

Under this heading will appear the text of proposed rules and changes. The notice of proposed rulemaking is required to contain an explanation of any new rule or any change in an existing rule and the reasons therefor. This is set out in the Purpose section with each rule. Also required is a citation to the legal authority to make rules. This appears following the text of the rule, after the word "Authority."

Entirely new rules are printed without any special symbolology under the heading of the proposed rule. If an existing rule is to be amended or rescinded, it will have a heading of proposed amendment or proposed rescission. Rules which are proposed to be amended will have new matter printed in boldface type and matter to be deleted placed in brackets.

An important function of the *Missouri Register* is to solicit and encourage public participation in the rulemaking process. The law provides that for every proposed rule, amendment, or rescission there must be a notice that anyone may comment on the proposed action. This comment may take different forms.

If an agency is required by statute to hold a public hearing before making any new rules, then a Notice of Public Hearing will appear following the text of the rule. Hearing dates must be at least thirty (30) days after publication of the notice in the *Missouri Register*. If no hearing is planned or required, the agency must give a Notice to Submit Comments. This allows anyone to file statements in support of or in opposition to the proposed action with the agency within a specified time, no less than thirty (30) days after publication of the notice in the *Missouri Register*.

An agency may hold a public hearing on a rule even though not required by law to hold one. If an agency allows comments to be received following the hearing date, the close of comments date will be used as the beginning day in the ninety (90)-day-count necessary for the filing of the order of rulemaking.

If an agency decides to hold a public hearing after planning not to, it must withdraw the earlier notice and file a new notice of proposed rulemaking and schedule a hearing for a date not less than thirty (30) days from the date of publication of the new notice.

Resources' Air Pollution Control Program at the address listed in the Notice of Public Hearing at the end of this rule. More information concerning this rulemaking can be found at the Missouri Department of Natural Resources' Environmental Regulatory Agenda website, www.dnr.mo.gov/regs/index.html.

PURPOSE: The purpose of this rule is to implement restrictions on the idling of heavy duty diesel vehicles in the Kansas City Ozone Maintenance Area. The purpose of this amendment is to clarify a discrepancy between the affected parties in the Applicability section and the stated requirements in the General Provisions section. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is an email dated November 4, 2010, from the U.S. Environmental Protection Agency, Region 7 and a rule comment form dated November 24, 2010, from Missouri Department of Natural Resources staff.

PURPOSE: The purpose of this rule[making] is to implement restrictions on the idling of heavy duty diesel vehicles in the Kansas City Ozone Maintenance Area. The evidence supporting the need for this [proposed] rule[making], per section 536.016, RSMo, is the federally approved 2007 Kansas City Maintenance Plan for the Control of Ozone.

(1) Applicability.

(B) This regulation applies to owners or operators of commercial, public, and institutional heavy duty diesel vehicles that are designed to operate on public streets and highways, whether or not the vehicles are operated on public roadways.

(C) This regulation applies to owners and operators of load/unload locations where commercial, public, and institutional heavy duty diesel vehicles load or unload passengers.

[(C)](D) Passenger vehicles as defined in subsection (2)(H) of this rule are exempt from this rule.

AUTHORITY: section 643.050, RSMo 2000. Original rule filed July 11, 2008, effective Feb. 28, 2009. Amended: Filed Oct. 28, 2011.

PUBLIC COST: This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.

PRIVATE COST: This proposed amendment will not cost private entities more than five hundred dollars (\$500) in the aggregate.

NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: A public hearing on this proposed amendment will begin at 9:00 a.m., February 2, 2012. The public hearing will be held at the Elm Street Conference Center, 1730 East Elm Street, Lower Level, Bennett Springs Conference Room, Jefferson City, Missouri. Opportunity to be heard at the hearing shall be afforded any interested person. Interested persons, whether or not heard, may submit a written or email statement of their views until 5:00 p.m., February 9, 2012. Written comments shall be sent to Chief, Air Quality Planning Section, Missouri Department of Natural Resources' Air Pollution Control Program, PO Box 176, Jefferson City, MO 65102-0176. Email comments shall be sent to apcprulespn@dnr.mo.gov.

Proposed Amendment Text Reminder:

Boldface text indicates new matter.

[Bracketed text indicates matter being deleted.]

**Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 10—Air Conservation Commission
Chapter 2—Air Quality Standards and Air Pollution
Control Rules Specific to the Kansas City Metropolitan
Area**

PROPOSED AMENDMENT

10 CSR 10-2.385 Control of Heavy Duty Diesel Vehicle Idling Emissions. The commission proposes to amend the rule purpose, amend subsection (1)(B), add new subsection (1)(C), and renumber original subsection (1)(C) as (1)(D). If the commission adopts this rule action, it will be the department's intention to submit this rule amendment to the U.S. Environmental Protection Agency to replace the current rule that is in the Missouri State Implementation Plan. The evidence supporting the need for this proposed rulemaking is available for viewing at the Missouri Department of Natural

**Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 10—Air Conservation Commission
Chapter 5—Air Quality Standards and Air Pollution
Control Rules Specific to the St. Louis Metropolitan
Area**

PROPOSED AMENDMENT

10 CSR 10-5.385 Control of Heavy Duty Diesel Vehicle Idling Emissions. The commission proposes to amend the rule purpose; amend subsections (1)(B), (2)(B), and (3)(C); add new subsection (1)(C); and renumber original subsection (1)(C) as (1)(D). If the commission adopts this rule action, it will be the department's intention to submit this rule amendment to the U.S. Environmental Protection Agency to replace the current rule that is in the Missouri State Implementation Plan. The evidence supporting the need for this proposed rulemaking is available for viewing at the Missouri Department of Natural Resources' Air Pollution Control Program at the address listed in the Notice of Public Hearing at the end of this rule. More information concerning this rulemaking can be found at the Missouri Department of Natural Resources' Environmental Regulatory Agenda website, www.dnr.mo.gov/reg/index.html.

PURPOSE: The purpose of this rule is to implement restrictions on the idling of heavy duty diesel vehicles in the St. Louis Ozone Nonattainment Area. The purpose of this amendment is to clarify a discrepancy between the affected parties in the Applicability section and the stated requirements in the General Provisions section. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is an email dated November 4, 2010, from the U.S. Environmental Protection Agency, Region 7 and a rule comment form dated November 24, 2010, from Missouri Department of Natural Resources staff.

PURPOSE: The purpose of this rule[making] is to implement restrictions on the idling of heavy duty diesel vehicles in the St. Louis Ozone Nonattainment Area. The evidence supporting the need for this [proposed] rule[making], per section 536.016, RSMo, is the federally approved 2007 Revision of the State Implementation Plan for the St. Louis Eight (8)-Hour Ozone Nonattainment Area.

(1) Applicability.

(B) This regulation applies to owners or operators of commercial, public, and institutional heavy duty diesel vehicles that are designed to operate on public streets and highways, whether or not the vehicles are operated on public roadways.

(C) **This regulation applies to owners or operators of load/unload locations where commercial, public, and institutional heavy duty diesel vehicles load or unload passengers.**

[(C)](D) Passenger vehicles as defined in subsection (2)(H) of this rule are exempt from this rule.

(2) Definitions.

(B) Commercial Vehicle—Any motor vehicle, other than a passenger vehicle, and any trailer, semitrailer, or pole trailer drawn by such motor vehicle, that is designed, used, and maintained for the transportation of persons or property for hire, compensation, profit, or in the furtherance of a commercial enterprise.

(3) General Provisions.

(C) Exempt idling activities. The following activities are exempt from 10 CSR 10-5.385:

1. A heavy duty diesel vehicle idling while forced to remain motionless because of road traffic, an official traffic control device or signal, or at the direction of a law enforcement official;

2. A heavy duty diesel vehicle idling when operating defrosters, heaters, air conditioners, safety lights, or other equipment solely to prevent a safety or health emergency;

3. A police, fire, ambulance, public safety, utility service vehicle, military, other emergency or law enforcement vehicle, or any heavy duty diesel vehicle being used in an emergency capacity, idling while in an emergency or training mode, and not for the convenience of the **heavy duty diesel** vehicle operator;

4. The primary propulsion engine idling for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity or if idling of the primary propulsion engine is being conducted in accordance with the manufacturer's recommendations;

5. A heavy duty diesel vehicle idling as part of a state or federal inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection;

6. A primary propulsion engine idling when necessary to power work-related mechanical or electrical operations other than propulsion (e.g., mixing, operating hydraulic lifts, processing cargo, or straight truck refrigeration). This exemption does not apply when idling for cabin comfort or to operate non-essential on-board equipment;

7. An armored vehicle idling when a person remains inside the vehicle to guard the contents, or while the vehicle is being loaded or unloaded;

8. A bus idling for no greater than fifteen (15) minutes in any sixty (60)-minute period to maintain passenger comfort while non-driver passengers are onboard;

9. An occupied heavy duty diesel vehicle with a sleeper berth compartment idling for purposes of air conditioning or heating during government mandated rest periods;

10. A heavy duty diesel vehicle idling due to mechanical difficulties over which the driver has no control;

11. Heavy duty diesel vehicles used exclusively for agricultural operations and only incidentally operated or moved upon public roads;

12. Operating an auxiliary power unit as an alternative to idling the main engine; and

13. A heavy duty diesel vehicle idling for no greater than thirty (30) minutes in any sixty (60)-minute period while waiting to load or unload at a freight load/unload location.

AUTHORITY: section 643.050, RSMo 2000. Original rule filed July 11, 2008, effective Feb. 28, 2009. Amended: Filed Oct. 28, 2011.

PUBLIC COST: This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.

PRIVATE COST: This proposed amendment will not cost private entities more than five hundred dollars (\$500) in the aggregate.

NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: A public hearing on this proposed amendment will begin at 9:00 a.m., February 2, 2012. The public hearing will be held at the Elm Street Conference Center, 1730 East Elm Street, Lower Level, Bennett Springs Conference Room, Jefferson City, Missouri. Opportunity to be heard at the hearing shall be afforded any interested person. Interested persons, whether or not heard, may submit a written or email statement of their views until 5:00 p.m., February 9, 2012. Written comments shall be sent to Chief, Air Quality Planning Section, Missouri Department of Natural Resources' Air Pollution Control Program, PO Box 176, Jefferson City, MO 65102-0176. Email comments shall be sent to apcprulespn@dnr.mo.gov.

**Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 20—Clean Water Commission
Chapter 7—Water Quality**

PROPOSED AMENDMENT

10 CSR 20-7.031 Water Quality Standards. The department is amending sections (1), (3), (4), (5), (6), (8), (11); adding sections (2) and (12); and renumbering sections (7), (9), (10), (13), (14), and (15) to accommodate added sections.

PURPOSE: This rule amendment includes revisions that ensure state water quality standards are functionally equivalent to federal standards. These revisions also improve the clarity, specificity, and effectiveness of the rule. Several of the revisions are program development priorities of the Department and U.S. Environmental Protection

Agency. Among these priorities are designation of “fishable/swimmable” uses to currently unclassified waters and updating state water quality criteria to be protective of designated beneficial uses.

PURPOSE: This rule identifies [beneficial] uses of waters of the state, criteria to protect those uses and defines the antidegradation policy. It is developed in response to the Missouri Clean Water Law and the federal Clean Water Act, Section 303(c)(1) and (2), which requires that state water quality standards be reviewed at least once every three (3) years. These revisions are pursuant to the national goal of protection of fish, shellfish, [and] wildlife, and recreation in and on the water as outlined in Section 101(a)(2) of the Act.

(1) Definitions.

(A) Acute toxicity—Conditions producing adverse effects or lethality on aquatic life following short-term exposure. The acute criteria in Tables A and B are maximum concentrations which protect against acutely toxic conditions. Acute toxicity is also indicated by exceedance of whole-effluent toxicity (WET) test conditions of paragraph [(3)/(4)(I)2]. For substances not listed in Table A or B, **three-tenths** (0.3) of the median lethal concentration, or the no observed acute effect concentration for representative species, may be used to determine absence of acute toxicity.

[(C) Beneficial or designated uses. Those uses specified in paragraphs 1.–15. of this subsection for each water body segment whether or not they are attained. Beneficial or designated uses (1)(C)1.–11. of classified waters are identified in Tables G and H. Beneficial or designated uses (1)(C)12.–15. of classified waters must be determined on a site-by-site basis and are therefore not listed in Tables G and H.

1. Irrigation—Application of water to cropland or directly to plants that may be used for human or livestock consumption. Occasional supplemental irrigation, rather than continuous irrigation, is assumed.

2. Livestock and wildlife watering—Maintenance of conditions to support health in livestock and wildlife.

3. Cold-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a naturally reproducing or stocked trout fishery and other naturally reproducing populations of recreationally important fish species.

4. Cool-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a sensitive, high-quality sport fishery (including smallmouth bass and rock bass) and other naturally reproducing populations of recreationally important fish species.

5. Protection of aquatic life (General warm-water fishery)—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a wide variety of warm-water biota, including naturally reproducing populations of recreationally important fish species. This includes all Ozark Class C and P streams, all streams with 7Q10 low flows of more than one-tenth cubic foot per second (0.1 cfs), all P1 streams, and all classified lakes. However, individual Ozark Class C streams may be determined to be limited warm-water fisheries on the basis of limited habitat, losing-stream classification, land-use characteristics, or faunal studies which demonstrate a lack of recreationally important fish species.

6. Protection of aquatic life (Limited warm-water fishery)—Waters in which natural water quality and/or habitat conditions prevent the maintenance of naturally reproducing populations of recreationally important fish species. This includes non-Ozark Class C streams and non-Ozark Class P streams with 7Q10 low flows equal to or less than 0.1 cfs and Ozark Class C streams with the characteristics outlined in paragraph (1)(C)5.

7. Human health protection (Fish consumption)—Criteria to protect this use are based on the assumption of an average amount of fish consumed on a long-term basis. Protection of this use includes compliance with Food and Drug Administration (FDA) limits for fish tissue, maximum water concentrations corresponding to the 10⁻⁶ cancer risk level, and other human health fish consumption criteria.

8. Whole body contact recreation—Activities in which there is direct human contact with the raw surface water to the point of complete body submergence. The raw water may be ingested accidentally and certain sensitive body organs, such as the eyes, ears, and the nose, will be exposed to the water. Although the water may be ingested accidentally, it is not intended to be used as a potable supply unless acceptable treatment is applied. Water so designated is intended to be used for swimming, water skiing, or skin diving. All waters in Tables G and H of this rule are presumed to support whole body contact recreation unless a Use Attainability Analysis (UAA) has shown that the use is unattainable. The use designation for whole body contact recreation may be removed or modified through a UAA for only those waters where whole body contact is not an existing use. Assignment of this use does not grant an individual the right to trespass when a land is not open to and accessible by the public through law or written permission of the landowner.

A. Category A—This category applies to those water segments that have been established by the property owner as public swimming areas allowing full and free access by the public for swimming purposes and waters with existing whole body contact recreational use(s). Examples of this category include, but are not limited to, public swimming beaches and property where whole body contact recreational activity is open to and accessible by the public through law or written permission of the landowner.

B. Category B—This category applies to waters designated for whole body contact recreation not contained within category A.

9. Secondary contact recreation—Uses include fishing, wading, commercial and recreational boating, any limited contact incidental to shoreline activities, and activities in which users do not swim or float in the water. These recreational activities may result in contact with the water that is either incidental or accidental and the probability of ingesting appreciable quantities of water is minimal. Assignment of this use does not grant an individual the right to trespass when a land is not open to and accessible by the public through law or written permission of the landowner.

10. Drinking water supply—Maintenance of a raw water supply which will yield potable water after treatment by public water treatment facilities.

11. Industrial process water and industrial cooling water—Water to support various industrial uses; since quality needs will vary by industry, no specific criteria are set in these standards.

12. Storm- and flood-water storage and attenuation—Waters which serve as overflow and storage areas during flood or storm events slowly release water to downstream areas, thus lowering flood peaks and associated damage to life and property.

13. Habitat for resident and migratory wildlife species, including rare and endangered species—Waters that provide essential breeding, nesting, feeding, and predator escape habitats for wildlife including waterfowl, birds, mammals, fish, amphibians, and reptiles.

14. Recreational, cultural, educational, scientific, and natural aesthetic values and uses—Waters that serve as recreational sites for fishing, hunting, and observing wildlife;

waters of historic or archaeological significance; waters which provide great diversity for nature observation, educational opportunities, and scientific study.

15. Hydrologic cycle maintenance—Waters hydrologically connected to rivers and streams serve to maintain flow conditions during periods of drought. Waters that are connected hydrologically to the groundwater system recharge groundwater supplies and assume an important local or regional role in maintaining groundwater levels.]

[(D)](C) Biocriteria—Numeric values or narrative expressions that describe the reference biological integrity of aquatic communities [inhabiting waters that have been designated for aquatic-life protection].

[(E)](D) Chronic toxicity—Conditions producing adverse effects on aquatic life or wildlife following long-term exposure but having no readily observable effect over a short time period. Chronic numeric criteria in Tables A1, A2, B2, and B3 are maximum concentrations which protect against chronic toxicity; these values shall be [considered] calculated as four (4)-day averages, with the exception of total ammonia nitrogen which shall be calculated as thirty (30)-day averages. Chronic toxicity is also indicated by exceedance of WET test conditions of subsection [(4)](5)(Q). For substances not listed in Tables A1, A2, B2, [or] and B3, commonly used endpoints such as the no-observed effect concentration or inhibition concentration of representative species may be used to demonstrate absence of toxicity.

[(F)](E) Class[ified waters]—[All waters listed as L1, L2 and L3 in Table G and P, P1 and C in Table H] A category that describes the surface water hydrology of a water of the state. During normal flow periods, some rivers back water into tributaries which [are not otherwise classified] have a different class. These permanent backwater areas are considered to have the same class[ification] as the water body into which the tributary flows.

1. Class L1—Lakes used primarily for public drinking water supply.

2. Class L2—Major reservoirs.

3. Class L3—Other lakes which are waters of the state. These include both public and private lakes. For effluent regulation purposes, publicly owned L3 lakes are those for which a substantial portion of the surrounding lands are publicly owned or managed.

4. Class P—Streams that maintain permanent flow even in drought periods.

5. Class P1—Standing-water reaches of Class P streams.

6. Class C—Streams that may cease flow in dry periods but maintain permanent pools [which support aquatic life].

7. Class E—Streams that do not have permanent surface flow or permanent pools, but have periodic surface flow in response to precipitation events.

[7.8. Class W—Wetlands that are waters of the state that meet the criteria in the *Corps of Engineers Wetlands Delineation Manual* (January 1987), and subsequent federal revisions. Class W waters do not include wetlands that are artificially created on dry land and maintained for the treatment of mine drainage, stormwater control, drainage associated with road construction, or industrial, municipal, or agricultural waste. Class W determination on any specific site shall be consistent with federal law.

(F) Designated use—Uses specified for each water body or segment whether or not they are being attained. Uses are designated according to section (2) of this rule and may include, but are not limited to:

1. Protection and propagation of fish, shellfish, and wildlife.

A. General warm-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a wide variety of warm-water biota, including naturally reproducing populations of recreationally-important fish species. This includes all Ozark Class C and P streams, all streams with 7Q10 low flows of more than one-tenth cubic foot per second (0.1 cfs), all P1 streams, and all lakes so designated

by this rule. However, individual Ozark Class C streams may be determined to be limited warm-water fisheries on the basis of limited habitat, losing-stream classification, land-use characteristics, or faunal studies which demonstrate a lack of recreationally important fish species.

B. Cool-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a sensitive, high-quality sport fishery (including smallmouth bass and rock bass) and other naturally reproducing populations of recreationally important fish species.

C. Cold-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a naturally reproducing or stocked trout fishery and other naturally reproducing populations of recreationally-important fish species.

D. Limited warm-water fishery—Waters in which natural water quality and/or habitat conditions prevent the maintenance of naturally reproducing populations of recreationally-important fish species. This may include non-Ozark Class C streams and non-Ozark Class P streams with 7Q10 low flows equal to or less than one-tenth cubic foot per second (0.1 cfs) and Ozark Class C streams with the characteristics outlined in subparagraph (1)(F)1.A. Waters designated for this use must have a demonstrated lack of support for a general warm-water fishery through a Use Attainability Analysis (UAA) conducted according to subsections (2)(E)–(G) and (2)(I) of this rule.

E. Exceptional aquatic community (EAC)—An aquatic community that contains a high diversity of aquatic species (fish or benthic macroinvertebrate) or contains unusual or unique assemblages of aquatic life;

2. Recreation in and on the water—Assignment of these uses does not grant an individual the right to trespass when a land is not open to and accessible by the public through law or written permission of the landowner.

A. Whole body contact recreation (WBC)—Activities involving direct human contact with waters of the state to the point of complete body submergence. The water may be ingested accidentally and certain sensitive body organs, such as the eyes, ears, and the nose, will be exposed to the water. Although the water may be ingested accidentally, it is not intended to be used as a potable supply unless acceptable treatment is applied. Water so designated is intended to be used for swimming, water skiing, or skin diving.

(I) Category A (WBC-A)—This category applies to waters that have been established by the property owner as public swimming areas welcoming access by the public for swimming purposes and waters with documented existing whole body contact recreational use(s) by the public. Examples of this category include, but are not limited to, public swimming beaches and property where whole body contact recreational activity is open to and accessible by the public through law or written permission of the landowner.

(II) Category B (WBC-B)—This category applies to waters designated for whole body contact recreation not contained within category A.

B. Secondary contact recreation (SCR)—Uses include fishing, wading, commercial and recreational boating, any limited contact incidental to shoreline activities, and activities in which users do not swim or float in the water. These recreational activities may result in contact with the water that is either incidental or accidental and the probability of ingesting appreciable quantities of water is minimal;

3. Human health protection (HHP)—Protection for the consumption of aquatic organisms or aquatic organisms and water from a single source. Criteria for this use includes compliance with Food and Drug Administration (FDA) limits for fish tissue consumption, maximum water concentrations corresponding to the 10⁻⁶ cancer risk level, and other human health aquatic organism

consumption criteria such as body weight.

A. Organism only—Protection of human health for the consumption of aquatic organisms.

B. Water + organism—Protection of human health for the consumption of aquatic organisms and water;

4. Livestock and wildlife protection (LWP)—Maintenance of conditions in waters of the state to support health in livestock and wildlife;

5. Drinking water supply (DWS)—Maintenance of a raw water supply which will yield potable water after treatment by public water treatment facilities in accordance with the Federal Safe Drinking Water Act;

6. Irrigation (IRR)—Application of water to cropland or directly to cultivated plants. Occasional supplemental irrigation, rather than continuous irrigation, is assumed;

7. Industrial water supply (IND)—Water to support various industrial uses; since quality needs will vary by industry, no numeric criteria are set in these standards;

8. Runoff storage and attenuation (RSA)—Waters which serve as overflow and storage areas during flood or storm events which slowly release water to downstream areas, thus lowering flood peaks and associated damage to life and property;

9. Wildlife habitat protection (WHP)—Habitat for resident and migratory wildlife species, including rare and endangered species. Waters that provide essential breeding, nesting, feeding, and predator escape habitats for wildlife including waterfowl, birds, mammals, fish, amphibians, and reptiles. Wildlife habitat protection waters include, but are not limited to, waters in National Wildlife Refuges, wetlands, and threatened or endangered species habitat;

10. Recreational, cultural, educational, scientific, and natural aesthetic use protection (RES)—Waters that serve as special recreational sites for fishing, hunting, and observing wildlife; waters of historic or archaeological significance; waters which provide great diversity for nature observation, educational opportunities, and scientific study;

11. Hydrologic cycle maintenance (HCM)—Waters hydrologically connected to rivers and streams which serve to maintain flow conditions during periods of drought and waters that are connected hydrologically to the groundwater system, recharge groundwater supplies, and assume an important local or regional role in maintaining groundwater levels; and

12. Outstanding resource waters—Waters that are subject to tier three protection under the antidegradation rule at 10 CSR 20-7.031(3).

A. Outstanding national resource waters (ONRW)—Waters which have outstanding national recreational and ecological significance. These waters shall receive special protection against any degradation in quality. Congressionally designated rivers, including those in the Ozark National Scenic Riverways and the Wild and Scenic Rivers System, are so designated. Waters designated as ONRW can be found in Table D.

B. Outstanding state resource waters (OSRW)—High quality waters with a significant aesthetic, recreational, or scientific value which are specifically designated as such by the Clean Water Commission in accordance with 10 CSR 20-7.031(8). Waters designated as OSRW can be found in Table E.

(K) *Escherichia coli* (*E. coli*)—A type of fecal coliform bacteria found in the intestines of humans and other warm-blooded animals [and humans]. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. Sewage may contain many types of disease-causing organisms (pathogens).

[(Q)] *Outstanding national resource waters*—Waters which have outstanding national recreational and ecological significance. These waters shall receive special protection against any degradation in quality. Congressionally designated rivers, including those in the Ozark national scenic riverways and the wild and scenic rivers system, are so designated (see Table D).

(R) *Outstanding state resource waters—High quality waters with a significant aesthetic, recreational, or scientific value which are specifically designated as such by the Clean Water Commission (see Table E).*

[(S)](Q) Ozark streams—Streams lying within the Ozark faunal region as described in the *Aquatic Community Classification System for Missouri*, Missouri Department of Conservation, 1989.

[(T)](R) Reference lakes or reservoirs—Lakes or reservoirs determined by Missouri Department of Natural Resources to be the best available representatives of ecoregion waters in a natural condition with respect to habitat, water quality, biological integrity and diversity, watershed land use, and riparian conditions.

[(U)](S) Reference stream reaches—Stream reaches determined by the department to be the best available representatives of ecoregion waters in a natural condition, with respect to habitat, water quality, biological integrity and diversity, watershed land use, and riparian conditions.

[(V)](T) Regulated-flow streams—A stream that derives a majority of its flow from an impounded area with a flow-regulating device.

[(W)](U) Use Attainability Analysis (UAA)—A structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in 40 CFR 131.10(g).

(V) Variance—Written approval and authorization of a proposed action that knowingly will result in a lack of conformity with one (1) or more criteria of 10 CSR 20-7.031 but that is deemed necessary based on the provisions of 40 CFR 131.10(g). Variances shall be administered by the commission in accordance with section 644.061, RSMo.

[(X)](W) Water effect ratio—Appropriate measure of the toxicity of a material obtained in a site water divided by the same measure of the toxicity of the same material obtained simultaneously in a laboratory dilution water.

[(Y)](X) Water hardness—The total concentration of calcium and magnesium ions expressed as calcium carbonate. For purposes of this rule, hardness will be determined by the lower quartile (twenty-fifth percentile) value of a representative number of samples from the water body in question or from a similar water body at the appropriate stream flow conditions.

[(Z)](Y) Water quality criteria—Chemical, physical, and biological properties of water that are necessary to protect beneficial water uses.

[(AA)](Z) Waters of the state—[All rivers, streams, lakes, and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased, or otherwise controlled by a single person or by two (2) or more persons jointly or as tenants in common and includes waters of the United States lying within the state.] See definition in section 644.016, RSMo. For purposes of this regulation, waters of the state shall not be construed to include the following:

1. Manmade waste treatment systems and effluent conveyances designed solely to treat or convey wastes, waste waters, or storm waters under a Missouri State Operating Permit, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), or Missouri Hazardous Waste Law, or other state or federal permitting authority; or

2. Manmade storm water control technologies and structural Best Management Practices (BMPs), including but not limited to sediment basins, wet and dry detention basins, bioremediation cells, rain gardens, and bioswales.

[(BB)](AA) Wetlands—Those areas that are inundated or saturated by surface or ground water 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 generally include swamps, marshes, bogs, and similar

areas. This definition is consistent with both the United States Army Corps of Engineers 33 CFR 328.3(b) and the United States Environmental Protection Agency 40 CFR 232.2(r).

/(CC)/(BB) Whole effluent toxicity tests—A toxicity test conducted under specified laboratory conditions on specific indicator organisms. To estimate chronic and acute toxicity of the effluent in its receiving stream, the effluent may be diluted to simulate the computed percent effluent at the edge of the mixing zone or zone of initial dilution.

/(DD)/(CC) Zone of initial dilution—A small area of initial mixing below an effluent outfall beyond which acute toxicity criteria must be met.

/(EE)/(DD) Zone of passage—A continuous water route necessary to allow passage of organisms with no acutely toxic effects produced on their populations.

/(FF)/(EE) Other definitions as set forth in the Missouri Clean Water Law and 10 CSR 20-2.010 shall apply to terms used in this rule.

(2) Designation of Uses.

(A) Rebuttable presumption. Consistent with the presumptive beneficial use protections described by 40 CFR Part 131 and sections 101(a)(2) of the federal Clean Water Act, the commission shall presume that—

1. All perennial rivers and streams;
2. All intermittent streams with permanent pools;
3. All rivers and streams spatially represented by the one to one hundred thousand (1:100,000) scale National Hydrography Dataset (NHD); and

4. All lakes and reservoirs that spatially intersect or are connected to the flowlines of rivers and streams identified in paragraph (2)(A)3. support the following designated uses: General warm-water fishery; Human health protection; Whole body contact recreation Category B; Secondary contact recreation; Livestock and wildlife protection; and Irrigation uses, as defined in this rule. The commission shall designate such water bodies accordingly, unless this presumption is properly rebutted through a UAA as described below.

(B) The commission may remove a designated use that is not an existing use, as defined in this rule, or assign subcategories of a use, if a UAA conducted pursuant to 40 CFR 131.10(g) demonstrates that attaining the designated use is not feasible.

(C) Use designations other than those mentioned in subsection (2)(A) of this rule may be applied to waters of the state on a site-by-site basis.

(D) Use Designation Dataset. The department shall maintain a geospatial dataset and associated list of waters that receive use designations as described in this rule and Tables G and H. Revisions to this use designation dataset shall be approved by the commission and incorporated into rule at the next systematic review or subsequent triennial review. Meanwhile, after acquiring site-specific information documenting that either i) a particular water body falls within the rebuttable presumption described above, ii) sufficient justification exists to designate additional uses for a particular water body, or iii) that a UAA demonstrates a designated use is not attainable, the commission may, with U.S. Environmental Protection Agency (EPA) approval, incorporate into the use designation dataset any approved new or revised designated uses for such water body, and apply such designated uses in performing any permitting, enforcement, or other department action as warranted under Chapter 644, RSMo or any federal water pollution control act.

(E) In accordance with 40 CFR 131.10(j), a UAA must be performed when the commission—

1. Designates or has designated uses for a water body that do not include the protection of fish, shellfish, wildlife, or recreation in and on the water;
2. Wishes to remove a designated use that protects fish,

shellfish, wildlife, or recreation in and on the water; or

3. Wishes to apply sub-categories of uses that protect fish, shellfish, wildlife, or recreation in and on the water, which require less stringent criteria than section 304(a) of the Clean Water Act.

(F) All UAA will be conducted on a representative portion of the water body in question, and will not cause segmentation of a water unless the UAA provides sound data that the designated uses are not representative of the water body as a whole as currently identified.

(G) UAA intended for recreation in and on the water shall be performed in accordance with methods and procedures as found in “Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol, December 19, 2007” which is hereby incorporated by reference and does not include any later amendments or additions. The department shall maintain a copy of the referenced document and shall make it available to the public for inspection and copying at no more than the actual cost of reproduction. A copy of this document may be obtained by writing to the Department of Natural Resources, Water Protection Program, PO Box 176, Jefferson City, MO 65102.

(H) UAA intended for aquatic life protection shall be performed in accordance with methods and procedures approved by the commission.

(I) Schedule of Compliance. Notwithstanding the provisions for complying with bacteria requirements under 10 CSR 20-7.015(9)(H) and water quality based effluent limitations under 10 CSR 20-7.031(11), any new effluent limitations for discharges affected by subsection (2)(A) of this rule shall be implemented within a reasonable time schedule for achieving full compliance, as described in a permit or other legally enforceable mechanism. Such time schedule shall allow no longer than June 30, 2020, to reach full compliance.

/(2)/(3) Antidegradation. The antidegradation policy shall provide three (3) levels of protection.

(A) Tier One. Public health, existing in-stream water uses, and a level of water quality necessary to protect existing uses shall be maintained and protected.

(B) Tier Two. For all waters of the state, if existing water quality is better than applicable water quality criteria established in these rules, that existing quality shall be fully maintained and protected. Water quality may be lowered only if the state finds, after full satisfaction of the intergovernmental coordination and public participation requirements, that the lowered water quality is necessary to allow important economic and social development in the geographical area in which the waters are located. In allowing the lowering of water quality, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control before allowing any lowering of water quality. This provision allows a proposed new or modified point or nonpoint source of pollution to result in limited lowering of water quality provided that—

1. The source does not violate any of the general criteria set forth in section **/(3)/(4)** of this rule, or any of the criteria for protection of beneficial uses set forth in section **/(4)/(5)** of this rule;

2. The source meets all applicable technological effluent limitations and minimum standards of design for point sources or minimum pollution control practices for nonpoint sources; and

3. The lowering of water quality, in the judgment of the department, is necessary for the accommodation of important economic and social development in the geographical vicinity of the discharge. In making a preliminary determination based on socioeconomic development considerations, the department may consider the potential for regional increases in utility rates, taxation levels, or recoverable costs associated with the production of goods or services that may result

from the imposition of a strict no-degradation policy. Consideration may also be given to the possible indirect effects of a policy on per capita income and the level of employment in the geographical vicinity of the proposed pollution source. Any preliminary decision by the department to allow a limited lowering of water quality will be stated as such in a public notice issued pursuant to 10 CSR 20-6.010. Pursuant to that provision, a public hearing will be held in the geographical vicinity of the proposed pollution source, if the department determines there is significant public interest in and need for a hearing.

(C) Tier Three. There shall be no lowered water quality in outstanding national resource waters or outstanding state resource waters, as designated in Tables D and E.

(D) The three (3) levels of protection provided by the antidegradation policy in subsections (A) through (C) of this section shall be implemented according to procedures hereby incorporated by reference and known as the "Missouri Antidegradation Rule and Implementation Procedure, April 20, 2007, Revised May 7, 2008." No later amendments or additions are included. This document shall be made available to anyone upon written request to the Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, PO Box 176, Jefferson City, MO 65102-0176.

[[3]](4) General Criteria. The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:

(A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly, or harmful bottom deposits or prevent full maintenance of beneficial uses;

(B) Waters shall be free from oil, scum, and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;

(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor, or prevent full maintenance of beneficial uses;

(D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life;

(E) There shall be no significant human health hazard from incidental contact with the water;

(F) There shall be no acute toxicity to livestock or wildlife watering;

(G) Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community;

(H) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment, and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247, RSMo;

(I) Waters in mixing zones and *[unclassified]* waters which support aquatic life on an intermittent basis shall be subject to the following requirements:

1. The acute toxicity criteria of Tables A1, A2, and B1 and the requirements of subsection **[[4]](5)(B)**; and

2. The following whole effluent toxicity conditions must be satisfied:

A. Single dilution method. The percent effluent at the edge of the zone of initial dilution will be computed and toxicity tests performed at this percent effluent. These tests must show statistically insignificant mortality on the most sensitive of at least two (2) representative, diverse species; and

B. Multiple dilution method. An LC₅₀ will be derived from a series of test dilutions. The computed percent effluent at the edge of the zone of initial dilution must be less than three-tenths (0.3) of the LC₅₀ for the most sensitive of at least two (2) representative, diverse species.

[[4]](5) Specific Criteria. The specific criteria shall apply to *[classified]* waters **contained in the use designation dataset and Tables G and H of this rule.** Protection of drinking water supply is limited to surface waters designated for raw drinking water supply and aquifers. Protection of whole body contact recreation is limited to *[classified]* waters designated for that use.

(A) The maximum chronic toxicity criteria in Tables A1, A2, B2, and B3 shall apply to waters designated for the indicated uses given in **the use designation dataset and Tables G and H.** *[All Table A and B criteria are chronic toxicity criteria, except those specifically identified as acute criteria.]* Water contaminants shall not cause or contribute to concentrations in excess of these values. *[Table A values listed as health advisory levels shall be used in establishing discharge permit limits and management strategies until additional data becomes available to support alternative criteria, or other standards are established.]* However, exceptions may be granted in the following cases:

1. Permanent flow streams when the stream flow is less than 7Q10;

2. Regulated flow streams if the flow is less than the minimum release flow agreed upon by the regulating agencies;

3. For the natural and unavoidable chemical and physical changes that occur in the hypolimnion of lakes. Streams below impoundments shall meet applicable specific criteria;

4. For mixing zones.

A. The mixing zone shall be exempted from the chronic criteria requirements of this section for those components of waste that are rendered nontoxic by dilution, dissipation, or rapid chemical transformation. Acute numeric criteria of Tables A1, A2, and B1 and whole effluent acute toxicity requirements of subsection **[[3]](4)(I)** must be met at all times within the mixing zone, except within the zone of initial dilution. The following criteria do not apply to thermal mixing zones. Criteria for thermal mixing zones are listed in paragraph **[[4]](5)(D)6**.

B. The maximum size of mixing zones and zone of initial dilution will be determined as follows:

(I) Streams with 7Q10 low flows of less than **one-tenth cubic foot per second (0.1 cfs)**;—

(a) Mixing zone—not allowed; and

(b) Zone of initial dilution—not allowed;

(II) Streams with 7Q10 low flow of one-tenth to twenty **cubic foot per second (0.1-20 cfs)** *[cfs]*—

(a) Mixing zone—one-quarter (1/4) of the stream width, cross-sectional area, or volume of flow; length one-quarter (1/4) mile. If the discharger can document that rapid and complete mixing of the effluent occurs in the receiving stream, the mixing zone may be up to one-half (1/2) of the stream width, cross-sectional area, or volume of flow; and

(b) Zone of initial dilution—one-tenth (0.1) of the mixing zone width, cross-sectional area, or volume of flow;

(III) Streams with 7Q10 low flow of greater than twenty **cubic foot per second (20 cfs)** *[cfs]*—

(a) Mixing zone—one-quarter (1/4) of stream width, cross-sectional area, or volume of flow; length of one-quarter (1/4) mile; and

(b) Zone of initial dilution—one-tenth (0.1) of the mixing zone width, cross-sectional area, or volume of flow and no more than ten (10) times the effluent design flow volume unless the use of diffusers or specific mixing zone studies can justify more dilution; and

(IV) Lakes.

(a) Mixing zone—not to exceed one-quarter (1/4) of the lake width at the discharge point or one hundred feet (100') from the discharge point, whichever is less.

(b) Zone of initial dilution—not allowed.

C. A mixing zone shall not overlap another mixing zone in a manner that the maintenance of aquatic life in the body of water in the overlapping area would be further adversely affected.

D. Other factors that may prohibit or further limit the size and location of mixing zones are the size of the river, the volume of discharge, the stream bank configuration, the mixing velocities, other hydrologic or physiographic characteristics, and the designated uses of the water, including type of aquatic life supported, potential effects on mouths of tributary streams, and proximity to water supply intakes.

E. Zones of passage must be provided wherever mixing zones are allowed.

F. Mixing zone and zone of initial dilution size limits will normally be based on streams at the 7Q10 low flow. However, this percent of stream size limits also applies at higher stream flows and discharge limitations may be based on higher stream flows if discharge volume or quality may be adjusted to correlate with stream flow; and

5. For wetlands. Water quality needs will vary depending on the individual characteristics of wetlands. Application of numeric criteria will depend on the specific aquatic life, wildlife, and vegetation requirements.

A. Specific criteria for wetlands shall be developed using scientific procedures including, but not limited to, those procedures described in the U.S. Environmental Protection Agency's *Water Quality Standards Handbook*, Second Edition, August 1994.

B. Specific criteria shall protect all life stages of species associated with wetlands and prevent acute and chronic toxicity in all parts of the wetland.

C. Specific criteria shall include both chronic and acute concentrations to better reflect the different tolerances to the inherent variability between concentrations and toxicological characteristics of a condition.

D. Specific criteria shall be clearly identified as maximum "not to be exceeded" or average values, and if an average, the averaging period and the minimum number of samples. The conditions, if any, when the criteria apply shall be clearly stated (e.g., specific levels of hardness, pH, or water temperature). Specific sampling requirements (e.g., location, frequency), if any, shall also be identified.

E. The data, testing procedures, and application (safety) factors used to develop specific criteria shall reflect the nature of the condition (e.g., persistency, bioaccumulation potential) and the most sensitive species associated with the wetland.

F. Each specific criterion shall be promulgated in rule 10 CSR 20-7.031. The public notice shall include a description of the affected wetland and the reasons for applying the proposed criterion. A public hearing may be held in the geographical vicinity of the affected wetland. Any specific criterion promulgated under these provisions is subject to U.S. EPA approval prior to becoming effective.

(B) Toxic Substances.

1. Water contaminants shall not cause the criteria in Tables A1, A2, A3, B1, B2, and B3 to be exceeded. Concentrations of these substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall state and federal maximum fish tissue levels for fish consumption be exceeded. More stringent criteria may be imposed if there is evidence of additive or synergistic effects.

2. For compliance with this rule, metals shall be analyzed by the following methods:

A. Aquatic life protection and human-health protection—fish consumption.

(I) Mercury—total recoverable metals.

(II) All other metals—dissolved metals;

B. Drinking water supply—total recoverable metals; and

C. All other beneficial uses—total recoverable metals.

3. Other potentially toxic substances for which sufficient toxicity data are not available may not be released to waters of the state until safe levels are demonstrated through adequate bioassay studies.

4. Drinking water criteria, for substances which are rendered nontoxic by transformation processes in the surface water body, shall apply at water supply withdrawal points.

5. Site-specific alternative criteria for human health-fish consumption may be allowed. Designation of these site-specific criteria must follow the established variance request process.

6. Metals criteria for which toxicity is hardness dependent are in equation format in Table A2.

7. Total ammonia nitrogen. For any given sample, the total ammonia nitrogen criteria shall be based on the pH and temperature of the water body measured at the time of each sample at the point of compliance.

A. The acute criteria shall not be exceeded at any time except in those waters for which the department has allowed a zone of initial dilution (ZID). The one (1)-day Q_{10} low flow condition will be used in determining acute total ammonia nitrogen criteria.

B. The chronic criteria shall not be exceeded except in water segments for which the department has allowed a mixing zone (MZ). The chronic criteria shall be based on a thirty (30)-day exposure period. Therefore, the thirty (30)-day Q_{10} low flow condition of the receiving water body will be used in determining chronic total ammonia nitrogen criteria.

C. Without sufficient and reliable data, it is assumed that early life stages are present and must be protected at all times of the year.

(I) Sufficient and reliable data shall include, but are not limited to, seasonal studies on the fish species distributions, spawning periods, nursery periods, duration of sensitive life stages, and water body temperature. Best professional judgment from fisheries biologists and other scientists will be considered as appropriate.

(II) The time frames during the year when early life stages are considered to be absent are those time periods when early life stages are present in numbers that, if chronic toxicity did occur, would not affect the long-term success of the populations.

(III) A source of information for determining the duration of early life stages is *The American Society for Testing and Materials (ASTM) Standard E-1241*, "Standard Guide for Conducting Early Life-Stage Toxicity Tests with Fishes."

(IV) Protection of early life stages should include the most sensitive species that have used a water body for spawning and rearing since November 28, 1975.

(C) Bacteria. The protection of whole body contact recreation is limited to [classified] waters designated for that use. The recreational season is from April 1 to October 31. [The *E. coli* count shall not exceed the criterion listed in Table A as a geometric mean during the recreational season in waters designated for whole body contact recreation. The *E. coli* count shall not exceed one hundred twenty-six (126) per one hundred milliliters (100 mL) at any time in losing streams. For waters designated for secondary contact recreation, the *E. coli* count shall not exceed one thousand one hundred thirty-four (1,134) per one hundred milliliters (100 mL) as a geometric mean during the recreational season.]

1. The *E. coli* count shall not exceed one hundred twenty-six (126) per one hundred milliliters (100 mL) of water as a geometric mean during the recreational season in waters designated for WBC-A.

2. The *E. coli* count shall not exceed two hundred six (206) per one hundred milliliters (100 mL) of water as a geometric mean during the recreational season in waters designated for WBC-B.

3. The *E. coli* count shall not exceed one thousand one hundred thirty-four (1,134) per one hundred milliliters (100 mL) of water as a geometric mean during the recreational season in waters designated for SCR.

4. The *E. coli* count shall not exceed one hundred twenty-six (126) per one hundred milliliters (100 mL) of water at any time in losing streams.

(D) Temperature.

1. For general and limited warm-water fisheries beyond the mixing zone, water contaminant sources and physical alteration of the water course shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5 °F) or two and seven-ninths degrees Celsius (2 7/9 °C). Water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90 °F) or thirty-two and two-ninths degrees Celsius (32 2/9 °C). However, site-specific ambient temperature data and requirements of sensitive resident aquatic species will be considered, when data are available, to establish alternative maxima or deviations from ambient temperatures.

2. For cool-water fisheries beyond the mixing zone, water contaminant sources and physical alteration of the water course shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5 °F) or two and seven-ninths degrees Celsius (2 7/9 °C). Water contaminant sources shall not cause or contribute to stream temperature in excess of eighty-four degrees Fahrenheit (84 °F) or twenty-eight and eight-ninths degrees Celsius (28 8/9 °C).

3. For cold-water fisheries beyond the mixing zone, water contaminant sources and physical alteration of the water course shall not raise or lower the temperature of the water body more than two degrees Fahrenheit (2 °F) or one and one-ninth degrees Celsius (1 1/9 °C). Water contaminant sources shall not cause or contribute to temperatures above sixty-eight degrees Fahrenheit (68 °F) or twenty degrees Celsius (20 °C).

4. Water contaminant sources shall not cause any measurable rise in the temperature of lakes. An increase is allowable for Lake Springfield, Thomas Hill Reservoir, and Montrose Lake; however, discharges from these lakes must comply with temperature limits for streams.

5. For the Mississippi River Zones 1A and 2, the water temperature outside the mixing zone shall not exceed the maximum limits indicated in the following list during more than one percent (1%) of the time in any calendar year. In Zone 1B, limits may not be exceeded more than five percent (5%) of the time in a calendar year. At no time shall the river water temperature outside of the thermal mixing zone exceed the listed limits by more than three degrees Fahrenheit (3 °F) or one and six-ninths degrees Celsius (1 6/9 °C).

	A and B		C	
	(°F)	(°C)	(°F)	(°C)
January	45	7 2/9	50	10
February	45	7 2/9	50	10
March	57	13 8/9	60	15 5/9
April	68	20	70	21 1/9
May	78	25 5/9	80	26 6/9
June	86	30	87	30 5/9
July	88	31 1/9	89	31 6/9
August	88	31 1/9	89	31 6/9
September	86	30	87	30 5/9
October	75	23 8/9	78	25 5/9
November	65	18 3/9	70	21 1/9
December	52	11 1/9	57	13 8/9

A = Zone 1A—Des Moines River to Lock and Dam No. 25.
B = Zone 1B—Lock and Dam No. 25 to Lock and Dam No. 26.
C = Zone 2—Lock and Dam No. 26 to the Missouri-Arkansas state line.

6. Thermal mixing zones shall be limited to twenty-five percent (25%) of the cross-sectional area or volume of a river, unless biological surveys performed in response to section 316(a) of the federal Clean Water Act (or equivalent) indicate no significant adverse impact on aquatic life. Thermal plume lengths and widths within rivers, and all plume dimensions within lakes, shall be determined on a case-by-case basis and shall be based on physical and biological surveys when appropriate.

(E) pH. Water contaminants shall not cause pH to be outside of the range of 6.5 to 9.0 standard pH units.

(F) Taste- and Odor-Producing Substances. Taste- and odor-producing substances shall be limited to concentrations in the streams or lakes that will not interfere with beneficial uses of the water. For those streams and lakes designated for drinking water supply use, the taste- and odor-producing substances shall be limited to concentrations that will not interfere with the production of potable water by reasonable water treatment processes.

(G) Turbidity and Color. Water contaminants shall not cause or contribute to turbidity or color that will cause substantial visible contrast with the natural appearance of the stream or lake or interfere with beneficial uses.

(H) Solids. Water contaminants shall not cause or contribute to solids in excess of a level that will interfere with beneficial uses. The stream or lake bottom shall be free of materials which will adversely alter the composition of the benthos, interfere with the spawning of fish or development of their eggs or adversely change the physical or chemical nature of the bottom.

(I) Radioactive Materials. All streams and lakes shall conform to state and federal limits for radionuclides established for drinking water supply.

(J) Dissolved Oxygen. Water contaminants shall not cause the dissolved oxygen to be lower than the levels described in Table A3 or Table K—Site-Specific Criteria.

(K) Total Dissolved Gases. Operation of impoundments shall not cause the total dissolved gas concentrations to exceed one hundred ten percent (110%) of the saturation value for gases at the existing atmospheric and hydrostatic pressures.

(L) Sulfate and Chloride Limit for Protection of Aquatic Life. **Water contaminants shall not cause sulfate or chloride criteria to exceed the levels described in Table A2.**

1. Streams with 7Q10 low flow of less than one (1) cubic foot per second. The concentration of chloride plus sulfate shall not exceed one thousand milligrams per liter (1,000 mg/L). Table A includes additional chloride criteria.

2. Class P1, L1, L2, and L3 waters and streams with 7Q10 low flow of more than one (1) cubic foot per second. The total chloride plus sulfate concentration shall not exceed the estimated natural background concentration by more than twenty percent (20%) at the 6Q10 low flow.]

(M) Carcinogenic Substances. Carcinogenic substances shall not exceed concentrations in water which correspond to the 10⁻⁶ cancer risk rate. This risk rate equates to one (1) additional cancer case in a population of one (1) million with lifetime exposure. Derivation of this concentration assumes average water and fish consumption amounts. Assumptions are two (2) liters of water and **six and one-half (6.5)** grams of fish consumed per day. Federally established final maximum contaminant levels for drinking water supply shall supersede drinking water supply criteria developed in this manner.

(N) Nutrients and Chlorophyll.

1. Definitions.

A. For the purposes of this rule—

(I) All lakes and reservoirs shall be referred to as “lakes/.”; and

(II) Only total phosphorus (TP) criteria are derived from lake characteristics. Total nitrogen (TN) and chlorophyll (Chl) criteria are determined as a function of TP criteria.

B. Lake ecoregions—Due to differences in topography, soils, and geology, nutrient criteria for lakes and reservoirs will be determined by the use of four (4) major ecoregions. These regions were delineated by grouping the ecological subsections described in Nigh and Schroeder, 2002, *Atlas of Missouri Ecoregions*, Missouri Department of Conservation as follows:

(I) Plains: TP2—Deep Loess Hills; TP3—Loess Hills; TP4—Grand River Hills; TP5—Chariton River Hills; TP6—Claypan Till Plains; TP7—Wyaconda River Dissected Till Plains; TP8—Mississippi River Hills;

(II) Ozark Border: MB2a—Crowley’s Ridge Loess Woodland/Forest Hills; OZ11—Prairie Ozark Border; OZ12—Outer Ozark Border; OZ13—Inner Ozark Border;

(III) Ozark Highland: OZ1—Springfield Plain; OZ2—Springfield Plateau; OZ3—Elk River Hills; OZ4—White River Hills; OZ5—Central Plateau; OZ6—Osage River Hills; OZ7—Gasconade River Hills; OZ8—Meramec River Hills; OZ9—Current River Hills; OZ10—St. Francois Knobs and Basins; OZ14—Black River Ozark Border;

(IV) Big River Floodplain: MB1—Black River Alluvial Plain; MB2b—Crowley’s Ridge Footslopes and Alluvial Plains; MB3—St. Francis River Alluvial Plain; MB4, OZ16, TP9—Mississippi River Alluvial Plain; OZ15, TP1—Missouri River Alluvial Plain.

C. Criteria values.

(I) Prediction value—A TP concentration that is derived from the characteristics of a lake including dam height in feet, hydraulic residence time in years, and percentage of the watershed that was historically covered by prairie grasses. Prediction values for total phosphorus are calculated directly from these characteristics.

(II) Reference value—A TP concentration that is representative of lakes within an ecoregion having the following characteristics:

(a) Less than twenty percent (20%) of the watershed is in crop land and urban land combined;

(b) There are no point source wastewater discharges and no concentrated animal feeding operations within the watershed;

(c) In the Plains region, more than fifty percent (50%) of the watershed is in grass land; and

(d) In the Ozark Highlands region, more than fifty percent (50%) of the watershed is in woodland.

(III) Site-Specific Value—A TP concentration for a lake that has been identified as having trophic characteristics for which the reference of the ecoregion and the prediction values for that water body are not adequate to prevent deterioration of water quality. Site-specific criteria are applicable to lakes having a geometric mean TP concentration equal to or less than the 10th percentile value of the range of geometric mean TP concentrations measured in reference lakes within a lake ecoregion. Site-specific criteria are also applicable to lakes with actual TP geometric mean concentrations that are at or below the reference value where the prediction value is at or below the 10th percentile for TP geometric mean concentrations within a lake ecoregion. The 10th percentile values for each ecoregion are listed in Table L and lakes with site-specific criteria are listed in Tables M and N.

D. Tributary arm—A substantial segment of an L2 lake that is primarily recharged by a source or sources other than the main channel of the lake.

2. This rule applies to all lakes and reservoirs that are waters of the state and that are outside the Big River Floodplain ecoregion and have an area of at least ten (10) acres during normal pool.

3. Nutrient criteria for lakes and reservoirs with site-specific criteria are listed in Tables M and N. Nutrient criteria for other lakes are as follows:

A. Total phosphorus (TP)—

(I) For lakes in which the TP prediction value or the actual TP concentration does not exceed the reference value listed in Table L, the TP criterion shall be the reference value, except as described below;

(II) For lakes in which the TP prediction value does not exceed the reference value, and the actual TP value does not exceed the prediction value, the TP criterion shall be the prediction value;

(III) For lakes in which the TP prediction value and the actual TP concentration exceed the reference value listed in Table L, the TP criterion shall be limited to the prediction value; and

(IV) Site-specific TP criteria for the tributary arms of L2 lakes are listed in Table N./.;

B. Total nitrogen (TN)—

(I) For lakes in which the TP prediction value does not exceed the reference value listed in Table L, TN concentration shall be limited to twenty (20) times the TP reference value;

(II) For lakes in which the TP prediction value does not exceed the reference value, and the actual TP value does not exceed the prediction value, TN concentration shall be limited to twenty (20) times the TP prediction value;

(III) For lakes in which the TP prediction value exceeds the TP reference value listed in Table L, TN concentration shall be limited to twenty (20) times the TP prediction value; and

(IV) This portion of the rule does not apply to lakes that are held to site-specific criteria for TP, TN, and Chl, as listed in Tables M and N./.; and

C. Chlorophyll (Chl)—Chl criteria shall be calculated from TP criteria as follows:

(I) Plains: Chl:TP = 0.44;

(II) Ozark Border and Ozark Highlands: Chl:TP = 0.42; and

(III) This portion of the rule does not apply to lakes that are held to site-specific criteria for TP, TN, and Chl, as listed in Tables M and N.

4. All TP, TN, and chlorophyll concentrations must be calculated as the geometric mean of a minimum of four (4) representative samples per year for four (4) years that are not necessarily consecutive. All samples must be collected from the surface, near the outflow end of the lake, and during the period May 1–August 31.

(O) All methods of sample collection, preservation, and analysis used in applying criteria in these standards shall be in accord with those prescribed in the latest edition of *Standard Methods for the Examination of Water and Wastewater* or other procedures approved by the [Environmental Protection Agency] EPA and the Missouri Department of Natural Resources.

(P) Criteria to protect designated uses are based on current technical literature, especially the [Environmental Protection Agency’s] EPA’s publications, [Quality Criteria for Water, 1986] National Recommended Water Quality Criteria (2009) and 2011 Edition of the Drinking Water Standards and Health Advisories. Criteria may be modified or expanded as additional information is developed or as needed to define narrative criteria for particular situations or locations.

(Q) WET Chronic Tests. Chronic WET tests performed at the percent effluent at the edge of the mixing zone shall not be toxic to the more sensitive of at least two (2) representative, diverse species. Pollutant attenuation processes such as volatilization and biodegradation which may occur within the allowable mixing zone will be considered in interpreting results.

(R) Biocriteria. The biological integrity of waters, as measured by lists or numeric diversity indices of benthic invertebrates, fish, algae, or other appropriate biological indicators, shall not be significantly different from reference waters. Waters shall be compared to reference waters of similar size within an ecoregion. Reference water locations are listed in Table I.

(S) Site-Specific Criteria Development for the Protection of Aquatic Life. When water quality criteria in this regulation are either underprotective or overprotective of water quality due to natural, non-anthropogenic conditions for a given water body segment, a petitioner may request site-specific criteria. The petitioner must provide the department with sufficient documentation to show that the current criteria are not adequate and that the proposed site-specific criteria will protect all existing and/or potential uses of the water body.

1. Site-specific criteria may be appropriate where, but is not limited to the examples given in subparagraphs A. or B. of this paragraph./.;

A. The resident aquatic species of the selected water body have a different degree of sensitivity to a specific pollutant as compared to those species in the data set used to calculate the national or state criteria as described in either of the following parts:

(I) Natural adaptive processes have enabled a viable, balanced aquatic community to exist in waters where natural (non-anthropogenic) background conditions exceed the criterion (e.g., resident species have evolved a genetically based greater tolerance to high concentrations of a chemical); or

(II) The composition of aquatic species in a water body is different from those used in deriving a criterion (e.g., most of the species considered among the most sensitive, such as salmonids or the cladoceran, *Ceriodaphnia dubia*, which were used in developing a criterion, are absent from a water body).

B. The physical and/or chemical characteristics of the water body alter the biological availability and/or toxicity of the pollutant (e.g., pH, alkalinity, salinity, water temperature, hardness).

2. All petitioners seeking to develop site-specific criteria shall coordinate with the department early in the process. This coordination will insure the use of adequate, relevant, and quality data; proper analysis and testing; and defensible procedures. The department will provide guidance for establishing site-specific water quality criteria using scientific procedures including, but not limited to, those procedures described in the *U.S. Environmental Protection Agency's/ EPA's Water Quality Standards Handbook*, Second Edition, August 1994.

3. Site-specific criteria shall protect all life stages of resident species and prevent acute and chronic toxicity in all parts of a water body.

4. Site-specific criteria shall include both chronic and acute concentrations to better reflect the different tolerances of resident species to the inherent variability between concentrations and toxicological characteristics of a chemical.

5. Site-specific criteria shall be clearly identified as maximum "not to be exceeded" or average values, and if an average, the averaging period and the minimum number of samples. The conditions, if any, when the criteria apply shall be clearly stated (e.g., specific levels of hardness, pH, or water temperature). Specific sampling requirements (e.g., location, frequency), if any, shall also be identified.

6. The data, testing procedures, and application (safety) factors used to develop site-specific criteria shall reflect the nature of the chemical (e.g., persistency, bioaccumulation potential, and avoidance or attraction responses in fish) and the most sensitive resident species of a water body.

7. The size of a site may be limited to a single water segment, single water subsegment, or may cover a whole watershed depending on the particular situation for which the specific criterion is developed. A group of water bodies may be considered one (1) site if their respective aquatic communities are similar in composition and have comparable water quality.

8. The department shall determine if a site-specific criterion is adequate and justifiable. Each site-specific criterion shall be promulgated into rule 10 CSR 20-7.031. The public notice shall include a description of the affected water body or water body segment and the reasons for applying the proposed criterion. If the department determines that there is significant public interest, a public hearing may be held in the geographical vicinity of the affected water body or water body segment. Any site-specific criterion promulgated under these provisions is subject to U.S. EPA approval prior to becoming effective.

[(5)](6) Groundwater.

(A) Water contaminants shall not cause or contribute to *[exceedence]* **exceedance** of Table A1 *[groundwater limits]* **drinking water supply (DWS) criteria**, in aquifers and caves. Table A1 values listed as health advisory levels shall be used in establishing management strategies and groundwater cleanup criteria, until additional data becomes available to support alternative criteria or other standards are established. Substances not listed in Table A1 shall be limited so that drinking water, livestock watering, and irrigation uses are protected.

(B) When criteria for the protection of aquatic life or human health protection-fish consumption in Table A1 are more stringent than groundwater criteria, appropriate criteria for the protection of aquatic life or human health protection-fish consumption shall apply to waters in caves and to aquifers which contribute an important part of base flow of surface waters designated for aquatic life protection. Other substances not listed in Table A1 shall be limited in these aquifers and caves so that the aquatic life use is protected.

(C) Groundwater and other criteria shall apply in any part of the aquifer, including the point at which the pollutant enters the aquifer. A specific monitoring depth requirement for releases to aquifers is included in 10 CSR 20-7.015(7)(A).

(D) For aquifers in which contaminant concentrations exceed groundwater criteria or other protection criteria, and existing and potential uses are not impaired, alternative site-specific criteria may be allowed. To allow alternative criteria, the management authority must demonstrate that alternative criteria will not impair existing and potential uses. The demonstration must consider the factors and be subject to the review requirements of 10 CSR 20-7.015(7)(F).

[(6)](7) Metropolitan No-Discharge Streams. No water contaminant except uncontaminated cooling water, permitted stormwater discharges in compliance with permit conditions and excess wet-weather bypass discharges not interfering with beneficial uses, shall be discharged to the watersheds of streams listed in Table F. Existing interim discharges may be allowed until interceptors are available within two thousand feet (2,000') or a distance deemed feasible by the department, or unless construction of outfalls to alternative receiving waters not listed in Table F is deemed feasible by the department. Existing discharges include wastewater volumes up to the design capacity of existing permitted treatment facilities, including phased increases in design capacity approved by the department prior to the effective date of this rule. Additional facilities may be constructed to discharge to these waters only if they are intended to be interim facilities in accordance with a regional wastewater treatment plan approved by the department.

[(7)](8) Outstanding National Resource Waters. Under section **[(2)](3)**, antidegradation section of this rule, new releases to outstanding national resource waters from any source are prohibited and releases from allowed facilities are subject to special effluent limitations as required in 10 CSR 20-7.015(6). Table D contains a list of the outstanding national resource waters in Missouri.

[(8)](9) Outstanding State Resource/s/ Waters. The commission wishes to recognize certain high-quality waters that may require exceptionally stringent water-quality management requirements to assure conformance with the antidegradation policy. The degree of management requirements will be decided on an individual basis. To qualify for inclusion, all of the following criteria must be met. The waters listed in Table E must—

(A) Have a high level of aesthetic or scientific value;

(B) Have an undeveloped watershed; and

(C) Be located on or pass through lands which are state or federally owned, or which are leased or held in perpetual easement for conservation purposes by a state, federal, or private conservation agency or organization.

[(9)](10) Lake Taneycomo. The commission wishes to recognize the uniqueness of Lake Taneycomo with respect to its high water clarity, its importance as a trout fishery and as the central natural resource in the rapidly developing Branson area and threats to the lake's water quality imposed by development. An especially stringent antidegradation policy will be observed in the development of effluent rules, discharge permits, and nonpoint-source management plans and permits to assure that the high visual quality and aquatic resources are maintained. The use of the best treatment technology for point- and nonpoint-source discharges in the lake's watershed between Table

Rock Lake and Power Site Dam will be the guiding principle in establishing limitations.

~~[(10)](11)~~ Compliance with Water Quality Based Limitations. Compliance with new or revised National Pollutant Discharge Elimination System (NPDES) or Missouri operating permit limitations based on criteria in this rule shall be achieved with all deliberate speed *[no later than three (3) years from the date of issuance of the permit except where provided for otherwise in 10 CSR 20-7.015(9)(H).]* and in accordance with federal regulation at 40 CFR Part 122.47, "Schedules of Compliance," May 15, 2000, as published by the Office of the Federal Register, National Archives and Records Administration, Superintendent of Documents, Pittsburgh, PA 15250-7954, which is hereby incorporated by reference and does not include any later amendments or additions. The department shall maintain a copy of the referenced document and shall make it available to the public for inspection and copying at no more than the actual cost of reproduction. Variances from water quality based limitations may be requested in accordance with section (12) of this rule.

(12) Variances.

(A) The department may grant, to an applicant for a NPDES or Missouri operating permit, a variance to a water quality-based effluent limitation or water quality standard found in the operating permit.

1. A variance applies only to the permittee identified in such variance and only to the pollutant or water quality standard specified in the variance. A variance does not affect or require the department to modify a corresponding standard or criteria value.

2. A variance shall not be granted if standards or criteria values will be attained by implementing technology-based effluent limits required under 10 CSR 20-7.015 of this rule and by implementing cost-effective and reasonable best management practices for nonpoint-source control.

3. A variance shall not be granted for actions that will impact water quality and conditions protected by 10 CSR 20-7.031(4).

4. A variance shall be not be granted that would likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of such species' critical habitat.

(B) A variance may be granted if the applicant demonstrates that achieving the water quality-based effluent limitation or water quality standard is not feasible as supported by an analysis considering the provisions of 40 CFR 131.10(g).

(C) In granting a variance, conditions and time limitations may be set by the department with the intent that progress be made toward improvements in surface water quality.

(D) Each variance shall be granted only after public notification and opportunity for public comment. Each variance, once granted, shall be approved by the EPA prior to implementation for Clean Water Act purposes. Each variance shall be adopted into rule at the next systematic review or subsequent triennial review.

~~[(11)](13)~~ Losing Streams.

(A) Losing stream determinations will usually be made upon the first application for discharge to a specific water or location within a watershed for a wastewater treatment facility, subdivision development, or animal waste management facility.

(B) Permits or other approvals for those applications will be processed in accordance with the determinations. Additional permits or approvals will be processed in accordance with the latest determination.

(C) For application purposes, any proposed facility within five (5) miles of a known losing stream segment should presume that facility's receiving stream segment is also losing until and unless a specific geologic evaluation is made of that stream and concludes the stream segment is gaining.

(D) Existing facilities operating under a state operating permit and new facilities being constructed under a construction permit in proximity to stream segments subsequently determined to be losing will be allowed to continue in operation at permitted or approved effluent limits for a period of time lasting the design life of the facility (usually twenty (20) years from the original construction completion), provided the facility is in compliance with its effluent limits and remains in compliance with those limits, and if neither of the following conditions is present:

1. If the discharge from such a facility can be eliminated by connection to a locally available facility, the facility shall be connected within three (3) years of the losing stream determination. A local facility shall be considered available if that facility or an interceptor is within two thousand feet (2000') or a distance deemed feasible by the department; and

2. If the discharge from such a facility is shown to cause pollution of groundwater, the facility shall be upgraded to appropriate effluent standards within three (3) years. The department shall include appropriate groundwater monitoring requirements in permits for any such facilities so that pollution, should it occur, would be detected.

(E) Any additional permits or approvals for increased treatment plant design capacity will be processed in accordance with the newest losing stream determination. No additional permits or approvals for any facilities shall be construed as lengthening the time for compliance with losing stream effluent limitations as established in subsection ~~[(11)](13)~~(D).

~~[(12)](14)~~ Severance. If a section, subsection, paragraph, sentence, clause, phrase, or any part of this rule be declared unconstitutional or invalid for any reason, the remainder of this rule shall not be affected and shall remain in full force and effect.

~~[(13)](15)~~ Effective Date. This rule becomes effective immediately upon adoption and compliance with the requirements of subsection 644.036.3, of the Missouri Clean Water Law and Chapter 536, RSMo.

[Table A—Criteria for Designated Uses

WBC = Whole Body Contact Recreation
 SCR = Secondary Contact Recreation
 AQL = Protection of Aquatic Life
 DWS = Drinking Water Supply
 LWW = Livestock and Wildlife Watering
 GRW = Groundwater

Pollutant ($\mu\text{g/L}$)	AQL
<i>Chlorine (total residual)</i>	
cold-water	2
warm-water chronic—	10
acute—	19
<i>Cyanide (amenable to chlorination)</i>	
chronic—	5
acute—	22
Hydrogen sulfide (un-ionized)	2

Pollutant (mg/L)	AQL	DWS	LWW	GRW	
<i>Chloride</i>	chronic—	230(+)	250		
	acute—	860(+)			
<i>Sulfate</i>	(+)	250			
<i>Fluoride</i>		4	4	4	
<i>Nitrate-N</i>		10		10	
<i>Dissolved oxygen (minimum) *</i>					
warm-water and cool-water fisheries	5				
cold-water fisheries	6				
<i>Oil and grease</i>	10				

+ See 10 CSR 20-7.031(4)(L).

* Site-Specific Criteria have been promulgated for waters listed in Table K.

Pollutant (/100 mL)	WBC-A	WBC-B	SCR
<i>E coli Bacteria **</i>	126	206	1134

** Geometric mean during the recreational season in waters designated for recreation or at any time in losing streams. The recreational season is from April 1 to October 31.

Pollutant	AQL	
	$^{\circ}\text{F}$	$^{\circ}\text{C}$
<i>Temperature (maximum)</i>		
warm-water	90	32 2/9
cool-water	84	28 8/9
cold-water	68	20
<i>Temperature (maximum change)</i>		
warm-water	5	2 7/9
cool-water	5	2 7/9
cold-water	2	1 6/9

Pollutant (percent saturation)	AQL
<i>Total Dissolved Gases</i>	110%

AQL = Protection of Aquatic Life
 HHF = Human Health Protection-Fish Consumption
 DWS = Drinking Water Supply
 IRR = Irrigation
 LWW = Livestock Wildlife Watering
 GRW = Groundwater

Pollutant ($\mu\text{g/L}$)	AQL	HHF	DWS	IRR	LWW	GRW
<i>Metals (refer to text in 10 CSR 20-7.031(4)(B)2.)</i>						
<i>(Not Hardness Dependant)</i>						
Aluminum (acute)	750					
Antimony		4,300	6			6
Arsenic	20		50	100		50
Barium			2,000			2,000
Beryllium	5		4	100		4
Boron				2,000		2,000
Cadmium	*		5			5
Chromium III	*		100	100		100
Chromium VI						
chronic	10					
acute	15					
Cobalt					1,000	1,000
Copper	*		1,300		500	1,300
Iron	1,000					300
Lead	*		15			15
Manganese						50
Mercury			2			2
chronic	0.5					
acute	2.4					
Nickel	*		100			100
Selenium	5		50			50
Silver	*		50			50
Thallium		6.3	2			2
Zinc	*		5,000			5,000

*See Metals (Hardness Dependent)

AQL = Protection of Aquatic Life

Pollutant (µg/L)	AQL	
<i>Metals (Hardness Dependent)</i>		
Cadmium (µg/L)	Acute:	$e^{(1.0166 \cdot \ln(\text{Hardness}) - 3.062490)} * (1.136672 - (\ln(\text{Hardness}) * 0.041838))$
	Chronic:	$e^{(0.7409 \cdot \ln(\text{Hardness}) - 4.719948)} * (1.101672 - (\ln(\text{Hardness}) * 0.041838))$
Chromium III (µg/L)	Acute:	$e^{(0.8190 \cdot \ln(\text{Hardness}) + 3.725666)} * 0.316$
	Chronic:	$e^{(0.8190 \cdot \ln(\text{Hardness}) + 0.684960)} * 0.860$
Copper (µg/L)	Acute:	$e^{(0.9422 \cdot \ln(\text{Hardness}) - 1.700300)} * 0.960$
	Chronic:	$e^{(0.8545 \cdot \ln(\text{Hardness}) - 1.702)} * 0.960$
Lead (µg/L)	Acute:	$e^{(1.273 \cdot \ln(\text{Hardness}) - 1.460448)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$
	Chronic:	$e^{(1.273 \cdot \ln(\text{Hardness}) - 4.704797)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$
Nickel (µg/L)	Acute:	$e^{(0.8460 \cdot \ln(\text{Hardness}) + 2.255647)} * 0.998$
	Chronic:	$e^{(0.8460 \cdot \ln(\text{Hardness}) + 0.058978)} * 0.997$
Silver (µg/L)	Acute:	$e^{(1.72 \cdot \ln(\text{Hardness}) - 6.588144)} * 0.850$
Zinc (µg/L)	Acute:	$e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.884)} * 0.98$
	Chronic:	$e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.884)} * 0.98$

	Hardness								
	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250+
<i>Cadmium</i>									
Acute:	2.4	3.6	4.8	5.9	7.1	8.2	9.4	10.5	11.6
Chronic:	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5
<i>Chromium III</i>									
Acute:	323	450	570	684	794	901	1,005	1,107	1,207
Chronic:	42	59	74	89	103	117	131	144	157
<i>Copper</i>									
Acute:	7	10	13	17	20	23	26	29	32
Chronic:	5	7	9	11	13	14	16	18	20
<i>Lead</i>									
Acute:	30	47	65	82	100	118	136	154	172
Chronic:	1	2	3	3	4	5	5	6	7
<i>Nickel</i>									
Acute:	261	367	469	566	660	752	842	930	1,017
Chronic:	29	41	52	63	73	84	94	103	113
<i>Silver</i>									
Acute:	1.0	2.0	3.2	4.7	6.5	8.4	10.6	13.0	15.6
<i>Zinc</i>									
Acute:	65	92	117	142	165	188	211	233	255
Chronic:	65	92	117	142	165	188	211	233	255

AQL = Protection of Aquatic Life
 HHF = Human Health Protection-Fish Consumption
 DWS = Drinking Water Supply
 GRW = Groundwater

Pollutant (µg/L)	AQL	HHF	DWS	GRW
<i>Organics</i>				
Acrolein		780	320	320
Bis-2-chloroisopropyl ether		4,360	1,400	1,400
2, chlorophenol		400	.1	.1
2,4-dichlorophenol	7	790	93	93
2,4-dinitrophenol		14,000	70	70
2,4-dimethylphenol		2,300	540	540
2,4,5-trichlorophenol		9,800	2,600	2,600
2,4,6-trichlorophenol		6.5	2	2
2-methyl-4,6-dinitrophenol		765	13	13
Ethylbenzene	320		700	700
Hexachlorocyclopentadiene	.5		50	50
Isophorone		2,600	36	36
Nitrobenzene		1,900	17	17
Phenol	100		100	300
Dichloropropene		1,700	87	87
Para(1,4)-dichlorobenzene		2,600	75	75
Other Dichlorobenzenes		2,600	600	600
1,2,4-trichlorobenzene		940	70	70
1,2,4,5-tetrachlorobenzene		2.9	2.3	2.3
pentachlorobenzene		4.1	3.5	3.5
1,1,1-trichloroethane			200	200
1,1,2-trichloroethane		42	5	5
2,4-dinitrotoluene		9	.11	.04
1,2-diphenylhydrazine		.54	.04	.04
di (2-ethylhexyl) adipate			400	400
n-nitrosodiphenylamine		16	5	5
n-nitrosopyrrolidene		91.9		
2-chloronaphthalene	4,300			
n-nitrosodi-n-propylamine		1.4		

Pollutant (µg/L)	AQL	DWS	GRW
<i>Pesticides</i>			
Demeton	.1		
Endosulfan			
chronic—	.056		
acute—	0.11		
Guthion	.01		
Malathion	.1		
Parathion	.04		
2,4-D		70	70
2,4,5-TP		50	50
Chlorpyrifos	.04		
Alachlor		2	2
Atrazine		3	3
Carbofuran		40	40
Dalapon		200	200
Dibromochloropropane		.2	.2
Dinoseb		7	7
Diquat		20	20
Endothall		100	100
Ethylene dibromide		.05	.05
Oxamyl (vydate)		200	200
Picloram		500	500
Simazine		4	4
Glyphosate		700	700

AQL = Protection of Aquatic Life
 HHF = Human Health Protection-Fish Consumption
 DWS = Drinking Water Supply
 GRW = Groundwater

Pollutant ($\mu\text{g/L}$)	AQL	HHF	DWS	GRW
<i>Bioaccumulative,</i>				
<i>Anthropogenic Toxics (+)</i>				
<i>PCBs</i>				
.000045		.000045		
4-4' dichlorodiphenyldichloroethane (DDT)		0.00059	0.00059	0.00059
4-4' dichlorodiphenyldichloroethylene (DDE)		0.00059	0.00059	0.00059
0.00059				
4-4' dichlorodiphenyldichloroethane (DDD)		0.00084	0.00083	0.00083
Endrin		.0023	2	2
Endrin aldehyde		.0023	.75	.75
Aldrin		.000079	.00013	.00013
Dieldrin		.000076	.00014	.00014
Heptachlor	.0038	.0002	0.4	0.4
Heptachlor epoxide		.00011	0.2	0.2
Methoxychlor	.03		40	40
Mirex	.001			
Toxaphene		.000073	3	3
Lindane (gamma-BHC)		.062	.2	.2
Alpha,beta,delta-BHC		.0074	.0022	.0022
Chlordane		.00048	2	2
Benzidine		.00053	.00012	.00012
2,3,7,8-tetrachlorodibenzo-p-dioxin (ng/L)*		.000014	0.000013	
0.000013				
(TCDD or dioxin)				
Pentachlorophenol**	3.2-pH 6.5	8	1	1
	5.3-pH 7.0			
	8.7-pH 7.5			
	14.0-pH 8.0			
	23.0-pH 8.5			

+ Many of these values are below current detection limits; analyses will be determined by the 17th edition of Standard Methods or the most current methods approved by the Environmental Protection Agency.

*Units for dioxin are nanograms/liter (ng/L); 1 $\mu\text{g/L}$ = 1,000 ng/L.

**Toxic impurities may be present in technical-grade pentachlorophenol; monitoring and discharge control will assure that impurities are below toxic concentrations.

HHF = Human Health Protection-Fish Consumption
 DWS = Drinking Water Supply
 GRW = Groundwater

Pollutant (µg/L)	HHF	DWS	GRW
<i>Anthropogenic Carcinogens(+)</i>			
Acrylonitrile	.65	.058	.058
Hexachlorobenzene	.00074	1	1
Bis (2-chloroethyl) ether	1.4	.03	.03
Bis (chloromethyl) ether	0.00078	.00013	.00013
Hexachloroethane	8.7	1.9	1.9
3,3'-dichlorobenzidine	0.08	.04	.04
Hexachlorobutadiene	50	.45	.45
n-nitrosodimethylamine	8	.0007	.0007

(+) Some of these values are below current detection limits; analyses will be determined by the 17th edition of Standard Methods or the most current methods approved by the Environmental Protection Agency.

Pollutant (µg/L)	HHF	DWS	GRW
<i>Volatile Organics</i>			
Chlorobenzene	21,000	100	100
Carbon Tetrachloride	5	5	5
Trihalomethanes		80	80
Bromoform	360	4.3	4.3
Chlorodibromomethane	34	0.41	0.41
Dichlorobromomethane	46	0.56	0.56
Chloroform	470	5.7	5.7
Methyl Bromide	4,000	48	48
Methyl Chloride	470	5	5
Methylene Chloride	1,600	4.7	4.7
Dichlorodifluoromethane	570,000		
Trichlorofluoromethane	860,000		
1,2-dichloroethane	99	5	5
1,1,2,2-tetrachloroethane	11	.17	.17
1,1-dichloroethylene	3.2	7	7
1,2-trans-dichloroethylene	140,000	100	100
1,2-cis-dichloroethylene		70	70
Trichloroethylene	80	5	5
Tetrachloroethylene	8.85	0.8	0.8
Benzene	71	5	5
Toluene	200,000	1,000	1,000
Xylenes (total)		10,000	10,000
Vinyl chloride	525	2	2
Styrene		100	100
1,2-dichloropropane	39	0.52	0.52

Pollutant (Fibers/L)	DWS	GRW
Asbestos	7,000,000	

HHF = Human Health Protection-Fish Consumption
DWS = Drinking Water Supply
GRW = Groundwater

Pollutant ($\mu\text{g/L}$)	HHF	DWS	GRW
<i>Polynuclear Aromatic Hydrocarbons</i>			
Anthracene	110,000	9,600	9,600
Fluoranthene	370	300	300
Fluorene	14,000	1,300	1,300
Pyrene	11,000	960	960
Benzo(a)pyrene	.049	0.2	0.2
other polynuclear aromatic hydrocarbons*	.049	.0044	.0044
Acenaphthene	2,700	1,200	1,200

*This concentration is allowed for each of the following PAHs: benzo(a)anthracene, 3,4-benzofluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene and benzo(k)fluoranthene. Higher values may be allowed if natural background concentrations exceed these values.

Pollutant ($\mu\text{g/L}$)	HHF	DWS	GRW
<i>Phthalate Esters</i>			
Bis(2-ethylhexyl) phthalate	5.9	6	6
Butylbenzyl phthalate	5,200	3,000	3,000
Diethyl phthalate	120,000	23,000	23,000
Dimethyl phthalate	2,900,000	313,000	313,000
Di-n-butyl phthalate	12,000	2,700	2,700

Health Advisory Levels

Pollutant ($\mu\text{g/L}$)	DWS	GRW
Ametryn	60	60
Baygon	3	3
Bentazon	20	20
Bis-2-chloroisopropyl ether	300	300
Bromacil	90	90
Bromochloromethane	90	90
Bromomethane	10	10
Butylate	350	350
Carbaryl	700	700
Carboxin	700	700
Chloramben	100	100
o-chlorotoluene	100	100
p-chlorotoluene	100	100
Chlorpyrifos	20	20
DCPA (dacthal)	4,000	4,000
Diazinon	0.6	0.6
Dicamba	200	200
Diisopropyl methylphosphonate	600	600
Dimethyl methylphosphonate	100	100
1,3-dinitrobenzene	1	1
Diphenamid	200	200
Diphenylamine	200	200
Disulfoton	0.3	0.3
1,4-dithiane	80	80
Diuron	10	10

DWS = Drinking Water Supply
 GRW = Groundwater

Health Advisory Levels (continued)

<i>Pollutant (µg/L)</i>	<i>DWS</i>	<i>GRW</i>
<i>Fenamiphos</i>	2	2
<i>Fluometron</i>	90	90
<i>Fluorotrichloromethane</i>	2,000	2,000
<i>Fonofos</i>	10	10
<i>Hexazinone</i>	200	200
<i>Malathion</i>	200	200
<i>Maleic hydrazide</i>	4,000	4,000
<i>MCPA</i>	10	10
<i>Methyl parathion</i>	2	2
<i>Metolachlor</i>	70	70
<i>Metribuzin</i>	100	100
<i>Naphthalene</i>	20	20
<i>Nitroguanidine</i>	700	700
<i>p-nitrophenol</i>	60	60
<i>Paraquat</i>	30	30
<i>Pronamide</i>	50	50
<i>Propachlor</i>	90	90
<i>Propazine</i>	10	10
<i>Propham</i>	100	100
<i>2,4,5-T</i>	70	70
<i>Tebuthiuron</i>	500	500
<i>Terbacil</i>	90	90
<i>Terbufos</i>	0.9	0.9
<i>1,1,1,2-Tetrachloroethane</i>	70	70
<i>1,2,3-trichloropropane</i>	40	40
<i>Trifluralin</i>	5	5
<i>Trinitroglycerol</i>	5	5
<i>Trinitrotoluene</i>	2	2

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
METALS							
Aluminum (pH 6.5-9.0)	7429905	750	87				
Antimony	7440360			5.6	640	6	
Arsenic	7440382	340	150	0.018	0.14	10	100
Barium	7440393			1,000		2,000	
Beryllium	7440417					4	100
Boron	7440428						2,000
Cadmium	7440439	Table A2	Table A2			5	
Chromium (Total)	7440473					100	100
Chromium (III)	16065831	Table A2	Table A2				
Chromium (VI)	18540299	16	11				
Cobalt	7440484						1,000

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
METALS							
Copper	7440508	Table A2	Table A2	1,300		1,300	500
Iron	7439896		1,000	300			
Lead	7439921	Table A2	Table A2			15	
Manganese	7439965			50	100		
Mercury	7439976	1.4	0.77			2	
Methylmercury	22967926				0.3 mg/kg		
Nickel	7440020	Table A2	Table A2	610	4,600		
Selenium (Total)	7782492		5	170	4,200	50	
Silver	7440224	Table A2					
Thallium	7440280			0.24	0.47	2	
Zinc	7440666	Table A2	Table A2	7,400	26,000		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
OTHER INORGANIC SUBSTANCES							
Alkalinity			20,000				
Ammonia	7664417	Table B1	Tables B2 & B3				
Asbestos	1332214			7 million fibers/L		7 million fibers/L	
Chloride	16887006	Table A2	Table A2				
Chlorine, Total Residual (Coldwater Fishery)	7782505		2				
Chlorine, Total Residual (Warmwater Fishery)	7782505	19	11				
Cyanide	57125	22	5.2	140	140	200	
<i>E. coli</i> Bacteria			10 CSR 20-7.031(4)(C)				
Fluoride						4,000	
Gases, Total Dissolved (percent saturation)		110%	110%				
Hydrogen Sulfide	7783064		2				

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Nitrates	14797558			10,000		10,000	
Oil and Grease			10,000				
Oxygen, Dissolved	7782447	Table A3	Table A3				
pH			6.5 - 9				
Solids Dissolved and Salinity						250,000	
Solids Suspended and Turbidity			Narrative Statement				
Sulfate		Table A2	Table A2				
Temperature		10 CSR 20-7.031(4)(D)	10 CSR 20-7.031(4)(D)				
ORGANIC SUBSTANCES							
Benzenes							
Benzene	71432			2.2	51	5	
Chlorobenzene	108907			130	1,600	100	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
1,2-Dichlorobenzene (ortho-dichlorobenzene)	95501			420	1,300	600	
1,3-Dichlorobenzene (meta-dichlorobenzene)	541731			320	960	600	
1,4-Dichlorobenzene (para-dichlorobenzene)	106467			63	190	75	
1,2,4-Trichlorobenzene	120821			35	70	70	
1,2,4,5-Tetrachlorobenzene	95943			0.97	1.1		
Pentachlorobenzene	608935			1.4	1.5		
Hexachlorobenzene	118741			0.00028	0.00029	1	
Ethylbenzene	100414			530	2,100	700	
Nitrobenzene	98953			17	690		
Styrene (Vinyl Benzene)	100425					100	
Chlorinated Hydrocarbons							
Carbon Tetrachloride (Tetrachloromethane)	56235			0.23	1.6	5	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
1,2-Dichloroethane	107062			0.38	37	5	
1,1,1-Trichloroethane	71556					200	
1,1,2-Trichloroethane	79005			0.59	16	5	
1,1,2,2-Tetrachloroethane	79345			0.17	4.0		
Hexachloroethane	67721			1.4	3.3		
1,1-Dichloroethylene	75354			330	7,100	7	
cis-1,2-Dichloroethylene	156592					70	
trans-1,2-Dichloroethylene	156605			140	10,000	100	
Trichloroethylene	79016			2.5	30	5	
Tetrachloroethylene	127184			0.69	3.3	5	
1,2-Dichloropropane	78875			0.5	15	5	
1,3-Dichloropropene (Dichloropropene)	542756			0.34	21		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Other Halogenated Hydrocarbons							
Ethylene Dibromide (1,2-Dibromoethane)	106934					0.05	
Methyl Bromide (Bromomethane)	74839			47	1,500		
Methylene Chloride (Dichloromethane)	75092			4.6	590	5.0	
Total Trihaloacetic Acids (HAA5)						60	
Total Trihalomethanes (TTHMs)						80	
Chlorodibromomethane	124481			0.4	13		
Dichlorobromomethane	75274			0.55	17		
Tribromomethane (Bromoform)	75252			4.3	140		
Trichloromethane (Chloroform)	67663			5.7	470		
Vinyl Chloride	75014			0.025	2.4	2	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Ethers							
Bis(2-Chloroethyl) Ether	111444			0.03	0.53		
Bis(2-Chloroisopropyl) Ether	108601			1,400	65,000		
Bis(Chloromethyl) Ether	542881			0.00010	0.00029		
Miscellaneous Organics							
2,3,7,8-TCDD (Dioxin)	1746016			5.00E-09	5.1E-9	1.3 E-08	
Di(2-ethylhexyl) adipate	103231					400	
Isophorone	78591			35	960		
Polychlorinated Biphenyls (PCBs)			0.014	0.000064	0.000064	0.5	
Tributyltin (TBT)		0.46	0.072				
Nitrogen Containing Compounds							
Nitrosamines				0.0008	1.24		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
N-Nitrosodibutylamine	924163			0.0063	0.22		
N-Nitrosodiethylamine	55185			0.0008	1.24		
N-Nitrosodimethylamine	62759			0.00069	3.0		
N-Nitrosodiphenylamine	86306			3.3	6.0		
N-Nitrosodi-n-propylamine	621647			0.0050	0.51		
N-Nitrosopyrrolidine	930552			0.016	34		
Acrylonitrile (2-propenenitrile)	107131			0.051	0.25		
Benzidine (4,4'-diaminobiphenyl)	92875			0.000086	0.00020		
3,3'-Dichlorobenzidine	91941			0.021	0.028		
1,2-Diphenylhydrazine	122667			0.036	0.2		
Polynuclear Aromatic Hydrocarbons (PAHs)							
Acenaphthene	83329			670	990		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+ Water (µg/l)	Org. Only (µg/l)		
Anthracene	120127			8,300	40,000		
Benzo-a-Anthracene	56553			0.0038	0.018		
Benzo-a-Pyrene	50328			0.0038	0.018	0.2	
Benzo-b-Fluoranthene	205992			0.0038	0.018		
Benzo-k-Fluoranthene	207089			0.0038	0.018		
2-Chloronaphthalene	91587			1,000	1,600		
Chrysene	218019			0.0038	0.018		
Dibenzo-a-h-Anthracene	53703			0.0038	0.018		
Fluoranthene	206440			130	140		
Fluorene	86737			1,100	5,300		
Ideno(1,2,3-cd)Pyrene	193395			0.0038	0.018		
Pyrene	129000			830	4,000		

Table A1		CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
POLLUTANT			Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Phthalate Esters								
Bis(2-Ethylhexyl) Phthalate	117817				1.2	2.2	6	
Butylbenzyl Phthalate	85687				1,500	1,900		
Diethyl Phthalate	84662				17,000	44,000		
Dimethyl Phthalate	131113				270,000	1,100,000		
Di-n-Butyl Phthalate	84742				2,000	4,500		
Phenolic Compounds								
2-Chlorophenol	95578				81	150		
2,4-Dichlorophenol	120832				77	290		
2,4-Dimethylphenol	105679				380	850		
2-Methyl-4,6-Dinitrophenol	534521				13	280		
2,4-Dinitrophenol	51285				69	5,300		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Dinitrophenols	25550587			69	5,300		
Pentachlorophenol	87865	Table A2	Table A2	0.27	3.0	1	
Phenol	108952	10,200	2,560	10,000	860,000		
2,4,5-Trichlorophenol	95954			1,800	3,600		
2,4,6-Trichlorophenol	88062			1.4	2.4		
Toluenes							
2,4-Dinitrotoluene	121142			0.11	3.4		
Toluene	108883			1,300	15,000	1,000	
Xylenes (Total)	1330207					10,000	
PESTICIDES							
Acrolein	107028	3	3	6	9		
Alachlor	15972608					2	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Aldrin	309002	3	1.3	0.000049	0.000050		
Atrazine	1912249					3	
Carbofuran	1563662					40	
Chlordane	57749	2.4	0.0043	0.00080	0.00081	2	
Chlorpyrifos	2921882	0.083	0.041				
Chlorophenoxy Herbicide (2,4-D)	94757			100		70	
Chlorophenoxy Herbicide (2,4,5,-TP)	93721			10		50	
Dalapon	75990					200	
Demeton	8065483		0.1				
Diazinon	333415	0.17	0.17				
1,2-Dibromo-3-chloropropane (DBCP)	96128					0.2	
4,4'- Dichlorodiphenyldichloroethyle ne (DDE)	72559			0.00022	0.00022		

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
4-4'-Dichlorodiphenyldichloroethane (DDD)	72548			0.00031	0.00031		
4-4'-Dichlorodiphenyltrichloroethane (DDT)	50293	1.1	0.001	0.00022	0.00022		
Dieldrin	60571	0.24	0.056	0.000052	0.000054		
Dinoseb	88857					7	
Diquat	85007					20	
alpha-Endosulfan (Endosulfan)	959988	0.22	0.056	62	89		
beta-Endosulfan (Endosulfan)	33213659	0.22	0.056	62	89		
Endosulfan Sulfate	1031078			62	89		
Endothall	145733					100	
Endrin	72208	0.086	0.036	0.059	0.060	2	
Endrin Aldehyde	7421934			0.29	0.30		
Glyphosate	1071836					700	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Guthion	86500		0.01				
Heptachlor	76448	0.52	0.0038	0.000079	0.000079	0.4	
Heptachlor Epoxide	1024573	0.52	0.0038	0.000039	0.000039	0.2	
Hexachlorobutadiene	87683			0.44	18		
Hexachlorocyclopentadiene	77474			40	1,100	50	
alpha-Hexachlorocyclohexane (alpha-BHC)	319846			0.0026	0.0049		
beta-Hexachlorocyclohexane (beta-BHC)	319857			0.0091	0.017		
gamma-Hexachlorocyclohexane (gamma-BHC; Lindane)	58899	0.95		0.98	1.8	0.2	
technical- Hexachlorocyclohexane	608731			0.0123	0.0414		
Malathion	121755		0.1				
Methoxychlor	72435		0.03	100		40	
Mirex	2385855		0.001				

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Oxamyl (Vydate)	23135220					200	
Picloram	1918021					500	
Parathion	56382	0.065	0.013				
Simazine	122349					4	
Toxaphene	8001352	0.73	0.0002	0.00028	0.00028	3	
HEALTH ADVISORY LEVELS							
Aldicarb	116063					7	
Aldicarb sulfone	1646884					7	
Aldicarb sulfoxide	1646873					7	
Ametryn	834128					60	
Ammonium sulfamate	7773060					2000	
Baygon	114261					3	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/L/WP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Bentazon	25057890					200	
Bis(2-Chloroisopropyl) Ether	108601					300	
Bromacil	314409					70	
Bromobenzene	108861					70	
Bromochloromethane	74975					90	
Bromomethane (Methyl Bromide)	74839					10	
Butylate	2008415					400	
Carbaryl	63252					700	
Carboxin	5234684					700	
Chloramben	133904					100	
2-Chlorophenol	95578					40	
ortho-Chlorotoluene	95498					100	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
para-Chlorotoluene	106434					100	
Chlorpyrifos	2921882					2	
Cyanazine	21725462					1	
DCPA (Dacthal)	1861321					70	
Diazinon	333415					1	
Dicamba	1918009					4,000	
Dichlorodifluoromethane	75718					1,000	
2,4-Dichlorophenol	120832					20	
Diisopropyl methylphosphonate	1445756					600	
Dimethrin	70382					2,000	
Dimethyl methylphosphonate	756796					100	
1,3-Dinitrobenzene	99650					1	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
1,4-Dioxane (para-Dioxane)	123911					200	
Diphenamid	957517					200	
Disulfoton	298044					0.7	
1,4-Dithiane	505293					80	
Diuron	330541					10	
Ethylene glycol	107211					14,000	
Fenamiphos	22224926					0.7	
Fluometuron	2164172					90	
Fonofos	944229					10	
Formaldehyde	50000					1,000	
Hexachloroethane	67721					1	
Hexazinone	51235042					400	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	2691410					400	
Isophorone	78591					100	
Isopropyl methylphosphonate	1832548					700	
Malathion	121755					500	
Maleic hydrazide	123331					4,000	
MCPA (4(chloro-2-methoxyphenoxy) acetic acid)	94746					30	
Methomyl	16752775					200	
Methyl ethyl ketone	78933					4,000	
Methyl parathion	298000					1	
Metolachlor	51218452					700	
Metribuzin	21087649					70	
Naphthalene	91203					100	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
Nitroguanidine	556887					700	
para-Nitrophenol	100027					60	
Paraquat	1910425					30	
Phenol	108952					2,000	
Prometon	1610180					400	
Propazine	139402					10	
Propham	122429					100	
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	121824					2	
2,4,5-T (Trichlorophenoxy-acetic acid)	93765					70	
Tebuthiuron	34014181					500	
Terbacil	5902512					90	
Terbufos	13071799					0.4	

Table A1 POLLUTANT	CAS #	Aquatic Life Protection		Human Health Protection		DWS (µg/l)	IRR/LWP (µg/l)
		Acute (µg/l)	Chronic (µg/l)	Org.+Water (µg/l)	Org. Only (µg/l)		
1,1,1,2-Tetrachloroethane	630206					70	
Trichlorofluoromethane (fluorotrichloromethane)	75694					2,000	
1,3,5-Trichlorobenzene	108703					40	
1,2,3-Trichloropropane	96184					40	
Trifluralin	1582098					10	
Trinitroglycerol	55630					5	
2,4,6-Trinitrotoluene (Trinitrotoluene)	118967					2	

Table A2		Aquatic Life Protection
POLLUTANT	CAS #	
METALS (µg/L) - Hardness Dependent		
Cadmium	7440439	Acute = $e^{(1.0166 \cdot \ln(\text{Hardness}) - 3.062490)} * (1.136672 - (\ln(\text{Hardness}) * 0.041838))$
		Chronic = $e^{(0.7409 \cdot \ln(\text{Hardness}) - 4.719948)} * (1.101672 - (\ln(\text{Hardness}) * 0.041838))$
Chromium (III)	16065831	Acute = $e^{(0.8190 \cdot \ln(\text{Hardness}) + 3.725666)} * 0.316$
		Chronic = $e^{(0.8190 \cdot \ln(\text{Hardness}) + 0.684960)} * 0.860$
Copper	7440508	Acute = $e^{(0.9422 \cdot \ln(\text{Hardness}) - 1.700300)} * 0.960$
		Chronic = $e^{(0.8545 \cdot \ln(\text{Hardness}) - 1.702)} * 0.960$
Lead	7439921	Acute = $e^{(1.273 \cdot \ln(\text{Hardness}) - 1.460448)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$
		Chronic = $e^{(1.273 \cdot \ln(\text{Hardness}) - 4.704797)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$

Table A2		Aquatic Life Protection	
POLLUTANT	CAS #		
METALS (µg/L) - Hardness Dependent			
Nickel	7440020	Acute = $e^{(0.8460 \cdot \ln(\text{Hardness}) + 2.255647)}$ * 0.998	
		Chronic = $e^{(0.8460 \cdot \ln(\text{Hardness}) + 0.058978)}$ * 0.997	
Silver	7440224	Acute = $e^{(1.72 \cdot \ln(\text{Hardness}) - 6.588144)}$ * 0.850	
Zinc	7440666	Acute = $e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.8884)}$ * 0.98	
		Chronic = $e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.8884)}$ * 0.98	
OTHER POLLUTANTS (mg/L) - Hardness Dependent			
Chloride	16887006	Acute = $287.8 \cdot (\text{Hardness})^{0.205797}$ * (Sulfate)^{-0.07452}	
		Chronic = $177.87 \cdot (\text{Hardness})^{0.205797}$ * (Sulfate)^{-0.07452}	

Table A2				
POLLUTANT	CAS #	Aquatic Life Protection		
OTHER POLLUTANTS (mg/L) - Hardness Dependent				
Sulfate		Chloride (Cl-), mg/L		
	Hardness (H), mg/L	Cl- < 5	5 ≤ Cl- < 25	25 ≤ Cl- ≤ 500
	H < 100	500	500	500
	100 ≤ H ≤ 500	500	S1	S2
	H > 500	500	2,000	2,000
		$S1 = [-57.478 + 5.79 (\text{hardness}) + 54.163 (\text{chloride})] * 0.65$ $S2 = [1276.7 + 5.508 (\text{hardness}) - 1.457 (\text{chloride})] * 0.65$		

Table A2		
POLLUTANT	CAS #	Aquatic Life Protection
OTHER POLLUTANTS (µg/L) - Equation Dependent		
Pentachlorophenol	87865	Acute = $e^{((1.005 * (\text{pH})) - 4.869)}$
		Chronic = $e^{((1.005 * (\text{pH})) - 5.134)}$

Table A3

POLLUTANT

DISSOLVED OXYGEN (mg/L)

	Cold-Water Fishery		Warm-Water & Cool-Water Fishery	
	Early Life Stages	Other Life Stages	Early Life Stages	Other Life Stages
30 Day Mean	NA	6.5	NA	5.5
7 Day Mean	9.5 ¹ (6.5) ²	NA	6.0	NA
7 Day Mean Minimum	NA	5.0	NA	4.0
1 Day Minimum ³	8.0 ¹ (5.0) ²	4.0	5.0	3.0

NA - Not Applicable

1 - Applies to waters that provide a habitat which supports natural reproduction of a salmonid (trout) population. These waters also are capable of maintaining year-round populations of a variety of other coldwater fish and associated vertebrate and invertebrate organisms.

2 - Applies to waters that provide, or could provide, a habitat capable of maintaining year-round populations of a variety of coldwater fish and associated vertebrate and invertebrate organisms or which support the seasonal migration of salmonids. These waters do not support natural reproduction of salmonid populations due to limitations of flow, substrate composition, or other habitat conditions, but salmonid populations may be maintained year-round if periodically stocked.

3 - All minima should be considered as instantaneous concentrations to be achieved at all times.