CHAPTER 33.1-16-02.1
STANDARDS OF QUALITY FOR WATERS OF THE STATE

Section
33.1-16-02.1-01 Authority
33.1-16-02.1-02 Purpose
33.1-16-02.1-03 Applicability
33.1-16-02.1-04 Definitions
33.1-16-02.1-05 Variances and Compliance Schedules 33.1-16-02.1-06 Severability
33.1-16-02.1-07 Classification of Waters of the State 33.1-16-02.1-08 General Water Quality Standards
33.1-16-02.1-09 Surface Water Classifications, Mixing Zones, and Numeric Standards
33.1-16-02.1-10 Ground Water Classifications and Standards
33.1-16-02.1-11 Discharge of Wastes

33.1-16-02.1-01. Authority.

These rules are promulgated pursuant to North Dakota Century Code chapters 61-28 and 23.1-11; specifically, sections 61-28-04 and 23.1-11-05, respectively.

History: Effective January 1, 2019.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-02. Purpose.

1. The purposes of this chapter are to establish a system for classifying waters of the state; provide standards of water quality for waters of the state; and protect existing and potential beneficial uses of waters of the state.

2. The state and public policy is to maintain or improve, or both, the quality of the waters of the state and to maintain and protect existing uses. Classifications and standards are established for the protection of public health and environmental resources and for the enjoyment of these waters, to ensure the propagation and well-being of resident fish, wildlife, and all biota associated with, or dependent upon, these waters~~;~~, and to safeguard social, ~~economical~~economic, and industrial development. Waters not being put to use shall be protected for all reasonable uses for which these waters are suitable. All known and reasonable methods to control and prevent pollution of the waters of this state are required, including improvement in quality of these waters, when feasible.

   a. The "quality of the waters" shall be the quality of record existing at the time the first standards were established in 1967, or later records if these indicate an improved quality. Waters with existing quality that is higher than established standards will be maintained at the higher quality unless affirmatively demonstrated, after full satisfaction of the intergovernmental coordination and public participation provisions of the continuing planning process, that a change in quality is necessary to accommodate important social or economic development in the area in which the waters are located. ~~In~~If allowing the lowering of existing quality, the department shall assure that existing uses are fully protected and that the highest statutory and regulatory requirements for all point sources and cost-effective and reasonable best management practices for nonpoint sources are achieved.

   b. Waters of the state having unique or high-quality characteristics that may constitute an outstanding state resource shall be maintained and protected.

   c. Any public or private project or development which constitutes a source of pollution shall provide the best degree of treatment as designated by the department in the North Dakota pollutant discharge elimination system. If review of data and public input indicates any detrimental water

quality changes, appropriate actions will be taken by the department following procedures approved by the environmental protection agency. (North Dakota Antidegradation Implementation Procedure, Appendix IV.)

History: Effective January 1, 2019; amended effective January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28-04; S.L. 2017, ch. 199, § 26

33.1-16-02.1-03. Applicability.

Nothing in this chapter may be construed to limit or interfere with the jurisdiction, duties, or authorities of other North Dakota state agencies.

History: Effective January 1, 2019.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-04. Definitions.

The terms used in this chapter have the same meaning as in North Dakota Century Code chapter 61-28, except:

1. "Acute standard" means the one-hour average concentration does not exceed the listed concentration more than once every three years.

2. "Best management practices" are methods, measures, or procedures selected by the department to control nonpoint source pollution. Best management practices include structural and nonstructural measures and operation and maintenance procedures.

3. "Chronic standard" means the four-day average concentration does not exceed the listed concentration more than once every three years.

4. "Consecutive thirty-day average" is the average of samples taken during any consecutive thirty-day period. It is not a requirement for thirty consecutive daily samples.

5. "Department" means the department of environmental quality.

6. A standard defined as "dissolved" means the total quantity of a given material present in a filtered water sample, regardless of the form or nature of its occurrence.

7. "Eutrophication" means the process of enrichment of rivers, streams, lakes, reservoirs, and wetlands with nutrients needed to maintain primary production.

8. “Existing use” means a use that was attained in the water body on or after 1967, whether or not it is included in the water quality standards.

~~8~~9. "Nutrients" mean the chemical elements, primarily nitrogen and phosphorus, which are critical to the growth of aquatic plants and animals.

~~9~~10. "Pollution" means such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state, including change in temperature, taste, color, turbidity, or odor. Pollution includes discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state that will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to public health, safety, or welfare; domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or livestock, wild animals, birds, fish, or other aquatic biota.

~~10~~11. "Site-specific standards" mean water quality criteria developed to reflect local environmental conditions to protect the uses of a specific water body.

~~11~~12. A standard defined as "total" means the entire quantity of a given material present in an unfiltered water sample regardless of the form or nature of its occurrence. This includes both dissolved and suspended forms of a substance, including the entire amount of the substance present as a constituent of the particulate material. Total recoverable is the quantity of a given material in an unfiltered aqueous sample following digestion by refluxing with hot dilute mineral acid.

~~12~~13. "~~Water usage".~~Beneficial use" ~~The best usage for the waters~~means those uses specified in 33.1-16-02.1-09 and Appendix I and II for each water body or segment whether or not they are being attained. The beneficial uses shall be ~~those uses determined to be the most consistent with~~the present and potential uses in accordance with the economic and social development of the area. ~~Present principal best uses~~Beneficial uses are ~~those~~ defined in subdivisions a, b, c, d, and e. These are not to be construed to be the only possible ~~usages~~uses.

a. Municipal and ~~domestic~~Domestic ~~water~~. Waters suitable for use as a source of water supply for drinking and culinary purposes after treatment to a level approved by the department. Treatment may include coagulation, settling, filtration, chlorination, softening, or equivalent processes necessary to meet the acceptable bacteriological, physical, and chemical requirements.

b. ~~Fish and aquatic biota~~Aquatic Life. Waters suitable for the propagation and support of fish and other aquatic biota and waters that will not adversely affect wildlife in the area. Low flows or natural physical and chemical conditions in some waters may limit their value for fish propagation or aquatic biota.

c. Recreation.

(1) Primary recreational waters are suitable for recreation where ~~direct~~ingestion and full immersion body contact is ~~involved~~likely, such as bathing ~~and~~, swimming, ~~and where~~water skiing, tubing, and water play by children.

(2) ~~secondary~~Secondary recreational waters are suitable for recreational activities where ingestion and immersion are less likely and there is a low degree of bodily contact with the water, such as boating, kayaking, canoeing, fishing, ~~and~~ wading ~~are involved~~, rowing, and sailing. This use is designated for waters that experience low flow conditions, such as ephemeral, small intermittent, and small perennial streams and ditches that may not maintain sufficient flow to support full body immersion activities. Natural high turbidities in some waters and physical characteristics of banks and streambeds of many streams are factors that limit their value for bathing.

d. ~~Agricultural uses~~Agriculture. Waters suitable for irrigation, stock watering, and other agricultural uses, but not suitable for use as a source of domestic supply for the farm unless satisfactory treatment is provided.

e. Industrial ~~water~~. Waters suitable for industrial purposes, including food processing, after treatment. Treatment may include ~~that~~ necessary processes for prevention of boiler scale and corrosion.

f. Fish Consumption. Waters suitable for harvesting and consumption of fish and other aquatic organisms by humans.

History: Effective January 1, 2019; amended effective January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-05. Variances and compliance schedules.

Upon written application by the responsible discharger, the department finds that by reason of substantial and widespread economic and social impacts the strict enforcement of state water quality criteria is not feasible, the department can permit a variance to the water quality standard for the affected segment. The department can set conditions and time limitations with the intent that progress toward improvements in water quality will be

made. This can include interim criteria which must be reviewed at least once every three years. A variance will be granted only after fulfillment of the approved requirements at 40 CFR section 131.14, including public participation requirements and environmental protection agency approval. A variance will not preclude an existing use.

A North Dakota pollutant discharge elimination system permit may contain a schedule to return a permittee to compliance with water quality based effluent limits consistent with federal and state regulations. Compliance schedules in North Dakota pollutant discharge elimination system permits are subject to the requirements of section 33.1-16-01-15 and cannot be issued for new discharges or sources.

History: Effective January 1, 2019; amended effective January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-06. Severability.

The rules contained in this chapter are severable. If any rules, or part thereof, or the application of such rules to any person or circumstance are declared invalid, that invalidity does not affect the validity of any remaining portion of this chapter.

History: Effective January 1, 2019.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-07. Classification of waters of the state.

General. Classification of waters of the state shall be used to maintain and protect the present and future beneficial uses of these waters. Classification of waters of the state shall be made or changed whenever new or additional data warrant the classification or a change of an existing classification.

History: Effective January 1, 2019.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-08. General water quality standards.

1. **Narrative standards.**

    a. The following minimum conditions are applicable to all waters of the state except for class II ground waters. All waters of the state shall be:

        (1) Free from substances attributable to municipal, industrial, or other discharges or agricultural practices that will cause the formation of putrescent or otherwise objectionable sludge deposits.

        (2) Free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.

        (3) Free from materials attributable to municipal, industrial, or other discharges or agricultural practices producing color, odor, or other conditions to such a degree as to create a nuisance or render any undesirable taste to fish flesh or, in any way, make fish inedible.

        (4) Free from substances attributable to municipal, industrial, or other discharges or agricultural practices in concentrations or combinations which are toxic or harmful to humans, animals, plants, or resident aquatic biota. For surface water, this standard will be enforced in part through appropriate whole effluent toxicity requirements in North Dakota pollutant discharge elimination system permits.

(5) Free from oil or grease residue attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

(6) Free from nutrients attributed to municipal, industrial, or other discharges or agricultural practices, in concentrations or loadings which will cause accelerated eutrophication resulting in the objectionable growth of aquatic vegetation or algae or other impairments to the extent that it threatens public health or welfare or impairs present or future beneficial uses.

b. There shall be no materials such as garbage, rubbish, offal, trash, cans, bottles, drums, or any unwanted or discarded material disposed of into the waters of the state.

c. There shall be no disposal of livestock or domestic animals in waters of the state.

d. The department shall propose and submit to the state engineer the minimum streamflows of major rivers in the state necessary to protect the public health and welfare. The department's determination shall address the present and prospective future use of the rivers for public water supplies, propagation of fish and aquatic life and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

e. No discharge of pollutants, which alone or in combination with other substances, shall:

(1) Cause a public health hazard or injury to environmental resources;

(2) Impair existing or reasonable beneficial uses of the receiving waters; or

(3) Directly or indirectly cause concentrations of pollutants to exceed applicable standards of the receiving waters.

f. If the department determines that site-specific criteria are necessary and appropriate for the protection of designated uses, procedures described in the environmental protection agency's Water Quality Standards Handbook 1994 or other defensible methods may be utilized to determine maximum limits. Where natural chemical, physical, and biological characteristics result in exceedances of the limits set forth in this section, the department may derive site-specific criteria based on the natural background level or condition. All available information shall be examined, and all possible sources of a contaminant will be identified in determining the naturally occurring concentration. All site-specific criteria shall be noticed for public comment and subjected to other applicable public participation requirements prior to being adopted.

2. **Narrative biological goal.**

a. Goal. The biological condition of surface waters shall be similar to sites or water bodies determined by the department to be regional reference sites.

b. Definitions.

(1) "Assemblage" means an association of aquatic organisms of similar taxonomic classification living in the same area. Examples of assemblages include fish, macroinvertebrates, algae, and vascular plants.

(2) "Aquatic organism" means any plant or animal which lives at least part of its life cycle in water.

(3) "Biological condition" means the taxonomic composition, richness, and functional organization of an assemblage of aquatic organisms at a site or within a water body.

(4) "Functional organization" means the number of species or abundance of organisms within an assemblage which perform the same or similar ecological functions.

(5) "Metric" means an expression of biological community composition, richness, or function which displays a predictable, measurable change in value along a gradient of pollution or other anthropogenic disturbance.

(6) "Regional reference sites" are sites or water bodies which are determined by the department to be representative of sites or water bodies of similar type (e.g., hydrology and ecoregion) and are least impaired with respect to habitat, water quality, watershed land use, and riparian and biological condition.

(7) "Richness" means the absolute number of taxa in an assemblage at a site or within a water body.

(8) "Taxonomic composition" means the identity and abundance of species or taxonomic groupings within an assemblage at a site or within a water body.

c. Implementation. The intent of the state in adopting a narrative biological goal is solely to provide an additional assessment method that can be used to identify impaired surface waters. Regulatory or enforcement actions based solely on a narrative biological goal, such as the development and enforcement of North Dakota pollutant discharge elimination system permit limits, are not authorized. However, representative biological assessment information may be used in combination with other information to assist in determining whether designated uses are attained and to assist in determining whether new or revised chemical-specific permit limitations may be needed. Implementation will be based on the comparison of current biological conditions at a particular site to the biological conditions deemed attainable based on regional reference sites. In implementing a narrative biological goal, biological condition may be expressed through an index composed of multiple metrics or through appropriate statistical procedures.

History: Effective January 1, 2019; amended effective July 1, 2021; January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

33.1-16-02.1-09. Surface water classifications, mixing zones, and numeric standards.

1. **Surface water classifications.** Procedures for the classifications of streams and lakes of the state shall follow this subsection. Classifications of streams and lakes are listed in ~~appendix~~Appendix I and ~~appendix~~Appendix II, respectively.

a. Class I streams~~. The quality of the waters in this class shall be suitable for the propagation or protection, or both, of resident fish species and other aquatic biota and for swimming, boating, and other water recreation. The quality of the waters shall be suitable for irrigation, stock watering, and wildlife without injurious effects. After treatment consisting of coagulation, settling, filtration, and chlorination, or equivalent treatment processes, the water quality shall meet the bacteriological, physical, and chemical requirements of the department for municipal or domestic use~~ shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

b. Class IA streams~~. The quality of the waters in this class shall be the same as the quality of class I streams, except that where natural conditions exceed class I criteria for municipal and domestic use, the availability of softening or other treatment methods may be considered in determining whether ambient water quality meets the drinking water requirements of the department.~~shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f). Where natural conditions exceed Class I criteria for municipal and domestic use, the availability of additional treatment methods, such as softening, may be considered in determining whether ambient water quality meets the drinking water requirements for the department. The Sheyenne River, from its headwaters to one-tenth mile downstream from Baldhill Dam, is not classified for municipal or domestic use. ~~The Sheyenne River from its headwaters to one-tenth mile downstream from Baldhill Dam is not classified for municipal or domestic use.~~

c. Class II streams~~. The quality of the waters in this class shall be the same as the quality of class I streams, except that additional treatment may be required to meet the drinking water requirements of the department. Streams in this classification may be intermittent in nature which would make these waters of limited value for beneficial uses such as municipal water, fish life, irrigation, bathing, or swimming.~~shall be protected for beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f), except that additional treatment may be required to meet the drinking water requirements of the department. Streams in this classification may be intermittent in nature.

d. Class III streams~~. The quality of the waters in this class shall be suitable for agricultural and industrial uses.~~ shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(b) through 13(f). The quality in these waters must be maintained to protect secondary contact recreation Streams in this class generally have low average flows with prolonged periods of no flow. ~~During periods of no flow, they are of limited value for recreation and fish and aquatic biota. The quality of these waters must be maintained to protect secondary contact recreation uses (e.g., wading), fish and aquatic biota, and wildlife uses.~~

e. Wetlands. These water bodies, including isolated ponds, sloughs, and marshes, are to be considered waters of the state and will be protected under section 33.1-16-02.1-08.

f. Lakes and reservoirs~~. The type of fishery a lake or reservoir may be capable of supporting is based on the lake's or reservoir's geophysical characteristics~~shall be classified according to the type of fishery a lake or reservoir can support. The capability of a lake or reservoir to support a fishery may be affected by seasonal or climatic variability or other natural occurrences, which may alter the physical and chemical characteristics of the lake or reservoir. The geophysical and landscape characteristics associated with each reservoir shall be indicated by a subclassification.

~~Class Characteristics~~

~~1 Cold water fishery. Waters capable of supporting growth of cold water fish species (e.g., salmonids) and associated aquatic biota.~~

~~2 Cool water fishery. Waters capable of supporting natural reproduction and growth of cool water fishes (e.g., northern pike and walleye) and associated aquatic biota. These waters are also capable of supporting the growth and marginal survival of cold water species and associated biota.~~

~~3 Warm water fishery. Waters capable of supporting natural reproduction and growth of warm water fishes (e.g., largemouth bass and bluegill) and associated aquatic biota. Some cool water species may also be present.~~

~~4 Marginal fishery. Waters capable of supporting a fishery on a short-term or seasonal basis (generally a "put and take" fishery).~~

~~5 Not capable of supporting a fishery due to high salinity.~~

(1) Class 1 Cold water fishery. Waters capable of supporting natural reproduction and growth of cold-water fish species (*e.g.* salmonids) and associated aquatic biota. Lakes and reservoirs designated as Class 1 fisheries shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

(2) Class 2 Cool water fishery. Waters capable of supporting natural reproduction and growth of cool water fishes (*e.g.* northern pike and walleye) and associated aquatic biota. These waters are also capable of supporting the growth and marginal survival of cold water species and associated biota. Lakes and reservoirs designated as Class 2 fisheries shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

(3) Class 3 Warm water fishery. Waters capable of supporting natural reproduction and growth of warm water fish (*e.g.* largemouth bass and bluegill) and associated aquatic biota. Some cool water species may also be present. Lakes and reservoirs designated as Class 3 fisheries shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

(4) Class 4 Marginal fishery. Waters capable of supporting a fishery on a short-term or seasonal basis (generally a "put and take" fishery). Lakes and reservoirs designated as Class 4 fisheries shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

(5)Class 5. Not capable of supporting a fishery due to high salinity. Lakes and reservoirs designated as Class 5 fisheries shall be protected for the beneficial uses defined in 33.1-16-02.1-04 subsection 13(a)-(f).

2. **Mixing zones.** North Dakota mixing zone and dilution policy is contained in ~~appendix~~Appendix III.

3. **Numeric standards.**

a. Class I streams. The physical and chemical criteria for class I streams are listed in table 1 and table 2.

b. Class IA streams. The physical and chemical criteria shall be those for class I streams, ~~with the exceptions~~except for chloride, percent sodium, and sulfate as listed in table 1.

c. Site-specific sulfate standard. The physical and chemical criteria for the Sheyenne River from its headwaters to one-tenth of a mile downstream from Baldhill Dam shall be those for class IA streams, ~~with the exception of~~except for sulfate as listed in table 1.

d. Class II streams. The physical and chemical criteria shall be those for class IA, with ~~the~~ chloride and pH and sulfates as listed in table 1.

e. Class III streams. The physical and chemical criteria shall be those for class II, ~~with the exceptions~~except for sulfate as listed in table 1.

f. Wetlands, including isolated ponds, class 4 lakes not listed in ~~appendix~~Appendix II, sloughs and marshes. The physical and chemical criteria shall be those for class III streams, with exceptions for temperature, dissolved oxygen as listed in paragraph 6 of subdivision g, and other conditions not attributable to municipal, industrial, domestic, or agricultural sources.

g. Lakes and reservoirs.

(1) The physical and chemical criteria for class I streams shall apply to all classified lakes or reservoirs listed in ~~appendix~~Appendix II.

(2) In addition, a guideline for use as a goal in any lake or reservoir improvement or maintenance program is a growing season (April through November) average chlorophyll-a concentration of twenty µg/l.

(3) The temperature standard for class I streams does not apply to Nelson Lake in Oliver County. The temperature of any discharge to Nelson Lake shall not have an adverse effect on fish, aquatic biota, recreation, and wildlife.

(4) A numeric temperature standard of not greater than fifty-nine degrees Fahrenheit [15 degrees Celsius] shall be maintained in the hypolimnion of ~~class I~~Class 1 lakes and reservoirs during periods of thermal stratification.

(5) The numeric dissolved oxygen standard of five mg/l as a daily minimum does not apply to the hypolimnion of ~~class III and IV~~Class 3 and Class 4 lakes and reservoirs during periods of thermal stratification.

(6) The numeric dissolved oxygen standard of five mg/l as a daily minimum and the maximum temperature of eighty-five degrees Fahrenheit [29.44 degrees Celsius] shall not apply to wetlands and class 4 lakes.

(7) Lake Sakakawea must maintain a minimum volume of water of five hundred thousand-acre feet [61,674-hectare meters] that has a temperature of fifty-nine degrees Fahrenheit [15 degrees Celsius] or less and a dissolved oxygen concentration of not less than five mg/l.

History: Effective January 1, 2019; amended effective July 1, 2021; January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

TABLE 1

MAXIMUM LIMITS FOR SUBSTANCES IN
OR CHARACTERISTICS OF CLASSES I, IA, II, AND III STREAMS

[REMOVE TABLE]

CAS[1] No.	**Substance or Characteristic (a = aquatic life) (b = municipal & domestic drinking water) (c = agricultural, irrigation, industrial) (d = recreation)**	**Maximum Limit**
7429905	Aluminum[2] (a)	**Acute Standard** 750 micrograms per liter (µg/l) **Chronic Standard** 87 µg/l Where the pH is equal to or greater than 7.0, and the hardness is equal to or greater than 50 mg/l as $CaCO_3$ in the receiving water after mixing, the 87 µg/l chronic total recoverable aluminum criterion will not apply, and aluminum will be regulated based on compliance with the 750 µg/l acute total recoverable aluminum criterion.

7446-41-7	Ammonia (Total as N) (a)	**Acute Standard** The one-hour average concentration of total ammonia as nitrogen in mg/l does not exceed, more often than once every three years on the average, the numerical value given by the following: $$0.7249 \times \left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right) \times MIN\left(51.93, 23.12 \times 10^{0.036\times(20-T)}\right)$$ Where Oncorhynchus are absent; or $$\text{MIN}\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{pH-7.204}}\right), \left(0.7249 \times \left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right) \times \left(23.12 \times 10^{0.036\times(20-T)}\right)\right)\right)$$ Where Oncorhynchus are present
		Chronic Standard The 30-day rolling average concentration of total ammonia as nitrogen expressed in mg/l is not to exceed, more than once every three years on average, the chronic criteria magnitude calculated using the following formula: $$0.8876 \times \left(\frac{0.0278}{1+10^{7.688-pH}}+\frac{1.1994}{1+10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$ In addition, the highest four-day average within the 30-day averaging period should not be more than 2.5 times the criteria more than once in three years on average.
7440-39-3	Barium (Total) (b)	1.0 mg/l (1-day arithmetic average)
7440-42-8	Boron (Total) (c)	0.75 mg/l (30-day arithmetic average)
16887-00-6	Chloride (Total) (a, b, c)	**Class I:** 100 mg/l (30-day arithmetic average) **Class IA:** 175 mg/l (30-day arithmetic average) **Class II and Class III:** 250 mg/l (30-day arithmetic average

7782-50-5	Chlorine Residual (Total) (a)	**Acute:** 0.019 mg/l **Chronic:** 0.011 mg/l
None	Cylindrospermopsin (d)	15 µ/l For Clean Water Act water quality criterion, no more than 3 excursions (10-day assessment periods) within a single recreational season in a single year.
None	Microcystins (d)	8 µ/l For Clean Water Act water quality criterion, no more than 3 excursions (10-day assessment periods) within a single recreational season in a single year.
7782-44-7	Dissolved Oxygen (a)	5 mg/l as a daily minimum (up to 10% of representative samples collected during any 3-year period may be less than this value provided that lethal conditions are avoided)
14797-55-8	Nitrate as N^3 (a, b)	1.0 mg/l (up to 10% of samples may exceed)
14797-65-0	Nitrite as N (b)	1.0 mg/l
None	E. coli[4] (d)	Not to exceed 126 organisms per 100 ml as a geometric mean of representative samples collected during any 30-day consecutive period, nor shall more than 10 percent of samples collected during any 30-day consecutive period individually exceed 409 organisms per 100 ml. For assessment purposes, the 30-day consecutive period shall follow the calendar month. This standard shall apply only during the recreation season May 1 to September 30.
None	pH (a)	**Class I and IA:** 6.5 – 9.0 (up to 10% of representative samples collected during any 3-year period may exceed this range, provided that lethal conditions are avoided). **Class II and Class III:** 6.0 – 9.0 (up to 10% of representative samples collected during any 3-year period may exceed this range, provided that lethal conditions are avoided).
108-95-2	Phenols (Total) (b)	0.3 mg/l (organoleptic criterion) (one-day arithmetic average)
7782-49-2	Selenium in Fish Flesh[5] (a)	**Egg-Ovary:** 15.1 mg/kg Dry Weight **Whole Body:** 8.5 mg/kg Dry Weight **Muscle:** 11.3 mg/kg Dry Weight
7440-23-5	Sodium (b, c)	**Class I:** 50 percent of total cations as milliequivalents per liter (mEq/l) **Class IA, II, and III:** 60 percent of total cations as mEq/l
18785-72-3	Sulfates (Total as SO_4) (b)	**Class I:** 250 mg/l (30-day arithmetic average) **Class IA and II:** 450 mg/l (30-day arithmetic average) **Class III:** 750 mg/l (30-day arithmetic average)

	Sulfates (Total as SO_4) (a, b)	**Site Specific:** 750 mg/l (maximum) applies to the Sheyenne River from its headwaters to 0.1 mile downstream from Baldhill Dam **131.10(b) requirement:** The water quality standards for the Red River and the portions of the Sheyenne River located downstream from the segment of the Sheyenne River to which the site-specific sulfate standard applies must continue to be maintained. The Sheyenne River from 0.1 mile downstream from Baldhill Dam to the confluence with the Red River shall not exceed 450 mg/l sulfate (total) 30-day arithmetic average, and the Red River shall not exceed 250 mg/l sulfate (total) 30-day arithmetic average after mixing downstream from the confluence of the Sheyenne River. Regulated pollution control efforts must be developed to achieve compliance with these water quality standards.
None	Temperature (a)	Eighty-five degrees Fahrenheit [29.44 degrees Celsius]. The maximum increase shall not be greater than five degrees Fahrenheit [2.78 degrees Celsius] above natural background conditions.
None	Combined radium 226 and radium 228 (Total) (b)	5 pCi/l (30-day arithmetic average)
None	Gross alpha particle activity, including radium 226, but excluding radon and uranium (b)	15 pCi/l (30-day arithmetic average)

[1] CAS No. is the chemical abstract service registry number. The registry database contains records for specific substances identified by the chemical abstract service.

[2] The US EPA 2018 recommended national criteria (304(a) criteria) for aluminum can be used for site-specific chronic and acute criteria when appropriate and data is available. The criteria is based upon multiple linear regression (MLR) models for fish and invertebrate species. Data requirements are pH, DOC, and total hardness to quantify the effects of these water chemistry parameters on the bioavailability and associated toxicity of aluminum to aquatic organisms.

[3] The standard for nitrates (N) is intended as benchmark concentration when stream or lake specific data is insufficient to determine the concentration that will cause excessive plant growth (eutrophication). However, in no case shall the concentration for nitrate plus nitrite N exceed 10 mg/l for any waters used as a municipal or domestic drinking water supply.

[4] Where the E. Coli criteria are exceeded and there are natural sources, the criteria may be considered attained, provided there is reasonable basis for concluding that the indicator bacteria density attributable to anthropogenic sources is consistent with the level of water quality required by the criteria. This may be the situation, for example, in headwater streams that are minimally affected by anthropogenic activities.

[5] Fish tissue elements are expressed as steady-state instantaneous measurement not to exceed the criteria in the table. When fish egg/ovary concentrations are measured, the egg/ovary criterion element supersedes any whole-body, or muscle criterion element. The fish flesh values in Table 1 and the water column criteria in Table 2 are independently applicable. Water column criterion elements that are derived site-specifically using an empirical bioaccumulation factor approach or a bioaccumulation mechanistic model approach, once duly established under the provisions of 40 CFR 131 will supersede the criteria in Table 2 and will be subordinate to fish tissue criterion elements when both fish and water concentrations are measured. Any site-specific water column criterion

~~element established under the provisions of 40 CFR 131 is the applicable criterion in the absence of fish tissue measurement, or in waters with new discharges of selenium where steady state has not been achieved between water and fish tissue at the site.~~

[INSERT TABLE]

CAS[1] No.	Substance or Characteristic*	Maximum Limit
***a = aquatic life; b = municipal & domestic; c = agricultural, irrigation, industrial, d = recreation**		
7429905	Aluminum[2] (a)	**Acute Standard** 750 micrograms per liter (µg/l) **Chronic Standard** 87 µg/l Where the pH is equal to or greater than 7.0, and the hardness is equal to or greater than 50 mg/l as $CaCO_3$ in the receiving water after mixing, the 87 µg/l chronic total recoverable aluminum criterion will not apply, and aluminum will be regulated based on compliance with the 750 µg/l acute total recoverable aluminum criterion.
7446-41-7	Ammonia (Total as N) (a)	**Acute Standard** The one-hour average concentration of total ammonia as nitrogen in mg/l does not exceed, more often than once every three years on the average, the numerical value given by the following: $$0.7249 \times \left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right) \times MIN\left(51.93,23.12\times 10^{0.036\times(20-T)}\right)$$ Where Oncorhynchus are absent; or $$\text{MIN}\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{pH-7.204}}\right),\left(0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\times\left(23.12\times 10^{0.036\times(20-T)}\right)\right)\right)$$ Where Oncorhynchus are present

CAS[1] No.	Substance or Characteristic*	Maximum Limit
*a = aquatic life; b = municipal & domestic; c = agricultural, irrigation, industrial, d = recreation		
		Chronic Standard The 30-day rolling average concentration of total ammonia as nitrogen expressed in mg/l is not to exceed, more than once every three years on average, the chronic criteria magnitude calculated using the following formula: $$0.8876 \times \left(\frac{0.0278}{1+10^{7.688-pH}} + \frac{1.1994}{1+10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$ In addition, the highest four-day average within the 30-day averaging period should not be more than 2.5 times the criteria more than once in three years on average.
7440-39-3	Barium (Total) (b)	1.0 mg/l (1-day arithmetic average)
7440-42-8	Boron (Total) (c)	0.75 mg/l (30-day arithmetic average)
16887-00-6	Chloride (Total)	(a) 860 mg/l (1-hour arithmetic average) and 230 mg/l (4-day arithmetic average) not to exceed more than once every three years • Class I, IA, II, and III (b) 100 mg/l (30-day arithmetic average) • Class I (b) 175 mg/l (30-day arithmetic average) • Class IA (b) 250 mg/l (30-day arithmetic average) • Class II (c) 250 mg/l (30-day arithmetic average) • Class I, IA, II, and III
7782-50-5	Chlorine Residual (Total) (a)	**Acute:** 0.019 mg/l **Chronic:** 0.011 mg/l
None	Cylindrospermopsin (d)	15 µg/l For Clean Water Act water quality criterion, no more than 3 excursions (10-day assessment periods) within a single recreational season in a single year.
None	Microcystins (d)	8 µg/l For Clean Water Act water quality criterion, no more than 3 excursions (10-day assessment periods) within a single recreational season in a single year.
7782-44-7	Dissolved Oxygen (a)	5 mg/l as a daily minimum (up to 10% of representative samples collected during any 3-year period may be less than this value provided that lethal conditions are avoided)
14797-55-8	Nitrate as N[3] (a, b)	1.0 mg/l (up to 10% of samples may exceed)
14797-65-0	Nitrite as N (b)	1.0 mg/l

CAS[1] No.	Substance or Characteristic*	Maximum Limit
***a = aquatic life; b = municipal & domestic; c = agricultural, irrigation, industrial, d = recreation**		
None	E. coli[4] (d)	Not to exceed 126 organisms per 100 ml as a geometric mean of representative samples collected during any 30-day consecutive period, nor shall more than 10 percent of samples collected during any 30-day consecutive period individually exceed 409 organisms per 100 ml. For assessment purposes, the 30-day consecutive period shall follow the calendar month. This standard shall apply only during the recreation season May 1 to September 30.
None	pH (a, c)	(a) 6.5 – 9.0 (up to 10% of representative samples collected during any 3-year period may exceed this range, provided that lethal conditions are avoided). • Class I, IA, II, and III (c) 6.0 – 9.0 (up to 10% representative samples collected during any 3-year period may exceed this range, provided that lethal conditions are avoided). • Class I, IA, II, and III
108-95-2	Phenols (Total) (b)	0.3 mg/l (organoleptic criterion) (one-day arithmetic average)
7782-49-2	Selenium in Fish Flesh[5] (a)	**Egg-Ovary:** 15.1 mg/kg Dry Weight **Whole Body:** 8.5 mg/kg Dry Weight **Muscle:** 11.3 mg/kg Dry Weight
7440-23-5	Sodium (b, c)	(b) 50 percent of total cations as milliequivalents per liter (mEq/l) • Class I (b) 60 percent of total cations as milliequivalents per liter (mEq/l) • Class IA, II (c) 60 percent of total cations as milliequivalents per liter (mEq/l) • Class I, IA, II, and III
18785-72-3	Sulfates (Total as SO_4) (a, b)	(a) 750 mg/l (30-day arithmetic average) • Class I, IA, II, and III (b) 250 mg/l (30-day arithmetic average) • Class I (b) 450 mg/l (30-day arithmetic average) • Class IA, II

CAS[1] No.	Substance or Characteristic*	Maximum Limit
***a = aquatic life; b = municipal & domestic; c = agricultural, irrigation, industrial, d = recreation**		
	Sulfates (Total as SO_4) (a, c)	**Site Specific:** 750 mg/l (maximum) applies to the Sheyenne River from its headwaters to 0.1 mile downstream from Baldhill Dam **131.10(b) requirement:** The water quality standards for the Red River and the portions of the Sheyenne River located downstream from the segment of the Sheyenne River to which the site-specific sulfate standard applies must continue to be maintained. The Sheyenne River from 0.1 mile downstream from Baldhill Dam to the confluence with the Red River shall not exceed 450 mg/l sulfate (total) 30-day arithmetic average, and the Red River shall not exceed 250 mg/l sulfate (total) 30-day arithmetic average after mixing downstream from the confluence of the Sheyenne River. Regulated pollution control efforts must be developed to achieve compliance with these water quality standards.
None	Temperature (a)	Eighty-five degrees Fahrenheit [29.44 degrees Celsius]. The maximum increase shall not be greater than five degrees Fahrenheit [2.78 degrees Celsius] above natural background conditions.
None	Combined radium 226 and radium 228 (Total) (b, c)	5 pCi/l (30-day arithmetic average)
None	Gross alpha particle activity, including radium 226, but excluding radon and uranium (b)	15 pCi/l (30-day arithmetic average)

CAS[1] No.	Substance or Characteristic*	Maximum Limit
***a = aquatic life; b = municipal & domestic; c = agricultural, irrigation, industrial, d = recreation**		

[1] CAS No. is the chemical abstract service registry number. The registry database contains records for specific substances identified by the chemical abstract service.

[2] The US EPA 2018 recommended national criteria (304(a) criteria) for aluminum can be used for site-specific chronic and acute criteria when appropriate and data is available. The criteria is based upon multiple linear regression (MLR) models for fish and invertebrate species. Data requirements are pH, DOC, and total hardness to quantify the effects of these water chemistry parameters on the bioavailability and associated toxicity of aluminum to aquatic organisms.

[3] The standard for nitrates (N) is intended as benchmark concentration when stream or lake specific data is insufficient to determine the concentration that will cause excessive plant growth (eutrophication). However, in no case shall the concentration for nitrate plus nitrite N exceed 10 mg/l for any waters used as a municipal or domestic drinking water supply.

[4] Where the E. Coli criteria are exceeded and there are natural sources, the criteria may be considered attained, provided there is reasonable basis for concluding that the indicator bacteria density attributable to anthropogenic sources is consistent with the level of water quality required by the criteria. This may be the situation, for example, in headwater streams that are minimally affected by anthropogenic activities.

[5] Fish tissue elements are expressed as steady-state instantaneous measurement not to exceed the criteria in the table. When fish egg/ovary concentrations are measured, the egg/ovary criterion element supersedes any whole-body, or muscle criterion element. The fish flesh values in Table 1 and the water column criteria in Table 2 are independently applicable. Water column criterion elements that are derived site-specifically using an empirical bioaccumulation factor approach or a bioaccumulation mechanistic model approach, once duly established under the provisions of 40 CFR 131 will supersede the criteria in Table 2 and will be subordinate to fish tissue criterion elements when both fish and water concentrations are measured. Any site-specific water column criterion element established under the provisions of 40 CFR 131 is the applicable criterion in the absence of fish tissue measurement, or in waters with new discharges of selenium where steady state has not been achieved between water and fish tissue at the site.

TABLE 2

WATER QUALITY CRITERIA[1]
(MICROGRAMS PER LITER)

[REMOVE TABLE]

		Aquatic Life Value Classes I, IA, II, III		Human Health Value	
CAS No.	Pollutant (Compounds)	Acute	Chronic	Classes I, IA, II[2]	Class III[3]
71-55-6	1,1,1-Trichloroethane			10,000[7]	200,000
79-00-5	1,1,2-Trichloroethane[4]			0.55	8.9
79-34-5	1,1,2,2-Tetrachloroethane[4]			0.2	3
75-35-4	1,1-Dichloroethylene[4]			300	20,000
156-60-5	1,2-trans-Dichloroethylene[7]			100	4,000
120-82-1	1,2,4-Trichlorobenzene			0.071	0.076
95-50-1	1,2-Dichlorobenzene[7]			1,000	3,000
541-73-1	1,3-Dichlorobenzene			7	10
106-46-7	1,4-Dichlorobenzene[7]			300	900
107-06-2	1,2-Dichloroethane[4]			9.9	650
78-87-5	1,2-Dichloropropane			0.90	31
542-75-6	1,3-Dichloropropylene (1,3-Dichloropropene) (cis and trans isomers)			0.27	12
122-66-7	1,2-Diphenylhydrazine[4]			0.03	0.20
121-14-2	2,4-Dinitrotoluene[4]			0.049	1.7
95-57-8	2-Chlorophenol			30	800
120-83-2	2,4-Dichlorophenol			10	60
88-06-2	2,4,6-Trichlorophenol[4]			1.5	2.8
91-58-7	2-Chloronaphthalene			800	1,000
91-94-1	3,3'-Dichlorobenzidine[4]			0.049	0.15
105-67-9	2,4-Dimethylphenol			100	3,000
51-28-5	2,4-Dinitrophenol			10	300
94-75-7	2,4-D			1,300	12,000
72-54-8	4,4'-DDD[4]			0.00012	0.00012
75-55-9	4,4'-DDE[4]			0.000018	0.000018
50-29-3	4,4'-DDT[4]	0.55[12]	0.001[12]	0.000030	0.000030
534-52-1	2-Methyl-4,6-Dinitrophenol			2	30
59-50-7	3-Methyl-4-Chlorophenol			500	2,000
83-32-9	Acenaphthene			70	90
107-02-8	Acrolein	3	3	3	400
107-13-1	Acrylonitrile[4]			0.061	7.0
15972-60-8	Alachlor			2[7]	
309-00-2	Aldrin[4]	1.5		7.7E-07	7.7E-07
319-84-6	alpha-BHC[4] (Hexachlorocyclohexane-alpha)			0.00036	0.00039
319-85-7	beta-BHC[4] (Hexachlorocyclohexane-beta)			0.008	0.014
58-89-9	gamma-BHC (Lindane)[4] (Hexachlorocyclohexane-gamma)	0.95		4.2[7]	4.4
959-98-8	alpha-Endosulfan	0.11[11]	0.056[11]	20	30

33213-65-9	beta-Endosulfan	0.11[11]	0.056[11]	20	40
120-12-7	Anthracene (PAH)[5]			300	400
1332-21-4	Asbestos[4,7]			7,000,000 f/l	7,000,000 f/l
1912-24-9	Atrazine			3[7]	
71-43-2	Benzene[4]			2.1	58
92-87-5	Benzidine[4]			0.00014	0.011
56-55-3	Benzo(a)anthracene (PAH)[4] (1,2-Benzanthracene)			0.0012	0.0013
50-32-8	Benzo(a)pyrene (PAH)[4] (3,4-Benzopyrene)			0.00012	0.00013
205-99-2	Benzo(b)fluoranthene (PAH)[4] (3,4-Benzofluoranthene)			0.0012	0.0013
207-08-9	Benzo(k)fluoranthene (PAH)[4] (11,12-Benzofluoranthene)			0.012	0.013
12587-47-2	Beta/photon emitters			4 mrem/yr[7]	
111-44-4	Bis(2-chloroethyl) ether[4]			0.030	2.2
108-60-1	Bis(2-chloro-1-Methylethyl) ether			200	4,000
117-81-7	Bis(2-ethylhexyl) phthalate[4]			0.32	0.37
15541-45-4	Bromate			10[7]	
75-25-2	Bromoform (HM)[5] (Tribromomethane)			7.0	120
85-68-7	Butyl benzyl phthalate			0.10	0.10
63-25-2	Carbaryl (1-naphthyl-N-methycarbamate)	2.1	2.1		
1563-66-2	Carbofuran			40[7]	
56-23-5	Carbon tetrachloride[4] (Tetrachloromethane)			0.40	5
57-74-9	Chlordane[4]	1.2	0.0043	0.00031	0.00032
14998-27-7	Chlorite			1,000[7]	
108-90-7	Chlorobenzene (Monochlorobenzene)			100[7]	800
124-48-1	Chlorodibromomethane (HM)[5]			0.80	21
67-66-3	Chloroform (HM)[4] (Trichloromethane)			60	2,000
2921-88-2	Chlorpyrifos	0.083	0.041		
218-01-9	Chrysene (PAH)[4]			0.12	0.13
57-12-5	Cyanide (total)	22	5.2	4	400
75-99-0	Dalapon			200[7]	
103-23-1	Di(2-ethylhexyl)adipate			400[7]	
333-41-5	Diazinon	0.17	0.17		
53-70-3	Dibenzo(a,h)anthracene (PAH)[4] (1,2,5,6-Dibenzanthracene)			0.00012	0.00013
67708-83-2	Dibromochloropropane			0.2[7]	
75-27-4	Dichlorobromomethane (HM)[5]			0.95	27
156-59-2	Dichloroethylene (cis-1,2-)			70[7]	
60-57-1	Dieldrin[4]	0.24	0.056	1.2E-06	1.2E-06
84-66-2	Diethyl phthalate			600	600
131-11-3	Dimethyl phthalate			2,000	2,000
84-74-2	Di-n-butyl phthalate			20	30
88-85-7	Dinoseb			7[7]	
1746-01-6	Dioxin (2,3,7,8-TCDD)[4]			5.00E-09	5.10E-09
85-00-7	Diquat			20[7]	
1031-07-8	Endosulfan sulfate			20	40

145-73-3	Endothall			100[7]	
72-20-8	Endrin	0.086	0.036	0.03	0.03
7421-93-4	Endrin aldehyde			1	1
100-41-4	Ethylbenzene[7]			68	130
106-93-4	Ethylene dibromide (EDB)			0.05[7]	
206-44-0	Fluoranthene			20	20
86-73-7	Fluorene (PAH)[5]			50	70
1071-83-6	Glyphosate			700[7]	
	Haloacetic acids[14]			60[7]	
1024-57-3	Heptachlor epoxide[4]	0.26	0.0038	0.000032	0.000032
76-44-8	Heptachlor[4]	0.26	0.0038	0.0000059	0.0000059
118-74-1	Hexachlorobenzene[4]			0.000079	0.000079
87-68-3	Hexachlorobutadiene[4]			0.01	0.01
77-47-4	Hexachlorocyclopentadiene			4	4
67-72-1	Hexachloroethane[4]			0.10	0.10
193-39-5	Indeno(1,2,3-cd) pyrene (PAH)[4]			0.0012	0.0013
78-59-1	Isophorone[4]			34	1,800
72-43-5	Methoxychlor			0.02	0.02
74-83-9	Methyl bromide (HM) (Bromomethane)			100	10,000
75-09-2	Methylene chloride (HM)[4] (Dichloromethane)			20	1,000
98-95-3	Nitrobenzene			10	600
62-75-9	N-Nitrosodimethylamine[4]			0.00069	3
621-64-7	N-Nitrosodi-n-propylamine[4]			0.005	0.51
86-30-6	N-Nitrosodiphenylamine[4]			3.3	6
84852-15-3	Nonylphenol (Isomer mixture)[13]	28	6.6		
23135-22-0	Oxamyl (Vydate)			200[7]	
56-38-2	Parathion	0.065	0.013		
53469-21-9	PCB-1242 (Arochlor 1242)[4]		0.014[10]	0.000064[10]	0.000064[10]
126764-11-2	PCB-1016 (Arochlor 1016)[4]		0.014[10]	0.000064[10]	0.000064[10]
11104-28-2	PCB-1221 (Arochlor 1221)[4]		0.014[10]	0.000064[10]	0.000064[10]
11141-16-5	PCB-1232 (Arochlor 1232)[4]		0.014[10]	0.000064[10]	0.000064[10]
12672-29-6	PCB-1248 (Arochlor 1248)[4]		0.014[10]	0.000064[10]	0.000064[10]
11097-69-1	PCB-1254 (Arochlor 1254)[4]		0.014[10]	0.000064[10]	0.000064[10]
11096-82-5	PCB-1260 (Arochlor 1260)[4]		0.014[10]	0.000064[10]	0.000064[10]
87-86-5	Pentachlorophenol	19[8]	15[8]	0.03	0.04
108-95-2	Phenol			4,000	300,000
1918-02-1	Picloram			500[7]	
129-00-0	Pyrene (PAH)[5]			20	30
122-34-9	Simazine			4[7]	
100-42-5	Styrene			100[7]	
127-18-4	Tetrachloroethylene[4]			10	29
108-88-3	Toluene			57	520
8001-35-2	Toxaphene[4]	0.73	0.0002	0.0007	0.00071
688-73-3	Tributyltin	0.46	0.072		
79-01-6	Trichloroethylene[4]			0.60	7
75-01-4	Vinyl chloride[4] (Cloroethylene)			0.022	1.6

1330-20-7	Xylenes			10,000[7]	
		Aquatic Life Value		Human Health Value	
CAS No.	Pollutant (Elements)	Acute	Chronic	Classes I, IA,	Class III[3]
7440-36-0	Antimony			5.6	640
7440-38-2	Arsenic[7]	340[9]	150[9]	10[7]	
7440-41-7	Beryllium[4]			4[7]	
7440-43-9	Cadmium	7.38[6,15]	2.39[6,15]	5[7]	
16065-83-1	Chromium (III)	5,611.70[6,15]	268.22[6,15]	100(total)[7]	
18540-29-9	Chromium (VI)	16	11	100(total)[7]	
7440-50-8	Copper	51.68[6,15,16]	30.50[6,15,16]	1000	
7782-41-4	Fluoride			4,000[7]	
7439-92-1	Lead	476.82[6]	18.58[6]	15[7]	
7439-97-6	Mercury	1.7	0.012	0.050	0.051
7440-02-0	Nickel	1,516.92[6,15]	168.54[6,15]	100[7]	4,200
7782-49-2	Selenium	20	5	50[7]	
7440-22-4	Silver	41.07[6,15]			
7440-28-0	Thallium			0.24	0.47
7440-61-1	Uranium			30[7]	
7440-66-6	Zinc	387.83[6,15]	387.82[6,15]	7,400	26,000

[1] Except for the aquatic life values for metals, the values given in this appendix refer to the total (dissolved plus suspended) amount of each substance unless otherwise noted. For the aquatic life values for metals, the values refer to the total recoverable method for ambient metals analyses.

[2] Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

[3] Based on one route of exposure - ingestion of contaminated aquatic organisms only.

[4] Substance classified as a carcinogen, with the value based on an incremental risk of one additional instance of cancer in one million persons.

[5] Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals, with carcinogenicity as the basis for the criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending.

[6] Hardness dependent criteria. Value given is an example based on a $CaCO_3$ hardness of 400 mg/l. Criteria for each case must be calculated using the following formula:

For the Criterion Maximum Concentration (CMC):

Cadmium CMC = $e^{0.9789[\ln(\text{hardness})]-3.866}$

Chromium (III) CMC = $e^{0.8190[\ln(\text{hardness})]+3.7256}$

Copper CMC = $e^{0.9422[\ln(\text{hardness})]-1.7000}$

Lead CMC = $e^{1.2730[\ln(\text{hardness})]-1.4600}$

Nickel CMC = $e^{0.8460[\ln(\text{hardness})]+2.2550}$

Silver CMC = $e^{1.7200[\ln(\text{hardness})]-6.5900}$

Zinc CMC = $e^{0.8473[\ln(\text{hardness})]+0.8840}$

CMC = Criterion Maximum Concentration (acute exposure value)

The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the one-hour concentration does not exceed that CMC value more than once every three years on the average.

For the Criterion Continuous Concentration (CCC):

Cadmium CCC = $e^{0.7977[\ln(\text{hardness})]-3.909}$

Chromium (III) CCC = $e^{0.8190[\ln(\text{hardness})]+0.6848}$

Copper CCC = $e^{0.8545[\ln(\text{hardness})]-1.7020}$

~~Lead CCC = $e^{1.2730[\ln(\text{hardness})] - 4.7050}$~~

~~Nickel CCC = $e^{0.8460[\ln(\text{hardness})] + 0.0584}$~~

~~Silver No CCC criterion for silver~~

~~Zinc CCC = $e^{0.8473[\ln(\text{hardness})] + 0.8840}$~~

~~CCC = Criterion Continuous Concentration (chronic exposure value)~~
~~The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the four-day concentration does not exceed that CCC value more than once every three years on the average.~~

~~[7] Safe Drinking Water Act (MCL).~~

~~[8] Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH. Values displayed in the table correspond to a pH of 7.8 and are calculated as follows:~~

~~CMC = exp [1.005 (pH) - 4.869] CCC = exp [1.005 (pH) - 5.134]~~

~~[9] This criterion applies to total arsenic.~~

~~[10] This criterion applies to total PCBs (i.e., the sum of all congener or all isomer or homolog or Arochlor analyses).~~

~~[11] This criterion applies to the sum of alpha-endosulfan and beta-endosulfan.~~

~~[12] This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).~~

~~[13] The nonylphenol criteria address CAS numbers 84852-15-3 and 25154-52-3.~~

~~[14] The criterion is for a total measurement of 5 haloacetic acids, dichloroacetic acid, trichloroacetic acid, monochloroacetic acid, bromoacetic acid, and dibromoacetic acid.~~

~~[15] Hardness values shall be no greater than 400 mg/l. For waters with hardness concentrations greater than 400 mg/l, the actual ambient hardness may be used where a site-specific water effect ratio has been determined consistent with the environmental protection agency's water effect ratio procedure.~~

~~[16] The department will recognize the biotic ligand model as an appropriate tool for developing site-specific limits for copper as well as the water effects ratio (WER) method.~~

[INSERT TABLE]

		Aquatic Life Value		Human Health Value	
CAS No.	Pollutant (Compounds)	Acute	Chronic	Use 13(a, f)	Use 13(f)
71-55-6	1,1,1-Trichloroethane			10,000[7]	200,000
79-00-5	1,1,2-Trichloroethane[4]			0.55	8.9
79-34-5	1,1,2,2-Tetrachloroethane[4]			0.2	3
75-35-4	1,1-Dichloroethylene[4]			300	20,000
156-60-5	1,2-trans-Dichloroethylene[7]			100	4,000
120-82-1	1,2,4-Trichlorobenzene			0.071	0.076
95-50-1	1,2-Dichlorobenzene[7]			1,000	3,000
541-73-1	1,3-Dichlorobenzene			7	10
106-46-7	1,4-Dichlorobenzene[7]			300	900
107-06-2	1,2-Dichloroethane[4]			9.9	650
78-87-5	1,2-Dichloropropane			0.90	31
542-75-6	1,3-Dichloropropylene (1,3-Dichloropropene) (cis and trans isomers)			0.27	12
122-66-7	1,2-Diphenylhydrazine[4]			0.03	0.20
121-14-2	2,4-Dinitrotoluene[4]			0.049	1.7
95-57-8	2-Chlorophenol			30	800
120-83-2	2,4-Dichlorophenol			10	60
88-06-2	2,4,6-Trichlorophenol[4]			1.5	2.8
91-58-7	2-Chloronaphthalene			800	1,000
91-94-1	3,3'-Dichlorobenzidine[4]			0.049	0.15

		Aquatic Life Value		Human Health Value	
CAS No.	Pollutant (Compounds)	Acute	Chronic	Use 13(a, f)	Use 13(f)
105-67-9	2,4-Dimethylphenol			100	3,000
51-28-5	2,4-Dinitrophenol			10	300
94-75-7	2,4-D			1,300	12,000
72-54-8	4,4'-DDD[4]			0.00012	0.00012
75-55-9	4,4'-DDE[4]			0.000018	0.000018
50-29-3	4,4'-DDT[4]	0.55[12]	0.001[12]	0.000030	0.000030
534-52-1	2-Methyl-4,6-Dinitrophenol			2	30
59-50-7	3-Methyl-4-Chlorophenol			500	2,000
83-32-9	Acenaphthene			70	90
107-02-8	Acrolein	3	3	3	400
107-13-1	Acrylonitrile[4]			0.061	7.0
15972-60-8	Alachlor			2[7]	
309-00-2	Aldrin[4]	1.5		7.7E-07	7.7E-07
319-84-6	alpha-BHC[4] (Hexachlorocyclohexane-alpha)			0.00036	0.00039
319-85-7	beta-BHC[4] (Hexachlorocyclohexane-beta)			0.008	0.014
58-89-9	gamma-BHC (Lindane)[4] (Hexachlorocyclohexane-gamma)	0.95		4.2[7]	4.4
959-98-8	alpha-Endosulfan	0.11[11]	0.056[11]	20	30
33213-65-9	beta-Endosulfan	0.11[11]	0.056[11]	20	40
120-12-7	Anthracene (PAH)[5]			300	400
1332-21-4	Asbestos[4,7]			7,000,000 f/l	7,000,000 f/l
1912-24-9	Atrazine			3[7]	
71-43-2	Benzene[4]			2.1	58
92-87-5	Benzidine[4]			0.00014	0.011
56-55-3	Benzo(a)anthracene (PAH)[4] (1,2-Benzanthracene)			0.0012	0.0013
50-32-8	Benzo(a)pyrene (PAH)[4] (3,4-Benzopyrene)			0.00012	0.00013
205-99-2	Benzo(b)fluoranthene (PAH)[4] (3,4-Benzofluoranthene)			0.0012	0.0013
207-08-9	Benzo(k)fluoranthene (PAH)[4] (11,12-Benzofluoranthene)			0.012	0.013
12587-47-2	Beta/photon emitters			4 mrem/yr[7]	
111-44-4	Bis(2-chloroethyl) ether[4]			0.030	2.2
108-60-1	Bis(2-chloro-1-Methylethyl) ether			200	4,000
117-81-7	Bis(2-ethylhexyl) phthalate[4]			0.32	0.37
15541-45-4	Bromate			10[7]	
75-25-2	Bromoform (HM)[5] (Tribromomethane)			7.0	120
85-68-7	Butyl benzyl phthalate			0.10	0.10
63-25-2	Carbaryl (1-naphthyl-N-methycarbamate)	2.1	2.1		
1563-66-2	Carbofuran			40[7]	
56-23-5	Carbon tetrachloride[4] (Tetrachloromethane)			0.40	5
57-74-9	Chlordane[4]	1.2	0.0043	0.00031	0.00032
14998-27-7	Chlorite			1,000[7]	
108-90-7	Chlorobenzene (Monochlorobenzene)			100[7]	800

		Aquatic Life Value		Human Health Value	
CAS No.	Pollutant (Compounds)	Acute	Chronic	Use 13(a, f)	Use 13(f)
124-48-1	Chlorodibromomethane (HM)[5]			0.80	21
67-66-3	Chloroform (HM)[4] (Trichloromethane)			60	2,000
2921-88-2	Chlorpyrifos	0.083	0.041		
218-01-9	Chrysene (PAH)[4]			0.12	0.13
57-12-5	Cyanide (total)	22	5.2	4	400
75-99-0	Dalapon			200[7]	
103-23-1	Di(2-ethylhexyl)adipate			400[7]	
333-41-5	Diazinon	0.17	0.17		
53-70-3	Dibenzo(a,h)anthracene (PAH)[4] (1,2,5,6-Dibenzanthracene)			0.00012	0.00013
67708-83-2	Dibromochloropropane			0.2[7]	
75-27-4	Dichlorobromomethane (HM)[5]			0.95	27
156-59-2	Dichloroethylene (cis-1,2-)			70[7]	
60-57-1	Dieldrin[4]	0.24	0.056	1.2E-06	1.2E-06
84-66-2	Diethyl phthalate			600	600
131-11-3	Dimethyl phthalate			2,000	2,000
84-74-2	Di-n-butyl phthalate			20	30
88-85-7	Dinoseb			7[7]	
1746-01-6	Dioxin (2,3,7,8-TCDD)[4]			5.00E-09	5.10E-09
85-00-7	Diquat			20[7]	
1031-07-8	Endosulfan sulfate			20	40
145-73-3	Endothall			100[7]	
72-20-8	Endrin	0.086	0.036	0.03	0.03
7421-93-4	Endrin aldehyde			1	1
100-41-4	Ethylbenzene[7]			68	130
106-93-4	Ethylene dibromide (EDB)			0.05[7]	
206-44-0	Fluoranthene			20	20
86-73-7	Fluorene (PAH)[5]			50	70
1071-83-6	Glyphosate			700[7]	
	Halocetic acids[14]			60[7]	
1024-57-3	Heptachlor epoxide[4]	0.26	0.0038	0.000032	0.000032
76-44-8	Heptachlor[4]	0.26	0.0038	0.0000059	0.0000059
118-74-1	Hexachlorobenzene[4]			0.000079	0.000079
87-68-3	Hexachlorobutadiene[4]			0.01	0.01
77-47-4	Hexachlorocyclopentadiene			4	4
67-72-1	Hexachloroethane[4]			0.10	0.10
193-39-5	Indeno(1,2,3-cd) pyrene (PAH)[4]			0.0012	0.0013
78-59-1	Isophorone[4]			34	1,800
72-43-5	Methoxychlor			0.02	0.02
74-83-9	Methyl bromide (HM) (Bromomethane)			100	10,000
75-09-2	Methylene chloride (HM)[4] (Dichloromethane)			20	1,000
98-95-3	Nitrobenzene			10	600
62-75-9	N-Nitrosodimethylamine[4]			0.00069	3

		Aquatic Life Value		Human Health Value	
CAS No.	Pollutant (Compounds)	Acute	Chronic	Use 13(a, f)	Use 13(f)
621-64-7	N-Nitrosodi-n-propylamine[4]			0.005	0.51
86-30-6	N-Nitrosodiphenylamine[4]			3.3	6
84852-15-3	Nonylphenol (Isomer mixture)[13]	28	6.6		
23135-22-0	Oxamyl (Vydate)			200[7]	
56-38-2	Parathion	0.065	0.013		
53469-21-9	PCB-1242 (Arochlor 1242)[4]		0.014[10]	0.000064[10]	0.000064[10]
126764-11-2	PCB-1016 (Arochlor 1016)[4]		0.014[10]	0.000064[10]	0.000064[10]
11104-28-2	PCB-1221 (Arochlor 1221)[4]		0.014[10]	0.000064[10]	0.000064[10]
11141-16-5	PCB-1232 (Arochlor 1232)[4]		0.014[10]	0.000064[10]	0.000064[10]
12672-29-6	PCB-1248 (Arochlor 1248)[4]		0.014[10]	0.000064[10]	0.000064[10]
11097-69-1	PCB-1254 (Arochlor 1254)[4]		0.014[10]	0.000064[10]	0.000064[10]
11096-82-5	PCB-1260 (Arochlor 1260)[4]		0.014[10]	0.000064[10]	0.000064[10]
87-86-5	Pentachlorophenol	19[8]	15[8]	0.03	0.04
108-95-2	Phenol			4,000	300,000
1918-02-1	Picloram			500[7]	
129-00-0	Pyrene (PAH)[5]			20	30
122-34-9	Simazine			4[7]	
100-42-5	Styrene			100[7]	
127-18-4	Tetrachloroethylene[4]			10	29
108-88-3	Toluene			57	520
8001-35-2	Toxaphene[4]	0.73	0.0002	0.0007	0.00071
688-73-3	Tributyltin	0.46	0.072		
79-01-6	Trichloroethylene[4]			0.60	7
75-01-4	Vinyl chloride[4] (Chloroethylene)			0.022	1.6
1330-20-7	Xylenes			10,000[7]	
7440-36-0	Antimony			5.6	640
7440-38-2	Arsenic[7]	340[9]	150[9]	10[7]	
7440-41-7	Beryllium[4]			4[7]	
7440-43-9	Cadmium	7.38[6,15]	2.39[6,15]	5[7]	
16065-83-1	Chromium (III)	5,611.70[6,15]	268.22[6,15]	100(total)[7]	
18540-29-9	Chromium (VI)	16	11	100(total)[7]	
7440-50-8	Copper	51.68[6,15,16]	30.50[6,15,16]	1000	
7782-41-4	Fluoride			4,000[7]	
7439-92-1	Lead	476.82[6]	18.58[6]	15[7]	
7439-97-6	Mercury	1.7	0.012	0.050	0.051
7440-02-0	Nickel	1,516.92[6,15]	168.54[6,15]	100[7]	4,200
7782-49-2	Selenium	20	5	50[7]	
7440-22-4	Silver	41.07[6,15]			
7440-28-0	Thallium			0.24	0.47
7440-61-1	Uranium			30[7]	
7440-66-6	Zinc	387.83[6,15]	387.82[6,15]	7,400	26,000

[1] Except for the aquatic life values for metals, the values given in this appendix refer to the total (dissolved plus suspended) amount of each substance unless otherwise noted. For the aquatic life

values for metals, the values refer to the total recoverable method for ambient metals analyses.

[2] Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

[3] Based on one route of exposure - ingestion of contaminated aquatic organisms only.

[4] Substance classified as a carcinogen, with the value based on an incremental risk of one additional instance of cancer in one million persons.

[5] Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals, with carcinogenicity as the basis for the criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending.

[6] Hardness dependent criteria. Value given is an example based on a $CaCO_3$ hardness of 400 mg/l. Criteria for each case must be calculated using the following formula:

Criterion Maximum Concentration (CMC):
Cadmium: CMC = e^[0.9789 ln(hardness) - 3.866]
Chromium (III): CMC = e^[0.8190 ln(hardness) + 3.7256]
Copper: CMC = e^[0.9422 ln(hardness) - 1.7000]
Lead: CMC = e^[1.2730 ln(hardness) - 1.4600]
Nickel: CMC = e^[0.8460 ln(hardness) + 2.2550]
Silver: CMC = e^[1.7200 ln(hardness) - 6.5900]
Zinc: CMC = e^[0.8473 ln(hardness) + 0.8840]

CMC = Criterion Maximum Concentration (acute exposure value).

The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the one-hour concentration does not exceed that CMC value more than once every three years on the average.

Criterion Continuous Concentration (CCC):
Cadmium: CCC = e^[0.7977 ln(hardness) - 3.909]
Chromium (III): CCC = e^[0.8190 ln(hardness) + 0.6848]
Copper: CCC = e^[0.8545 ln(hardness) - 1.7020]
Lead: CCC = e^[1.2730 ln(hardness) - 4.7050]
Nickel: CCC = e^[0.8460 ln(hardness) + 0.0584]
Silver: No CCC criterion for silver
Zinc: CCC = e^[0.8473 ln(hardness) + 0.8840]

CCC = Criterion Continuous Concentration (chronic exposure value).

The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the four-day concentration does not exceed that CCC value more than once every three years on the average.

[7] Safe Drinking Water Act (MCL).

[8] Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH. Values displayed in the table correspond to a pH of 7.8 and are calculated as follows:

CMC = exp[1.005(pH) - 4.869] CCC = exp[1.005(pH) - 5.134]

[9] This criterion applies to total arsenic.

[10] This criterion applies to total PCBs (i.e., the sum of all congener or all isomer or homolog or Aroclor analyses).

[11] This criterion applies to the sum of alpha-endosulfan and beta-endosulfan.

[12] This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its

metabolites should not exceed this value).
[13] The nonylphenol criteria address CAS numbers 84852-15-3 and 25154-52-3.
[14] The criterion is for a total measurement of 5 haloacetic acids: dichloroacetic acid, trichloroacetic acid, monochloroacetic acid, bromoacetic acid, and dibromoacetic acid.
[15] Hardness values shall be no greater than 400 mg/l. For waters with hardness concentrations greater than 400 mg/l, the actual ambient hardness may be used where a site-specific water effect ratio has been determined consistent with the Environmental Protection Agency's water effect ratio procedure.
[16] The department will recognize the biotic ligand model as an appropriate tool for developing site-specific limits for copper as well as the water-effects ratio (WER) method.

33.1-16-02.1-10. Ground water classifications and standards.

1. Class I ground waters. Class I ground waters are those with a total dissolved solids concentration of less than 10,000 mg/l. The minimum conditions described in subsection 1 of section 33.1-16-02.1-08 apply. Class I ground waters are not exempt under the North Dakota underground injection control program in section 33.1-25-01-05.

2. Class II ground waters. Class II ground waters are those with a total dissolved solids concentration of 10,000 mg/l or greater. Class II ground waters are exempt under the North Dakota underground injection control program in section 33.1-25-01-05.

History: Effective January 1, 2019; amended effective January 1, 2024.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 61-28-04

33.1-16-02.1-11. Discharge of wastes.

On-surface discharges. The following are general requirements for all waste discharges or chemical additions:

1. No untreated domestic sewage shall be discharged into the waters of the state.

2. No untreated industrial wastes or other wastes which contain substances or organisms which may endanger public health or degrade the water quality of water usage shall be discharged into the waters of the state.

3. The department must be notified at least twenty days prior to the application of any herbicide or pesticide to surface waters of the state for control of aquatic pests. Only certified applicators are allowed to apply chemicals. The notification must include the following information:

   a. Chemical name and composition.

   b. Map which identifies the area of application and aerial extent (e.g., acres or square feet).

   c. A list of target species of aquatic biota the applicant desires to control.

   d. The calculated concentration of the active ingredient in surface waters immediately after application.

   e. Name, address, and telephone number of the certified applicator.

4. Any spill or discharge of waste which causes or is likely to cause pollution of waters of the state must be reported immediately. The owner, operator, or person responsible for a spill or discharge must notify the department as soon as possible by telephoning 1-833-99SPILL (1-833-997-7455) or on the website

www.spill.nd.gov and provide all relevant information about the spill. The owner or operator is required to:

a. Take immediate remedial measures appropriate for the severity of the spill;

b. Determine the extent of pollution to waters of the state;

c. Provide alternate water sources to water users impacted by the spill or accidental discharge;

d. Provide on request any documents, reports, or other information relevant to the spill or discharge; or

e. Any other actions necessary to comply with this chapter.

History: Effective January 1, 2019; amended effective July 1, 2021.
General Authority: NDCC 61-28-04; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-11, 61-28; S.L. 2017, ch. 199, § 26

APPENDIX I

STREAM CLASSIFICATIONS

The following intrastate and interstate streams are classified as the class of water quality which is to be maintained in the specified stream or segments noted. All tributaries, minor or intermittently flowing watercourse, unnamed creeks, or draws not specifically mentioned are classified as class III streams.

RIVER BASINS SUBBASINS TRIBUTARIES	CLASSIFICATION
Missouri River, including Lake Sakakawea and Oahe Reservoir	I
Yellowstone	I
Little Muddy River near Williston	II
White Earth River	II
Little Missouri River	II
Knife River	II
Spring Creek	IA
Square Butte Creek below Nelson Lake	IA
Heart River	IA
Green River	IA
Antelope Creek	II
Muddy Creek	II
Apple Creek	II
Cannonball River	II
Cedar Creek	II
Beaver Creek near Linton	II
Grand River	IA
Spring Creek	II
Souris River	IA
Des Lacs River	II
Willow Creek	II
Deep River	III
Mauvais Coulee	I
James River	IA
Pipestem	IA
Cottonwood Creek	II
Beaver Creek	II
Elm River	II
Maple River	II

RIVER BASINS SUBBASINS TRIBUTARIES	CLASSIFICATION
Bois de Sioux	I
Red River	I
Wild Rice River	II
Antelope Creek	III
Sheyenne River (except as noted below)	IA
Baldhill Creek	II
Maple River	~~II~~III
Rush River	III
Elm River	II
Goose River	IA
Turtle River	II
Forest River	II
North Branch of Forest River	III
Park River	II
North Branch	III
South Branch	II
Middle Branch	III
Cart Creek	III
Pembina River	IA
Tongue River	II

The Sheyenne River from its headwaters to 0.1 mile downstream from Baldhill Dam is not classified for municipal or domestic use.

APPENDIX II

LAKE AND RESERVOIR CLASSIFICATION

Lakes and reservoirs are classified according to the water characteristics which are to be maintained in the specified lakes and reservoirs. ~~The physical and chemical criteria for class I streams shall apply to all classified lakes and reservoirs listed.~~Subclassifications for all reservoirs listed in Appendix II are listed below. For lakes and other lentic water bodies not listed, the physical and chemical criteria designated for class III streams shall apply.

[INSERT TABLE]

Subclass ID	Subclass Name	Subclass Description / Characteristics
(i)	Small River Reservoirs	Watershed-dominated impoundments are characterized by smaller morphometric structure, and stronger watershed coupling. These systems may exhibit lower mean and maximum depths, shorter fetch, and reduced shoreline development compared to other subclasses. Lakes in this subclass may be more influenced by watershed inflow and drainage basin interactions than by lacustrine processes.
(ii)	Medium River Reservoirs	Transitional reservoir systems exhibiting mixed riverine and lacustrine characteristics. These reservoirs typically occupy an intermediate position between small and large systems in terms of depth, fetch and shoreline development. Medium River Reservoirs display moderate watershed influence while also exhibiting some lacustrine structure and morphometric complexity.
(iii)	Large River Reservoirs	Deep, extensive reservoir systems characterized by large morphometric magnitude, long fetch, greater shoreline development, and more lacustrine physical structure. These systems generally exhibit longer hydraulic residence times and stronger internal lake processes relative to watershed influence. Large River Reservoirs represent the largest impoundments in the state and are associated with broad longitudinal gradients and extensive open-water conditions.

[REMOVE TABLE]

~~COUNTY~~	~~LAKE~~	~~CLASSIFICATION~~
~~Adams~~	~~Mirror Lake~~	~~3~~
~~Adams~~	~~N. Lemmon Lake~~	~~1~~
~~Barnes~~	~~Lake Ashtabula~~	~~3~~
~~Barnes~~	~~Moon Lake~~	~~2~~
~~Barnes~~	~~Clausen Springs~~	~~3~~
~~Benson~~	~~Wood Lake~~	~~2~~
~~Benson~~	~~Graves~~	~~3~~
~~Benson~~	~~Reeves~~	~~3~~
~~Bottineau~~	~~Lake Metigoshe~~	~~2~~
~~Bottineau~~	~~Long Lake~~	~~2~~
~~Bottineau~~	~~Pelican Lake~~	~~3~~
~~Bottineau~~	~~Carbury Dam~~	~~2~~
~~Bottineau~~	~~Cassidy Lake~~	~~4~~
~~Bottineau~~	~~Strawberry Lake~~	~~2~~
~~Bowman~~	~~Bowman-Haley Dam~~	~~3~~

COUNTY	LAKE	CLASSIFICATION
Bowman	Gascoyne Lake	3
Bowman	Kalina Dam	3
Bowman	Lutz Dam	2
Bowman	Spring Lake	3
Burke	Powers Lake	3
Burke	Short Creek Dam	2
Burke	Smishek Dam	2
Burke	Northgate Dam	2
Burleigh	McDowell Dam	3
Burleigh	Mitchell Lake	3
Burleigh	New Johns Lake	2
Cass	Casselton Reservoir	3
Cass	Brewer Lake	2
Cavalier	Mt. Carmel Dam	2
Dickey	Moores Lake	3
Dickey	Pheasant Lake	3
Dickey	Wilson Dam	3
Divide	Baukol-Noonan Dam	2
Divide	Baukol-Noonan East Mine Pond	2
Divide	Skjermo Dam	2
Dunn	Lake Ilo	3
Eddy	Battle Lake	3
Eddy	Warsing Dam	3
Emmons	Braddock Dam	3
Emmons	Nieuwsma Dam	2
Emmons	Rice Lake	3
Foster	Juanita Lake	3
Golden Valley	South Buffalo Gap Dam	4
Golden Valley	Camel Hump Dam	1
Golden Valley	Odland Dam	3
Grand Forks	Fordville Dam	2
Grand Forks	Kolding Dam	3
Grand Forks	Larimore Dam	2
Grand Forks	Niagara Dam	3
Grant	Heart Butte Dam (Lake Tschida)	2

Grant	Niagara Dam	3
Grant	Raleigh Reservoir	2
Grant	Sheep Creek Dam	2
Griggs	Carlson-Tande Dam	3
Griggs	Red Willow Lake	2
Hettinger	Blickensderfer Dam	2
Hettinger	Castle Rock Dam	4
Hettinger	Indian Creek	2
Hettinger	Larson Lake	3
Hettinger	Mott Watershed Dam	3
Kidder	Alkaline Lake	2
Kidder	Cherry Lake	3
Kidder	Crystal Springs	3
Kidder	Frettim Lake	2
Kidder	George Lake	5

COUNTY	LAKE	CLASSIFICATION
Kidder	Horsehead Lake	2
Kidder	Lake Isabel	3
Kidder	Lake Josephine	2
Kidder	Lake Williams	3
Kidder	Round Lake	2
LaMoure	Heinrich-Martin Dam	3
LaMoure	Kalmbach Lake	3
LaMoure	Kulm-Edgeley Dam	3
LaMoure	Lake LaMoure	3
LaMoure	Lehr Dam	3
LaMoure	Limesand-Seefeldt Dam	3
LaMoure	Schlecht-Thom Dam	3
LaMoure	Schlecht-Weix Dam	3
Logan	Beaver Lake	3
Logan	Mundt Lake	3
Logan	Rudolph Lake	3
McHenry	Cottonwood Lake	3
McHenry	George Lake	3
McHenry	Round Lake	3
McHenry	Buffalo Lodge Lake	3
McIntosh	Blumhardt Dam	2
McIntosh	Clear Lake	3
McIntosh	Coldwater Lake	3

McIntosh	Dry Lake	2
McIntosh	Green Lake	2
McIntosh	Lake Hoskins	3
McKenzie	Arnegard Dam	4
McKenzie	Leland Dam	2
McKenzie	Sather Dam	2
McLean	Brush Lake	3
McLean	Crooked Lake	3
McLean	Custer Mine Pond	2
McLean	East Park Lake	2
McLean	Lake Audubon	2
McLean	Lake Brekken	2
McLean	Lake Holmes	2

COUNTY	LAKE	CLASSIFICATION
McLean	Lightning Lake	1
McLean	Long Lake	4
McLean	Riverdale Spillway Lake	1
McLean	Strawberry Lake	3
McLean	West Park Lake	2
Mercer	Harmony Lake	3
Morton	Crown Butte Dam	3
Morton	Danzig Dam	3
Morton	Fish Creek Dam	1
Morton	Harmon Lake	3
Morton	Nygren Dam	2
Morton	Sweetbriar Dam	2
Mountrail	Clearwater Lake	3
Mountrail	Stanley City Pond	3
Mountrail	Stanley Reservoir	3
Mountrail	White Earth Dam	2
Nelson	McVille Dam	2
Nelson	Tolna Dam	2
Nelson	Whitman Dam	2
Oliver	East Arroda Lake	2
Oliver	Nelson Lake	3
Oliver	West Arroda Lake	2
Pembina	Renwick Dam	3
Pierce	Balta Dam	3

Pierce	Buffalo Lake	3
Ramsey	Cavanaugh Lake	3
Ramsey	Devils Lake	2
Ransom	Dead Colt Creek Dam	3
Renville	Lake Darling	2
Richland	Lake Elsie	3
Richland	Mooreton Pond	3
Rolette	Belcourt Lake	2
Rolette	Carpenter Lake	2
Rolette	Dion Lake	2
Rolette	Gordon Lake	2
Rolette	Gravel Lake	2
COUNTY	LAKE	CLASSIFICATION
Rolette	Hooker Lake	2
Rolette	Island Lake	3
Rolette	Jensen Lake	3
Rolette	School Section Lake	2
Rolette	Upsilon Lake	2
Rolette	Shutte Lake	2
Sargent	Alkali Lake	3
Sargent	Buffalo Lake	3
Sargent	Lake Tewaukon	3
Sargent	Silver Lake	3
Sargent	Sprague Lake	3
Sheridan	Hecker Lake	2
Sheridan	South McClusky Lake (Hoffer Lake)	2
Sioux	Froelich Dam	2
Slope	Cedar Lake	3
Slope	Davis Dam	2
Slope	Stewart Lake	3
Stark	Belfield Pond	1
Stark	Dickinson Dike	1
Stark	Patterson Lake	3
Steele	North Golden Lake	3
Steele	North Tobiason Lake	3
Steele	South Golden Lake	3
Stutsman	Arrowwood Lake	4
Stutsman	Bader Lake	3

Stutsman	Barnes Lake	3
Stutsman	Clark Lake	3
Stutsman	Crystal Springs	3
Stutsman	Hehn-Schaffer Lake	3
Stutsman	Jamestown Reservoir	3
Stutsman	Jim Lake	4
Stutsman	Spiritwood Lake	3
Stutsman	Pipestem Reservoir	3
Towner	Armourdale Dam	2
Towner	Bisbee Dam	2
Walsh	Bylin Dam	3
COUNTY	LAKE	CLASSIFICATION
Walsh	Homme Dam	3
Walsh	Matejcek Dam	3
Ward	Hiddenwood Lake	3
Ward	Makoti Lake	4
Ward	North Carlson Lake	3
Ward	Rice Lake	3
Ward	Velva Sportsmans Pond	1
Wells	Harvey Dam	3
Wells	Lake Hiawatha (Sykeston Dam)	4
Williams	Blacktail Dam	3
Williams	Cottonwood Lake	3
Williams	East Spring Lake Pond	3
Williams	Epping-Springbrook Dam	3
Williams	Iverson Dam	2
Williams	Kettle Lake	2
Williams	Kota-Ray Dam	1
Williams	McCleod (Ray) Reservoir	3
Williams	McGregor Dam	1
Williams	Tioga Dam	3
Williams	Trenton Lake	2
Williams	West Spring Lake Pond	3
Burleigh, Emmons, Morton, Sioux	Lake Oahe	1
Dunn, McKenzie, McLean, Mercer, Mountrail, Williams	Lake Sakakawea	1

[INSERT TABLE]

COUNTY	LAKE NAME	CLASSIFICATION
Adams	Mirror Lake	3(i)
Adams	N. Lemmon Lake	1(ii)
Barnes	Lake Ashtabula	3(iii)
Barnes	Moon Lake	2
Barnes	Clausen Springs	3(ii)
Benson	Wood Lake	2
Benson	Graves	3
Benson	Reeves	3
Bottineau	Lake Metigoshe	2
Bottineau	Long Lake	2
Bottineau	Pelican Lake	3
Bottineau	Carbury Dam	2(i)
Bottineau	Cassidy Lake	4
Bottineau	Strawberry Lake	2
Bowman	Bowman-Haley Dam	3(ii)
Bowman	Gascoyne Lake	3(i)
Bowman	Kalina Dam	3(i)
Bowman	Lutz Dam	2(i)
Bowman	Spring Lake	3(i)
Burke	Powers Lake	3
Burke	Short Creek Dam	2(i)
Burke	Smishek Dam	2
Burke	Northgate Dam	2(i)
Burleigh	McDowell Dam	3(ii)
Burleigh	Mitchell Lake	3
Burleigh	New Johns Lake	2(ii)
Cass	Casselton Reservoir	3(i)
Cass	Brewer Lake	2(ii)
Cavalier	Mt. Carmel Dam	2(ii)
Dickey	Moores Lake	3
Dickey	Pheasant Lake	3(i)
Dickey	Wilson Dam	3(i)
Divide	Baukol-Noonan Dam	2(i)
Divide	Baukol-Noonan East Mine Pond	2(i)
Divide	Skjermo Dam	2
Dunn	Lake Ilo	3(i)
Eddy	Battle Lake	3
Eddy	Warsing Dam	3(i)
Emmons	Braddock Dam	3(i)
Emmons	Nieuwsma Dam	2(i)
Emmons	Rice Lake	3
Foster	Juanita Lake	3
Golden Valley	South Buffalo Gap Dam	4(i)
Golden Valley	Camel Hump Dam	1(ii)
Golden Valley	Odland Dam	3(i)
Grand Forks	Fordville Dam	2(ii)

COUNTY	LAKE NAME	CLASSIFICATION
Grand Forks	Kolding Dam	3(i)
Grand Forks	Larimore Dam	2(i)
Grand Forks	Niagara Dam	3(i)
Grant	Heart Butte Dam (Lake Tschida)	2(iii)
Grant	Niagara Dam	3
Grant	Raleigh Reservoir	2(ii)
Grant	Sheep Creek Dam	2(ii)
Griggs	Carlson-Tande Dam	3(i)
Griggs	Red Willow Lake	2
Hettinger	Blickensderfer Dam	2(i)
Hettinger	Castle Rock Dam	4(i)
Hettinger	Indian Creek	2(ii)
Hettinger	Larson Lake	3(i)
Hettinger	Mott Watershed Dam	3(i)
Kidder	Alkaline Lake	2
Kidder	Cherry Lake	3
Kidder	Crystal Springs	3
Kidder	Frettim Lake	2
Kidder	George Lake	5
Kidder	Horsehead Lake	2
Kidder	Lake Isabel	3
Kidder	Lake Josephine	2
Kidder	Lake Williams	3
Kidder	Round Lake	2
LaMoure	Heinrich-Martin Dam	3(ii)
LaMoure	Kalmbach Lake	3
LaMoure	Kulm-Edgeley Dam	3(i)
LaMoure	Lake LaMoure	3(ii)
LaMoure	Lehr Dam	3(i)
LaMoure	Limesand-Seefeldt Dam	3(ii)
LaMoure	Schlecht-Thom Dam	3(i)
LaMoure	Schlecht-Weix Dam	3(i)
Logan	Beaver Lake	3
Logan	Mundt Lake	3
Logan	Rudolph Lake	3
McHenry	Cottonwood Lake	3
McHenry	George Lake	3
McHenry	Round Lake	3
McHenry	Buffalo Lodge Lake	3
McIntosh	Blumhardt Dam	2(ii)
McIntosh	Clear Lake	3
McIntosh	Coldwater Lake	3
McIntosh	Dry Lake	2
McIntosh	Green Lake	2
McIntosh	Lake Hoskins	3
McKenzie	Arnegard Dam	4(i)

COUNTY	LAKE NAME	CLASSIFICATION
McKenzie	Leland Dam	2(i)
McKenzie	Sather Dam	2(i)
McLean	Brush Lake	3
McLean	Crooked Lake	3
McLean	Custer Mine Pond	2(i)
McLean	East Park Lake	2(ii)
McLean	Lake Audubon	2(iii)
McLean	Lake Brekken	2
McLean	Lake Holmes	2
McLean	Lightning Lake	1
McLean	Long Lake	4
McLean	Riverdale Spillway Lake	1(iii)
McLean	Strawberry Lake	3
McLean	West Park Lake	2(ii)
Mercer	Harmony Lake	3(i)
Morton	Crown Butte Dam	3(i)
Morton	Danzig Dam	3(i)
Morton	Fish Creek Dam	1(ii)
Morton	Harmon Lake	3(ii)
Morton	Nygren Dam	2(ii)
Morton	Sweetbriar Dam	2(ii)
Mountrail	Clearwater Lake	3
Mountrail	Stanley City Pond	3(i)
Mountrail	Stanley Reservoir	3(i)
Mountrail	White Earth Dam	2(i)
Nelson	McVille Dam	2(i)
Nelson	Tolna Dam	2(ii)
Nelson	Whitman Dam	2(i)
Oliver	East Arroda Lake	2(ii)
Oliver	Nelson Lake	3(ii)
Oliver	West Arroda Lake	2(ii)
Pembina	Renwick Dam	3(i)
Pierce	Balta Dam	3(i)
Pierce	Buffalo Lake	3
Ramsey	Cavanaugh Lake	3
Ramsey	Devils Lake	2
Ransom	Dead Colt Creek Dam	3(ii)
Renville	Lake Darling	2(iii)
Richland	Lake Elsie	3
Richland	Mooreton Pond	3(ii)
Rolette	Belcourt Lake	2
Rolette	Carpenter Lake	2
Rolette	Dion Lake	2
Rolette	Gordon Lake	2
Rolette	Gravel Lake	2
Rolette	Hooker Lake	2
Rolette	Island Lake	3

COUNTY	LAKE NAME	CLASSIFICATION
Rolette	Jensen Lake	3
Rolette	School Section Lake	2
Rolette	Upsilon Lake	2
Rolette	Shutte Lake	2
Sargent	Alkali Lake	3
Sargent	Buffalo Lake	3
Sargent	Lake Tewaukon	3
Sargent	Silver Lake	3
Sargent	Sprague Lake	3
Sheridan	Hecker Lake	2(i)
Sheridan	South McClusky Lake (Hoffer Lake)	2(i)
Sioux	Froelich Dam	2(ii)
Slope	Cedar Lake	3(i)
Slope	Davis Dam	2(i)
Slope	Stewart Lake	3(i)
Stark	Belfield Pond	1(i)
Stark	Dickinson Dike	1(i)
Stark	Patterson Lake	3(ii)
Steele	North Golden Lake	3
Steele	North Tobiason Lake	3
Steele	South Golden Lake	3
Stutsman	Arrowwood Lake	4(ii)
Stutsman	Bader Lake	3
Stutsman	Barnes Lake	3
Stutsman	Clark Lake	3
Stutsman	Crystal Springs	3
Stutsman	Hehn-Schaffer Lake	3(ii)
Stutsman	Jamestown Reservoir	3(ii)
Stutsman	Jim Lake	4(ii)
Stutsman	Spiritwood Lake	3
Stutsman	Pipestem Reservoir	3(ii)
Towner	Armourdale Dam	2(ii)
Towner	Bisbee Dam	2(ii)
Walsh	Bylin Dam	3(i)
Walsh	Homme Dam	3(ii)
Walsh	Matejcek Dam	3(ii)
Ward	Hiddenwood Lake	3(ii)
Ward	Makoti Lake	4
Ward	North-Carlson Lake	3
Ward	Rice Lake	3
Ward	Velva Sportsmans Pond	1(i)
Wells	Harvey Dam	3(i)
Wells	Lake Hiawatha (Sykeston Dam)	4(i)
Williams	Blacktail Dam	3(ii)
Williams	Cottonwood Lake	3

COUNTY	LAKE NAME	CLASSIFICATION
Williams	East Spring Lake Pond	3(i)
Williams	Epping-Springbrook Dam	3(i)
Williams	Iverson Dam	2(i)
Williams	Kettle Lake	2
Williams	Kota-Ray Dam	1(i)
Williams	McCleod (Ray) Reservoir	3(i)
Williams	McGregor Dam	1(ii)
Williams	Tioga Dam	3(i)
Williams	Trenton Lake	2
Williams	West Spring Lake Pond	3(i)
Burleigh, Emmons, Morton, Sioux	Lake Oahe	1(iii)
Dunn, McKenzie, McLean, Mercer, Mountrail, Williams	Lake Sakakawea	1(iii)

APPENDIX III

MIXING ZONE AND DILUTION POLICY
AND
IMPLEMENTATION PROCEDURE

PURPOSE

This policy addresses how mixing and dilution of point source discharges with receiving waters will be addressed in developing chemical-specific and whole effluent toxicity discharge limitations for point source discharges. Depending upon site-specific mixing patterns and environmental concerns, some pollutants/criteria may be allowed a mixing zone or dilution while others may not. In all cases, mixing zone and dilution allowances shall be limited, as necessary, to protect the integrity of the receiving water's ecosystem and designated uses.

MIXING ZONES

Where dilution is available and the discharge does not mix at a near instantaneous and complete rate with the receiving water (incomplete mixing), an appropriate mixing zone may be designated. In addition, a mixing zone may only be designated if it is not possible to achieve chemical-specific standards and whole effluent toxicity objectives at the end-of-pipe with no allowance for dilution. The size and shape of a mixing zone will be determined on a case-by-case basis. At a maximum, mixing zones for streams and rivers shall not exceed one-half the cross-sectional area or a length ten times the stream width at critical low flows, whichever is more limiting. Also, at a maximum, mixing zones in lakes shall not exceed five percent of lake surface area or two hundred feet in radius, whichever is more limiting. Individual mixing zones may be limited or denied in consideration of designated beneficial uses or presence of the following concerns in the area affected by the discharge:

1. There is the potential for bioaccumulation in fish tissues or wildlife.
2. The area is biologically important, such as fish spawning/nursery areas.
3. The pollutant of concern exhibits a low acute to chronic ratio.
4. There is a potential for human exposure to pollutants resulting from drinking water use or recreational activities.
5. The effluent and resultant mixing zone results in an attraction of aquatic life to the effluent plume.
6. The pollutant of concern is extremely toxic and persistent in the environment.
7. The mixing zone would prohibit a zone of passage for migrating fish or other species (including access to tributaries).
8. There are cumulative effects of multiple discharges and their mixing zones.

Within the mixing zone designated for a particular pollutant, certain numeric water quality criteria for that substance may not apply. However, all mixing zones shall meet the general conditions set forth in section 33-16-02-08 of the state water quality standards.

While exceedances of acute chemical specific numeric standards are not allowed within the entire mixing zone, a portion of the mixing zone (the zone of initial dilution or ZID) may exceed acute chemical-specific numeric standards established for the protection of aquatic life. The ZID shall be determined on a case-by-case basis where the statement of basis for the discharge permit includes a rationale for concluding that a zone of initial dilution poses no unacceptable risks to aquatic life. Acute whole effluent toxicity (WET) limits shall be achieved at the end-of-pipe with no allowance for a ZID.

DILUTION ALLOWANCES

An appropriate dilution allowance may be provided in calculating chemical-specific acute and chronic and WET discharge limitations where: 1) the discharge is to a river or stream, 2) dilution is available at low-flow conditions, and 3) available information is sufficient to reasonably conclude that there is near instantaneous and complete mixing of the discharge with the receiving water (complete mixing). The basis for concluding that such near instantaneous and complete mixing is occurring shall be documented in the statement of basis for the North Dakota pollutant discharge elimination system permit. In the case of field studies, the dilution allowance for continuous dischargers shall be based on the critical low flow (or some portion of the critical low flow). The requirements and environmental concerns identified in the paragraphs above may be considered in deciding the portion of the critical low flow to provide as dilution. The following critical low flows shall be used for streams and effluents:

Stream Flows	
Aquatic life, chronic	4-day, 3-year flow (biologically based*)**
Aquatic life, acute	1-day, 3-year flow (biologically based)
Human health (carcinogens)	Harmonic mean flow
Human health (noncarcinogens)	4-day, 3-year flow (biologically based) or 1-day, 3-year flow (biologically based)

Effluent Flows	
Aquatic life, chronic	Mean daily flow
Aquatic life, acute	Maximum daily flow
Human health (all)	Mean daily flow

* Biologically based refers to the biologically based design flow method developed by the environmental protection agency. It differs from the hydrologically based design flow method in that it directly uses the averaging periods and frequencies specified in the aquatic life water quality criteria for individual pollutants and whole effluents for determining design flows.

** A 30-day, 10-year flow (biologically based) can be used for ammonia or other chronic standard with a 30-day averaging period.

For chemical-specific and chronic WET limits, an appropriate dilution allowance may also be provided for certain minor publicly owned treatment works where allowing such dilution will pose insignificant environmental risks. For acute WET limits, an allowance for dilution is authorized only where dilution is available and mixing is complete.

For controlled discharges, such as lagoon facilities that discharge during high ambient flows, the stream flow to be used in the mixing zone analysis should be the lowest statistical flow expected to occur during the period of discharge.

Where a discharger has installed a diffuser in the receiving water, all or a portion of the critical low stream flow may be provided as a dilution allowance. The determination shall depend on the diffuser design and on the requirements and potential environmental concerns identified in the above paragraphs. Where a diffuser is installed across the entire river/stream width (at critical low flow), it will generally be presumed that near instantaneous and complete mixing is achieved and that providing the entire critical low flow as dilution is appropriate.

OTHER CONSIDERATIONS

Where dilution flow is not available at critical conditions (i.e., the water body is dry), the discharge limits will be based on achieving applicable water quality criteria (i.e., narrative and numeric, chronic and acute) at the end-of-pipe; neither a mixing zone or an allowance for dilution will be provided.

All mixing zone dilution assumptions are subject to review and revision as information on the nature and impacts of the discharge becomes available (e.g., chemical or biological monitoring at the mixing zone boundary). At a minimum, mixing zone and dilution decisions are subject to review and revision, along with all other aspects of the discharge permit upon expiration of the permit.

For certain pollutants (e.g., ammonia, dissolved oxygen, metals) that may exhibit increased toxicity or other effects on water quality after dilution and complete mixing is achieved, the waste load allocation shall address such effects on water quality, as necessary, to fully protect designated and existing uses. In other words, the point of compliance may be something other than the mixing zone boundary or the point where complete mixing is achieved.

The discharge will be consistent with the Antidegradation Procedure.

IMPLEMENTATION PROCEDURE

This procedure describes how dilution and mixing of point source discharges with receiving waters will be addressed in developing discharge limitations for point source discharges. For the purposes of this procedure, a mixing zone is defined as a designated area or volume of water surrounding or downstream of a point source discharge where the discharge is progressively diluted by the receiving water and numerical water quality criteria may not apply. Based on site-specific considerations, such a mixing zone may be designated in the context of an individual permit decision. Discharges may also be provided an allowance for dilution where it is determined that the discharge mixes with the receiving water in near instantaneous and complete fashion. Such mixing zones and allowances for dilution will be granted on a parameter-by-parameter and criterion-by-criterion basis as necessary to fully protect existing and designated uses.

The procedure to be followed is composed of six individual elements or steps. The relationship of the six steps and an overview of the mixing zone/dilution procedure is shown in figure 1.

Step 1 - No dilution available during critical low-flow conditions

Where dilution flow is not available at critical low-flow conditions, discharge limitations will be based on achieving applicable narrative and numeric water quality criteria at the end-of-pipe during critical low-flow conditions.

Step 2 - Dilution categorically prohibited for wetland discharges

Permit limitations for discharges to a wetland shall be based on achieving all applicable water quality criteria (i.e., narrative and numeric, chronic and acute) at end-of-pipe.

Step 3 - Procedure for certain minor publicly owned treatment works

Minor publicly owned treatment works that discharge to a lake or to a river/stream at a dilution greater than a 50-to-1 ratio qualify for this procedure. Minor publicly owned treatment works with dilution ratios less than a 50-to-1 ratio may also qualify (at the discretion of the permit writer) where it can be adequately demonstrated that this procedure poses insignificant environmental risks. For the purposes of this procedure, the river/stream dilution ratio is defined as the chronic low flow of the segment upstream of the publicly owned treatment works discharge divided by the mean daily flow of the publicly owned treatment works. For controlled discharges from lagoon facilities (discharging during high flows), the river/stream dilution ratio is defined as the lowest upstream flow expected during the period of discharge divided by the mean daily flow of the discharge.

For minor publicly owned treatment works that qualify for this procedure and discharge to lakes, the allowance for dilution for chemical-specific and chronic WET limits will be determined on a case-by-case basis. Dilution up to a 19-to-1 ratio (five percent effluent) may be provided.

For minor publicly owned treatment works that qualify for this procedure and discharge to a river/stream segment, dilution up to the full chronic aquatic life, acute aquatic life, and human health critical flows may be provided.

Step 4 - Site-specific risk considerations

Where allowing a mixing zone or a dilution allowance would pose unacceptable environmental risks, the discharge limitations will be based on achieving applicable narrative and numeric water quality criteria at the end-of-pipe. The existence of environmental risks may also be the basis for a site-specific mixing zone or dilution allowance. Such risk determinations will be made on a case-by-case and parameter-by-parameter basis. These decisions will take into account the designated and existing uses and all relevant site-specific environmental concerns, including the following:

1. Bioaccumulation in fish tissues or wildlife.
2. Biologically important areas such as fish spawning areas.
3. Low acute to chronic ratio.
4. Potential human exposure to pollutants resulting from drinking water or recreational areas.
5. Attraction of aquatic life to the effluent plume.
6. Toxicity/persistence of the substance discharged.
7. Zone of passage for migrating fish or other species (including access to tributaries).
8. Cumulative effects of multiple discharges and mixing zones.

Step 5 - Complete mix procedures

For point source discharges to rivers/streams where available data are adequate to support a conclusion that there is near instantaneous and complete mixing of the discharge with the receiving water (complete mix) the full critical low flow or a portion thereof may be provided as dilution for chemical-specific and WET limitations. Such determinations of complete mixing will be made on a case-by-case basis using best professional judgement. Presence of an effluent diffuser that covers the entire river/stream width at critical low flow will generally be assumed to provide complete mixing. Also, where the mean daily flow of the discharge exceeds the chronic low stream flow of the receiving water, complete mixing will generally be assumed. In addition, where the mean daily flow of the discharge is less than or equal to the chronic low flow of the receiving water, it will generally be assumed that complete mixing does not occur unless otherwise demonstrated by the permittee. Demonstrations for complete mixing should be consistent with the study plan developed in cooperation with the states/tribes and environmental protection agency region VIII. Near instantaneous and complete mixing is defined as no more than a ten percent difference in bank-to-bank concentrations within a longitudinal distance not greater than two river/stream widths. For controlled discharges (lagoon facilities), the test of near instantaneous and complete mixing will be made using the expected rate of effluent discharge and the lowest upstream flow expected to occur during the period of discharge.

The following critical low flows shall be applied for streams and effluents:

Stream Flows	
Aquatic life, chronic	4-day, 3-year flow (biologically based*)**
Aquatic life, acute	1-day, 3-year flow (biologically based)

Human health (carcinogens)	Harmonic mean flow
Human health (noncarcinogens)	4-day, 3-year flow (biologically based) or 1-day, 3-year flow (biologically based)

Effluent Flows

Aquatic life, chronic	Mean daily flow
Aquatic life, acute	Maximum daily flow
Human health (all)	Mean daily flow

* Biologically based refers to the biologically based design flow method developed by the environmental protection agency. It differs from the hydrologically based design flow method in that it directly uses the averaging periods and frequencies specified in the aquatic life water quality criteria for individual pollutants and whole effluents for determining design flows.

** A 30-day, 10-year flow (biologically based) can be used for ammonia or other chronic standard with a 30-day averaging period.

Where complete mixing can be concluded and the environmental concerns identified in step 4 do not justify denying dilution, but are nevertheless significant, some portion of the critical low flows identified above may be provided as dilution. Such decisions will take site-specific environmental concerns into account as necessary to ensure adequate protection of designated and existing uses.

Step 6 - Incomplete mix procedures

This step addresses point source discharges that exhibit incomplete mixing. Because acute WET limits are achieved at the end-of-pipe in incomplete mix situations, this step provides mixing zone procedures for chronic aquatic life, human health, and WET limits, and ZID procedures for acute chemical-specific limits. Where a ZID is allowed for chemical limits, the size of the ZID shall be limited as follows:

Lakes:	The ZID volume shall not exceed ten percent of the volume of the chronic mixing zone.
Rivers and Streams:	The ZID shall not exceed ten percent of the chronic mixing zone volume or flow, nor shall the ZID exceed a maximum downstream length of one hundred feet, whichever is more restrictive.

The following provides guidelines for determining the amount of dilution available for dischargers that exhibit incomplete mixing.

Default Method

This method addresses situations where information needed for modeling is not available or there are concerns about potential environmental impacts of allowing a mixing zone. The default method provides a conservative dilution allowance.

Stream/river dischargers: Dilution calculation which uses up to ten percent of the critical low flow for chronic aquatic life limits or human health limits. However, this allowance may be adjusted downward on a case-by-case basis depending upon relevant site-specific information, designed and existing uses of the segment, and especially the uses of the segment portion affected by the discharge.

Lake/reservoir dischargers: Dilution up to a 4-to-1 ratio (twenty percent effluent) may be provided for chronic aquatic life analyses or human health analyses. However, this allowance may be adjusted downward on a case-by-case basis depending upon discharge flow, lake size, lake

flushing potential, designated and existing uses of the lake, and uses of the lake portion affected by the discharge.

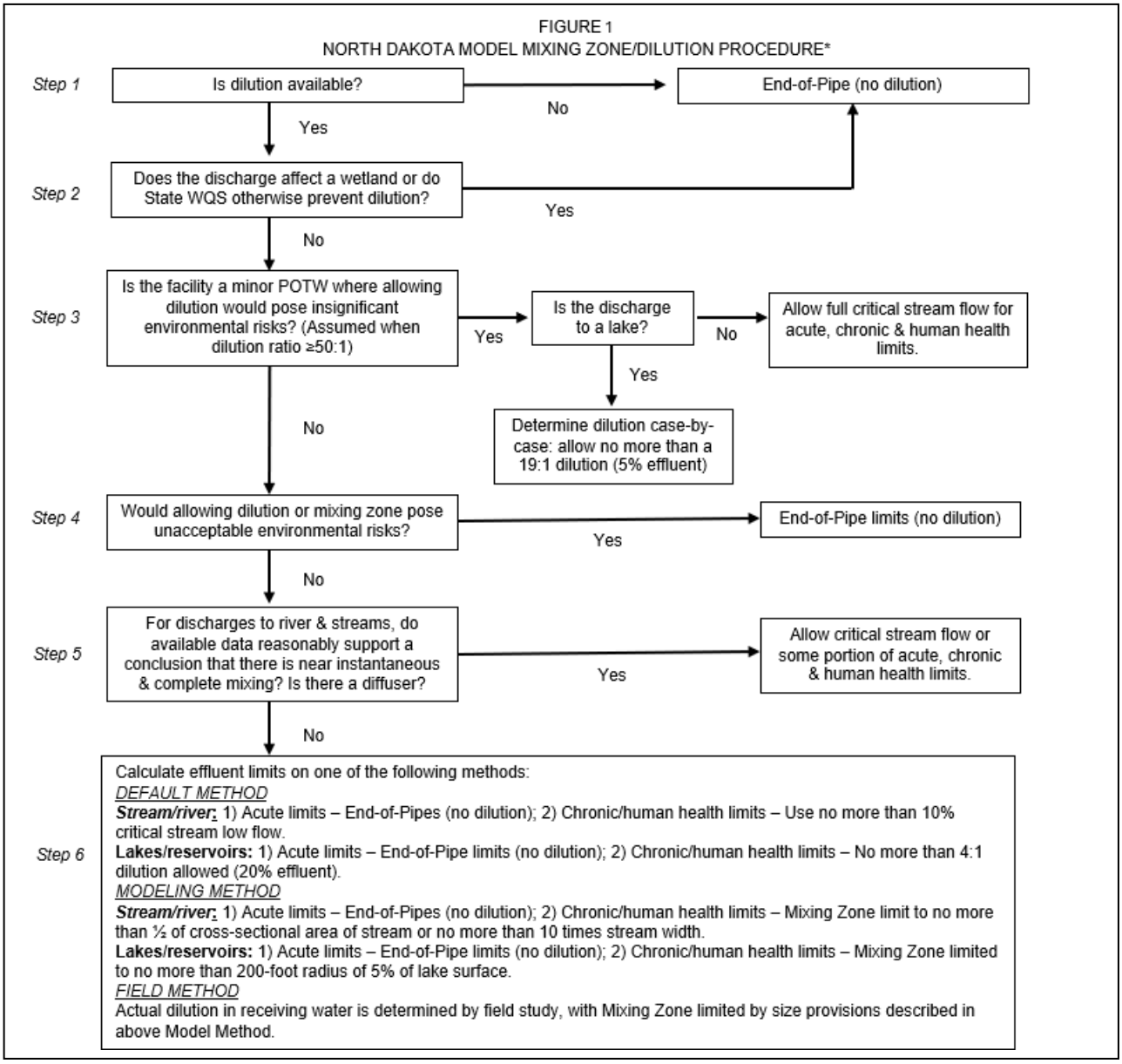
Modeling Method

An appropriate mixing zone model is used to calculate the dilution flow that will allow mixing zone limits to be achieved at the critical low flow. Prior to initiating modeling studies, it should be determined that compliance with criteria at the end-of-pipe is not practicable.

Field Study Method

Field studies which document the actual mixing characteristics in the receiving water are used to determine the dilution flow that will allow mixing zone size limits to be achieved at the critical low flow. For the purposes of field studies, "near instantaneous and complete mixing" is operationally defined as no more than a ten percent difference in bank-to-bank concentrations within a longitudinal distance not greater than two stream/river widths.

FIGURE 1
NORTH DAKOTA MODEL MIXING ZONE/DILUTION PROCEDURE*



*The procedure is applied to both chemical-specific and WET limits. In the case of complex discharges, the dilution of mixing zone may vary parameter-by parameter.

APPENDIX IV

NORTH DAKOTA ANTIDEGRADATION
PROCEDURE

I. INTRODUCTION

This antidegradation implementation procedure delineates the process that will be followed by the department of environmental quality for implementing the antidegradation policy found in Standards of Quality for Waters of the State, ~~chapter 33.1-16-02.1~~section 33.1-16-02.1-02.

Under this implementation procedure, all waters of the state are afforded one or more of three different levels of antidegradation protection. All existing uses, and the water quality necessary for those uses, shall be maintained and protected. Antidegradation requirements are necessary whenever a regulated activity is proposed that may ~~have some effect on~~lower water quality. Regulated actions include permits issued under sections 402 (North Dakota pollutant discharge elimination system) and 404 (dredge and fill) of the Clean Water Act, and any other activity requiring section 401 water quality certification. Nonpoint ~~sources of pollution~~source activities are not included. When reviewing section 404 nationwide permits, the department will issue section 401 certifications only where it determines that the conditions imposed by such permits are expected to result in attainment of the applicable water quality standards, including the antidegradation requirements. However, it is anticipated that the department will exclude certain nationwide permits from the antidegradation procedures for category 1 waters on the basis that the category of activities covered by the permit is not expected to have significant permanent effects on the quality and beneficial uses of those waters, or the effects will be appropriately minimized and temporary.

II. EXISTING USE PROTECTION FOR CATEGORY 1, 2, AND 3 WATERS

Existing use means a use that was attained in the water body on or after 1967, whether or not it is included in the water quality standards. This procedure presumes that attainment of the criteria assigned to protect the current water body classification will serve to maintain and protect all existing uses. However, where an existing use has water quality requirements that are clearly defined, but are not addressed by the current classification and criteria, the department will ensure that such existing uses are protected fully, based on implementation of appropriate numeric or narrative water quality criteria or criteria guidance. In some cases, water quality may have improved in the segment since the classification was assigned, resulting in attainment of a higher use. In other cases, the classification may have been assigned based on inadequate information, resulting in a classification that does not describe or adequately protect actual uses of the segment. In such cases, the department will develop requirements necessary to protect the existing uses and, where appropriate, recommend reclassification of the segment.

III. ANTIDEGRADATION REVIEW PROCEDURE

The department will complete an antidegradation review for all proposed regulated activities. The findings of these reviews will be summarized using an antidegradation worksheet. A statement of basis for all conclusions will be attached to the completed worksheet. The level of detail of the review will depend upon the antidegradation protection applicable to the various classes of water.

In conducting an antidegradation review, the division of water quality will sequentially apply the following steps:

A. Determine which level of antidegradation applies.

B. Determine whether authorizing the proposed regulated activity is consistent with antidegradation requirements.

C. Review existing water quality data and other information submitted by the project applicant.

D. Determine if additional information or assessment is necessary to make a decision.

E. A preliminary decision is made by the department and subsequently distributed for public participation and intergovernmental coordination.

- The content of public notices will be determined case by case. In preparing a public notice, the department may address: a) the department's preliminary antidegradation review conclusions; b) a request for public input on particular aspects of the antidegradation review that might be improved based on public input (e.g., existing uses of a segment that needs to be protected); c) notice of the availability of the antidegradation review worksheet; d) notice of the availability of general information regarding the state antidegradation program; and e) a reference to the state antidegradation policy.

- The antidegradation review findings will be available for public comment; however, publication of a separate notice for purposes of antidegradation is not necessary. For example, the antidegradation preliminary findings may be included in the public notice issued for purposes of a North Dakota pollutant discharge elimination system permit or Clean Water Act section 401 certification.

The department will ensure appropriate intergovernmental coordination on all antidegradation reviews. At a minimum, the department will provide copies of the completed antidegradation review worksheet and/or the public notice to appropriate local, state, and federal government agencies, along with a written request to provide comments by the public comment deadline.

F. Comments are considered.

G. The department determines if the change in water quality is necessary to accommodate important economic or social development.

H. The department makes a final decision.

The level of antidegradation protection afforded each water body in the state is consistent with beneficial uses of those water bodies. Appendix I and appendix II of the Standards of Quality for Waters of the State identify rivers, streams, and lakes in the state with their classification. The classification shall be consistent with the following categories:

Category 1: Very high level of protection that automatically applies to class I and class IA streams and class ~~I~~1, ~~II~~class 2, and ~~III~~class 3 lakes, and wetlands that are functioning at their optimal level. In addition, category 1 is presumed to apply to class II and class III streams. Particular class II and class III streams may be excluded from category 1 if, at the time of the antidegradation review, it is determined that one or both of the following criteria are applicable: 1) there is no remaining assimilative capacity for any of the parameters that may potentially be affected by the proposed regulated activity in the segment in question, or 2) an evaluation submitted by the project applicant demonstrates (based on adequate and representative chemical, physical, and biological data) that aquatic life and primary contact recreation uses are not currently being attained because of stressors that will require a long-term effort to remedy. Evaluations in response to criterion #2 must include more than an identification of current water quality levels. They must include evidence of the current status of the aquatic life and primary contact recreation uses of the segment.

Category 2: Class 4 and class 5 lakes and particular wetlands after antidegradation review. In addition, class II and class III streams or wetlands meeting one of the criteria identified above at the time of the antidegradation review shall be included in category 2.

Category 3: Highest level of protection; outstanding state resource waters.

Procedures for Category 1 Waters

Regulated activities that result in a new or expanded source of pollutants to this category of water are subject to the review process, unless the source would have no significant permanent effect on the quality and beneficial uses of those waters, or if the effects will be appropriately minimized and temporary.

- Proposed activities that would lower the ambient quality in a water body of any parameter by more than fifteen percent, reduce the available assimilative capacity by more than fifteen percent, or increase permitted pollutant loadings to a water body by more than fifteen percent will be deemed to have significant effects.

- The department will identify and eliminate from further review those proposed activities that will have no significant effect on water quality or beneficial uses. Category 1 reviews will be conducted where significant effects are projected for one or more water quality parameters. Findings of significant effects may be based on the following factors: a) percent change in ambient concentrations predicted at the appropriate conditions; b) percent change in loadings for the individual discharge or to the segment from all discharges; c) reduction in available assimilative capacity; d) nature, persistence, and potential effects of the parameter; e) potential for cumulative effects; and f) ~~predicted impacts to aquatic biota; and g)~~ degree of confidence in any modeling techniques utilized.

- The applicant may be required to provide available monitoring data or other information about the affected water body and/or proposed activity to help determine the significance of the proposed degradation for specific parameters. The information includes recent ambient chemical, physical, or biological monitoring data sufficient to characterize, during the appropriate conditions, the spatial and temporal variability of existing background quality of the segment for the parameters that would be affected by the proposed activity. The information would also describe the water quality that would result if the proposed activity were authorized.

The project applicant is required to provide an evaluation of the water quality effects of the project. This evaluation may consist of the following components:

1. Pollution prevention measures.
2. Reduction in scale of the project.
3. Water recycle or reuse.
4. Process changes.
5. Alternative treatment technology.
6. Advanced treatment technology.
7. Seasonal or controlled discharge options to avoid critical water quality periods.
8. Improved operation and maintenance of existing facilities.
9. Alternative discharge locations.

The primary emphasis of the category 1 reviews will be to determine whether ~~reasonable~~practicable nondegrading or less-degrading alternatives to the proposed degradation are available. The department will first evaluate any alternatives analysis submitted by the applicant for adherence to the minimum requirements described below. If an acceptable analysis of alternatives was completed and submitted to the department as part of the initial project proposal, no further evaluation of alternatives will be required of the applicant. If an acceptable alternatives analysis has not been completed, the department will work with the project applicant to ensure that an acceptable alternatives analysis is developed.

Once the department has determined that feasible alternatives to allowing the degradation have been adequately evaluated, the department shall make a preliminary determination regarding whether reasonable nondegrading or less-degrading alternatives are available. This determination will be based primarily on the alternatives analysis developed by the project applicant, but may be supplemented with other information or data. As a rule-of-thumb, nondegrading or less-degrading pollution control alternatives with costs that are similar to the costs of the applicant's favored alternative shall be considered reasonable. If the department determines that reasonable alternatives to allowing the degradation do not exist, the department shall continue with the antidegradation review and document the basis for the preliminary determination.

If the department makes a preliminary determination that one or more reasonable alternatives exist, the department will work with the applicant to revise the project design. If a mutually acceptable resolution cannot be reached, the department will document the alternative analysis findings and provide public notice of a preliminary decision to deny the activity.

Although it is recognized that any activity resulting in a discharge to surface waters may have positive and negative aspects, the applicant must show that any discharge or increased discharge will be of economic or social importance in the area. Where there are existing regulated sources located in the area, the department will assure that those sources are complying with applicable requirements prior to authorizing the proposed regulated activity. New sources of a particular parameter will not be allowed where there are existing unresolved compliance problems (involving the same parameter) in the zone of influence of the proposed activity. The "zone of influence" is determined as appropriate for the parameter of concern, the characteristics of the receiving water body (e.g., lake versus river, etc.), and other relevant factors. Where available, a total maximum daily load analysis or other watershed-scale plan will be the basis for identifying the appropriate zone of influence. The department may conclude that such compliance has not been achieved where existing sources are violating their North Dakota pollutant discharge elimination system permit limits. However, the existence of a compliance schedule in the North Dakota pollutant discharge elimination system permit may be taken into consideration in such cases. Required controls on existing regulated sources need not be finally achieved prior to authorizing a proposed activity provided there is reasonable assurance of future compliance.

Procedures for Category 2 Waters

Regulated activities that result in a permanent or temporary, new or expanded source of pollution to this category of water are permitted if the following conditions are met:

1. The classified uses of the water would be maintained.

2. The assimilative capacity of the water is available for the parameters that would be affected by the regulated activity, and existing uses would be protected as discussed in section II.

A decision will be made on a case-by-case basis, using available data and best professional judgment. The applicant may be required to provide additional information necessary for the department to characterize or otherwise predict changes to the physical, chemical, and/or biological condition of the water.

Procedures for Category 3 Waters

Outstanding state resource waters - Eligibility. Outstanding state resource waters may be designated category 3 waters only after they have been determined to have exceptional value for present or prospective future use for public water supplies, propagation of fish or aquatic life, wildlife, recreational purposes, or agricultural, industrial, or other legitimate beneficial uses. The factors that may be considered in determining whether a water body is eligible for inclusion in category 3 include the following: a) location, b) previous special designations, c) existing water quality, d) physical characteristics, e) ecological value, and f) recreational value.

Nomination. Any person may nominate any waters of the state for designation as outstanding state resource waters. The nomination must be made in writing to the department, must describe its specific location and present uses, and must state the reasons why the resource has exceptional value for present or prospective future beneficial use.

Review process. The department with cooperation of the state water commission shall review any nomination to determine whether the nominated waters of the state are eligible, clearly defined, and identify beneficial uses of exceptional value for present or prospective future use. The department of environmental quality with cooperation of the state water commission shall provide as a part of its assessment: 1) a verification of the uses, properties, and attributes that define the proposed "exceptional" value; 2) an evaluation of the current and historical condition of the water with respect to the proposed value using the best data available; and 3) an estimate of likely regulatory measures needed to achieve the desired level of protection. If the identified waters of the state are eligible, clearly defined, and appear to identify beneficial uses of exceptional value for present or prospective future use, the department, and the state water commission will solicit public comment and/or hold a public hearing regarding the nomination. After reviewing the public comments and views, the department jointly with the state water commission will make a decision on whether to designate the defined water body as an outstanding state water resource. If both the department and the state water commission agree that the defined water body should be designated as an outstanding state water resource, the department shall submit the recommendation to the department of environmental quality advisory council as part of the water quality standard revision process. The designation, if made, may be reviewed on a periodic basis.

Implementation process. Effects on category 3 waters resulting from regulated activity will be determined by appropriate evaluation and assessment techniques and best professional judgment. Any proposed regulated activity that would result in a new or expanded source of pollutants to a segment located in or upstream of a category 3 segment will be allowed only if there are appropriate restrictions to maintain and protect existing water quality. Reductions in water quality may be allowed only if they are temporary and negligible. Factors that may be considered in judging whether the quality of a category 3 water would be affected include: a) percent change in ambient concentrations predicted at the appropriate critical conditions; b) percent change in loadings; c) percent reduction in available assimilative capacity; d) nature, persistence, and potential effects of the parameter; e) potential for cumulative effects; and f) degree of confidence in any modeling techniques utilized.