PROPOSED RULE AMENDMENT SUMMARY
SUPPORTING INFORMATION
REGULATORY ANALYSIS, TAKINGS ASSESSMENT, SMALL ENTITY REGULATORY ANALYSIS SMALL ENTITY REGULATORY ANALYSIS, AND FISCAL NOTE

Introduction

The Clean Water Act (CWA), specifically §303(c)(1), requires states to review their water quality standards at least once every three years. The review requires modifying and adopting as appropriate applicable new scientific and technical information into its Standards of Quality for Waters of the State of North Dakota N.D. Admin. Code ch. 33-16-02.1 (standards), taking into consideration public concerns and U.S. Environmental Protection Agency (EPA) recommended guidance. The CWA requires states to adopt EPA's Section 304(a) recommended criteria or adopt their own to ensure consistency with the requirements of the CWA.

The NDDEQ could choose to not adopt the recommended criteria. If this occurred, the U.S. Environmental Protection Agency could challenge the state's primacy by establishing and enforcing water quality standards for North Dakota. Also, if NDDEQ choose not to adopt the changes or complete a triennial review, it could face a third party or citizen lawsuit.

The standards consist of the three basic elements of: (1) designated uses, (2) water quality criteria, and (3) antidegradation. All three of these elements are being reviewed and amended where appropriate to reflect the most current scientific and technical information.

1. Designated Uses: The designated use describes the existing and/or potential use of the water body. Examples of some designated uses are municipal water supply (after treatment), aquatic life, water-based recreation, irrigation and stock watering.

2. Water Quality Criteria: Numeric criteria are established for specific pollutants. If the concentration of a pollutant exceeds the numeric criterion, a designated use is not being maintained. Narrative and general requirements are also included in the standards. These are referred to as "free from" and include garbage, dead animals, oil, scum and materials that produce odors and/or render undesirable taste to fish flesh.

3. Antidegradation and Mixing Zone Policies: These state policies are established to protect, maintain and improve the water quality necessary for all existing and designated uses.

The state's last review of the standards began in 2016, and the changes were adopted in the Summer of 2018. The revised rules received U.S. Environmental Protection Agencies approval on December 2, 2018.

The current review began in 2019 with the North Dakota Department of Environmental Quality (NDDEQ) soliciting comments, concerns, suggested improvements on the current standards. The solicitation was made by publishing a public notice on the NDDEQ webpage and in all North Dakota Daily newspapers beginning on July 12th. Additionally the notice was mailed and emailed to individuals and agencies that had expressed an interest in the past. Copies of the standards could be obtained by writing or calling the department. The public notice was followed with a public hearing on September 17, 2019. Written and oral comments were given fully considered until September 28, 2019.

Afterwards, the NDDEQ began making proposed amendments to the water quality standards. Amendments proposed were based on correcting grammar and punctuation, improving or correcting language, simplifying tables, and updating numeric criteria as required under the CWA. Founded on the past two plus years of review and public comments the department is proposing the following amendments to the standards.

Summary of Proposed Changes to the Standards

1. **33.1-16-02.1-05. Variances and Compliance schedules:**

    - Correct spelling of the word exceedance.

2. **Water Quality Criteria:**

    - Add the word "None" in the Cas No. Column when no Cas Number exist for the criteria.

    - Update the Ammonia Criteria in Table 1, to reflect Clean Water Act, Section 304(a) Criteria Recommendations for the protection of aquatic life.

    - Removed from Table 1 the Site-Specific Ammonia Criteria applied to the Red River of the North beginning at 12th Avenue North bridge in Fargo and continuing north approximately 32 miles to meet the Clean Water Act, Section 304(a) Criteria Recommendations for the Protection of Aquatic Life.

    - Updated pH in Table 1 for Class I and IA streams from 7.0-9.0 to 6.5-9.0 to reflect the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life.

    - Adding selenium fish flesh to Table 1. Criteria is applied in a hierarchy process beginning with Egg-Ovary of 15.1, Whole Body of 8.5 and Muscle of 11.1 mg/kg as dry weight. The addition reflects the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life.

    - Changed the example of the hardness dependent criteria for Cadmium, Chromium(III), Copper, Lead, Nickel, Silver, and Zinc from a hardness of 100 mg/l to 400 mg/l to more accurately reflect the hardness in North Dakota waters.

    - Corrected the spelling of the Chromium.

    - Updated the chronic aquatic life Mercury criteria from 0.012 µg/l to 0.88 µg/l total recoverable to reflects the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life.

3. **Discharge of Wastes:**

    - Updated the language in 33.1-16-02.1-11. Discharge of wastes to accurately reflect the process of reporting any spill or discharge of waste that causes or is likely to cause pollution of waters.

4. **APPENDIX I, STREAM CLASSSIFICATION TABLE:**

    - Formatting improvements.

5. **APPENDIX II, LAKE & RESERVOIR CLASSIFICATION TABLE:**

    - Formatting improvements.

6. **APPENDIX III, MIXING ZONE & DILUTION POLICY & PROCEDURES:**

    - Improve a grammar and spelling.

    - Updated language for implementing mixing zone procedures during critical low-flow conditions.

7. **APPENDIX IV, ANTIDEGREDATION PROCEDURES:**

    - Improve a grammar and spelling.

    - Updated language in the review process for Category 3 Waters. Primarily removing reference to Pollution Control Board.

Proposed Changes to the Standards
(Strikeouts are proposed deletions and underlined proposed additions)

Section 33.1-16-02.1-08 page 5 is amended as follows:

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 acceleratedeutrophication 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 ~~exceedences~~ 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.

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

Section 33.1-16-02.1-09, Table 1. Pages 9-12 amended as follows:

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

		~~The one-hour average concentration of total ammonia (expressed as N in mg/l) does not exceed, more often than once every three years on the average, the numerical value given by the following formula:~~ $\frac{0.411}{1+10^{7.204-pH}}+\frac{58.4}{1+10^{pH-7.204}}$ ~~where salmonids are absent; or~~ $\frac{0.275}{1+10^{7.204-pH}}+\frac{0.275}{1+10^{pH-7.204}}$ ~~where salmonids are present.~~ **Chronic Standard** ~~The 30-day average concentration of total ammonia (expressed as N in mg/l) does not exceed, more often than once every three years on the average, the numerical value given by the following formula; and the highest 4-day average concentration of total ammonia within the 30-day averaging period does not exceed 2.5 times the numerical value given by the following formula:~~ $(CV)\left(\frac{0.0577}{1+10^{7.688-pH}}\right)+\left(\frac{2.487}{1+10^{pH-7.688}}\right)$ ~~Where cv =2.85, when temperatures (T) is ≤ 14°C~~ ~~Or~~ ~~Where:~~ $(CV)=1.45^{10^{0.028(25-T)}}$ ~~When T > 14°C~~

~~**Site-Specific Chronic Standard**~~

~~The following site-specific standard applies to the Red River of the North beginning at the 12th Avenue North bridge in Fargo, North Dakota, and extending approximately 32 miles downstream to its confluence with the Buffalo River, Minnesota. This site-specific standard applies only during the months of October, November, December, January, and February. During the months of March through September, the statewide chronic ammonia standard applies.~~

~~The 30-day average concentration of total ammonia (expressed as N in mg/l) does not exceed, more often than once every three years on the average, the numerical value given by the following formula; and the highest 4-day average concentration of total ammonia within the 30-day averaging period does not exceed 2.5 times the numerical value given by the following formula:~~

$$\cancel{(CV)\left(\frac{0.0577}{1+10^{7.688-pH}}\right)+\left(\frac{2.487}{1+10^{pH-7.688}}\right)}$$

~~Where cv = 4.63, when T≤ 7° C; or~~

~~Where:~~

$$\cancel{(CV)=1.45^{10^{0.028(25-T)}}}$$

~~When T > 7°C~~

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:

$$0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{7.204-pH}}\right)\times MIN(51.93,23.12\times10^{0.036x(20-T)})$$

Where Oncorhynchus are absent; or

$$MIN\left(\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39.0}{1+10^{7.204-pH}}\right),\left(0.7249\times\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{7.204-pH}}\right)\times\left(23.12\times10^{0.036x(20-T)}\right)\right)\right)$$

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:

$$0.7249\times\left(\frac{0.0278}{1+10^{7.688-pH}}+\frac{1.1.994}{1+10^{pH-7.688}}\right)\times(2.126\times10^{0.028\times(20-max(T,7))})$$

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.

None	E. coli[3] (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:** ~~7.0~~ 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 to10% 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[4] Flesh (a)	**Egg-Overy:** 15.1 mg/kg Dry Weight **Whole Body:** 8.5 mg/kg Dry Weight **Muscle:** 11.2 mg/kg Dry Weight
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 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.

[3] 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

[4] When fish egg/ovary concentrations are measured, the values supersede any whole-body, and muscle. Fish egg/ovary, whole body or muscle measurements supersede any water column element. Water column values in Table 2 are the applicable criterion in the absence of fish tissue measurements including waters where fish have

been extirpated or where physical habitat and/or flow regime cannot sustain fish populations, or in waters with new discharges of selenium where steady state has not been achieved between water and fish tissue at the site.

33.1-16-02.1-09, Pages 13-17, Table 2.

CAS No.	Pollutant (Elements)	Acute	Chronic	Classes I, IA, II[2]	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	~~1.87~~ 7.38[6,15]	~~0.72~~ 2.39[6,15]	5[7]	
16065-83-1	Chromium (III)	~~1,805~~,611.70[6,15]	~~86~~268.22[6,15]	100(total)[7]	
18540-29-9	Chromium (VI)	16	11	100(total)[7]	
7440-50-8	Copper	~~14.05~~1.68[6,15,16]	~~9.3~~30.50[6,15,16]	1000	
7782-41-4	Fluoride			4,000[7]	
7439-92-1	Lead	~~81.82~~476.82[6]	~~3.2~~ 18.58[6]	15[7]	
7439-97-6	Mercury	1.7	~~0.012~~ 0.88	0.050	0.051
7440-02-0	Nickel	~~470~~1,516.92[6,15]	~~52~~168.54[6,15]	100[7]	4,200
7782-49-2	Selenium	20	5	50[7]	
7440-22-4	Silver	~~3.8~~41.07[6,15]			
7440-28-0	Thallium			0.24	0.47
7440-61-1	Uranium			30[7]	
7440-66-6	Zinc	~~120~~387.83[6,15]	~~120~~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. 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 only and is based on a $CaCO_3$ hardness of ~~100~~ 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

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

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

[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.

Section 33.1-16-02.1-11, page 18, is amended as follows:

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

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 ~~exceedences~~ 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.

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 ~~(701-328-5210) or the North Dakota hazardous materials emergency assistance and spill reporting number~~ by contacting State Radio(1-800-472-2121, or online) and provide all relevant information about the spill. ~~Depending on the severity of the spill or accidental discharge, the department may require t~~The owner or operator is required to:

   a. Take immediate remedial measures;

   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; ~~or~~

   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.
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, page 19-20 is amended as follows:

33.1-16-02.1, Appendix I

~~RIVER BASINS, SUBBASINS, AND TRIBUTARIES~~	~~CLASSIFICATION~~
~~Missouri River, including Lake Sakakawea and Oahe Reservoir~~	~~I~~
~~Yellowstone~~	~~I~~
~~Little Muddy Creek 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~~
~~Bois de Sioux~~	~~I~~
~~Red River~~	~~I~~

~~RIVER BASINS, SUBBASINS, AND TRIBUTARIES~~	~~CLASSIFICATION~~
~~Wild Rice River~~	~~II~~
~~Antelope Creek~~	~~III~~
~~Sheyenne River (except as noted below)~~	~~IA~~
~~Baldhill Creek~~	~~II~~
~~Maple River~~	~~II~~
~~Rush River~~	~~III~~
~~Elm River~~	~~II~~
~~Goose River~~	~~IA~~
~~Turtle River~~	~~II~~
~~Forest River~~	~~II~~

~~North Branch~~	~~III~~
~~Park River~~	~~II~~
~~North Branch~~	~~III~~
~~South Branch~~	~~II~~
~~Middle Branch~~	~~III~~
~~Cart Creek~~	~~III~~
~~Pembina River~~	~~IA~~
~~Tongue River~~	~~II~~

RIVER BASINS, SUBBASINS, ~~AND~~ TRIBUTARIES	CLASSIFICATION
Missouri River, including Lake Sakakawea and Oahe Reservoir	I
Yellowstone	I
Little Muddy Creek 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
Heart River	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

RIVER BASINS, SUBBASINS, AND TRIBUTARIES	CLASSIFICATION
James River	IA
Pipestem	IA
Cottonwood Creek	II
Beaver Creek	II
Elm River	II
Maple River	II
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
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, pages 33-39 is amended as follows:

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. For lakes and other lentic water bodies not listed, the physical and chemical criteria designated for class III streams shall apply.

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
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
COUNTY	LAKE	CLASSIFICATION
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
Gant	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
Kidder	Horsehead Lake	2
Kidder	Lake Isabel	3
Kidder	Lake Josephine	2
Kidder	Lake Williams	3
COUNTY	LAKE	CLASSIFICATION
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

COUNTY	LAKE	CLASSIFICATION
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
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
Rolette	Hooker Lake	2
Rolette	Island Lake	3
Rolette	Jensen Lake	3
Rolette	School Section Lake	2

COUNTY	LAKE	CLASSIFICATION
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
COUNTY	LAKE	CLASSIFICATION
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
Walsh	Homme Dam	3
Walsh	Matejcek Dam	3
Ward	Hiddenwood Lake	3
Ward	Makoti Lake	4
Ward	Makoti Lake	4
COUNTY	LAKE	CLASSIFICATION
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~~
	~~Lake Oahe~~	~~1~~
	~~Lake Sakakawea~~	~~1~~

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
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	Skiermo 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

COUNTY	LAKE	CLASSIFICATION
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
Kidder	Horsehead Lake	2
Kidder	Lake Isabel	3
Kidder	Lake Josephine	2
Kidder	Lake Williams	3
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
LaMoure	Kalmbach Lake	3
LaMoure	Kulm-Edgeley Dam	3
LaMoure	Lake LaMoure	3
LaMoure	Lehr Dam	3
LaMoure	Limesand-Seefeldt Dam	3
LaMoure	Schlecht-Thorn 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

COUNTY	LAKE	CLASSIFICATION
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
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	Whitman Dam	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

COUNTY	LAKE	CLASSIFICATION
Rolette	Gravel Lake	2
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
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

COUNTY	LAKE	CLASSIFICATION
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

Appendix III, page 33-38 is amended as follows:

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 ~~exceedences~~ 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)

Human health (noncarcinogens)

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 condition.

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. Bioaccummulation 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.

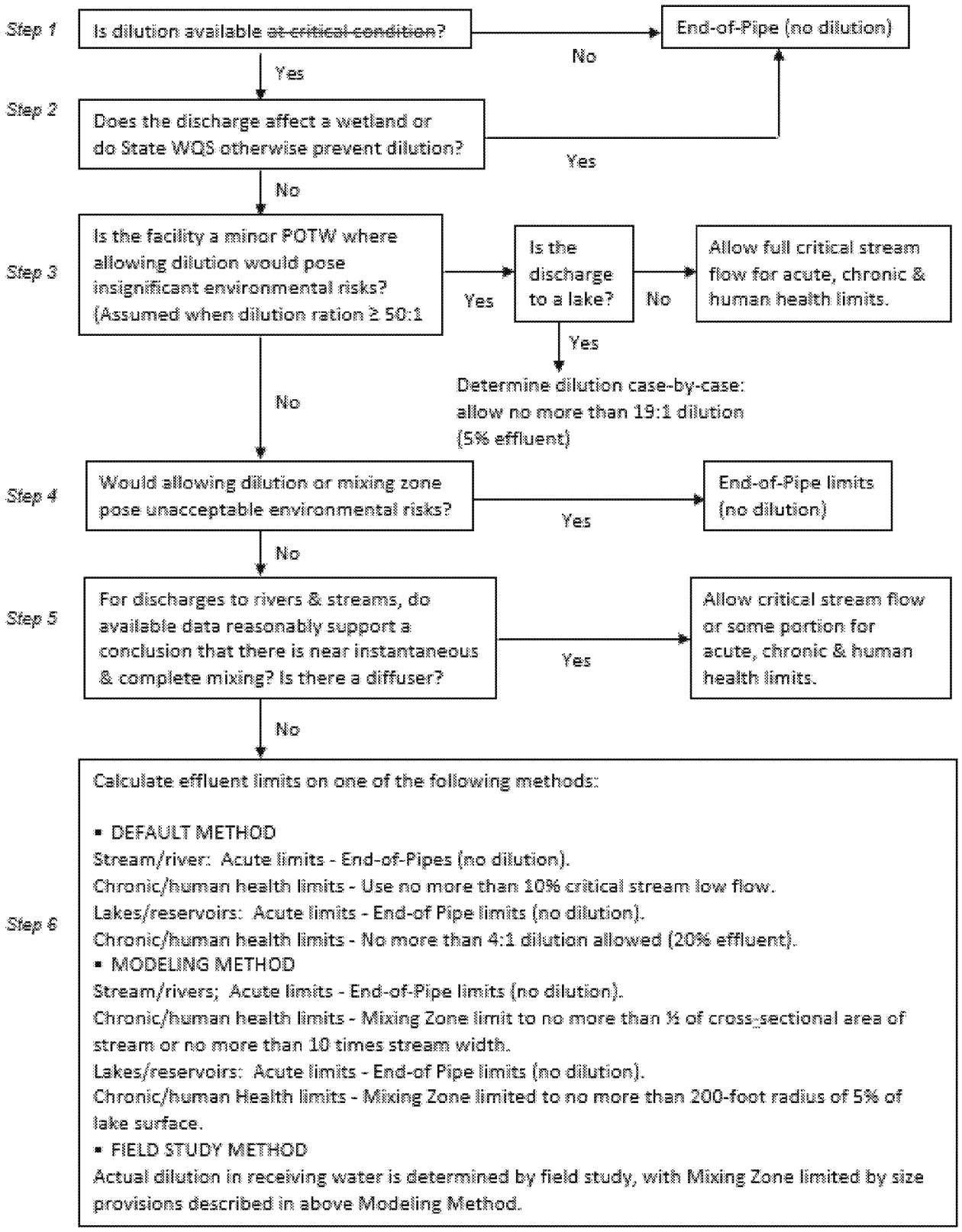
Modeling Method

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 is amended as follows:

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.

Under this implementation procedure, all waters of the state are afforded one 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 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 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 WATER

Existing use means a use that was ~~actually~~ 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 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, II, and III 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; 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 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 water pollution control board,~~ the department, and the state water commission will solicit public comment and/or hold a public hearing regarding the nomination. ~~The water pollution control board will review the application record and the public comments, and make a recommendation to the department.~~ After reviewing the ~~board's recommendation,~~ 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 ~~review~~ 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.

Basis for Revisions to Water Quality Standards

The Clean Water Act (CWA), specifically §303(c)(1), requires states to review their water quality standards at least once every three years. The review requires modifying and adopting as appropriate applicable new scientific and technical information into its Standards of Quality for Waters of the State of North Dakota Administration Code (NDAC) ch. 33-16-02.1 (standards), taking into consideration public concerns and U.S. Environmental Protection Agency (EPA) guidance. The CWA requires states to adopt EPA's Section 304(a) recommended criteria or adopt their own to ensure consistency with the requirements of the CWA.

The NDDEQ could choose to not adopt the recommended criteria. If this occurred, the U.S. Environmental Protection Agency could challenge the state's primacy by establishing and enforcing water quality standards for North Dakota. Also, if NDDEQ choose not to adopt the changes or complete a triennial review, it could face a third party or citizen lawsuit.

1. Water Quality Criteria:

Ammonia: Update the Ammonia Criteria in Table 1, to reflect the CWA, Section 304(a) Criteria Recommendations for the protection of aquatic life.

The department has completed a review of the recommended ammonia criteria as outlined in the publication EPA 822-R-13-001 Aquatic Life Ambient Water Quality Criteria for Ammonia in Freshwater, 2013, and its implication to the state, it's communities and specific waters.

The initial review compared the current acute aquatic life ammonia criteria to EPA's 2013 recommendation. The comparison showed that the new criteria will result in an increase of 3 facilities not meeting the ammonia criteria.

Further review indicates that implementing the proposed ammonia criteria will have substantial by manageable challenges. The regulatory compliance challenges are technical, social and economic. The technical difficulties surround understanding the complex science of ammonia, the probable effectiveness of alternative treatment options and identifying the natural biological communities. The social and economic challenges are primarily, though not limited to, developing a workable strategy that combines the science with applicable and affordable options to achieve compliance particularly for the smaller publicly owned treatment works (POTWs).

The department is confident it can address the deficiencies in technical expertise through state assisted management at no additional cost to the communities. This strategy will address the state's obligation to protect the waters of the state and still be supportive of the rural communities that makeup the backbone of the state.

A short list of tools available in assisting small POTWS, but not limited to, are:

1) Improved overall management of the lagoon option
2) Timing
3) Mixing Zone
4) Compliance Zones

Removal of Site-Specific Ammonia Criteria: Proposing to remove from Table 1 the Site-Specific Ammonia Criteria applied to the Red River of the North, beginning at 12th Avenue North bridge in Fargo and continuing north approximately 32 miles and replace with CWA, Section 304(a) Criteria Recommendations for the Protection of Aquatic Life.

Updating pH: Updated pH range in Table 1 for Class I and IA streams from 7.0-9.0 to 6.5-9.0 to reflect the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life.

Selenium: Adding selenium fish flesh to Table 1. Criteria is applied in a hierarchy process beginning with Egg-Ovary of 15.1 mg/kg, Whole Body of 8.5 mg/kg and Muscle of 11.1 mg/kg as dry weight to reflect the CWA Section 304(a) Recommended criteria for the Protection of Aquatic Life.

The EPA recommendations translates the fish flesh data into water concentrations criteria for lentic (lakes) and lotic (streams). The department has determined the translation from flesh concentrations of selenium to water is not appropriate for the state and does not propose changing the water concentration criteria for lakes and streams.

Not implementing a change in the water concentration criteria for selenium took into account the following rationale: (1) Aquatic life is protected using Egg-Ovary, Whole Body and Muscle criteria, (2) North Dakota selenium concentrations in fish flesh are less than half the proposed criteria, (3) biological accumulation of selenium in flesh is not occurring, and (4) comparisons of water column to fish flesh selenium concentrations show no statistically significant relationship.

Selenium concentrations in 529 fish tissue samples collected from North Dakota lakes were less than half the Clean Water Act, section 403(a) recommended criteria for fish muscle in lentic systems of 11.3 mg/kg/dw. Selenium concentrations in 529 fish fillet samples ranged from 0.056 mg/kg/dw to 4.53 mg/kg/dw. The results provide reasonable confidence that continuation of research into an appropriate state specific concentration for water (Lentic and Lotic) will not place the beneficial use Aquatic Life as risk.

Ancillary decision-making processes includes: (1) Maintaining credibility with the citizens of North Dakota and the regulated community, (2) historical difficulties in amending criteria once it has been adopted, and (3) a lack of known dischargers/generators of selenium in the state.

In short, the reasoning for adopting the EPA recommended fish flesh criteria for selenium: Based on the departments review, the Egg-Ovary accurately identifies impairment to aquatic life (fish) and that there is a clear linkage to Whole Body and Muscle.

In short, the Reasoning for not adopting of the EPA lentic and lotic water concentration selenium criterion: (1) North Dakota lake and fish flesh (skin on fillet) data does not support a linkage between water column selenium concentrations or accumulation of selenium in fish flesh, (2) the linkage between water quality concentrations, ingestion, and biological accumulations and expression is complex and not explained by greater concentrations in the water, and (3) fish in North Dakota are not in jeopardy from high selenium concentrations in muscle.

Continuation of selenium criteria evaluation for adoption or development of state specific water quality criteria with include restarting the state's fish flesh monitoring program. The restart will include a study design that will identify the relationship between water column concentration of selenium and fish flesh in North Dakota lakes and streams.

Selenium Detail: EPA finalized and published updated criterion for selenium per the CWA section 304(a) in 2016. The 2016 version reflects the latest scientific knowledge, which indicates that selenium toxicity to aquatic life is primarily based on organisms consuming selenium contaminated food rather than exposer to selenium in water (EPA 822-R-16-006, June 2018). The final criterion is expressed both in terms of fish tissue concentration (egg/ovary, whole body, muscle) and water concentration (lentic, lotic). North Dakota agrees with EPA's finding on fish tissue and proposes to amend the state's Standards of Quality for Waters of the State for fish flesh. North Dakota has determined there is enough contradictory results in the state specific data to question the recommended water concentration (lentic and lotic) and proposes to continue with development of state specific criterion and not risk writing an inappropriate standard for North Dakota.

The decision to not adopt the recommended water lentic and lotic water concentration is data driven. The decision involves researching current concentration in fish flesh, bioaccumulation and the relationship between selenium concentrations in 529 fish tissue samples to average lake water concentrations of selenium. The fish flesh samples come from 31 discrete lakes. The majority come from Lake Darling, Lake Tewaukon, Lake Ilo, Lake Oahe, Lake Sakakawea, and Devils Lake with 132, 81, 59, 59, 45 and 24 fish samples, respectively. There were 15 species of fish sampled. Species most commonly represented in the data are northern pike, walleye, yellow perch, and channel catfish dominating the date at 186, 183, 44, and 26, respectively. The department looked at the levels of selenium in fish flesh, the bioaccumulation by species in lakes and the relationship between the concentration of selenium in fish tissue flesh and selenium concentrations in the water.

Fish Flesh Concentrations: Selenium concentrations in 529 fish fillet (skin on) samples ranged from 0.056 to 4.53 mg/kg/dw. The median concentration is 1.36 mg/kg/dw, the average is 1.408 mg/kg/dw and the standard deviation was 0.847. No fish were above the 304(a) recommended concentration for muscle of 11.3 mg/kg/dw.

Biological Accumulation: Bioaccumulation of selenium was not found. Length of fish was used as an age indictor in individual waters for the bioaccumulation investigations (Table 1). Biological accumulation was assumed if selenium concentrations increased with length.

Thirteen comparisons of selenium flesh concentration and length were completed. The relationship between species length and flesh concentration were weakly correlated, randomly distributed and as or more likely to produce a downward trend in selenium concentrations as the species of fish grew as an increase (Figures 1 & 2) (Table 1).

Table 1. Results of selenium bioaccumulation investigation.

Lake	Species	N	R^2	P-Value	Trend
Lake Darling	Walleye	67	0.089	0.014	Increasing
Lake Darling	Northern Pike	37	0.030	0.304	Decreasing
Lake Darling	Yellow Perch	25	0.003	0.782	Decreasing
Devils Lake	Walleye	12	0.245	0.102	Decreasing
Lake Oahe	Channel Catfish	14	0.000	0.977	Increasing
Lake Sakakawea	Walleye	17	0.398	0.007	Decreasing
Lake Sakakawea	Northern Pike	6	0.199	0.503	Decreasing
Lake Sakakawea	Channel Catfish	12	0.018	0.679	Increasing
Lake Tewaukon	Walleye	36	0.027	0.335	Decreasing
Lake Tewaukon	Northern Pike	33	0.124	0.044	Decreasing
Lake Ilo	Northern Pike	51	0.003	0.711	Decreasing
Sprague Lake	Walleye	29	0.039	0.304	Increasing
Sprague Lake	Northern Pike	42	0.014	0.463	Decreasing

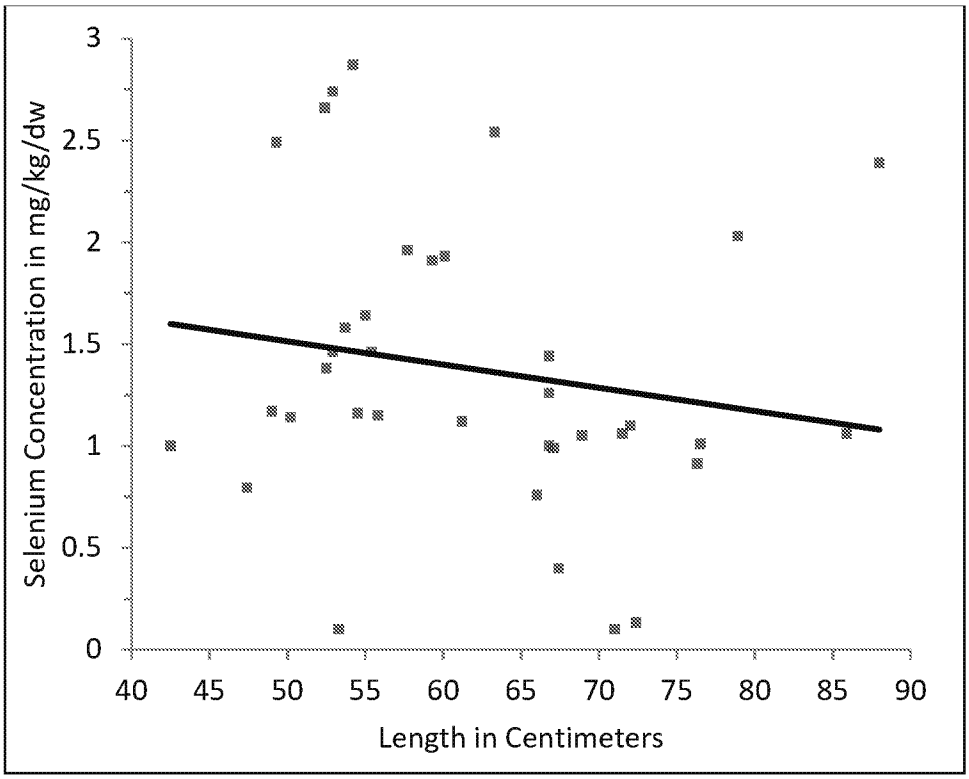


Figure 1. Lake Darling Se in Northern Pike/Length. R-Square of 0.030.

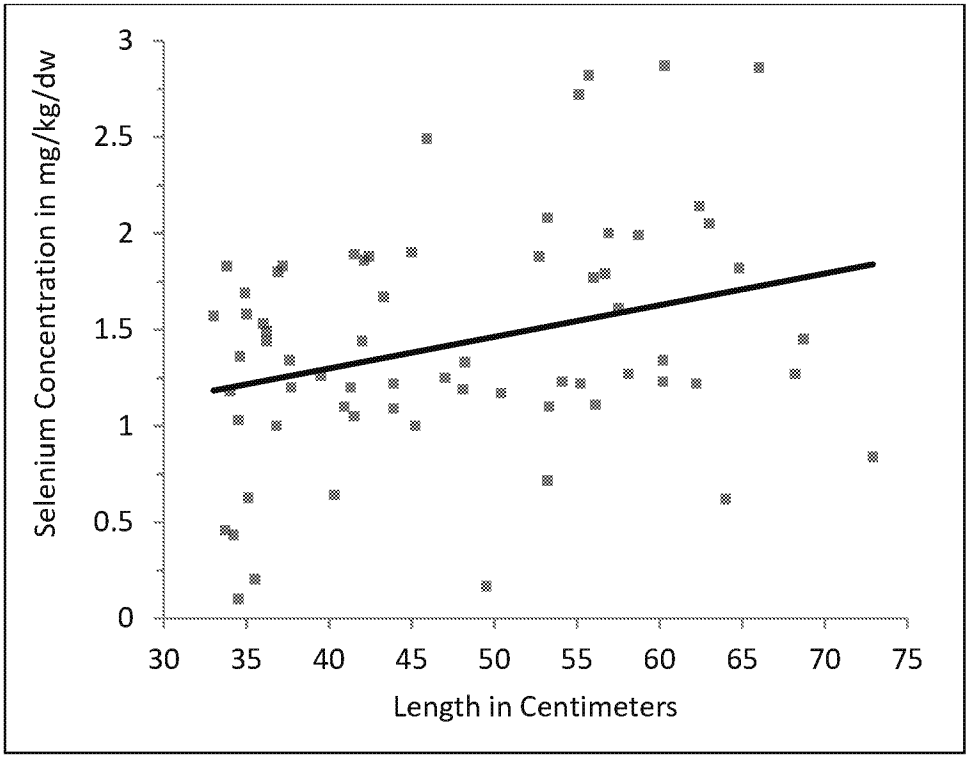


Figure 2. Lake Darling Se in Walleye/Length. R-Square of 0.089.

The investigation of bioaccumulation of selenium is inconclusive, but suggestive that selenium in flesh reduces as fish become larger. Of the 22 bioaccumulation investigations, 9 or 69% declined as fish became larger.

Only two of the relationships are significant. The two significant relationships (p=0.0066) and (p=0.044) are walleye in Lake Sakakawea and northern pike Lake Tewaukon, respectively. Both species experience steep declines in selenium concentrations as the fish become larger, which is the opposite of what would be expected if fish were accumulating selenium from the water column (Table 1) (Figures 3 & 4).

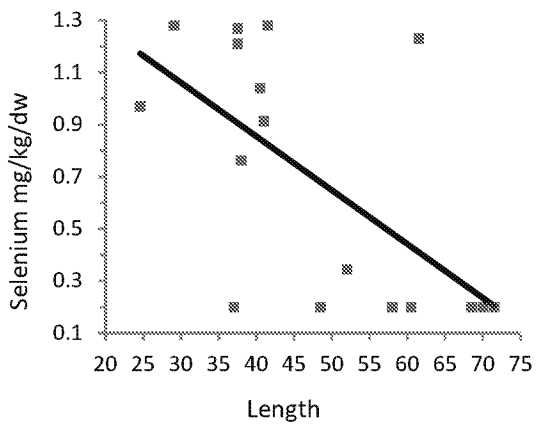


Figure 3. Walleye from Lake Sakakawea Selenium/Length.

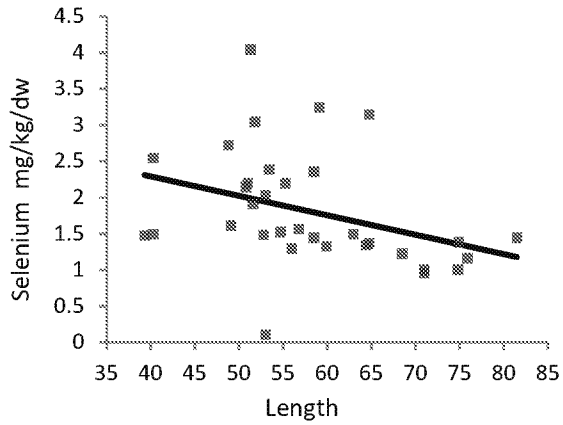


Figure 4: Northern Pike from Lake Tewaukon Selenium/Length.

The analysis provides confidence that the fish of North Dakota do not have an abundance of selenium in their flesh and are not accumulating selenium. In retrospect, the results are not surprising as ingestion, not adsorption, is the mode of selenium accumulation (EPA 822-R-16-006, June 2018).

<u>Selenium Fish Flesh and Water Concentration:</u> Comparing the concentration of selenium in fish flesh to lake water concentrations is complicated. Of the 6,613 selenium lake samples 4,314 (65%) are less then detection and the lower detection limit was a moving target ranging from 1.0 to 10 µg/l. All fish flesh samples had reportable concentrations of selenium. To overcome the water quality challenges, multiple comparisons were run looking for significant results.

The preliminary investigations compared the average and maximum water selenium concentrations to fish flesh samples collected from matching water bodies. Result of the preliminary comparison using the average water concentrations are conflicting but significant (Table 2). Comparing the average selenium concentration in lake water to all fish samples shows an increasing trend while comparing the maximum water concentration to fish flesh had a decreasing trend (Figures 3 & 4), (Table 2).

These initial results are heavily influenced by just a few water bodies. To reduce the influence of select water bodies, selenium fish flesh concentrations are averaged by species and compared. The result from this analysis yielded weak relationships (R^2 of 0.006 and 0.001) with insignificant trend (p-values of 0.228 and 0.841). These results are heavily influenced by the large number of non-detections in water that were assigned a 1.0 µg/l.

Attempt to address the large number of non-detections, all non-detections were removed from the data set and the analysis rerun. This investigation yielded no substantial change from the results (Table 2).

Table 2. Results of selenium in water to selenium in flesh investigation

Water Quality	Fish Type	N	R^2	P-Value	Trend
Average	All	529	0.011	0.018	Increasing
Maximum	All	529	0.007	0.053	Decreasing
Average	Average by Species	76	0.006	0.228	Increasing
Maximum	Average by Species	76	0.001	0.841	Increasing
Average	Average by species[1]	45	0.010	0.509	Increasing
Maximum	Average by species[1]	45	0.001	0.872	Decreasing
Average	Bottom Feeder	19	0.001	0.936	Decreasing
Maximum	Bottom Feeder	19	0.001	0.917	Increasing
Average	Insectivore	27	0.074	0.169	Increasing
Maximum	Insectivore	27	0.001	0.906	Increasing
Average	Predator	30	0.004	0.745	Increasing
Maximum	Predator	30	0.019	0.466	Increasing

[1]Less than the detection limit water quality results removed

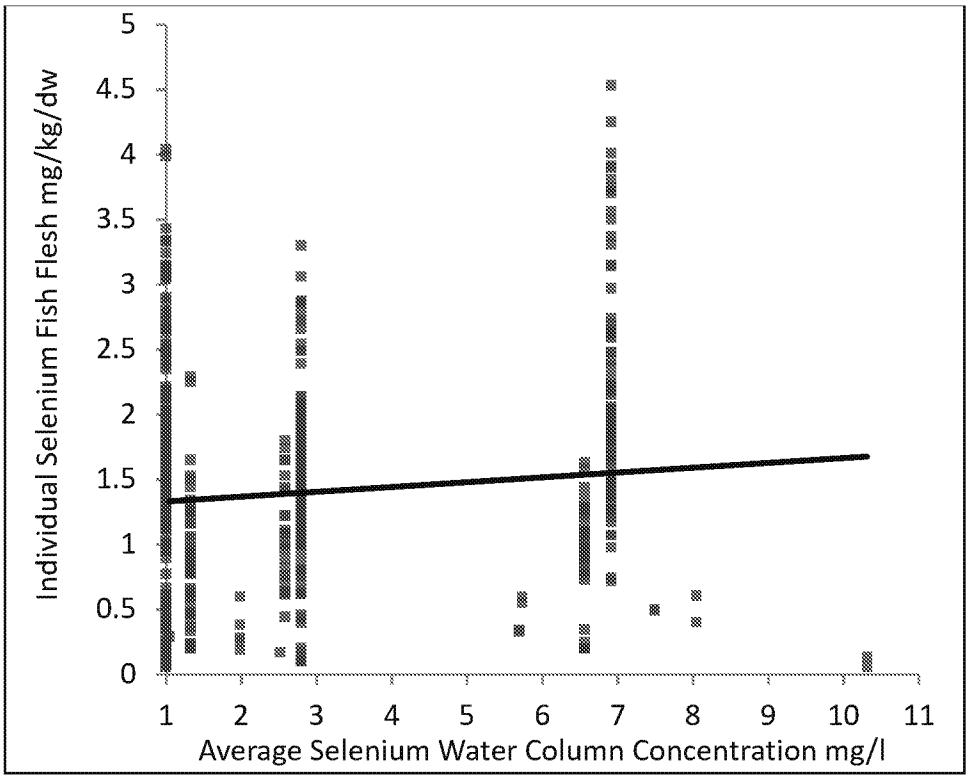


Figure 3. All 529 fish flesh samples compared to average water quality from lake of origin.

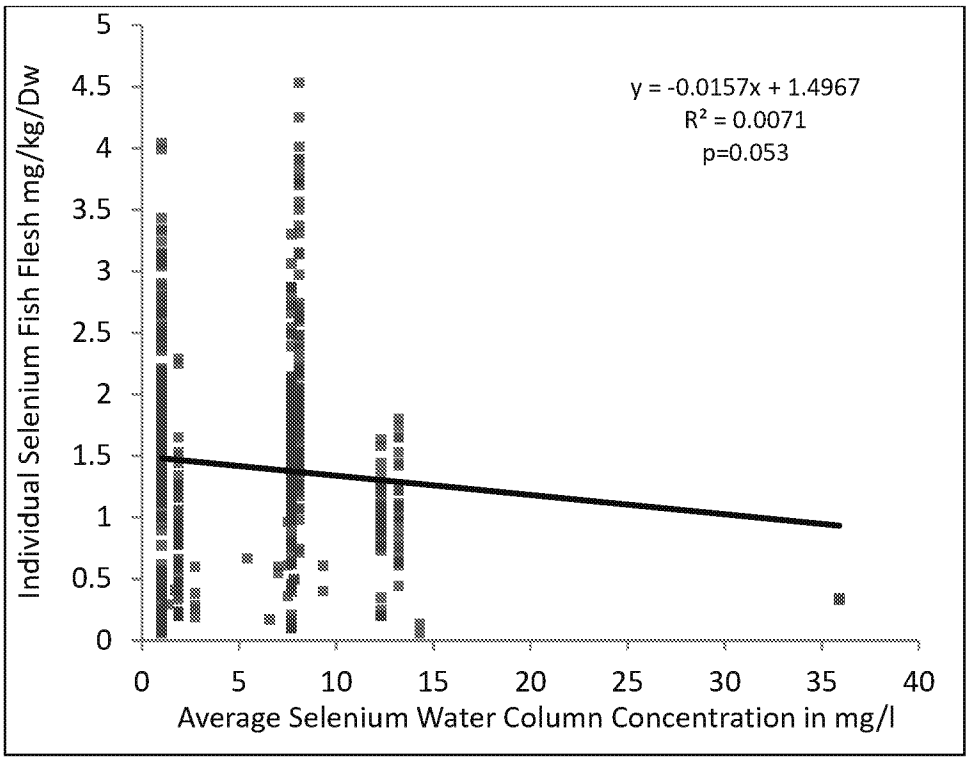


Figure 4. All 529 fish flesh samples compared to maximum water quality from lake of origin.

Comparing the average selenium concentration by species to the average and maximum water concentrations provided insignificant (p-value range of 0.228 – 0.906) and weakly correlated (R^2 values of 0.001 – 0.010) the comparisons which resulted in both increasing and decreasing trends in concentrations of flesh with increasing concentrations in the water body (Table 2).

Since selenium is accumulated through ingestion (EPA 822-R-16-006, June 2018) there might be a difference in uptake and accumulation of based on feeding type. To investigate that, the fish flesh data was subdivided into three groups based on feeding habits. The three feeding groups represented are: Bottom feeders, Insectivores, and Predators. Correlation analysis was run on all three groups using the average selenium concentrations of each fish species compared to the average and maximum water concentrations from the lake of origin. All results follow a similar path of being insignificant (p-value range of 0.169 – 0.936) and weakly correlated (R^2 values of 0.001 – 0.074) with 5 of the 6 comparisons trending towards an increase in flesh concentration with an increase in water concentrations (Table 2).

Conclusions of Selenium Investigations

1) North Dakota Aquatic Life is fully supporting based on selenium concentrations in flesh.
    a. The highest concentration reported was less than half (4.53 mg/kg/dw) the recommended criteria for fish muscle (11.3 mg/kg/dw). The state recognizes that skin on fillets is not the same as muscle, however, the department determined that double the concentration is a significant safety factor which is protective of our fish populations.
2) Bioaccumulation was not identified.
3) Correlations between water and fish flesh concentrations of selenium are poorly correlated and statistically insignificant.
4) North Dakota study design is deficient:
    a. Lower detection for selenium concentrations in water not sensitive enough.
    b. Muscle sample had skin attached.
    c. No stream fish flesh data.
    d. Fish species are a minor representation of total taxa.
    e. No whole fish data included.
    f. No ovary or egg data included.
5) Current data is needed.
6) It is prudent to adopt egg/ovary, whole body, and as a measure of safety muscle selenium criteria for the protection of aquatic life.
7) It is prudent to restart selenium fish flesh investigations.

Hardness Dependent Example in Table 2: Changed the example of the hardness dependent criteria for Cadmium, Chromium(III), Copper, Lead, Nickel, Silver, and Zinc from a hardness of 100 mg/l to 400 mg/l. The change from 100mg/l of hardness to 400 mg/l was initiated to more accurately reflect the hardness present in North Dakota waters.

Updated Chronic Aquatic Life Mercury Criteria: Updated the chronic aquatic life mercury criteria to reflects the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life. Change is from 0.012 µg/l to 0.88 µg/l total recoverable.

Human health is protected by two methods: (1) North Dakota's fish consumption advisory, and (2) The EPA approved criteria for water of 0.050 µg/l for class I, IA and II streams and 0.051 µg/l in class III streams.

The consumption advisory is based on EPA's methylmercury reference dose of oral exposures. It is expressed as meals/month for the various groups: Children under 6, Pregnant/nursing women, Children over 6 & under 15, and all other women & men and from generic lakes and fish species and where data is available specific lakes and fish species. The advisory may be found at: https://deq.nd.gov/publications/WQ/3_WM/FishAdvisory.pdf

Updated Language: Updated the language in NDAC 33.1-16-02.1-11. Discharge of wastes to accurately reflect the process of reporting any spill or discharge of waste that causes or is likely to cause pollution of waters.

Update APPENDIX I, STREAM CLASSSIFICATION TABLE: Formatting improvements. Current format is confusing if not misleading. Proposed format should clearly define which watershed the stream~~s~~ belongs in.

Update APPENDIX II, LAKE & RESERVOIR CLASSIFICATION TABLE: Formatting improvements. Simply placing boarders on the table to improve ease of reading.

Update APPENDIX III, MIXING ZONE & DILUTION POLICY & PROCEDURES: Updated language for implementing mixing zone procedures during critical low-flow conditions.

Update APPENDIX IV, ANTIDEGREDATION PROCEDURES: Updated language in the review process for Category 3 Waters by removing reference to Pollution Control Board.

REGULATORY ANALYSIS PURSUANT TO
NORTH DAKOTA CENTURY CODE 28-32-08
TO AMEND NORTH DAKOTA ADMINSTRATIVE CODE CHAPTER 33.1-16-02.1
STANDARDS OF QUALITY OF WATERS OF THE STATE

Classes of People Probably Affected

The proposed amendments to the Standards of Quality for Waters of the State have the potential to affect new industries, existing industries, and municipalities.

Probable Impact

Updating the aquatic life criteria for ammonia to reflects the CWA Section 304(a) Criteria Recommendation. New and existing industries or municipalities that are currently struggling to meet the current criteria or plan to significantly increase discharges will potentially be affected with the new aquatic life standards for the ammonia. The potential is considered manageable through compliance assistance provided by the NDDEQ and physical upgrades to systems.

Compliance Assistance
5) Improved overall management of the lagoon option
6) Timing
7) Mixing Zone
8) Compliance Schedules
9) Loans

Updating the options for reporting discharges or spills that are or have the potential to harm waters of the state, and adding the requirement that the owner or operator will upon request provides documents, reports or other relevant information on the spill will puts into language to the current process. The addition of accepting online reporting is anticipated to decrease time between spill and reporting, decrease expenses, and improve communication.

The updates to pH criteria in Table 1 for Class I and IA streams from 7.0-9.0 to 6.5-9.0 to reflect the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life. There is no anticipated impact to the regulated community.

Adding selenium fish flesh criteria to Table 1 is to protect the fertility of fish. It is based on sound science and reflects the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life. There is no anticipated impact to the regulated community.

Updating the chronic aquatic life Mercury criteria from 0.012 µg/l to 0.88 µg/l total recoverable to reflects the CWA Section 304(a) Criteria Recommendation for the Protection of Aquatic Life. There is no anticipated impact to the regulated community.

Other changes are editorial corrections or clarifications.

Economic Impact

Other than the proposed ammonia criteria, there is no anticipated economic impact to point source dischargers and other regulated entities. The proposed ammonia criterium, is likely to affect point source dischargers that are currently in violation and possibly those that are struggling to remain in compliance. The largest impact will be to the amount of management, planning and coordination required.

Cost to Agency and Effect on State Revenues

Additional staff time required to implement and enforce the changes to the rules will be minimal.

Alternative Methods Considered

The NDDEQ could choose to not adopt the changes. If this occurred, the U.S. Environmental Protection Agency could establish water quality standards for North Dakota and enforce them or the agency could be sued by a third party.

Data Assessments

Regulatory analysis for numeric criteria (mercury, selenium, pH, ammonia) is based on a comparison of the current criteria to the proposed. It assumes a steady state condition for all dischargers (no increases or decreases from current conditions). This comparison shows that there will be no change for the regulated community for mercury and selenium, an increase in compliance for pH, and a decrease in compliance for ammonia by three facilities. The data used to assess regulatory impact from spill reporting compliance is subjective. It is based on a belief that most operator/owners will prefer/find it easier to report online using either a text, email, or website. The addition of adding a requirement to supply documents, reports and other relevant information is placing into rule what the NDDEQ generally requests when addressing pollution spills and releases.

TAKINGS ASSESSMENT PURSUANT TO
NORTH DAKOTA CENTURY CODE 28-32-09
TO AMEND NORTH DAKOTA ADMINSTRATIVE CODE CHAPTER 33.1-16-02.1
STANDARDS OF QUALITY OF WATERS OF THE STATE

Assessment

The proposed rules update the Standards for Quality for Waters of the State to be consistent with the Federal Clean Water Act and the federal rules promulgated thereunder. The proposed rules will not limit the use of a landowner's private real property and will therefore not result in a regulatory taking.

Purpose

The purpose of the proposed rules is to update the state water quality standards

Alternative

No alternative is available. The NDDEQ is required to update the state's water quality standards every three years under the federal Clean Water Act.

Potential Costs

There will be no additional costs since the comparable federal rules are already in place.

Cost Benefit

Since there will be no cost associated with the rules, any benefits achieved will exceed the costs.

SMALL ENTITY ECONOMIC IMPACT STATEMENT PURSUANT TO NORTH DAKOTA CENTURY CODE 28-32-08.1 TO AMEND NORTH DAKOTA ADMINSTRATIVE CODE CHAPTER 33.1-16-02.1 STANDARDS OF QUALITY OF WATERS OF THE STATE

The following statement is prepared to comply with the requirements for changes to the North Dakota Administrative Code (D.D.A.C.) Chapter 33.1-16-02.1, Standards of Quality for Water of the State (standards). Under N.D.C.C. § 28-32-08.1 rules required by federal law do not require a small entity regulatory analysis, however, the North Dakota Department of Environmental Quality (NDDEQ) chooses to do so anyway.

The small entity economic impact state examines the economic impact from proposed rules on small entities. The small entity economic impact statement must contain the following:

1. Which small entities may be subject to the proposed rule:
   All entities defined as small in N.D.C.C. § 28-32-08.1 that discharge wastes to waters of the state and all small entities that have the potential to spill pollutants to waters of the state.

2. Administrative or other cost will be required for small entities to comply with the propose rule:
   The NDDEQ has review the recommended ammonia criteria as outlined in the publication EPA 822-R-13-001 Aquatic Life Ambient Water Quality Criteria for Ammonia in Freshwater, 2013, and its implication to the state, it's communities and specific waters.

   The review compared the current acute aquatic life Ammonia criteria to EPA newer recommendation and has reached the conclusion that it will not result in an overwhelming increase in criteria violations. Of the general permits evaluated those that are struggling with the current criteria most will continue.

   Based on the NDDEQ's review, implementing the proposed ammonia criteria poses substantial but manageable regulatory compliance challenges. The regulatory compliance challenges are primarily technical. The technical difficulties surround understanding the complex science of ammonia, the probable effectiveness of alternative treatment options and identifying the natural biological communities. There are economic challenges as well. These are primarily, though not limited to, developing a workable strategy that combines the science with applicable and affordable options to achieve compliance for the smaller publicly owned treatment works (POTWs).

   There are 258 smaller POTWs in rural North Dakota. They are often isolated by 20 miles or more, ranging in population served from 15 to 2411, with a median population of 219. The average resident served is 52 years old with more than 30 percent of residents over 65 years old. The lack of population, coupled with a large

percentage of retirement age residents, make any regulatory solution limited in both expertise and funding.

The NDDEQ is confident it can address the deficiencies in technical expertise through state assisted management at no or very small additional costs to the communities. This strategy will address the state's obligation to protect the waters of the state and still be supportive of the rural small towns that makeup the backbone of the state.

A short list of tools available in assisting small POTWS are:

10) Improved overall management of the lagoon option
11) Timing
12) Mixing Zone
13) Compliance schedules

All other proposed changes to the rule are not expected to have any economic impact on small entities.

3. Probable cost and benefit to private persons and consumers who may be effected by the proposal:
   If an entity were to increase discharging of waste containing ammonia, it is probably that an increased cost in operation or construction will be incurred to address the additional pollution. This cost would be passed onto the consumer.

4. Probably effect of the proposed rules on State revenue:
   No effect on state revenues are anticipated.

5. Are there less intrusive or costly ways of achieving the proposed rule's purpose:
   The NDDEQ has spent considerable time investigating and strategizing ways to minimize the economic impact of the rules to all citizens and have found none.

SMALL ENTITY REGULATORY ANALYSIS PURSUANT TO NORTH DAKOTA CENTURY CODE 28-32-08.1 TO AMEND NORTH DAKOTA ADMINSTRATIVE CODE CHAPTER 33.1-16-02.1 STANDARDS OF QUALITY OF WATERS OF THE STATE

The following analysis is prepared to comply with the requirements for changes to the North Dakota Administrative Code (N.D.A.C.) Chapter 33.1-16-02.1, Standards of Quality for Water of the State (standards). Under N.D.C.C. § 28-32-08.1 rules required by federal law do not require a small entity regulatory analysis, however, the North Dakota Department of Environmental Quality (NDDEQ) chooses to do so anyway.

The small entity regulatory analysis considers each of the possible ways the NDDEQ can enact rules that minimize the adverse impact on small entities by:

6. Establishing less stringent compliance or reporting requirements,
7. Establishing less stringent schedules of deadlines for compliance or reporting requirements,
8. Consolidating or simplifying compliance or reporting requirements,
9. Establishing performance standards that replace design or operational standards required in the proposed rule, and
10. Exempting from all or part of the rule's requirement.

Pollution/Spill Reporting: Less stringent compliance, reporting, or exempting of reporting requirements of pollution spills was not considered as the requirement is not difficult or time consuming and pollution releases need to be addressed rapidly. There is no cost to report and the report can be made by phone or online. Online reporting is anticipated to reduce the amount of time and effort required to report.

Ammonia Criteria: Less stringent criteria or exempting of criteria for small entities reporting requirements of pollution spills was not considered as: (1) the criteria protects the beneficial use aquatic life for all citizens, and (2) under the federal Clean Water Act (CWA) the NDDEQ is required to update the state's water quality standards every three years with the most current federally recommended criteria or develop criteria of our own that is as or more protective. Note that the NDDEQ could choose to not adopt the ammonia criteria. If this occurred, the U.S. Environmental Protection Agency (EPA) could establish water quality standards for North Dakota and enforce them or the agency could be sued by a third party.

In 2013 the EPA published updated ammonia criterium. The updated criterium, is based on the latest science for the protection of freshwater aquatic life and is applied evenly to all entities. It is more stringent than the current criteria.

The potential regulatory implications to small entities was recognized by the NDDEQ in 2012. Based on reviewing historical permitted discharge records, the impact will be felt by small communities primarily in how they manage lagoon discharges into waters of the state.

To assist small entities a list of tools to mitigate the regulatory impact has been identified. The least difficult of these involves improved lagoon management and the addition of mixing zones. Other options include physical improvements to lagoons and site-specific criteria. The NDDEQ will continue to provide small communities with technical assistance to help soften the regulatory impact.

Other Amendments: Other amendments are not anticipated to have regulatory impact on small entities.

FISCAL NOTE PURSUANT TO
NORTH DAKOTA CENTURY CODE SECTION 28-32-08.2
TO AMEND NORTH DAKOTA ADMINISTRATIVE CODE CHAPTER 33.1-16-02.1
STANDARDS OF QUALITY FOR WATERS OF THE STATE

BACKGROUND

North Dakota Century Code (N.D.C.C.) §28-32-08.2, requires the North Dakota Department of Environmental Quality (NDDEQ) to provide the Administrative Rules Committee with a fiscal note reflecting the effect of the rule changes on state revenues and expenditures, including any effect on funds controlled by the agency, or a statement that the rules have no fiscal effect.

COST TO AGENCY AND EFFECT ON STATE REVENUES

It is anticipated that there will be no significant fiscal cost to the agency to implement and enforce proposed amendments. The proposed amendments will require no additional staff. The amendments will require a small amount of additional time to implement. The additional time will be absorbed without adding staff, increasing management duties or employee training. No fiscal effect.