

567—61.3 (455B) Surface water quality criteria.

61.3(1) Surface water classification. All waters of the state are classified for protection of beneficial uses. These classified waters include general use segments and designated use segments.

a. General use segments. These are intermittent watercourses and those watercourses which typically flow only for short periods of time following precipitation and whose channels are normally above the water table. These waters do not support a viable aquatic community during low flow and do not maintain pooled conditions during periods of no flow.

The general use segments are to be protected for livestock and wildlife watering, aquatic life, noncontact recreation, crop irrigation, and industrial, agricultural, domestic and other incidental water withdrawal uses.

b. Designated use segments. These are water bodies which maintain flow throughout the year or contain sufficient pooled areas during intermittent flow periods to maintain a viable aquatic community.

All perennial rivers and streams as identified by the U.S. Geological Survey 1:100,000 DLG Hydrography Data Map (published July 1993) or intermittent streams with perennial pools in Iowa not specifically listed in the surface water classification of 61.3(5) are designated as Class B(WW-1) waters.

All perennial rivers and streams as identified by the U.S. Geological Survey 1:100,000 DLG Hydrography Data Map (published July 1993) or intermittent streams with perennial pools in Iowa are designated as Class A1 waters.

Designated uses of segments may change based on a use attainability analysis consistent with 61.2(5)“e.” Designated use changes will be specifically listed in the surface water classification of 61.3(5).

Designated use waters are to be protected for all uses of general use segments in addition to the specific uses assigned. Designated use segments include:

(1) Primary contact recreational use (Class “A1”). Waters in which recreational or other uses may result in prolonged and direct contact with the water, involving considerable risk of ingesting water in quantities sufficient to pose a health hazard. Such activities would include, but not be limited to, swimming, diving, water skiing, and water contact recreational canoeing.

(2) Secondary contact recreational use (Class “A2”). Waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity.

(3) Children’s recreational use (Class “A3”). Waters in which recreational uses by children are common. Class A3 waters are water bodies having definite banks and bed with visible evidence of the flow or occurrence of water. This type of use would primarily occur in urban or residential areas.

(4) Cold water aquatic life—Type 1 (Class “B(CW1)”). Waters in which the temperature and flow are suitable for the maintenance of a variety of cold water species, including reproducing and nonreproducing populations of trout (*Salmonidae* family) and associated aquatic communities.

(5) Cold water aquatic life—Type 2 (Class “B(CW2)”). Waters that include small, channeled streams, headwaters, and spring runs that possess natural cold water attributes of temperature and flow. These waters usually do not support consistent populations of trout (*Salmonidae* family), but may support associated vertebrate and invertebrate organisms.

(6) High quality water (Class “HQ”). Waters with exceptionally better quality than the levels specified in Tables 1, 2 and 3 and with exceptional recreational and ecological importance. Special protection is warranted to maintain the unusual, unique or outstanding physical, chemical, or biological characteristics which these waters possess.

(7) High quality resource water (Class “HQR”). Waters of substantial recreational or ecological significance which possess unusual, outstanding or unique physical, chemical, or biological characteristics which enhance the beneficial uses and warrant special protection.

(8) Warm water—Type 1 (Class “B(WW-1)”). Waters in which temperature, flow and other habitat characteristics are suitable to maintain warm water game fish populations along with a resident aquatic community that includes a variety of native nongame fish and invertebrate species. These waters generally include border rivers, large interior rivers, and the lower segments of medium-size tributary streams.

(9) Warm water—Type 2 (Class “B(WW-2)”). Waters in which flow or other physical characteristics are capable of supporting a resident aquatic community that includes a variety of native nongame fish and invertebrate species. The flow and other physical characteristics limit the maintenance of warm water game fish populations. These waters generally consist of small perennially flowing streams.

(10) Warm water—Type 3 (Class “B(WW-3)”). Waters in which flow persists during periods when antecedent soil moisture and groundwater discharge levels are adequate; however, aquatic habitat typically consists of nonflowing pools during dry periods of the year. These waters generally include small streams of marginally perennial aquatic habitat status. Such waters support a limited variety of native fish and invertebrate species that are adapted to survive in relatively harsh aquatic conditions.

(11) Lakes and wetlands (Class “B(LW)”). These are artificial and natural impoundments with hydraulic retention times and other physical and chemical characteristics suitable to maintain a balanced community normally associated with lake-like conditions.

(12) Human health (Class “HH”). Waters in which fish are routinely harvested for human consumption or waters both designated as a drinking water supply and in which fish are routinely harvested for human consumption.

(13) Drinking water supply (Class “C”). Waters which are used as a raw water source of potable water supply.

61.3(2) General water quality criteria. The following criteria are applicable to all surface waters including general use and designated use waters, at all places and at all times for the uses described in 61.3(1) “a.”

a. Such waters shall be free from substances attributable to point source wastewater discharges that will settle to form sludge deposits.

b. Such waters shall be free from floating debris, oil, grease, scum and other floating materials attributable to wastewater discharges or agricultural practices in amounts sufficient to create a nuisance.

c. Such waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor or other aesthetically objectionable conditions.

d. Such waters shall be free from substances attributable to wastewater discharges or agricultural practices in concentrations or combinations which are acutely toxic to human, animal, or plant life.

e. Such waters shall be free from substances, attributable to wastewater discharges or agricultural practices, in quantities which would produce undesirable or nuisance aquatic life.

f. The turbidity of the receiving water shall not be increased by more than 25 Nephelometric turbidity units by any point source discharge.

g. Cations and anions guideline values to protect livestock watering may be found in the “Supporting Document for Iowa Water Quality Management Plans,” Chapter IV, July 1976, as revised on November 11, 2009.

h. The *Escherichia coli* (*E. coli*) content of water which enters a sinkhole or losing stream segment, regardless of the water body’s designated use, shall not exceed a Geometric Mean value of 126 organisms/100 ml or a sample maximum value of 235 organisms/100 ml. No new wastewater discharges will be allowed on watercourses which directly or indirectly enter sinkholes or losing stream segments.

61.3(3) Specific water quality criteria.

a. Class “A” waters. Waters which are designated as Class “A1,” “A2,” or “A3” in subrule 61.3(5) are to be protected for primary contact, secondary contact, and children’s recreational uses. The general criteria of subrule 61.3(2) and the following specific criteria apply to all Class “A” waters.

(1) The Escherichia coli (E. coli) content shall not exceed the levels noted in the Bacteria Criteria Table when the Class “A1,” “A2,” or “A3” uses can reasonably be expected to occur.

Bacteria Criteria Table (organisms/100 ml of water)

Use	Geometric Mean	Sample Maximum
Class A1		
3/15 – 11/15	126	235
11/16 – 3/14	Does not apply	Does not apply
Class A2 (Only)		
3/15 – 11/15	630	2880
11/16 – 3/14	Does not apply	Does not apply
Class A2 and B(CW) or HQ		
Year-Round	630	2880
Class A3		
3/15 – 11/15	126	235
11/16 – 3/14	Does not apply	Does not apply

Class A1 - Primary Contact Recreational Use, Class A2 - Secondary Contact Recreational Use, Class A3 - Children’s Recreational Use

When a water body is designated for more than one of the recreational uses, the most stringent criteria for the appropriate season shall apply.

(2) The pH shall not be less than 6.5 nor greater than 9.0. The maximum change permitted as a result of a waste discharge shall not exceed 0.5 pH units.

b. Class “B” waters. All waters which are designated as Class B(CW1), B(CW2), B(WW-1), B(WW-2), B(WW-3) or B(LW) are to be protected for wildlife, fish, aquatic, and semiaquatic life. The following criteria shall apply to all Class “B” waters designated in subrule 61.3(5).

(1) Dissolved oxygen. Dissolved oxygen shall not be less than the values shown in Table 2 of this subrule.

(2) pH. The pH shall not be less than 6.5 nor greater than 9.0. The maximum change permitted as a result of a waste discharge shall not exceed 0.5 pH units.

(3) General chemical constituents. The specific numerical criteria shown in Tables 1, 2, and 3 of this subrule apply to all waters designated in subrule 61.3(5). The sole determinant of compliance with these criteria will be established by the department on a case-by-case basis. Effluent monitoring or instream monitoring, or both, will be the required approach to determine compliance.

1. The acute criteria represent the level of protection necessary to prevent acute toxicity to aquatic life. Instream concentrations above the acute criteria will be allowed only within the boundaries of the zone of initial dilution.

2. The chronic criteria represent the level of protection necessary to prevent chronic toxicity to aquatic life. Excursions above the chronic criteria will be allowed only inside of mixing zones or only for short-term periods outside of mixing zones; however, these excursions cannot exceed the acute criteria shown in Tables 1 and 3. The chronic criteria will be met as short-term average conditions at all times

the flow equals or exceeds either the design flows noted in subrule 61.2(5) or any site-specific low flow established under the provisions of subrule 61.2(5).

3. Rescinded IAB 2/15/06, effective 3/22/06.

(4) Rescinded IAB 2/15/06, effective 3/22/06.

(5) Temperature.

1. No heat shall be added to interior streams or the Big Sioux River that would cause an increase of more than 3°C. The rate of temperature change shall not exceed 1°C per hour. In no case shall heat be added in excess of that amount that would raise the stream temperature above 32°C.

2. No heat shall be added to streams designated as cold water fisheries that would cause an increase of more than 2°C. The rate of temperature change shall not exceed 1°C per hour. In no case shall heat be added in excess of that amount that would raise the stream temperature above 20°C.

3. No heat shall be added to lakes and reservoirs that would cause an increase of more than 2°C. The rate of temperature change shall not exceed 1°C per hour. In no case shall heat be added in excess of that amount that would raise the temperature of the lake or reservoirs above 32°C.

4. No heat shall be added to the Missouri River that would cause an increase of more than 3°C. The rate of temperature change shall not exceed 1°C per hour. In no case shall heat be added that would raise the stream temperature above 32°C.

5. No heat shall be added to the Mississippi River that would cause an increase of more than 3°C. The rate of temperature change shall not exceed 1°C per hour. In addition, the water temperature at representative locations in the Mississippi River shall not exceed the maximum limits in the table below during more than 1 percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature at such locations exceed the maximum limits in the table below by more than 2°C.

Zone II—Iowa-Minnesota state line to the northern Illinois border (Mile Point 1534.6).

Zone III—Northern Illinois border (Mile Point 1534.6) to Iowa-Missouri state line.

Month	Zone II	Zone III
January	4°C	7°C
February	4°C	7°C
March	12°C	14°C
April	18°C	20°C
May	24°C	26°C
June	29°C	29°C
July	29°C	30°C
August	29°C	30°C
September	28°C	29°C
October	23°C	24°C
November	14°C	18°C
December	9°C	11°C

(6) Early life stage for each use designation. The following seasons will be used in applying the early life stage present chronic criteria noted in Table 3b, "Chronic Criterion for Ammonia in Iowa Streams - Early Life Stages Present."

1. For all Class B(CW1) waters, the early life stage will be year-round.
2. For all Class B(CW2) waters, the early life stage will begin on April 1 and last through September 30.
3. For all Class B(WW-1) waters, the early life stage will begin in March and last through September, except as follows:
 - For the following, the early life stage will begin in February and last through September:
 - The entire length of the Mississippi and Missouri Rivers,
 - The lower reach of the Des Moines River south of the Ottumwa dam, and
 - The lower reach of the Iowa River below the Cedar River.
 - For the following, the early life stage will begin in April and last through September:
 - All Class B(WW-1) waters in the Southern Iowa River Basin,
 - All of the Class B(WW-1) reach of the Skunk River, the North Skunk River and the South Skunk River south of Indian Creek (Jasper County), and the Class B(WW-1) tributaries to these reaches, and the entire Class B(WW-1) reach of the English River.
4. For all Class B(WW-2) and Class B(WW-3) waters, the early life stage will begin in April and last through September.
5. For all Class B(LW) lake and wetland waters, the early life stage will begin in March and last through September except for the Class B(LW) waters in the southern two tiers of Iowa counties which will have the early life stage of April through September.

c. Class "C" waters. Waters which are designated as Class "C" are to be protected as a raw water source of potable water supply. The following criteria shall apply to all Class "C" waters designated in subrule 61.3(5).

- (1) Radioactive substances.
 1. The combined radium-226 and radium-228 shall not exceed 5 picocuries per liter at the point of withdrawal.
 2. Gross alpha particle activity (including radium-226 but excluding radon and uranium) shall not exceed 15 picocuries per liter at the point of withdrawal.
 3. The average annual concentration at the point of withdrawal of beta particle and photon radioactivity from man-made radionuclides other than tritium and strontium-90 shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year.
 4. The average annual concentration of tritium shall not exceed 20,000 picocuries per liter at the point of withdrawal; the average annual concentration of strontium-90 shall not exceed 8 picocuries per liter at the point of withdrawal.
- (2) All substances toxic or detrimental to humans or detrimental to treatment process shall be limited to nontoxic or nondetrimental concentrations in the surface water.
- (3) The pH shall not be less than 6.5 nor greater than 9.0.

d. Class "HH" waters. Waters which are designated as Class HH shall contain no substances in concentrations which will make fish or shellfish inedible due to undesirable tastes or cause a hazard to humans after consumption.

(1) The human health criteria represent the level of protection necessary, in the case of noncarcinogens, to prevent adverse health effects in humans and, in the case of carcinogens, to prevent a level of incremental cancer risk not exceeding 1 in 100,000. Instream concentrations in excess of the human health criteria will be allowed only within the boundaries of the mixing zone.

- (2) Reserved.

Parameter		Use Designations							C	HH
		B(CW1)	B(CW2)	B(WW-1)	B(WW-2)	B(WW-3)	B(LW)			
Carbofuran	MCL	—	—	—	—	—	—	—	40	—
Carbon Tetrachloride	Human Health — F & W	—	—	—	—	—	—	—	—	2.3 ^(f)
	Human Health — Fish	—	—	—	—	—	—	—	—	16 ^(e)
Chlordane	Chronic	.004	—	.0043	.0043	.0043	.004	—	—	—
	Acute	2.5	—	2.4	2.4	2.4	2.5	—	—	—
	Human Health — Fish	—	—	—	—	—	—	—	—	.0081 ^(e)
	Human Health — F & W	—	—	—	—	—	—	—	—	.008 ^(f)
Chloride	Chronic	389(m)*	389(m)*	389(m)*	389(m)*	389(m)*	389(m)*	—	—	—
	Acute	629(m)*	629(m)*	629(m)*	629(m)*	629(m)*	629(m)*	—	—	—
	MCL	—	—	—	—	—	—	—	250*	—
Chlorobenzene	Human Health + — Fish	—	—	—	—	—	—	—	—	1.6* ^(e)
	Human Health + — F & W	—	—	—	—	—	—	—	—	130 ^(f)
	MCL	—	—	—	—	—	—	—	100	—
Chlorodibromomethane	Human Health — F & W	—	—	—	—	—	—	—	—	4.0 ^(f)
	Human Health — Fish	—	—	—	—	—	—	—	—	130 ^(e)
Chloroform	Human Health — F & W	—	—	—	—	—	—	—	—	57 ^(f)
	Human Health — Fish	—	—	—	—	—	—	—	—	4700 ^(e)
Chloropyrifos	Chronic	.041	—	.041	.041	.041	.041	—	—	—
	Acute	.083	—	.083	.083	.083	.083	—	—	—
Chromium (VI)	Chronic	40	—	11	11	11	10	—	—	—
	Acute	60	—	16	16	16	15	—	—	—
	Human Health + — Fish	—	—	—	—	—	—	—	—	3365 ^(e)
	MCL	—	—	—	—	—	—	—	100	—
Copper	Chronic	20	—	16.9 ⁽ⁱ⁾	16.9 ⁽ⁱ⁾	16.9 ⁽ⁱ⁾	10	—	—	—
	Acute	30	—	26.9 ⁽ⁱ⁾	26.9 ⁽ⁱ⁾	26.9 ⁽ⁱ⁾	20	—	—	—
	Human Health + — Fish	—	—	—	—	—	—	—	—	1000 ^(e)
	Human Health + — F & W	—	—	—	—	—	—	—	—	1300 ^(f)
Cyanide	Chronic	5	—	5.2	5.2	5.2	10	—	—	—
	Acute	20	—	22	22	22	45	—	—	—
	Human Health + — F & W	—	—	—	—	—	—	—	—	140 ^(f)
	Human Health — Fish	—	—	—	—	—	—	—	—	140 ^(e)
Dalapon	MCL	—	—	—	—	—	—	—	200	—
Dibromochloropropane	MCL	—	—	—	—	—	—	—	.2	—
4,4-DDT ++	Chronic	.001	—	.001	.001	.001	.001	—	—	—
	Acute	.9	—	1.1	1.1	1.1	.55	—	—	—
	Human Health — Fish	—	—	—	—	—	—	—	—	.0022 ^(e)

Parameter		Use Designations							C	HH
		B(CW1)	B(CW2)	B(WW-1)	B(WW-2)	B(WW-3)	B(LW)			
Endrin	Chronic	.05	—	.036	.036	.036	.036	—	—	
	Acute	.12	—	.086	.086	.086	.086	—	—	
	Human Health + — Fish	—	—	—	—	—	—	—	.06 ^(e)	
	Human Health + — F & W	—	—	—	—	—	—	—	.059 ^(f)	
Ethylbenzene	Human Health + — F & W	—	—	—	—	—	—	—	530 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	2100 ^(e)	
Ethylene dibromide	MCL	—	—	—	—	—	—	.05	—	
Di(2-ethylhexyl)adipate	MCL	—	—	—	—	—	—	400	—	
bis(2-ethylhexyl)phthalate	Human Health — F & W	—	—	—	—	—	—	—	12 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	22 ^(e)	
Fluoride	MCL	—	—	—	—	—	—	4000	—	
Glyphosate	MCL	—	—	—	—	—	—	700	—	
Heptachlor	Chronic	.0038	—	.0038	.0038	.0038	.0038	—	—	
	Acute	.38	—	.52	.52	.52	.38	—	—	
	Human Health — Fish	—	—	—	—	—	—	—	.00079 ^(e)	
	Human Health — F & W	—	—	—	—	—	—	—	.00079 ^(f)	
Heptachlor epoxide	Chronic	.0038	—	.0038	.0038	.0038	.0038	—	—	
	Acute	.52	—	.52	.52	.52	.52	—	—	
	Human Health — F & W	—	—	—	—	—	—	—	.00039 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	.00039 ^(e)	
Hexachlorobenzene	Human Health — F & W	—	—	—	—	—	—	—	.0028 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	.0029 ^(e)	
Hexachlorocyclopentadiene	Human Health — F & W	—	—	—	—	—	—	—	40 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	1100 ^(e)	
Lead	Chronic	3	—	7.7 ^(f)	7.7 ^(f)	7.7 ^(f)	3	—	—	
	Acute	80	—	197 ^(f)	197 ^(f)	197 ^(f)	80	—	—	
	MCL	—	—	—	—	—	—	50	—	
gamma-BHC (Lindane)	Chronic	N/A	—	N/A	N/A	N/A	N/A	—	—	
	Acute	.95	—	.95	.95	.95	.95	—	—	
	Human Health + — Fish	—	—	—	—	—	—	—	1.8 ^(e)	
	Human Health + — F & W	—	—	—	—	—	—	—	.98 ^(f)	
Mercury (II)	Chronic	3.5	—	.9	.9	.9	.91	—	—	
	Acute	6.5	—	1.64	1.64	1.64	1.7	—	—	
	Human Health + — Fish	—	—	—	—	—	—	—	.15 ^(e)	
	Human Health + — F & W	—	—	—	—	—	—	—	.05 ^(f)	
Methoxychlor	Human Health + — F & W	—	—	—	—	—	—	—	100 ^(f)	

Parameter		Use Designations							C	HH
		B(CW1)	B(CW2)	B(WW-1)	B(WW-2)	B(WW-3)	B(LW)			
Simazine	MCL	—	—	—	—	—	—	4	—	
Styrene	MCL	—	—	—	—	—	—	100	—	
Tetrachlorethylene	Human Health — F & W	—	—	—	—	—	—	—	6.9 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	33 ^(e)	
Thallium	Human Health + — F & W	—	—	—	—	—	—	—	.24 ^(f)	
	Human Health + — Fish	—	—	—	—	—	—	—	.47 ^(e)	
Toluene	Chronic	50	—	50	150	150	50	—	—	
	Acute	2500	—	2500	7500	7500	2500	—	—	
	Human Health + — Fish	—	—	—	—	—	—	—	15* ^(e)	
	Human Health + — F & W	—	—	—	—	—	—	—	1300 ^(f)	
Total Residual Chlorine (TRC)	Chronic	10	—	11	11	11	10	—	—	
	Acute	35	—	19	19	19	20	—	—	
Toxaphene	Chronic	.037	—	.002	.002	.002	.037	—	—	
	Acute	.73	—	.73	.73	.73	.73	—	—	
	Human Health — Fish	—	—	—	—	—	—	—	.0028 ^(e)	
	Human Health — F & W	—	—	—	—	—	—	—	.0028 ^(f)	
1,2,4-Trichlorobenzene	MCL	—	—	—	—	—	—	70	—	
1,1,1-Trichlorethane	MCL	—	—	—	—	—	—	200	—	
	Human Health + — Fish	—	—	—	—	—	—	—	173* ^(e)	
1,1,2-Trichloroethane	Human Health — F & W	—	—	—	—	—	—	—	6 ^(f)	
Trichloroethylene (TCE)	Chronic	80	—	80	80	80	80	—	—	
	Acute	4000	—	4000	4000	4000	4000	—	—	
	Human Health — Fish	—	—	—	—	—	—	—	300 ^(e)	
	Human Health — F & W	—	—	—	—	—	—	—	25 ^(f)	
Trihalomethanes (total) ^(e)	MCL	—	—	—	—	—	—	80	—	
Vinyl Chloride	Human Health — F & W	—	—	—	—	—	—	—	.25 ^(f)	
	Human Health — Fish	—	—	—	—	—	—	—	.24 ^(e)	
Xylenes (Total)	MCL	—	—	—	—	—	—	10*	—	
Zinc	Chronic	200	—	215 ^(f)	215 ^(f)	215 ^(f)	100	—	—	
	Acute	220	—	215 ^(f)	215 ^(f)	215 ^(f)	110	—	—	
	Human Health + — Fish	—	—	—	—	—	—	—	26* ^(e)	
	Human Health + — F & W	—	—	—	—	—	—	—	7.4* ^(f)	

- * units expressed as milligrams/liter
- ** to include the sum of known and suspected carcinogenic PAHs (includes benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene)
- † expressed as nanograms/liter
- + represents the noncarcinogenic human health parameters
- ++ The concentrations of 4,4-DDT or its metabolites; 4,4-DDE and 4,4-DDD, individually shall not exceed the human health criteria.
- (a) units expressed as million fibers/liter (longer than 10 micrometers)
- (b) includes alpha-endosulfan, beta-endosulfan, and endosulfan sulfate in combination or as individually measured
- (c) The sum of the four trihalomethanes (bromoform [tribromomethane], chlorodibromomethane, chloroform [trichloromethane], and dichlorobromomethane) may not exceed the MCL.
- (d) Class B numerical criteria for pentachlorophenol are a function of pH using the equation: Criterion (µg/l) = $e^{[1.005(\text{pH}) - x]}$, where $e = 2.71828$ and x varies according to the following table:

	B(CW1)	B(CW2)	B(WW-1)	B(WW-2)	B(WW-3)	B(LW)
Acute	3.869	—	4.869	4.869	4.869	4.869
Chronic	4.134	—	5.134	5.134	5.134	5.134

- (e) This Class HH criterion would be applicable to any Class B(LW), B(CW1), B(WW-1), B(WW-2), or B(WW-3) water body that is also designated Class HH.
- (f) This Class HH criterion would be applicable to any Class C water body that is also designated Class HH.
- (g) inorganic form only
- (h) Class B(WW-1), B(WW-2), and B(WW-3) criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)). Numerical criteria (µg/l) for cadmium are a function of hardness (as CaCO₃ (mg/l)) using the equation for each use according to the following table:

	B(WW-1)	B(WW-2)	B(WW-3)
Acute	$e^{[1.0166\text{Ln}(\text{Hardness}) - 3.924]}$	$e^{[1.0166\text{Ln}(\text{Hardness}) - 3.924]}$	$e^{[1.0166\text{Ln}(\text{Hardness}) - 3.924]}$
Chronic	$e^{[0.7409\text{Ln}(\text{Hardness}) - 4.719]}$	$e^{[0.7409\text{Ln}(\text{Hardness}) - 4.719]}$	$e^{[0.7409\text{Ln}(\text{Hardness}) - 4.719]}$

- (i) Class B(WW-1), B(WW-2), and B(WW-3) criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)). Numerical criteria (µg/l) for copper are a function of hardness (CaCO₃ (mg/l)) using the equation for each use according to the following table:

	B(WW-1)	B(WW-2)	B(WW-3)
Acute	$e^{[0.9422\text{Ln}(\text{Hardness}) - 1.700]}$	$e^{[0.9422\text{Ln}(\text{Hardness}) - 1.700]}$	$e^{[0.9422\text{Ln}(\text{Hardness}) - 1.700]}$
Chronic	$e^{[0.8545\text{Ln}(\text{Hardness}) - 1.702]}$	$e^{[0.8545\text{Ln}(\text{Hardness}) - 1.702]}$	$e^{[0.8545\text{Ln}(\text{Hardness}) - 1.702]}$

- (j) Class B(WW-1), B(WW-2), and B(WW-3) criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)). Numerical criteria (µg/l) for lead are a function of hardness (CaCO₃ (mg/l)) using the equation for each use according to the following table:

	B(WW-1)	B(WW-2)	B(WW-3)
Acute	$e^{[1.2731\text{Ln}(\text{Hardness}) - 1.46]}$	$e^{[1.2731\text{Ln}(\text{Hardness}) - 1.46]}$	$e^{[1.2731\text{Ln}(\text{Hardness}) - 1.46]}$
Chronic	$e^{[1.2731\text{Ln}(\text{Hardness}) - 4.705]}$	$e^{[1.2731\text{Ln}(\text{Hardness}) - 4.705]}$	$e^{[1.2731\text{Ln}(\text{Hardness}) - 4.705]}$

(k) Class B(WW-1), B(WW-2), and B(WW-3) criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)). Numerical criteria (µg/l) for nickel are a function of hardness (CaCO₃ (mg/l)) using the equation for each use according to the following table:

	B(WW-1)	B(WW-2)	B(WW-3)
Acute	$e^{[0.846\text{Ln}(\text{Hardness}) + 2.255]}$	$e^{[0.846\text{Ln}(\text{Hardness}) + 2.255]}$	$e^{[0.846\text{Ln}(\text{Hardness}) + 2.255]}$
Chronic	$e^{[0.846\text{Ln}(\text{Hardness}) + 0.0584]}$	$e^{[0.846\text{Ln}(\text{Hardness}) + 0.0584]}$	$e^{[0.846\text{Ln}(\text{Hardness}) + 0.0584]}$

(l) Class B(WW-1), B(WW-2), and B(WW-3) criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)). Numerical criteria (µg/l) for zinc are a function of hardness (CaCO₃ (mg/l)) using the equation for each use according to the following table:

	B(WW-1)	B(WW-2)	B(WW-3)
Acute	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$
Chronic	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$	$e^{[0.8473\text{Ln}(\text{Hardness}) + 0.884]}$

(m) Acute and chronic criteria listed in main table are based on a hardness of 200 mg/l (as CaCO₃ (mg/l)) and a sulfate concentration of 63 mg/l. Numerical criteria (µg/l) for chloride are a function of hardness (CaCO₃ (mg/l)) and sulfate (mg/l) using the equation for each use according to the following table:

	B(CW1), B(CW2), B(WW-1), B(WW-2), B(WW-3), B(LW)
Acute	$287.8(\text{Hardness})^{0.205797}(\text{Sulfate})^{-0.07452}$
Chronic	$177.87(\text{Hardness})^{0.205797}(\text{Sulfate})^{-0.07452}$

TABLE 2. Criteria for Dissolved Oxygen

(all values expressed in milligrams per liter)

	B(CW1)	B(CW2)	B(WW-1)	B(WW-2)	B(WW-3)	B(LW)
Minimum value for at least 16 hours of every 24-hour period	7.0	7.0	5.0	5.0	5.0	5.0*
Minimum value at any time during every 24-hour period	5.0	5.0	5.0	4.0	4.0	5.0*

*applies only to the upper layer of stratification in lakes

TABLE 3a. Acute Criterion for Ammonia in Iowa Streams

Acute Criterion, mg/l as N (or Criterion Maximum Concentration, CMC)		
pH	Class B(WW-1), B(WW-2), B(WW-3) & B(LW)	Class B(CW1) & B(CW2)
6.5	48.8	32.6
6.6	46.8	31.3
6.7	44.6	29.8
6.8	42.0	28.0
6.9	39.1	26.1
7.0	36.1	24.1
7.1	32.8	21.9
7.2	29.5	19.7
7.3	26.2	17.5
7.4	23.0	15.3
7.5	19.9	13.3
7.6	17.0	11.4
7.7	14.4	9.64
7.8	12.1	8.11
7.9	10.1	6.77
8.0	8.40	5.62
8.1	6.95	4.64
8.2	5.72	3.83
8.3	4.71	3.15
8.4	3.88	2.59
8.5	3.20	2.14
8.6	2.65	1.77
8.7	2.20	1.47
8.8	1.84	1.23
8.9	1.56	1.04
9.0	1.32	0.885

TABLE 3b. Chronic Criterion for Ammonia in Iowa Streams - Early Life Stages Present

Chronic Criterion - Early Life Stages Present, mg/l as N (or Criterion Continuous Concentration, CCC)										
pH	Temperature, °C									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32

Chronic Criterion - Early Life Stages Present, mg/l as N (or Criterion Continuous Concentration, CCC)										
pH	Temperature, °C									
	0	14	16	18	20	22	24	26	28	30
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.8	2.8	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

TABLE 3c. Chronic Criterion for Ammonia in Iowa Streams - Early Life Stages Absent

Chronic Criterion - Early Life Stages Absent, mg/l as N (or Criterion Continuous Concentration, CCC)										
pH	Temperature, °C									
	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25

Chronic Criterion - Early Life Stages Absent, mg/l as N (or Criterion Continuous Concentration, CCC)										
pH	Temperature, °C									
	0-7	8	9	10	11	12	13	14	15*	16*
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.99
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

*At 15°C and above, the criterion for fish early life stage (ELS) absent is the same as the criterion for fish ELS present.

TABLE 4. Aquatic Life Criteria for Sulfate for Class B Waters

(all values expressed in milligrams per liter)

Hardness mg/l as CaCO ₃	Chloride		
	Cl ⁻ < 5 mg/l	5 ≤ Cl ⁻ < 25	25 ≤ Cl ⁻ ≤ 500
H < 100 mg/l	500	500	500
100 ≤ H ≤ 500	500	$[-57.478 + 5.79$ (hardness) + 54.163 (chloride)] × 0.65	$[1276.7 + 5.508$ (hardness) - 1.457 (chloride)] × 0.65
H > 500	500	2,000	2,000

61.3(4) *Class "C" waters.* Rescinded IAB 4/18/90, effective 5/23/90.

61.3(5) *Surface water classification.* The department hereby incorporates by reference "Surface Water Classification," effective November 11, 2009. This document may be obtained on the department's Web site at <http://www.iowadnr.com/water/standards/index.html>.

61.3(6) *Cold water use designation assessment protocol.* The department hereby incorporates by reference "Cold Water Use Designation Assessment Protocol," effective December 15, 2004. This document may be obtained on the department's Web site at <http://www.iowadnr.com/water/standards/index.html>.

61.3(7) *Warm water stream use assessment and attainability analysis protocol.* The department hereby incorporates by reference "Warm Water Stream Use Assessment and Attainability Analysis Protocol," effective March 22, 2006. This document may be obtained on the departments Web site at <http://www.iowadnr.com/water/standards/index.html>.

61.3(8) *Recreational use assessment and attainability analysis protocol.* The department hereby incorporates by reference "Recreational Use Assessment and Attainability Analysis Protocol," effective March 19, 2008. This document may be obtained on the department's Web site.

This rule is intended to implement Iowa Code chapter 455B, division I, and division III, part 1.

[**ARC 8039B**, IAB 8/12/09, effective 9/16/09; **ARC 8214B**, IAB 10/7/09, effective 11/11/09; **ARC 8226B**, IAB 10/7/09, effective 11/11/09]