps.epa.gov/apps/chl-microcystin/) is applicable to KBIC lakes. This model requires the specification of a maximum lake depth, which was taken as the maximum observed depth recorded during sampling in 2018 (Table 5). Using a target microcystin concentration of 8 µg/L (USEPA, 2019), 1% probability of exceedance, and a certainty level of 90%, the model provides a median chlorophyll target of **8.0 µg/L** (Table 6).

Table 5. Lake-specific inputs to the national nutrient criteria models for lakes

	DOC, mg/L	Depth, m
Bella Lake	12.0	2.9
Bishop Lake	6.2	5.5
Laughs Lake	9.3	4.0
Third Lake	7.1	3.4

Table 6. Chlorophyll criteria derived from the national chlorophyll-microcystin model for lakes

	chl-*a*, µg/L
Bella Lake	8.0
Bishop Lake	7.2
Laughs Lake	8.0
Third Lake	8.0
Overall Median	**8.0**

The nutrient-chlorophyll model (https://nsteps.epa.gov/apps/tp-tn-chl) was then used with individual lake characteristics (maximum depth, DOC concentration) and a certainty level of 90% to relate target chlorophyll concentrations to ambient TP and TN concentrations using the microcystin-based chlorophyll targets (Table 6). Median dissolved organic carbon (DOC) values were calculated from monitoring data by first calculating seasonal medians for each lake and then computing an overall median across seasons (Table 5). Criteria were then calculated as the overall median of lake-specific values. Results are summarized in Tables 7 and 8 below.

Table 7. Total Phosphorus and Total Nitrogen criteria derived from the national nutrient criteria models for lakes

	TP, µg/L	TN, mg/L
Bella Lake	20	0.72
Bishop Lake	19	0.42
Laughs Lake	19	0.58
Third Lake	20	0.46
Overall Median	**20**	**0.52**

Final criteria determination

A weight-of-evidence approach was employed to calculate final nutrient criteria. Each of the three approaches (two for rivers and streams) has strengths and weaknesses as applied to the determination of KBIC's tribal nutrient criteria. The ecoregional approach is based on a relatively large sample size, but water bodies regulated by these criteria are located within a small geographic area that may not be representative of the larger ecoregion. Further, KBIC lakes are shallow (Table 5) and unstratified, whereas the ecoregional criteria are derived from data weighted towards the deeper, stratified lakes characteristic of the region. This likely explains why the ecoregional TN and TP criteria are lower than the 25th percentile of observed concentrations in KBIC. The national criteria models provides a TP criterion that is greater than the other two methods, and a TN value between the other two methods (Table 8).

Taking all of the above into account, final values were determined by **averaging values across all methods** (Tables 8 and 9). For TN in lakes, all values are within 20% of the mean. TP varies more across methods, but the final value agrees well with local data. For rivers, TP and TN criteria were very similar between methods.

Table 8. Final criteria determination for Lakes and Reservoirs

	TP, µg/L	TN, mg/L
Subregion 50	9.7	0.40
Local data, 25th percentile	12	0.57
EPA national criteria models	20	0.52
Final value (mean)	14	0.50

Table 9. Final criteria determination for Rivers and Streams

	TP, µg/L	TN, mg/L

Subregion 50	12	0.44
Local data, 25th percentile	12	0.32
Final value (mean)	12	0.38

References

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U.S. EPA. 2019. Recommended human health recreational ambient water quality criteria or swimming advisories for microcystin and cylindrospermopsin. Office of Water. EPA 822-R-19-001.

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Appendix C: Map of the KBIC L'Anse Indian Reservation


88°30'W
88°20'W
46°50'N
46°40'N
Ojibwe Gichigami
(Lake Superior)
Keweenaw Bay
KEWEENAW BAY
PEQUAMING
ALIRA
Huron
Bay
STURGEON
RESERVATION EXTERIOR BOUNDARY
KELSEY
CARP
LITTLE
ASSININS
LITTLE SILVER
ZEBA
41
38
SAND POINT
BARAGA
L'ANSE
THIRD Lk
PINERY Lks
LINDEN
SILVER
DAKOTA
SIXMILE
MENGE
COUMANCHE
LOST Lk
ROUSSEAU
BOVINE
DENOMIE
EAST BRANCH
RESERVATION EXTERIOR BOUNDARY
HERMAN
Luis Verissimo (08/2023)
L'ANSE INDIAN RESERVATION
0 1 2 3 4 5 Miles
CEDED TERRITORY - 1842
LAKE
SUPERIOR
a
b
MAP
a) Ontonagon Indian Reservation
b) Chocolay Township Property
Lk. MICHIGAN
Lk. HURON