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SALUS POPULI SUPREMA LEX ESTO

*“The welfare of the people shall be the supreme law.”*



ROBIN CARNAHAN  
SECRETARY OF STATE

MISSOURI  
REGISTER

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January 2, 2009 January 16, 2009	<b>February 3, 2009</b> <b>February 17, 2009</b>	February 28, 2009 February 28, 2009	March 30, 2009 March 30, 2009
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June 1, 2009 June 15, 2009	<b>July 1, 2009</b> <b>July 15, 2009</b>	July 31, 2009 July 31, 2009	August 30, 2009 August 30, 2009
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August 3, 2009 August 17, 2009	<b>September 1, 2009</b> <b>September 15, 2009</b>	September 30, 2009 September 30, 2009	October 30, 2009 October 30, 2009
September 1, 2009 September 15, 2009	<b>October 1, 2009</b> <b>October 15, 2009</b>	October 31, 2009 October 31, 2009	November 30, 2009 November 30, 2009

Documents will be accepted for filing on all regular workdays from 8:00 a.m. until 5:00 p.m. We encourage early filings to facilitate the timely publication of the *Missouri Register*. Orders of Rulemaking appearing in the *Missouri Register* will be published in the *Code of State Regulations* and become effective as listed in the chart above. Advance notice of large volume filings will facilitate their timely publication. We reserve the right to change the schedule due to special circumstances. Please check the latest publication to verify that no changes have been made in this schedule. To review the entire year's schedule, please check out the website at <http://www.sos.mo.gov/adrules/pubsched.asp>

# Missouri Participating Libraries

The *Missouri Register* and the *Code of State Regulations*, as required by the Missouri Documents Law (section 181.100, RSMo Supp. 2008), are available in the listed participating libraries, as selected by the Missouri State Library:

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Thomas Jefferson Library University of Missouri-St. Louis 8001 Natural Bridge Road St. Louis, MO 63121-4499 (314) 516-5084	James C. Kirkpatrick Library University of Central Missouri 142 Edwards Library Warrensburg, MO 64093-5020 (660) 543-4149	Elmer Ellis Library University of Missouri-Columbia 106 B Ellis Library Columbia, MO 65211-5149 (573) 882-0748	Garnett Library Missouri State University—West Plains 304 Cleveland West Plains, MO 65775-3414 (417) 255-7945
Washington University Law Library Washington University Campus Box 1171, Mudd Bldg., One Brookings Dr. St. Louis, MO 63130-4899 (314) 935-6443	Kansas City Public Library 14 West 10th Street Kansas City, MO 64105 (816) 701-3546	Library State Historical Society of Missouri 1020 Lowry St. Columbia, MO 65211-7298 (573) 882-9369	Springfield-Greene County Library 4653 S. Campbell Springfield, MO 65801-0760 (417) 874-8110
St. Louis County Library 1640 S. Lindbergh Blvd. St. Louis, MO 63131-3598 (314) 994-3300 ext. 247	Law Library University of Missouri-Kansas City 5100 Rockhill Road Kansas City, MO 64110-2499 (816) 235-2438	Daniel Boone Regional Library PO Box 1267, 100 West Broadway Columbia, MO 65205-1267 (573) 443-3161 ext. 359	Meyer Library Missouri State University PO Box 175, 901 S. National Springfield, MO 65804-0095 (417) 836-4533
Library Maryville University 13550 Conway Road St. Louis, MO 63141-7232 (314) 529-9494	Miller Nichols Library University of Missouri-Kansas City 5100 Rockhill Road Kansas City, MO 64110-2499 (816) 235-2438	School of Law University of Missouri-Columbia 224 Hulston Hall Columbia, MO 65211-0001 (573) 882-1125	
Pickler Memorial Library Truman State University 100 E. Normal Kirksville, MO 63501-4221 (660) 785-7416	B.D. Owens Library Northwest Missouri State University 800 University Drive Maryville, MO 64468-6001 (660) 562-1841	Smiley Memorial Library Central Methodist University 411 Central Methodist Square Fayette, MO 65248-1198 (660) 248-6279	

## HOW TO CITE RULES AND RSMo

**RULES**—Cite material in the *Missouri Register* by volume and page number, for example, Vol. 28, *Missouri Register*, page 27. The approved short form of citation is 28 MoReg 27.

The rules are codified in the *Code of State Regulations* in this system—

Title	Code of State Regulations	Division	Chapter	Rule
1	CSR	10-	1.	010
Department		Agency, Division	General area regulated	Specific area regulated

They are properly cited by using the full citation, i.e., 1 CSR 10-1.010.

Each department of state government is assigned a title. Each agency or division within the department is assigned a division number. The agency then groups its rules into general subject matter areas called chapters and specific areas called rules. Within a rule, the first breakdown is called a section and is designated as (1). Subsection is (A) with further breakdown into paragraph 1., subparagraph A., part (I), subpart (a), item I. and subitem a.

**RSMo**—The most recent version of the statute containing the section number and the date.

**T**he Secretary of State shall publish all executive orders beginning January 1, 2003, pursuant to section 536.035.2, RSMo Supp. 2008.

## EXECUTIVE ORDER

09-04

WHEREAS, I have been advised by the State Emergency Management Agency that the on-going and forecast severe storm systems have caused, or have the potential to cause, damages associated with snow, freezing rain, sleet, and ice impacting communities throughout the state of Missouri; and

WHEREAS, interruptions of public services are occurring, or anticipated to occur, as a result of the severe weather event that started on January 26, 2009, and is continuing; and

WHEREAS, the severe weather that began on January 26, 2009, and continues, has the potential to create a condition of distress and hazard to the safety, welfare, and property of the citizens of the state of Missouri beyond the capabilities of some local jurisdictions and other established agencies; and

WHEREAS, the state will continue to be proactive where the health and safety of the citizens of Missouri are concerned; and

WHEREAS, the resources of the state of Missouri may be needed to assist affected jurisdictions and to help relieve the condition of distress and hazard to the safety and welfare of our fellow Missourians; and

WHEREAS, an invocation of the provisions of Sections 44.100 and 44.110, RSMo, will be required to ensure the protection of the safety and welfare of the citizens of Missouri.

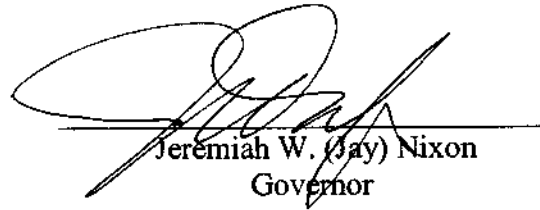
NOW, THEREFORE, I, JEREMIAH W. (JAY) NIXON, Governor of the State of Missouri, by virtue of the authority vested in me by the Constitution and Laws of the state of Missouri, including Sections 44.100 and 44.110, RSMo, do hereby declare that a State of Emergency exists in the state of Missouri. I do hereby direct that the Missouri State Emergency Operations Plan be activated.

I further authorize the use of state agencies to provide assistance, as needed.

This order shall terminate on February 26, 2009, unless extended in whole or in part.




IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri in the City of Jefferson on this 26<sup>th</sup> day of January 2009.



Jeremiah W. (Jay) Nixon  
Governor

ATTEST:



Robin Carnahan  
Secretary of State

EXECUTIVE ORDER  
09-05

WHEREAS, the United States Constitution mandates that the nation undertake a census of population every ten years; and

WHEREAS, the Census requires years of planning and requires more than 500,000 temporary workers; and

WHEREAS, it is vitally important that every household completes a Census form; and

WHEREAS, the Census is used to apportion seats in the United States House of Representatives; and

WHEREAS, the State of Missouri faces the possible loss of a seat in the United States House of Representatives based on Missouri's population counts relative to those of all other states; and

WHEREAS, federal funds are vital to Missourians and distributed based on population counts collected during the Census; and

WHEREAS, the United States Census Bureau encourages all states to form a Complete Count Committee with the goals of heightening awareness about the 2010 Census and encouraging the populace to participate in the United States Census of Population; and

WHEREAS, a Complete Count Committee is comprised of individuals, including the state demographer, who work together to develop outreach plans to encourage participation in the census to make sure all persons are counted; and

WHEREAS, the State of Missouri is committed to ensuring Missouri has an accurate count of its citizens during the 2010 Census.

NOW, THEREFORE, I, JEREMIAH W. (JAY) NIXON, GOVERNOR OF THE STATE OF MISSOURI, by virtue of the authority vested in me by the Constitution and laws of the State of Missouri, do hereby order the establishment of a Complete Count Committee.

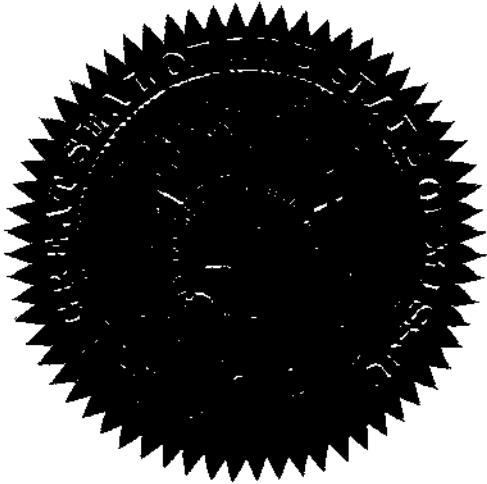
I hereby charge the Committee with heightening Missouri's awareness of the 2010 Census, encouraging participation in the process, developing targeted community outreach and working to ensure that every resident is counted:

1. The Committee will be chaired by the Commissioner of Administration.
2. No more than 30 additional members will be appointed by the Governor. Additional appointments will represent Missouri's diverse population. Membership on the committee will be bipartisan and representative of the state. The State Demographer shall be one of the members.
3. The Governor will, whenever possible, appoint members who have interaction with Complete Count Committees that have been, or will be, established at the local or sub-state level.


4. The Committee shall begin work on an action plan soon after its formation that will identify specific areas or groups within Missouri, which are isolated geographically, linguistically, racially, culturally, or otherwise, that may be hard to enumerate. The plan also should identify strategies to overcome recognized barriers; develop campaigns targeted toward the identified areas or groups, which will build awareness of Census 2010; and encourage cooperation with enumerators.
5. The chair, in consultation with the Governor, will decide if the committee will have subcommittees. The purpose of such subcommittees will be to help the committee better achieve its mission on a particular geographic region or group of citizens within the State of Missouri.
6. The Committee members shall not be compensated for their services other than reimbursement of costs directly associated with the execution of their duties, subject to appropriation.
7. The Committee is authorized to submit requests for appropriations through the Commissioner of Administration necessary to carry out its charge.
8. The Committee shall fulfill this charge in the most cost-effective manner possible.
9. Staff support will be provided by the Office of Administration.
10. The Committee shall meet at least quarterly until March 31, 2010, and as often as is required thereafter to complete this charge.
11. The Committee shall provide quarterly reports to the Governor on its activities beginning March 30, 2009.
12. Wherever possible, the Committee should coordinate its efforts with those of the United States Bureau of the Census and Complete Count Committees established at the local or sub-state level.
13. The Committee shall submit a final report to the Governor summarizing its activities and suggesting improvements to Missouri's Complete Count Committee for Census 2020.
14. Executive Order 08-34 is hereby superseded and replaced by this Executive Order.

The Committee will complete its work and submit its final report by August 1, 2010.






IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, on this 27<sup>th</sup> day of January, 2009.

  
\_\_\_\_\_  
Jeremiah W. (Jay) Nixon  
Governor

ATTEST:

  
\_\_\_\_\_  
Robin Carnahan  
Secretary of State

## EXECUTIVE ORDER

09-06

WHEREAS, I have been advised by the State Emergency Management Agency that the severe storm system has caused significant damage associated with snow, freezing rain, sleet, and ice impacting communities throughout the state of Missouri; and

WHEREAS, interruptions of public services are occurring, or anticipated to occur, as a result of the severe weather event that started on January 26, 2009, and is continuing; and

WHEREAS, the severe weather that began on January 26, 2009, and continues, has the potential to create a condition of distress and hazard to the safety, welfare, and property of the citizens of the state of Missouri beyond the capabilities of some local jurisdictions and other established agencies; and

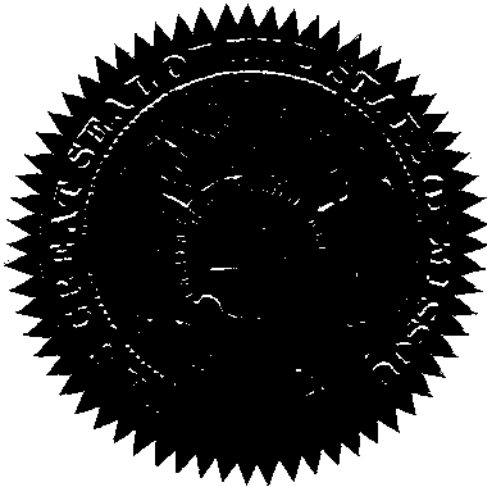
WHEREAS, the state will continue to be proactive where the health and safety of the citizens of Missouri are concerned; and

WHEREAS, the resources of the state of Missouri may be needed to assist affected jurisdictions and to help relieve the condition of distress and hazard to the safety and welfare of our fellow Missourians; and

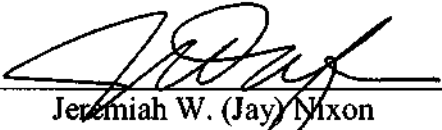
WHEREAS, an invocation of the provisions of Sections 44.100 and 44.110, RSMo, will be required to ensure the protection of the safety and welfare of the citizens of Missouri.

NOW, THEREFORE, I, JEREMIAH W. (JAY) NIXON, GOVERNOR OF THE STATE OF MISSOURI, by virtue of the authority vested in me by the Constitution and Laws of the state of Missouri, including Section 41.480.2 RSMo, order and direct the Adjutant General of the state of Missouri, or his designee, to forthwith call and order into active service such portions of the organized militia as he deems necessary to aid the executive officials of Missouri, to protect life and property, and it is further ordered and directed that the Adjutant General or his designee, and through him, the commanding officer of any unit or other organization of such organized militia so called into active service take such action and employ such equipment as may be necessary in support of civilian authorities, and provide such assistance as may be authorized and directed by the Governor of this state.

This order shall terminate on February 26, 2009, unless extended in whole or in part.



IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, on this 28<sup>th</sup> day of January, 2009.

  
\_\_\_\_\_  
Jeremiah W. (Jay) Nixon  
Governor

ATTEST:

  
\_\_\_\_\_  
Robin Carnahan  
Secretary of State

EXECUTIVE ORDER  
09-07

WHEREAS, the State Emergency Management Agency has advised me that severe weather has caused a natural disaster of significant proportions in Missouri; and

WHEREAS, the severe winter weather that began on January 26, 2009, has created a condition of distress and hazards to the safety and welfare of the citizens of the state of Missouri beyond the capabilities of some local jurisdictions and other established agencies; and

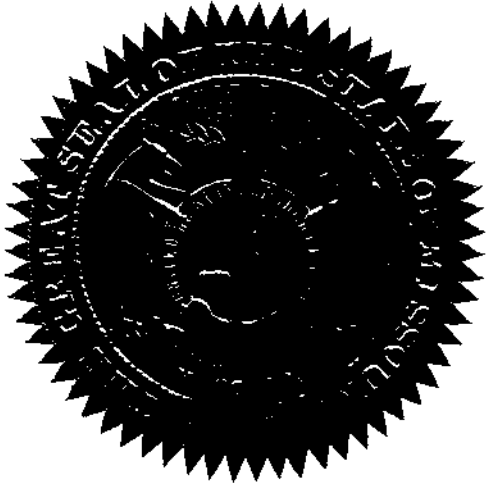
WHEREAS, the Missouri Department of Natural Resources is charged by law with protecting and enhancing the quality of Missouri's environment and with enforcing a variety of environmental rules and regulations; and

WHEREAS, in order to respond to the emergency and expedite the cleanup and recovery process, it is necessary to adjust certain environmental rules and regulations on a temporary and short-term basis.

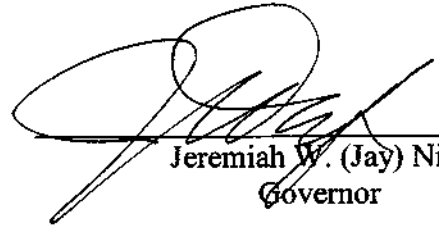
NOW, THEREFORE, I, JEREMIAH W. (JAY) NIXON, GOVERNOR OF THE STATE OF MISSOURI, by virtue of the authority vested in me by Chapter 44, RSMo, do hereby issue the following order:

The Acting Director of the Missouri Department of Natural Resources is vested with full discretionary authority to temporarily waive or suspend the operation of any statutory or administrative rule or regulation currently in place under his purview in order to best serve the interests of the public health and safety during the period of the emergency and the subsequent recovery period.

This order shall terminate on March 31, 2009, unless extended in whole or in part.



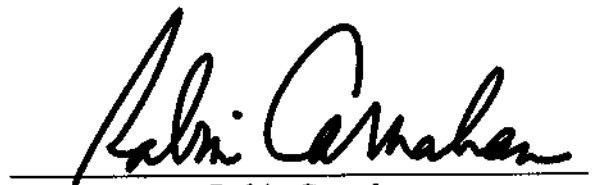
IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, on this 30<sup>th</sup> day of January, 2009.



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Jeremiah W. (Jay) Nixon  
Governor

ATTEST:



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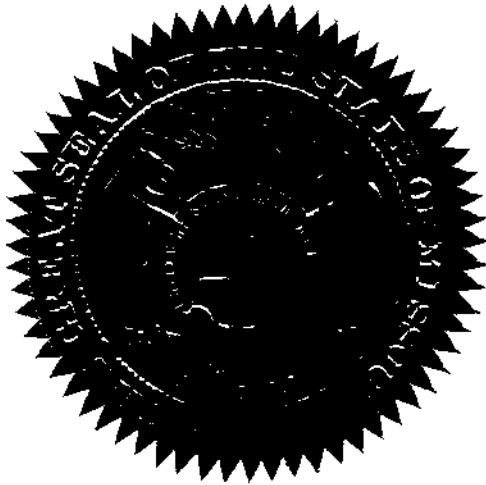
Robin Carnahan  
Secretary of State

EXECUTIVE ORDER  
09-08

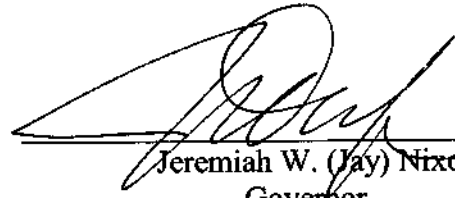
WHEREAS, Section 105.454(5), RSMo, requires the Governor to designate those members of his staff who have supervisory authority over each department, division or agency of the state government.

NOW, THEREFORE, I, JEREMIAH W. (JAY) NIXON, GOVERNOR OF MISSOURI, by virtue and authority vested in me by the Constitution and laws of the State of Missouri, do hereby designate the following members of my staff as having supervisory authority over the following departments, divisions or agencies:

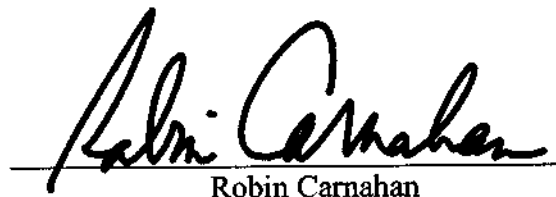
Office of Administration	Paul Wilson
Department of Agriculture	John Watson
Department of Conservation	Dustin Allison
Department of Corrections	Edward R. Ardini, Jr.
Department of Economic Development	Dustin Allison
Department of Elementary and Secondary Education	Jeff Harris
Department of Health and Senior Services	Jeff Harris
Department of Higher Education	Jeff Harris
Department of Insurance, Financial Institutions and Professional Registration	Mary Nelson
Department of Labor and Industrial Relations	Edward R. Ardini, Jr.
Department of Mental Health	Mayme Miller
Department of Natural Resources	John Watson
Department of Public Safety	Edward R. Ardini, Jr.
Department of Revenue	Dustin Allison
Department of Social Services	Jeff Mazur
Department of Transportation	Daniel Hall
Missouri Housing Development Commission	Edward R. Ardini, Jr.
Boards Assigned to the Governor	Mary Nelson
Unassigned Boards and Commissions	Mary Nelson.



IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, on this 2<sup>nd</sup> day of February, 2009.

  
Jeremiah W. (Jay) Nixon  
Governor

ATTEST:

  
Robin Carnahan  
Secretary of State

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

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

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

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

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

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

state-approved teacher preparation program or earned a doctoral degree may be granted an initial Missouri certificate of license to teach in their major area of study subject to the specific certification requirements found in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendment or additions.

*AUTHORITY: sections 168.011, 168.405, and 168.409, RSMo 2000 and sections 161.092, 168.021, 168.071, 168.081, and 168.400, RSMo Supp. [2007] 2008. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attn: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the *Missouri Register*. No public hearing is scheduled.*

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.220 Application for Certificate of License to Teach for Administrators.** The State Board of Education is amending section (1) and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE: This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.*

(1) An applicant may be granted an administrator certificate of license to teach in the following areas subject to the specific certification requirements found in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule, and criteria established in the rules promulgated by the State Board of Education (board), to an individual who possesses good moral character. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions:

Proposed Amendment Text Reminder:

**Boldface text indicates new matter.**

*[Bracketed text indicates matter being deleted.]*

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.200 Application for Certificate of License to Teach.** The State Board of Education is amending section (1) and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE: This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.*

(1) An applicant for a Missouri certificate of license to teach who possesses good moral character and has successfully completed a



*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and 168.400, RSMo Supp. [2007] 2008 and sections 168.011, 168.405, and 168.409, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the Missouri Register. No public hearing is scheduled.*

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.230 Application for a Student Services Certificate of License to Teach.** The State Board of Education is amending sections (1), (5), and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE: This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.*

(1) An applicant for a student services certificate of license to teach may be granted in the following areas subject to the specific certification requirements found in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions. The criteria established in the rules, promulgated by the State Board of Education (board), to an individual who possesses good moral character is:

(5) The applicant for a student services certificate of license to teach as a school counselor must comply with the following additional criteria:

(B) The applicant must possess either:

1. A master's or higher degree in school counseling from a state-approved school counselor preparation program; or

2. A master's or higher degree in education, school counseling, counseling, counseling psychology, **rehabilitation counseling**, or a closely related mental health discipline with additional graduate course work specific to school counseling, as designated by the state-approved recommending certification official, including a supervised internship or field experience of at least three hundred (300) hours in an appropriate school setting; and

*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and*

*168.400, RSMo Supp. [2007] 2008 and section 168.011, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the Missouri Register. No public hearing is scheduled.*

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.260 Temporary Authorization Certificate of License to Teach.** The State Board of Education is amending sections (7), (14), and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE: This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.*

(7) The applicant for a temporary authorization certificate (excluding a temporary authorization administrator's and/or career education certificate) must comply with the following criteria:

(D) If this is the applicant's initial certificate of license to teach, documentation of a plan of study based upon required certification competencies incorporated in classes provided by an accredited college or university. If the applicant holds an initial Missouri professional or life certificate of license to teach and is seeking an additional certificate of license to teach, a transcript analysis from DESE based on the requirements set forth in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule, must be submitted. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions.

(14) An individual may qualify for a professional classification certificate of license to teach upon documentation of the following:

(A) The certificate holder has been teaching under a temporary authorization certificate of license to teach for a minimum of [three (3)] **two (2)** years;

*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and 168.083, RSMo Supp. [2007] 2008 and section 168.011, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS:* Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the *Missouri Register*. No public hearing is scheduled.

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.270 Application for a Career Education Certificate of License to Teach.** The State Board of Education is amending section (5) and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE:* This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.

(5) The applicant must comply with the specific requirements for the various career education certificates of license to teach as set forth in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions.

*AUTHORITY:* sections 161.092, 168.021, 168.071, and 168.081, *RSMo Supp.* [2007] 2008 and section 168.011, *RSMo* 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the *Code of State Regulations*. Amended: Filed Jan. 30, 2009.

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

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

*NOTICE TO SUBMIT COMMENTS:* Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the *Missouri Register*. No public hearing is scheduled.

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.280 Application for an Adult Education and Literacy Certificate of License to Teach.** The State Board of Education is amending section (5) and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE:* This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.

(5) The following AEL professional classification certificates of license to teach may be issued and renewed as set forth in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions:

*AUTHORITY:* sections 161.092, 168.021, 168.071, and 168.081, *RSMo Supp.* [2007] 2008 and section 168.011, *RSMo* 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the *Code of State Regulations*. Amended: Filed Jan. 30, 2009.

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

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

*NOTICE TO SUBMIT COMMENTS:* Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to [tammy.allee@dese.mo.gov](mailto:tammy.allee@dese.mo.gov). To be considered, comments must be received within thirty (30) days after publication of this notice in the *Missouri Register*. No public hearing is scheduled.

**Title 5—DEPARTMENT OF ELEMENTARY AND  
SECONDARY EDUCATION  
Division 80—Teacher Quality and Urban Education  
Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.350 Certificate of License to Teach Content Areas.** The State Board of Education is amending section (2), Appendix A, and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE:* This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.

(2) Certificates of license to teach are issued and renewed by the State Board of Education (board) pursuant to the certification requirements found in the *Compendium of Missouri Certification*

*Requirements* (compendium), which is incorporated by reference and made a part of this rule, and the rules promulgated by the board in the specialized areas as follows. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008/2009]), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions.

(J) Career education certificates of license to teach may be issued in one (1) or more of the following areas (see Appendix A, which is included herein):

1. Agriculture education;
2. Business education;
3. Family, [and c]Consumer [s]/Science[s education], and Human Services;
4. Health sciences;
5. Junior Reserve Officers Training Corps (ROTC);
6. Marketing education;
7. Special needs; and/or
8. [Trade and industrial education] Technology and Engineering;

#### Appendix A—Career Education Certificates

##### Agricultur[al]e Education

- Agricultural Business
- Agricultural Education
- Agricultural Mechanics
- Agricultural Processing
- Agricultural Production
- Agricultural Resources
- Agricultural Services/Supplies
- Forestry
- Horticulture

##### Business Education

- Career Business Education

##### [Family and Consumer Sciences Education] Family, Consumer Science, and Human Services

- Apparel and Textiles
- Career Family and Consumer Science
- Cosmetic Services, Other
- Cosmetologist\*
- Culinary Arts
- Dietetic Services
- Food and Beverage/Restaurant Operations Manager
- Food Production, Management, and Related Services
- Hospitality Administration/Management, General
- Housing and Home Environments
- Human Development/Adult Development and Aging
- Human Development/Child Care
- Massage Therapy\*

##### [Career Family and Consumer Sciences]

##### Health Sciences

- Dental Assistant\*
- Dental Hygienist\*
- Dental Laboratory Technician
- Diagnostic Medical Sonography Technician\*
- Emergency Medical Technology/Technician\*
- Funeral Service and Mortuary Science\*

##### [Health Aide (Health Services Assistant) \*]

- Health Professions and Related Sciences, Other
- Health Unit Coordinator/Ward Clerk
- Licensed Practical Nursing (LPN Training)\*

##### [Massage Therapy \*]

- Medical Assistant\*
- Medical Laboratory Assistant\*
- Medical Laboratory Technician\*
- Medical Radiologic Technology/Technician\*
- Medical Record Technology/Technician (Health Information Technology)\*
- Medical Transcription\*
- Nursing Assistant/Aide\*
- Nursing, Other\*
- Occupational Therapy Assistant\*
- Pharmacy Technician/Assistant\*
- Physical Therapy Assistant\*
- Registered Nursing (RN Training)\*
- Respiratory Therapy Technician\*
- Sign Language Interpreter\*
- Surgical/Operating Room Technology\*

##### Marketing Education

- Marketing

##### [Trade and Industrial Education] Technology and Engineering

- Aircraft Mechanic/Technician, Airframe\*
- Aircraft Mechanic/Technician, Powerplant\*
- Architectural Engineering Technology/Technician
- Auto/Automotive Body Repairer
- Auto/Automotive Mechanic/Technician
- Automotive Engineering Technology/Technician
- Aviation Management
- Aviation Systems and Avionics Maintenance Technologist/Technician\*
- Biomedical Engineering-Related Technology/Technician
- Building/Property Maintenance and Manager
- Cabinet Maker and Millworker
- Carpenter
- Cartography
- Chemical Technology/Technician
- Civil Engineering/Civil Technology/Technician
- Commercial Photography
- Communications Systems Installer and Repairer
- Computer Installer and Repairer
- Computer Maintenance Technology/Technician

##### [Construction and Building Finishers and Managers, Other]

- Construction Equipment Operator

##### [Construction Trades, Other]

- Construction/Building Technology/Technician

##### [Cosmetic Services, Other]

##### [Cosmetologist \*]

##### [Culinary Arts]

- Diesel Engine Mechanic and Repairer
- Drafting, General

##### [Drycleaner and Launderer (Commercial)]

- Electrical and Electronics Equipment Installer and Repairer, General

##### [Electrical and Electronics Equipment Installer and Repairer, Other]

- Electrical and Power Transmission Installer, General

##### [Electrical, Electronic and Communications Engineering Technology/Technician]

##### [Electrician]

- Electromechanical Technology/Technician
- Fire Protection and Safety Technology/Technician
- Fire Science/Firefighting

##### [Food and Beverage/Restaurant Operations Manager]

- Graphic and Printing Equipment Operator, General

##### [Graphic and Printing Equipment Operator, Other]

- Graphic Design, Commercial Art, and Illustration
- Heating, Air Conditioning, and Refrigeration Mechanic and Repairer

- Heavy Equipment Maintenance and Repairer
  - Industrial Design
  - Industrial Electronics Installer and Repairer
  - [*Industrial Equipment Maintenance and Repairer, Other*]
  - Industrial Machinery Maintenance and Repairer
  - [*Industrial Production Technologies/Technicians, Other*]
  - [*Industrial Technology/Technician*]
  - Instrumentation Technology/Technician
  - Ironworking/Ironworker
  - Laser and Optical Technology/Technician
  - Law Enforcement/Police Science
  - Machinist/Machine Technologist
  - Major Appliance Installer and Repairer
  - Manufacturing Technology
  - Marine Maintenance and Ship Repairer
  - Mason and Tile Setter
  - Mechanical Engineering/Mechanical Technology/Technician
  - Motorcycle Mechanic and Repairer
  - Nuclear Engineering Technology/Technician
  - Occupational Safety and Health Technology/Technician
  - Painter and Wall Coverer
  - Pipefitting/Pipefitter and Sprinkler Fitter
  - Plumbing Technology/Plumber
  - Quality Control Technology/Technician
  - Radio and Television Broadcasting Technology/Technician
  - Robotics Technology/Technician
  - Sheet Metal Worker
  - Small Engine Mechanic and Repairer
  - Truck, Bus, and Other Commercial Vehicle Operator
  - Upholsterer
  - [*Vehicle and Mobile Equipment Mechanics and Repairer, Other*]
  - Water Quality and Wastewater Treatment Technology/Technician
  - Welder/Welding Technologist
- \* Requires Professional Licensing

*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and 168.400, RSMo Supp. [2007] 2008 and section 168.011, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to tammy.allee@dese.mo.gov. To be considered, comments must be received within thirty (30) days after publication of this notice in the Missouri Register. No public hearing is scheduled.*

**Title 5—DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION**  
**Division 80—Teacher Quality and Urban Education**  
**Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.360 Certificate of License to Teach Classifications.** The State Board of Education is amending section (1) and the *Compendium of Missouri Certification Requirements*, which is incorporated by reference.

*PURPOSE: This amendment incorporates changes in the compendium to update certification requirements for various certification areas and corrects typographical errors as of January 2009.*

(1) Certificates of license to teach are issued and renewed by the State Board of Education (board) pursuant to the certification requirements found in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule, and the rules promulgated by the board. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions.

*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and 168.400, RSMo Supp. [2007] 2008 and sections 168.011, 168.128, 168.405, and 168.409, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

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

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, PO Box 480, Jefferson City, MO 65102-0480, or by email to tammy.allee@dese.mo.gov. To be considered, comments must be received within thirty (30) days after publication of this notice in the Missouri Register. No public hearing is scheduled.*

**Title 5—DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION**  
**Division 80—Teacher Quality and Urban Education**  
**Chapter 800—Educator Certification**

**PROPOSED AMENDMENT**

**5 CSR 80-800.380 Required Assessments for Professional Education Certification in Missouri.** The State Board of Education is amending the *Compendium of Missouri Certification Requirements*, which is incorporated by reference, and Appendix A, included herein.

*PURPOSE: This amendment is updating the compendium and Appendix A along with amending three (3) of the existing Praxis II assessments that have been regenerated, and new forms of the assessments will be administered during the 2008–2009 testing year. These assessments will have new test codes: Family and Consumer Sciences (0121), Marketing Education (0561), and School Psychologist (0401). The Praxis II assessments' five (5)-digit test codes are being replaced by a four (4)-digit test code to reflect current test codes established by the Educational Testing Service (ETS).*

(1) Each applicant seeking a Missouri certificate of license to teach will successfully complete an exit assessment to measure the applicant's competency in subject matter, pedagogical knowledge, or both, prior to being granted the certificate. An exemption exists if the applicant holds a valid certificate of license to teach from another state.

(A) The State Board of Education (board) has selected the Praxis II: Content Knowledge or Specialty Area assessments and the Principles of Learning and Teaching assessments developed by the Educational Testing Service (ETS) as the exit assessments for certificates of license to teach. Qualifying scores are established by the board and published by ETS for each assessment designated for an area of certification.

1. Applicants seeking initial certificates of license to teach must complete and achieve a Missouri qualifying score in the content knowledge or specialty area assessment in their major area of preparation or the appropriate principles of learning and teaching assessment if no content knowledge or specialty area assessment is designated, except in the areas of special education, student services, and administration (see Appendix A, which is included herein).

2. Applicants holding a valid Missouri professional or life certificate of license to teach in a content area who are seeking an additional certificate(s) of license to teach in another content area(s), will receive the additional certificate(s) upon meeting either of the following conditions:

A. Complete and achieve a Missouri qualifying score for the Praxis II content knowledge or specialty area assessment designated for the certificate of license to teach, except for the areas of unified science, special education other than mild/moderate cross-categorical disabilities, student services, administration, career education, and adult education and literacy; or

B. Successfully complete the applicable certification requirements as set forth in the *Compendium of Missouri Certification Requirements* (compendium), which is incorporated by reference and made a part of this rule. Anyone interested in viewing or requesting a copy of the compendium, published by the Department of Elementary and Secondary Education (revised January [2008] 2009), may contact the Educator Certification Section, 205 Jefferson Street, PO Box 480, Jefferson City, MO 65102-0480. This rule does not incorporate any subsequent amendments or additions.

3. Applicants holding a valid Missouri professional or life certificate of license to teach in a secondary content area who are seeking additional certification for middle school in the same content area[,] will receive the additional certification upon meeting either of the following conditions:

A. Complete and achieve a Missouri qualifying score for the Praxis II: Principles of Learning and Teaching, grades five through nine (5-9), assessments; or

B. Successfully complete the applicable certification requirements for middle school education, grades five through nine (5-9), as set forth in the compendium.

## APPENDIX A

## ASSESSMENTS DESIGNATED FOR CERTIFICATION IN MISSOURI

The Praxis® assessments listed below have been designated by the State Board of Education to fulfill the assessment requirement for certification in Missouri. The assessments are listed beside the certificates to which they correspond.

<u>Missouri Certificate of License to Teach</u>	<u>Test Code</u>	<u>Designated Assessment</u>
Early Childhood Education, Birth–Grade 3	[2]0021	Education of Young Children
Early Childhood Special Education, Birth–Grade 3	[1]0690	Special Education: Preschool/Early Childhood
Elementary Education, Grades 1–6	[1]0011	Elementary Education: Curriculum, Instruction, and Assessment
Middle School Education, Grades 5–9	—	—
Language Arts	[1]0049	<i>[MS] Middle School English[-] Language Arts[: Content Knowledge]</i>
Mathematics	[2]0069	<i>[MS] Middle School Mathematics[: Content Knowledge]</i>
Science	[1]0439	<i>[MS] Middle School Science[: Content Knowledge]</i>
Social Science	[2]0089	<i>[MS] Middle School Social Studies[: Content Knowledge]</i>
Other Middle School Subject Areas	[3]0523	Principles of Learning and Teaching, Grades 5–9
Secondary Education, Grades 9–12 (except as noted)	—	—
Agriculture	[1]0700	Agriculture
Art K–12, 9–12	[1]0133	Art: Content Knowledge
Business Education	[1]0100	Business Education
English	[1]0041	English Language, Literature, and Composition: Content Knowledge
<i>[Family and Consumer Science]</i>		
<b>Family, Consumer Science, and Human Services</b>	<b>[10120] 0121</b>	Family and Consumer Science
Foreign Language: K–12		
French K–12	[2]0173	French: Content Knowledge
German K–12	[2]0181	German: Content Knowledge
Spanish K–12	[1]0191	Spanish: Content Knowledge
Health K–12, 9–12	[2]0550	Health Education
Industrial Technology	[1]0050	Technology Education
Library Media Specialist, K–12	[1]0310	Library Media Specialist
Marketing <i>[and Distributive]</i> Education	<b>[10560] 0561</b>	Marketing Education
Mathematics	[1]0061	Mathematics: Content Knowledge
Music: Instrumental, Vocal K–12	[1]0113	Music: Content Knowledge
Physical Education K–9, K–12, 9–12	[1]0091	Physical Education: Content Knowledge
Science:		
Biology	[2]0235	Biology: Content Knowledge
Chemistry	[2]0245	Chemistry: Content Knowledge
Earth Science	[2]0571	Earth <b>and Space</b> Sciences: Content Knowledge
General Science	[1]0435	General Science: Content Knowledge
Physics	[1]0265	Physics: Content Knowledge
Social Science	[1]0081	Social Studies: Content Knowledge
Special Education, K–12		
Blind and Partially Sighted <sup>1</sup>	[1]0280	Teaching Students with Visual Impairments
Deaf and Hearing Impaired <sup>1</sup>	[1]0271	Education of Deaf and Hard of Hearing Students
<i>[Mild-Moderate Disabilities: Learning Disabled, Behavioral Disordered, Mentally Handicapped, or Physical and Other Health Impairments<sup>1</sup>]</i>	<b>[20353]</b>	<i>[Education of Exceptional Students: Core Content Knowledge]</i>
Mild-Moderate Cross-Categorical Disabilities	[2]0353 and [1]0542	Education of Exceptional Students: Core Content Knowledge Education of Exceptional Students: Mild to Moderate Disabilities
Severely Developmentally Disabled <sup>1</sup>	[2]0353 and [1]0544	Education of Exceptional Students: Core Content Knowledge Education of Exceptional Students: Severe to Profound Disabilities
Speech/Theatre	[1]0220	Speech Communication
Speech and Language Pathologist K–12 <sup>3</sup>	[2]0330	Speech-Language Pathology

APPENDIX A—continued

<u>Missouri Certificate of License to Teach</u>	<u>Test Code</u>	<u>Designated Assessment</u>
Unified Science <sup>2</sup>	—	—
Biology	[2]0235	Biology: Content Knowledge
Chemistry	[2]0245	Chemistry: Content Knowledge
Earth Science	[2]0571	Earth <b>and Space</b> Sciences: Content Knowledge
Physics	[1]0265	Physics: Content Knowledge
K-12 or 9-12 teaching certification for which no specialty area assessment or content knowledge assessment is designated and a Temporary Authorization Certificate (TAC) of License to Teach	[3]0524	Principles of Learning and Teaching, Grades 7-12
School Counselor K-8, 7-12 <sup>3</sup>	[2]0420	School Guidance and Counseling
School Psychologist K-12 <sup>3</sup>	[10400] 0401	School Psychologist
Building-Level Administrator <sup>3</sup>	[1]1010	School Leaders Licensure Assessment (SLLA)
Principal K-8, 5-9, 9-12		
Special Education Administrator K-12		
Career Education Director		
District-Level Administrator (Superintendent) K-12 <sup>2/3</sup>	[1]1020	School Superintendent Assessment (SSA)

- [1.]<sup>1</sup> Not available by completion of the designated assessment only; also requires completion of a program of study in special education with the area of specialization from a state-approved institution.
- [2.]<sup>2</sup> Not available by completion of the designated assessment only; also requires completion of a program of study in the unified science core with the area of specialization from a state-approved institution.
- [3.]<sup>3</sup> Not available by completion of the designated assessment only; also requires completion of a program of study and a recommendation from a state-approved institution.

*AUTHORITY: sections 161.092, 168.021, 168.071, 168.081, and 168.400, RSMo Supp. [2007] 2008 and sections 168.011, 168.405, and 168.409, RSMo 2000. Original rule filed April 26, 2000, effective Nov. 30, 2000. For intervening history, please consult the Code of State Regulations. Amended: Filed Jan. 30, 2009.*

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

*PRIVATE COST: Currently, the cost per exam is one hundred thirty dollars (\$130) per examination, which includes a fifty dollar (\$50) registration fee and an eighty dollar (\$80) Praxis test fee. The total private cost would be based upon the number of applicants seeking licensure and the number of content areas in which the applicants seek certification. Since these numbers cannot be determined, the total private cost is unknown.*

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Elementary and Secondary Education, Attention: Dr. Charles Brown, Assistant Commissioner, Division of Teacher Quality and Urban Education, Missouri Department of Elementary & Secondary Education, PO Box 480, Jefferson City, Missouri 65102-0480, or by email to tammy.allee@dese.mo.gov. To be considered, comments must be received within thirty (30) days after publication of this notice in the Missouri Register. No public hearing is scheduled.*

**FISCAL NOTE  
PRIVATE COST**

**I. RULE NUMBER**

Rule Number and Name:	5 CSR 80-800.380 Required Assessments for Professional Education Certification in Missouri
Type of Rulemaking:	Proposed Amendment

**II. SUMMARY OF FISCAL IMPACT**

Estimate of the number of entities by class which would likely be affected by the adoption of the proposed amendment:	Classification by types of the business entities which would likely be affected:	Estimate in the aggregate as to the cost of compliance with the amendment by the affected entities:
	Applicants @ \$130 per examination	Since these numbers cannot be determined, the total private cost is unknown.

**III. WORKSHEET**

Currently, the cost per exam is one hundred thirty dollars (\$130) per examination, which includes a fifty dollar (\$50) registration fee and an eighty dollar (\$80) Praxis test fee. The total private cost would be based upon the number of applicants seeking licensure and the number of content areas in which the applicants seek certification. Since these numbers cannot be determined, the total private cost is unknown.

**IV. ASSUMPTIONS**



**Title 10—DEPARTMENT OF NATURAL RESOURCES  
Division 20—Clean Water Commission  
Chapter 6—Permits**

**PROPOSED AMENDMENT**

**10 CSR 20-6.200 Storm Water Regulations.** The department is amending subparagraph (1)(C)24.A.

*PURPOSE: The department is amending this rule to clarify the definition of a regulated MS4.*

(1) Storm Water Permits—General.

(C) Definitions.

1. Best management practices (BMPs). Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

2. BMPs for land disturbance. A schedule of activities, practices, or procedures that reduces the amount of soil available for transport or a device that reduces the amount of suspended solids in runoff before discharge to waters of the state. Types of BMPs for storm water control include, but are not limited to:

A. State-approved standard specifications and permit programs;

B. Employee training in erosion control, material handling and storage, and housekeeping of maintenance areas;

C. Site preparation such as grading, surface roughening, topsoiling, tree preservation and protection, and temporary construction entrances;

D. Surface stabilization such as temporary seeding, permanent seeding, mulching, sodding, ground cover including vines and shrubs, riprap, and geotextile fabric. Mulches may be hay, straw, fiber mats, netting, wood cellulose, corn or tobacco stalks, bark, corn cobs, wood chips, or other suitable material which is reasonably clean and free of noxious weeds and deleterious materials. Grasses used for temporary seeding shall be a quick growing species such as rye grass, Italian rye grass, or cereal grasses suitable to the area and which will not compete with the grasses sown later for permanent cover;

E. Runoff control measures such as temporary diversion dikes or berms, permanent diversion dikes or berms, right-of-way or perimeter diversion devices, and retention and detention basins. Sediment traps and barriers, sediment basins, sediment (silt) fence, and staked straw bale barriers;

F. Runoff conveyance measures such as grass-lined channels, riprap, and paved channels, temporary slope drains, paved flumes, or chutes. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other materials that adequately will control erosion;

G. Inlet and outlet protection;

H. Streambank protection such as a vegetative greenbelt between the land disturbance and the watercourse. Also, structural protection which stabilizes the stream channel;

I. A critical path method analysis or a schedule for performing erosion control measures; and

J. Other proven methods for controlling runoff and sedimentation;

3. Copetitioner. A person with apportioned legal, financial, and administrative responsibility based on land area under its control for filing Part 1 and Part 2 of a state operating permit for the discharge of storm water from municipal separate storm sewer systems. A copetitioner becomes a copermittee once the permit is issued.

4. Copermittee. A permittee to a state operating permit that is responsible only for permit conditions relating to the discharge for which it is owner or operator, or both.

5. *De minimis* water contaminant source. A water contaminant source, point source, or wastewater treatment facility that is determined by the department to pose a negligible potential impact on

waters of the state, even in the event of the malfunction of wastewater treatment controls or material handling procedures.

6. Field screening point. A specific location which during monitoring will provide representative information to indicate the presence of illicit connections or illegal dumping and quality of water within a municipal separate storm sewer system.

7. Illicit discharge. Any discharge to a municipal separate storm sewer that is not composed entirely of storm water, except discharges pursuant to a state operating permit, other than storm water discharge permits and discharges from fire fighting activities.

8. Incorporated place (in Missouri, a municipality). A city, town, or village that is incorporated under the laws of Missouri.

9. Landfill. Location where waste materials are deposited on or buried within the soil or subsoil. Included are open dumps and landfills built or operated, or both, prior to the passage of the Missouri Solid Waste Management Law as well as those built or operated, or both, since.

10. Large municipal separate storm sewer system. All municipal separate storm sewers that are either—

A. Located in an incorporated place with a population of two hundred fifty thousand (250,000) or more;

B. Located in the counties designated by the director as unincorporated places with significant urbanization and identified systems of municipal separate storm sewers;

C. Owned and operated by a municipality other than those described in subparagraph (1)(C)10.A. of this rule that are designated by the director as part of a system. In making this determination, the director may consider the following factors:

(I) Physical interconnections between the municipal separate storm sewers;

(II) The location of discharges from the designated municipal storm sewer relative to the discharges from municipal separate storm sewer described in subparagraph (1)(C)10.A. of this rule;

(III) The quantity and nature of pollutants discharged to the waters of the state;

(IV) The nature of the receiving waters; or

(V) Other relevant factors; and

D. The director, upon petition, may designate as a large municipal separate storm sewer system, municipal separate storm sewers located within the boundaries of a region defined by a storm water management regional authority based on a jurisdiction/*all*, watershed, or other appropriate basis that includes one (1) or more of the systems described in subparagraph (1)(C)10.A. of this rule.

11. MS4 means:

A. A municipal separate storm sewer system.

12. Major municipal separate storm sewer system outfall (major outfall). A municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of thirty-six inches (36") or more (or its equivalent) or for municipal separate storm sewers that receive storm waters from lands zoned for industrial activity within the municipal separate storm sewer system with an outfall that discharges from a single pipe with an inside diameter of twelve inches (12") or more (or from its equivalent). Industrial activity areas do not include commercial areas.

13. Major outfall. A major municipal separate storm sewer outfall.

14. Major structural controls. Man-made retention basins, detention basins, major infiltration devices, or other structures designed and operated for the purpose of containing storm water discharges from an area greater than or equal to fifty (50) acres.

15. Medium municipal separate storm sewer system. All municipal separate storm sewers that are either—

A. Located in an incorporated place with a population of one hundred thousand (100,000) or more but less than two hundred fifty thousand (250,000), as determined by the latest decennial census by the Bureau of Census; or

B. Owned and operated by a municipality other than those described in subparagraph (1)(C)15.A. of this rule and that are designated by the director as part of the system. In making this determination, the director may consider the following factors:

(I) Physical interconnections between the municipal separate storm sewers;

(II) The locations of discharges from the designated municipal separate storm sewer relative to discharges from the municipal separate storm sewers described in subparagraph (1)(C)15.A. of this rule;

(III) The quantity and nature of pollutants discharged to waters of the state;

(IV) The nature of the receiving waters;

(V) Other relevant factors; or

(VI) The director, upon petition, may designate as a medium municipal separate storm sewer system, municipal separate storm sewers located within the boundaries of a region defined by a storm water management regional authority based on a jurisdiction/*all*, watershed, or other appropriate basis that includes one (1) or more of the systems described in subparagraph (1)(C)15.A. of this rule.

16. Municipal separate storm sewer means a conveyance or system of conveyances including roads and highways with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, paved or unpaved channels, or storm drains designated and utilized for routing of storm water which—

A. Does not include any waters of the state as defined in this rule;

B. Is contained within the municipal corporate limits or is owned and operated by the state, city, town, village, county, district, association, or other public body created by or pursuant to the laws of Missouri having jurisdiction over disposal of sewage, industrial waste, storm water, or other liquid wastes;

C. Is not a part or portion of a combined sewer system;

D. Is not a part of a publicly owned treatment works as defined in 40 CFR 122.2; and

E. Sewers that are defined as large or medium or small municipal separate storm sewer systems pursuant to paragraphs 10., 15., and 28. of this section, or designated under subsection (1)(B) of this rule.

17. Operator. The owner, or an agent of the owner, of a separate storm sewer with responsibility for operating and maintaining the effectiveness of the system.

18. Outfall. A point source as defined by 10 CSR 20-2.010 at the point where a municipal separate storm sewer discharges and does not include open conveyances connecting two (2) municipal separate storm sewers, pipes, tunnels, or other conveyances which connect segments of waters of the state and are used to convey waters of the state.

19. Overburden. Any material of any nature consolidated or unconsolidated that overlays a mineral deposit excluding topsoil or similar naturally occurring surface materials that are not disturbed by mining operations.

20. Owner. A person who owns and controls the use, operation, and maintenance of a separate storm sewer.

21. Process wastewater. Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product.

22. Receiving waters. Waters of the state as defined in this rule.

23. Recycling facilities. Locations where metals, paper, tires, glass, organic materials, used oils, spent solvents, or other materials are collected for reuse, reprocessing, or resale.

24. Regulated MS4 means:

A. A MS4 which serves a population of one thousand (1,000) or more within an urbanized area, or *in a MS4 which serves a population of ten thousand (10,000) or more elsewhere in the state/ any MS4 located outside of an urbanized area serving a jurisdiction with a population of at least ten thousand (10,000) and a population density of one thousand (1,000) people per square mile or greater.*

B. A MS4 which is designated by the department when it is determined that the discharges from the MS4 have caused or have the potential to cause an adverse impact on water quality. An application shall be submitted within one hundred eighty (180) days of the

designation by the department.

25. Runoff coefficient. The fraction of total rainfall that will appear at a conveyance as runoff.

26. Significant contributor of pollutants. A person who discharges or causes the discharge of pollutants in storm water which can cause water quality standards of the waters of the state to be violated.

27. Significant material or activity associated with industrial activity.

A. For the categories of industries identified in subsections (2)(A)–(D) of this rule, the term includes, but is not limited to, storm water discharged from industrial plant yards, immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility.

B. Significant materials include, but are not limited to, raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of the Comprehensive Environmental Response, Compensation, Liability Act of 1980 (CERCLA); any chemical the facility is required to report pursuant to Section 313 of Title III of Superfund Amendments & Reauthorization Act of 1986 (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

C. Material received in drums, totes, or other secure containers or packages which prevent contact with storm water, including run on, are exempted from the significant materials classification until the container has been opened for any reason. If the container is moved into a building or other protected area prior to opening, it will not become a significant material.

D. Empty containers which have been properly triple rinsed are not significant materials.

28. Small construction activity means:

A. Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres. Small construction activity also includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one (1) and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

B. Any other construction activity designated by the department, based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

29. Small municipal separate storm sewer system means:

A. Owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district, or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act (CWA) that discharges to water of the United States.

B. Not defined as large or medium municipal separate storm sewer systems pursuant to paragraphs 10. and 15. of this subsection.

C. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as around individual buildings.

30. Small MS4 means:

A. A small municipal separate storm sewer system.

31. Storm water means storm water runoff, snowmelt runoff and surface runoff, and drainage.

32. Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw material storage areas at an industrial plant.

33. Waters of the state, as it applies to large and medium municipalities under this regulation, means all waters listed as L1, L2, and L3 in Table G and P, P1, and C in Table H of 10 CSR 20-7.031.

*AUTHORITY: section 644.026, RSMo 2000 and section 644.036, RSMo Supp. 2008. Original rule filed July 15, 1991, effective Oct. 1, 1992. Amended: Filed Sept. 14, 2001, effective May 30, 2002. Amended: Filed Feb. 3, 2009.*

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

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

*NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Natural Resources, Division of Environmental Quality, Water Protection Program, John Rustige, PO Box 176, Jefferson City, MO 65102. Comments may be sent with name and address through email to john.rustige@dnr.mo.gov. Public comments must be received by May 13, 2009. A public hearing is scheduled at a meeting of the Clean Water Commission to be held at 9 A.M., May 6, 2009, in the Lewis and Clark State Office Building, LaCharrette/Nightingale Creek Conference Rooms, 1101 Riverside Drive, Jefferson City, Missouri 65102.*

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

**PROPOSED AMENDMENT**

**10 CSR 20-7.031 Water Quality Standards.** The department is amending sections (1), (4), and (5), amending Tables A, B2, B3, G, and H, and adding Tables K, L, M, and N.

*PURPOSE: This amendment proposes to revise the state numeric water quality criteria for copper, zinc, nutrients in lakes, bacteria, and ammonia. New and more accurate descriptions of the classified waters are proposed. Proposed revisions also include the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses. Further revisions proposed include site-specific criteria for dissolved oxygen on several streams. The changes proposed also correct several typographical errors discovered after the effective date of the last revisions to the Water Quality Standards (WQS) in 2005.*

(1) Definitions.

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

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

2. Livestock and wildlife watering—Maintenance of conditions

to support health in livestock and wildlife.

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

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

5. Protection of aquatic life (General warm-water fishery)—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a wide variety of warm-water biota, including naturally reproducing populations of recreationally important fish species. This includes all Ozark Class C and P streams, all streams with [seven (7)-day  $Q_{10}$ ] **7Q10** low flows of more than one-tenth cubic foot per second (0.1 cfs), all P1 streams, and all classified lakes. However, individual Ozark Class C streams may be determined to be limited warm-water fisheries on the basis of limited habitat, losing-stream classification, land-use characteristics, or faunal studies which demonstrate a lack of recreationally important fish species.

6. Protection of aquatic life (Limited warm-water fishery)—Waters in which natural water quality and/or habitat conditions prevent the maintenance of naturally reproducing populations of recreationally important fish species. This includes non-Ozark Class C streams and non-Ozark Class P streams with [seven (7)-day  $Q_{10}$ ] **7Q10** low flows equal to or less than 0.1 cfs and Ozark Class C streams with the characteristics outlined in paragraph (1)(C)5.

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

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

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

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

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

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

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

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

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

14. Recreational, cultural, educational, scientific, and natural aesthetic values and uses—Waters that serve as recreational sites for fishing, hunting, and observing wildlife; waters of historic or archaeological significance; waters which provide great diversity for nature observation, educational opportunities, and scientific study.

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

(E) Chronic toxicity—Conditions producing adverse effects on aquatic life or wildlife following long-term exposure but having no readily observable effect over a short time period. Chronic numeric criteria in Tables A and B are maximum concentrations which protect against chronic toxicity; these values shall be considered four (4)-day averages. Chronic toxicity is also indicated by exceedence of WET test conditions of subsection (4)(P)(Q). For substances not listed in Table A or B, commonly used endpoints such as the no-observed effect concentration or inhibition concentration of representative species may be used to demonstrate absence of toxicity.

(I) Ecoregion—*[A major region within the state which contains waters with similar geological, hydrological, chemical and biological characteristics.] Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance (Bryce, Omernik, and Larsen, 1999).*

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

(N) Losing stream—A stream which distributes thirty percent (30%) or more of its flow during low flow conditions through natural processes, such as through permeable geologic materials into a bedrock aquifer within two (2) miles' flow distance downstream of an existing or proposed discharge. Flow measurements to determine percentage of water loss must be corrected to approximate the [seven (7)-day  $Q_{10}$ ] 7Q10 stream flow. If a stream bed or drainage way has an intermittent flow or a flow insufficient to measure in accordance with this rule, it may be determined to be a losing stream on the basis of channel development, valley configuration, vegetation development, dye tracing studies, bedrock characteristics, geographical data, and other geological factors. Losing streams are listed in Table J; additional streams may be determined to be losing by the Missouri Department of Natural Resources.

(O) Low-flow conditions—Where used in this regulation in the context of mixing zones, the low-flow conditions shall refer to the

minimum amount of stream flow occurring immediately upstream of a wastewater discharge and available, in whole or in part, for attenuation of wastewater pollutants.

1. Seven (7)-day, one (1)-in-ten (10)-year low flow [7-day  $Q_{10}$ ] (7Q10)—The lowest average flow for seven (7) consecutive days that has a probable recurrence interval of once-in-ten (10) years.

2. Sixty (60)-day, one (1)-in-two (2)-year low flow [60-day  $Q_2$ ] (60Q2)—The lowest average flow for sixty (60) consecutive days that has a probable recurrence interval of once-in-two (2) years.

3. Thirty (30)-day, one (1)-in-ten (10)-year low flow [30-day  $Q_{10}$ ] (30Q10)—The lowest average flow for thirty (30) consecutive days that has a probable recurrence interval of once-in-ten (10) years.

4. One (1)-day, one (1)-in-ten (10)-year low flow [1-day  $Q_{10}$ ] (1Q10)—The lowest average flow for one (1) day that has a probable recurrence interval of once-in-ten (10) years.

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

(4) Specific Criteria. The specific criteria shall apply to classified waters. Protection of drinking water supply is limited to surface waters designated for raw drinking water supply and aquifers. Protection of whole body contact recreation is limited to classified waters designated for that use.

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

1. Permanent flow streams when the stream flow is less than [seven (7)-day  $Q_{10}$ ] 7Q10;

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

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

4. For mixing zones.

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

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

(I) Streams with [seven (7)-day  $Q_{10}$ ] 7Q10 low flows of less than 0.1 cfs.

(a) Mixing zone—not allowed; and

(b) Zone of initial dilution—not allowed;

(II) Streams with [seven (7)-day  $Q_{10}$ ] 7Q10 low flow of one-tenth to twenty (0.1–20) cfs—

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

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

(III) Streams with [seven (7)-day  $Q_{10}$ ] **7Q10** low flow of greater than twenty (20) cfs—

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

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

(IV) Lakes.

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

(b) Zone of initial dilution—not allowed.

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

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

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

F. Mixing zone and zone of initial dilution size limits will normally be based on streams at the [seven (7)-day  $Q_{10}$ ] **7Q10** low flow. However, this percent of stream size limits also applies at higher stream flows and discharge limitations may be based on higher stream flows if discharge volume or quality may be adjusted to correlate with stream flow; and

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

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

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

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

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

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

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

(B) Toxic Substances.

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

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

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

(I) Mercury—total recoverable metals.

(II) All other metals—dissolved metals;

B. Drinking water supply—total recoverable metals; and

C. All other beneficial uses—total recoverable metals.

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

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

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

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

7. Total ammonia nitrogen. **The state of Missouri adopts the National Criteria for Ammonia in Fresh Water (1999 Update). The criteria, expressed in exponential function, are pH and temperature dependent, and their coefficients are based on the presence or absence of salmonid fish (for acute criteria) and early life stages of fish (for chronic criteria).** For any given sample, the total ammonia nitrogen criteria shall be based on the pH and temperature of the water body measured at the time of each sample at the point of compliance.

A. The acute criteria shall not be exceeded at any time except in those waters for which the department has allowed a zone of initial dilution (ZID). [The one (1)-day  $Q_{10}$  low flow condition will be used in determining acute total ammonia nitrogen criteria.] **The one (1)-hour average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three (3) years on the average, the CMC (acute criterion) calculated using the following equations.**

Where salmonid fish are present—

$$CMC = \frac{0.275}{1 + 10^{(7.204-pH)}} + \frac{39.0}{1 + 10^{(pH-7.204)}}$$

Or where salmonid fish are not present—

$$CMC = \frac{0.411}{1 + 10^{(7.204-pH)}} + \frac{58.4}{1 + 10^{(pH-7.204)}}$$

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

(I) **The thirty (30)-day average concentration of total ammonia nitrogen (in mg N/L) shall not exceed, more than once every three (3) years on the average, the CCC (chronic criterion) calculated using the following equations:**

When fish early life stages are present—

$$CCC = \left( \frac{0.0577}{1 + 10^{(7.688 - \text{pH})}} + \frac{2.487}{1 + 10^{(\text{pH} - 7.688)}} \right) \times \text{MIN} (2.85, 1.45 \times 10^{(0.028 * (25 - T))})$$

When fish early life stages are absent—

$$CCC = \left( \frac{0.0577}{1 + 10^{(7.688 - \text{pH})}} + \frac{2.487}{1 + 10^{(\text{pH} - 7.688)}} \right) \times 1.45 \times 10^{(0.028 * (25 - \text{MAX} (T, 7)))}$$

Where T = water temperature in degree Celsius (C)

(II) In addition, the highest four (4)-day average within the thirty (30)-day period shall not exceed two and one half (2.5) times the CCC.

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

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

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

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

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

(C) Bacteria. [Protection] The protection of whole body contact recreation is limited to classified waters designated for that use. [Either of the following bacteria criterion shall apply until December 31, 2008; at which time, only E coli criterion shall apply.] The recreational season is from April 1 to October 31.

[1. Fecal coliform bacteria—the fecal coliform count shall not exceed the criterion listed in Table A as a geometric mean during the recreational season in waters designated for whole body contact recreation. The fecal coliform count shall not exceed two hundred (200) per one hundred milliliters (100 mL) at any time in losing streams. For waters designated for secondary contact recreation, the fecal coliform count shall not exceed one thousand eight hundred (1,800) per one hundred milliliters (100 mL) as a geometric mean during the recreational season; or]

[2. E coli bacteria—the] The E. coli count shall not exceed the criterion listed in Table A as a geometric mean during the recreational season in waters designated for whole body contact recreation. The E. coli count shall not exceed one hundred twenty-six (126) per one hundred milliliters (100 mL) at any time in losing streams. For waters designated for secondary contact recreation, the E. coli count shall not exceed one thousand one hundred thirty-four (1,134) per one hundred milliliters (100 mL) as a geometric mean during the recreational season.

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

(J) Dissolved Oxygen. Water contaminants shall not cause the dissolved oxygen to be lower than the levels described in Table A or [as indicated in paragraph (4)(A)3] Table K—Site-Specific Criteria.

(L) Sulfate and Chloride Limit for Protection of Aquatic Life.

1. Streams with [seven (7)-day  $Q_{10}$ ] 7Q10 low flow of less than one (1) cubic foot per second. The concentration of chloride plus sulfate shall not exceed one thousand milligrams per liter (1,000 mg/L). Table A includes additional chloride criteria.

2. Class P1, L1, L2, and L3 waters and streams with [seven (7)-day  $Q_{10}$ ] 7Q10 low flow of more than one (1) cubic foot per second. The total chloride plus sulfate concentration shall not exceed the estimated natural background concentration by more than twenty percent (20%) at the [sixty (60)-day  $Q_{10}$ ] 60Q10 low flow.

(N) Nutrients and Chlorophyll.

1. Definitions.

A. For the purposes of this rule—

(I) All lakes and reservoirs shall be referred to as "lakes"; and

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

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

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

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

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

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

C. Criteria values.

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

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

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

(b) There are no point source wastewater discharges

and no concentrated animal feeding operations within the watershed;

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

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

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

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

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

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

A. Total phosphorus (TP)—

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

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

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

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

B. Total nitrogen (TN)—

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

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

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

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

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

(I) Plains: Chl:TP = 0.44;

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

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

4. All TP, TN, and chlorophyll concentrations must be calculated as the geometric mean of a minimum of four (4) samples

per year for four (4) consecutive years. All samples must be collected from the surface, near the outflow end of the lake, and during the period May 1–August 31.

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

((O))/(P) Criteria to protect designated uses are based on current technical literature, especially the Environmental Protection Agency's publication, *Quality Criteria for Water*, 1986. Criteria may be modified or expanded as additional information is developed or as needed to define narrative criteria for particular situations or locations.

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

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

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

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

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

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

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

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

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

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

4. Site-specific criteria shall include both chronic and acute

concentrations to better reflect the different tolerances of resident species to the inherent variability between concentrations and toxicological characteristics of a chemical.

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

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

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

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

(5) Groundwater.

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



Table A—Criteria for Designated Uses

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

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

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

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

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

Pollutant (/100 mL)	WBC-A	WBC-B	SCR
<i>[Fecal Coliform Bacteria</i> *	200		1800]
<i>E. coli</i> Bacteria**	126	[548]206	1134

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

Pollutant	AQL	
Temperature (maximum)	°F	°C
warm-water	90	32 2/9
cool-water	84	28 8/9
cold-water	68	20
Temperature (maximum change)		
warm-water	5	2 7/9
cool-water	5	2 7/9
cold-water	2	1 6/9

Pollutant (percent saturation)	AQL
Total Dissolved Gases	110%

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

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

\*See Metals (Hardness Dependent)

AQL = Protection of Aquatic Life

Pollutant ( $\mu\text{g/L}$ )	AQL	
Metals (Hardness Dependent)		
Cadmium ( $\mu\text{g/L}$ )	Acute:	$e^{(1.0166 \cdot \ln(\text{Hardness}) - 3.062490)} * (1.136672 - (\ln(\text{Hardness}) * 0.041838))$
	Chronic:	$e^{(0.7409 \cdot \ln(\text{Hardness}) - 4.719948)} * (1.101672 - (\ln(\text{Hardness}) * 0.041838))$
Chromium III ( $\mu\text{g/L}$ )	Acute:	$e^{(0.8190 \cdot \ln(\text{Hardness}) + 3.725666)} * 0.316$
	Chronic:	$e^{(0.8190 \cdot \ln(\text{Hardness}) + 0.684960)} * 0.860$
Copper ( $\mu\text{g/L}$ )	Acute:	$e^{(0.9422 \cdot \ln(\text{Hardness}) - 1.700300)} * 0.960$
	Chronic:	$e^{(0.8845 / 0.8545 \cdot \ln(\text{Hardness}) - 1.2044953 / 1.702)} * 0.960$
Lead ( $\mu\text{g/L}$ )	Acute:	$e^{(1.273 \cdot \ln(\text{Hardness}) - 1.460448)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$
	Chronic:	$e^{(1.273 \cdot \ln(\text{Hardness}) - 4.704797)} * (1.46203 - (\ln(\text{Hardness}) * 0.145712))$
Nickel ( $\mu\text{g/L}$ )	Acute:	$e^{(0.8460 \cdot \ln(\text{Hardness}) + 2.255647)} * 0.998$
	Chronic:	$e^{(0.8460 \cdot \ln(\text{Hardness}) + 0.058978)} * 0.997$
Silver ( $\mu\text{g/L}$ )	Acute:	$e^{(1.72 \cdot \ln(\text{Hardness}) - 6.588144)} * 0.850$
Zinc ( $\mu\text{g/L}$ )	Acute:	$e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.884211 / 0.884)} * [0.978 / 0.98]$
	Chronic:	$e^{(0.8473 \cdot \ln(\text{Hardness}) + 0.785271 / 0.884)} * [0.986 / 0.98]$

	Hardness								
	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250+
Cadmium									
Acute:	2.4	3.6	4.8	5.9	7.1	8.2	9.4	10.5	11.6
Chronic:	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5
Chromium III									
Acute:	323	450	570	684	794	901	1,005	1,107	1,207
Chronic:	42	59	74	89	103	117	131	144	157
Copper									
Acute:	7	10	13	17	20	23	26	29	32
Chronic:	[4] 5	[6] 7	[7] 9	[9] 11	[10] 13	[12] 14	[13] 16	[15] 18	[16] 20
Lead									
Acute:	30	47	65	82	100	118	136	154	172
Chronic:	1	2	3	3	4	5	5	6	7
Nickel									
Acute:	261	367	469	566	660	752	842	930	1,017
Chronic:	29	41	52	63	73	84	94	103	113
Silver									
Acute:	1.0	2.0	3.2	4.7	6.5	8.4	10.6	13.0	15.6
Zinc									
Acute:	65	92	117	142	165	188	211	233	255
Chronic:	[59] 65	[84] 92	[107] 117	[129] 142	[151] 165	[172] 188	[193] 211	[213] 233	[233] 255

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

Pollutant ( $\mu\text{g/L}$ )	AQL	HHF	DWS	GRW
<b>Organics</b>				
Acrolein		780	320	320
Bis-2-chloroisopropyl ether		4,360	1,400	1,400
2, chlorophenol		400	.1	.1
2,4-dichlorophenol	7	790	93	93
2,4-dinitrophenol		14,000	70	70
2,4-dimethylphenol		2,300	540	540
2,4,5-trichlorophenol		9,800	2,600	2,600
2,4,6-trichlorophenol		6.5	2	2
2-methyl-4,6-dinitrophenol		765	13	13
Ethylbenzene	320		700	700
Hexachlorocyclopentadiene	.5		50	50
Isophorone		2,600	36	36
Nitrobenzene		1,900	17	17
Phenol	100		100	300
Dichloropropene		1,700	87	87
Para(1,4)-dichlorobenzene		2,600	75	75
Other Dichlorobenzenes		2,600	600	600
1,2,4-trichlorobenzene		940	70	70
1,2,4,5-tetrachlorobenzene		2.9	2.3	2.3
pentachlorobenzene		4.1	3.5	3.5
1,1,1-trichloroethane			200	200
1,1,2-trichloroethane		42	5	5
2,4-dinitrotoluene		9	.11	.04
1,2-diphenylhydrazine		.54	.04	.04
di (2-ethylhexyl) adipate			400	400
n-nitrosodiphenylamine		16	5	5
n-nitrosopyrrolidene		91.9		
2-chloronaphthalene	4,300			
n-nitrosodi-n-propylamine		1.4		
<b>Pesticides</b>				
Demeton	.1			
Endosulfan				
chronic—	.056			
acute—	0.11			
Guthion	.01			
Malathion	.1			
Parathion	.04			
2,4-D			70	70
2,4,5-TP			50	50
Chlorpyrifos	.04			
Alachlor			2	2
Atrazine			3	3
Carbofuran			40	40
Dalapon			200	200
Dibromochloropropane			.2	.2
Dinoseb			7	7
Diquat			20	20
Endothall			100	100
Ethylene dibromide			.05	.05
Oxamyl (vydate)			200	200
Picloram			500	500
Simazine			4	4
Glyphosate			700	700

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Health Advisory Levels

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

DWS = Drinking Water Supply  
GRW = Groundwater

## Health Advisory Levels (continued)

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



Table B2. Chronic Criteria for Total Ammonia Nitrogen (mg N/L): Early Life Stage absent<sup>(3)(4)</sup>

<i>pH</i>	<i>Temperature (°C)</i>																
	<i>0-7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>18</i>	<i>20</i>	<i>22</i>	<i>24</i>	<i>26</i>	<i>28</i>	<i>30</i>
6.5	10.8	10.1	9.5	8.9	8.3	7.8	7.3	6.8	6.4	6.0	5.3	4.6	4.1	3.6	3.1	2.8	2.4
6.6	10.7	9.9	9.3	8.7	8.2	7.7	7.2	6.7	6.3	5.9	5.2	4.6	4.0	3.5	3.1	2.7	2.4
6.7	10.5	9.8	9.2	8.6	8.0	7.5	7.1	6.6	6.2	5.8	5.1	4.5	3.9	3.5	3.0	2.7	2.3
6.8	10.2	9.5	8.9	8.4	7.9	7.4	6.9	6.5	6.1	5.7	5.0	4.4	3.8	3.4	3.0	2.6	2.3
6.9	9.9	9.3	8.7	8.1	7.6	7.2	6.7	6.3	5.9	5.5	4.8	4.3	3.7	3.3	2.9	2.5	2.2
7.0	9.6	9.0	8.4	7.9	7.4	6.9	6.5	6.1	5.7	5.3	4.7	4.1	3.6	3.2	2.8	2.4	2.1
7.1	9.2	8.6	8.0	7.5	7.1	6.6	6.2	5.8	5.4	5.1	4.5	3.9	3.5	3.0	2.7	2.3	2.0
7.2	8.7	8.2	7.6	7.2	6.7	6.3	5.9	5.5	5.2	4.9	4.3	3.7	3.3	2.9	2.5	2.2	1.9
7.3	8.2	7.7	7.2	6.7	6.3	5.9	5.6	5.2	4.9	4.6	4.0	3.5	3.1	2.7	2.4	2.1	1.8
7.4	7.6	7.2	6.7	6.3	5.9	5.5	5.2	4.8	4.5	4.3	3.7	3.3	2.9	2.5	2.2	1.9	1.7
7.5	7.0	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.4	3.0	2.6	2.3	2.0	1.8	1.6
7.6	6.4	6.0	5.6	5.3	5.0	4.6	4.3	4.1	3.8	3.6	3.1	2.7	2.4	2.1	1.9	1.6	1.4
7.7	5.8	5.4	5.1	4.7	4.0	4.2	3.9	3.7	3.4	3.2	2.8	2.5	2.2	1.9	1.7	1.5	1.3
7.8	5.1	4.8	4.5	4.2	4.4	3.7	3.5	3.2	3.0	2.8	2.5	2.2	1.9	1.7	1.5	1.3	1.1
7.9	4.5	4.2	3.9	3.7	3.5	3.2	3.1	2.8	2.7	2.5	2.2	1.9	1.7	1.5	1.3	1.1	1.0
8.0	3.9	3.7	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	1.9	1.7	1.5	1.3	1.1	1.0	0.8
8.1	3.4	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.6	1.4	1.2	1.1	1.0	0.8	0.7
8.2	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.4	1.2	1.1	0.9	0.8	0.7	0.6
8.3	2.4	2.3	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.0	0.9	0.8	0.7	0.6	0.5
8.4	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.7	0.7	0.6	0.5	0.4
8.5	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4
8.6	1.4	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3
8.7	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2
8.8	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2
8.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2
9.0	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1

pH	Temperature °C									
	0-7	8	9	10	11	12	13	14	*15	*16
6.5	10.82	10.15	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.66	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.46	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.22	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
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	0.990
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 ELS absent is the same as the criterion for fish ELS present.

Table B3. Chronic Criteria for Total Ammonia Nitrogen (mg N/L): Early Life Stages present <sup>(5)</sup>

<i>l</i> pH	Temperature (°C)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.6	6.6	6.0	5.3	4.6	4.1	3.6	3.1	2.8	2.4
6.6	6.5	6.5	5.9	5.2	4.6	4.0	3.5	3.1	2.7	2.4
6.7	6.4	6.4	5.8	5.1	4.5	3.9	3.5	3.0	2.7	2.3
6.8	6.2	6.2	5.7	5.0	4.4	3.8	3.4	3.0	2.6	2.3
6.9	6.1	6.1	5.5	4.8	4.3	3.7	3.3	2.9	2.5	2.2
7.0	5.9	5.9	5.3	4.7	4.1	3.6	3.2	2.8	2.4	2.1
7.1	5.6	5.6	5.1	4.5	3.9	3.5	3.0	2.7	2.3	2.0
7.2	5.3	5.3	4.9	4.3	3.7	3.3	2.9	2.5	2.2	1.9
7.3	5.0	5.0	4.6	4.0	3.5	3.1	2.7	2.4	2.1	1.8
7.4	4.7	4.7	4.3	3.7	3.3	2.9	2.5	2.2	1.9	1.7
7.5	4.3	4.3	3.9	3.4	3.0	2.6	2.3	2.0	1.8	1.6
7.6	3.9	3.9	3.6	3.1	2.7	2.4	2.1	1.9	1.6	1.4
7.7	3.5	3.5	3.2	2.8	2.5	2.2	1.9	1.7	1.5	1.3
7.8	3.1	3.1	2.8	2.5	2.2	1.9	1.7	1.5	1.3	1.1
7.9	2.8	2.8	2.5	2.2	1.9	1.7	1.5	1.3	1.1	1.0
8.0	2.4	2.4	2.2	1.9	1.7	1.5	1.3	1.1	1.0	0.8
8.1	2.1	2.1	1.9	1.6	1.4	1.2	1.1	1.0	0.8	0.7
8.2	1.7	1.7	1.6	1.4	1.2	1.1	0.9	0.8	0.7	0.6
8.3	1.5	1.5	1.3	1.2	1.0	0.9	0.8	0.7	0.6	0.5
8.4	1.2	1.2	1.1	1.0	0.9	0.7	0.7	0.6	0.5	0.4
8.5	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4
8.6	0.9	0.9	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3
8.7	0.7	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2
8.8	0.6	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2
8.9	0.5	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2
9.0	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1

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
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	2.80	2.80	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	0.99	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

(1) *Salmonids present*:  $CMC = [0.275 / (1 + 10^{7.204 - pH})] + [39.0 / (1 + 10^{pH - 7.204})]$

(2) *Salmonids absent*:  $CMC = [0.411 / (1 + 10^{7.204 - pH})] + [58.4 / (1 + 10^{pH - 7.204})]$

(3) Without sufficient and reliable data, it is assumed that Early Life Stages are present and must be protected at all times of the year.

(4) Early Life Stages absent:

$$CCC = [0.0577 / (1 + 10^{7.688 - pH})] + [2.487 / (1 + 10^{pH - 7.688})] * 1.45 * 10^{0.028 * (25 - \text{MAX}(T, 7))}$$

(5) Early Life Stages present:

$$CCC = [0.0577 / (1 + 10^{7.688 - pH})] + [2.487 / (1 + 10^{pH - 7.688})] * \text{MIN}(2.85, 1.45 * 10^{0.028 * (25 - T)})$$