Missouri Clean Water Commission Meeting
Department of Natural Resources
Lewis and Clark State Office Building
LaCharrette/Nightingale Creek Conference Rooms
1101 Riverside Drive
Jefferson City, Missouri

March 9, 2012

Clean Water Commission Order of Rulemaking
10 CSR 20-7.031, Water Quality Standards

Issue: The Watershed Protection Section has prepared an Order of Rulemaking for the Water Quality Standards Regulation with an anticipated effective date of June 30, 2012.

Background: The purpose of the proposed rulemaking is to update Missouri's water quality standards to make them functionally equivalent to federal standards and to improve the clarity, specificity and effectiveness of the rule. Several of the revisions are department program development priorities, responses to decisions by the U.S. Environmental Protection Agency (EPA) and revisions as a result of petitions presented to the Commission.

The proposed rulemaking amendment was published in the *Missouri Register* on December 1, 2011. Comments were made at the January 4, 2012 public hearing. The public comment remained open through January 18, 2012.

During the public hearing, sixteen (16) individuals provided verbal comments on the proposed rule. Fifty-eight (58) written comments from individuals, municipalities and organizations were received during the public comment period. Several of the comment letters were signed by multiple individuals or organizations and a few submitted more than one comment letter. Multiple comment letters from the same entity were counted as one comment but addressed separately, where appropriate. The Department provides written responses to general comments regarding the rulemaking and specific comments where support or changes have been made. Changes proposed based on comments are described in the responses and listed at the end of the order.

Recommended Action: The Department recommends the Commission adopt the Order of Rulemaking amending 10 CSR 20-7.031, Water Quality Standards.

Suggested Motion Language: The Commission moves to adopt the Order of Rulemaking for 10 CSR 20-7.031, Water Quality Standards. The Order is to be filed with JCAR and the Secretary of State.

List of Attachments:

- Order of Rulemaking Amendment
- Proposed Amendment Published in the December 1, 2011 *Missouri Register*
- Fiscal Note Private Cost
- Fiscal Note Public Cost

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

ORDER OF RULEMAKING

By the authority vested in the Clean Water Commission under section 644.026, RSMo 2011, the Clean Water Commission amends a rule as follows:

10 CSR 20-7.031 is amended

A notice of proposed rulemaking containing the text of the proposed amendment was published in the *Missouri Register* on December 1, 2011 (36 MoReg 2521-2686). Those sections with changes are reprinted here. This proposed amendment will become effective thirty (30) days after publication in the *Code of State Regulations*.

SUMMARY OF COMMENTS: A public hearing on this proposed amendment was held January 4, 2012, and the public comment period ended January 18, 2012. At the public hearing, the Watershed Protection Section staff explained the proposed amendment and sixteen (16) comments were made. The department also received fifty-eight (58) written comments from individuals, municipalities and organizations during the public comment period. Several of the comment letters were signed by multiple individuals or organizations and a few submitted more than one comment letter. Multiple comment letters from the same entity were counted as one comment but addressed separately, where appropriate. The department's responses to these comments have been categorized as general and specific, and are located following the sixteen comments provided during the public hearing.

COMMENT #1: Aimee Davenport, Lathrop & Gage, commented on the fiscal notes stating that the department must put forth a comprehensive and diligent effort to identify all affected parties, and must ensure that its estimate is reasonable, realistic and makes good sense. The fiscal note is not complete, there are costs that have been overlooked and need to be included in this fiscal note.

RESPONSE AND EXPLANATION OF CHANGE: The department believes the fiscal note is accurate and representative of the affected parties and their projected requirements under this rulemaking. However, the department revisited the cost calculations for both the public and private fiscal notes and has updated both fiscal notes using updated cost multipliers.

COMMENT #2: Phil Walsack, Missouri Public Utility Alliance, commented that the RIR's fiscal note does not accurately describe the current cost estimates to be borne by municipal governments when these cities are required to implement the proposed water body classification system. MPUA notified the department that it was not using recent cost estimates from municipalities whose wastewater systems will be affected.

RESPONSE AND EXPLANATION OF CHANGE: The department revisited the cost calculations for both the public and private fiscal notes and has updated both fiscal notes using updated cost multipliers. The sources of updated costs referenced in the comment were either draft or aggregated costs for an entire wastewater treatment plant upgrade, projected line-item expenditures were sometimes not available.

The revised costs found in the updated fiscal notes use national, peer-reviewed cost index information and should be representative of costs in Missouri.

COMMENT #3: Mary West-Calcagno, Jacobs Engineering, commented that a subset of the municipal permittees that operate lagoon systems will be affected by this rule change and receive new requirements for ammonia that are not captured by the fiscal note. The department's ammonia implementation policy was used as a reference.

RESPONSE: The department's Permits and Engineering Section was consulted prior to the initiation of this rulemaking to determine whether ammonia from domestic wastewater treatment systems, including lagoons, would be affected by this rule change. It was determined that due to reasonable potential to exceed ammonia water quality standards from domestic wastewater sources, and limited ammonia degradation, ammonia limits would be required and included in permits for all domestic wastewater discharges regardless of the proposed classification system. As a result, ammonia and toxic pollutants would be permitted at the chronic level and not be affected by the rulemaking. No changes were made as a result of this comment.

COMMENT #4: Roger Walker, REGFORM, gave a short presentation regarding the extent of application of the federal Clean Water Act and the intent to protect navigable bodies of water and those with a significant nexus. Mr. Walker commented that based on his review of the proposed rule it is consistent with Missouri law, fits within Missouri law and is permissible within the scope of the Clean Water Act. Even so, site-specific considerations and determinations will be needed.

RESPONSE: The department agrees with Mr. Walker that the current proposal to apply default "fishable/swimmable" uses to the 1:100,000 National Hydrography Dataset, waters with permanent flow and permanent pools, and lakes with a significant nexus is a reasonable step forward toward implementing the federal Clean Water Act in Missouri. No changes were made as a result of this comment.

COMMENT #5: Trent Stober, Geosyntec Consultants, commented that while the current proposal to designate "fishable/swimmable" uses has been vetted substantially through the stakeholder process, there are still some components that go beyond where reasonable assignment of beneficial uses should extend to. An expedited Use Attainability Analyses process is needed to handle these cases. Mr. Stober also expressed concern for human health protection designated use and criteria for all waters, and specific human health criteria for arsenic, manganese, aluminum and salinity.

RESPONSE AND EXPLANATION OF CHANGE: The department agrees that there may be waters within the proposed framework that may not attain the presumed "fishable/swimmable" use designations and an expedited Use Attainability Analysis (UAA) process is needed. The department has added reference to the Commission approved stream classification protocol "Final Guidelines for Water Body Classification, March 2, 2005" to 10 CSR 20-7.031(2)(H) of the proposed rule to allow assessment discussions of aquatic life use attainment. Regarding human health protection uses, the criteria for "organism + water" will apply only to those waters with aquatic life protection and drinking water supply uses. As a result of the comment, the department has removed specific human health criteria for arsenic, iron, manganese and salinity (Total Dissolved Solids, TDS) from the proposed rule as well as chronic criteria for aluminum. With the removal of the proposed TDS criteria, drinking water supply criteria for chloride and sulfate will remain in rule and have been added back to Table A.

COMMENT #6: Steve Meyer, City of Springfield, commented that at least 47 of the streams contained within the proposed classification network in the Springfield area are either dry streams or engineered channels. Mr. Meyer expressed concern that 47 UAAs would be needed to remove the default presumed uses for these waters and the resources used to conduct those UAAs could be better spent improving appropriately classified streams.

RESPONSE AND EXPLANATION OF CHANGE: The department agrees that an expedited UAA process is needed to determine those streams that do not attain aquatic life protection and recreational uses. The department looks forward to working with the City of Springfield to develop and implement such a protocol, using the Commission approved stream classification protocol as the basis. This comment supports the earlier change adding reference to the Commission approved stream classification protocol "Final Guidelines for Water Body Classification, March 2, 2005" to 10 CSR 20-7.031(2)(H).

COMMENT #7: Robert Brundage, Newman, Comley & Ruth, P.C., commented on the addition of the human health protection use designations for "organism only" and "organism + water" and the increase in the number of standards for this use. Mr. Brundage notes that the department is not under a deadline to promulgate these new standards and that more time is needed to review them. It is suggested that the department did not provide sufficient opportunity in stakeholder meetings or the rulemaking process to review and make information comments on the new standards. Mr. Brundage recommends the human health protection criteria be deferred to a later rulemaking.

RESPONSE AND EXPLANATION OF CHANGE: As noted in the response to written comments, the department provided sufficient opportunity during the stakeholder and rulemaking process to review and make informed comments on the proposed human health protection criteria. In response to both oral and written testimony, however, the department conducted further review of the criteria for arsenic, iron, manganese and salinity. The result of this review was the removal of human health criteria for these pollutants from the proposed rule as well as the chronic aquatic life protection criterion for aluminum. These withdrawn criteria will be reviewed and recalculated, as appropriate, during the next water quality standards triennial review.

COMMENT #8: Ed Galbraith, Barr Engineering, provided comments regarding the importance of the Use Designation Dataset to be created and maintained by the department. Mr. Galbraith also commented that the proposed rule lacked a process or definition for how waters would be added to or removed from the Use Designation Dataset and recommended the Commission consider the "Final Guidelines for Water Body Classification, March 2, 2005" for this purpose. Mr. Galbraith also recommended the revised table for dissolved oxygen criteria (Table A3) be withdrawn from the proposed rule as the department, Missouri Department of Conservation and interested stakeholders were not able to reach resolution on how the revised criteria would be implemented.

RESPONSE AND EXPLANATION OF CHANGE: As a result of Mr. Galbraith's comment and others, reference to the "Final Guidelines for Water Body Classification, March 2, 2005" have been add to to 10 CSR 20-7.031(2)(H) of the proposed rule. Reference to this Commission approved protocol will allow for expedited discussions of aquatic life use attainability and refinement of a process to add or remove waters from the Use Designation Dataset. As a result of this comment and others, the revised dissolved oxygen criteria found in Table A3 of the proposed rule have been removed and the existing approved criteria reinstated.

COMMENT #9: Ron Hardecke, farmer, expressed concern regarding the cost of the proposed expansion of "fishable/swimmable" uses to an additional 84,000 miles of stream and the department's ability to manage, collect and analyze data from those streams. Mr. Hardecke also commented on the increased costs to facilities and ratepayers and the lack of estimates of cost for non-point sources of pollution that would be covered by this regulation. The Commission should reject the proposal and ask the Governor and Attorney General to push back on EPA.

RESPONSE: The department appreciates Mr. Hardecke's concern on how it will manage, collect and analyze data collected from the additional stream miles. As noted previously in other venues, should funding remain at current levels the department will adjust data collection and assessment to match departmental and state priorities. Absent increases in funding or resources, statewide assessments of water quality will take longer, be less robust and focus on priority areas and needs. No costs are expected or detailed for non-point sources of pollution as these sources are addressed using non-regulatory means under the federal Clean Water Act. No changes were made as a result of this comment.

COMMENT #10: Tom Ratermann, Boone County Regional Sewer District, provided information regarding the impact of the proposed regulations on the sewer district. The proposed regulations will result in the closure of about nine facilities, the rate impact of which has not been calculated. Mr. Ratermann asked that the Commission consider the impact on rates and the time needed to fully plan and implement improvements. The June 30, 2020 deadline should be removed or left open ended.

RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment and others, the department has removed the June 30, 2020 compliance deadline from the rule at 10 CSR 20-7.031(2)(I) and permits affected by this rule will receive compliance schedules consistent with 10 CSR 20.7.031(11) and federal regulation.

COMMENT #11: Liz Hubertz, Washington University/Missouri Coalition for the Environment, commented that the proposed rulemaking will not fully cover those waters that must be protected under the federal Clean Water Act. The proposed rulemaking also undoes the rebuttable presumption of the Clean Water Act and leaves many waters unprotected. Ms. Hubertz also commented that Missouri has had sufficient time to comply with the Clean Water Act and has avoided the cost of compliance over that period of time.

RESPONSE: The department acknowledges the need to apply "fishable/swimmable" default protections and believes the current rulemaking is consistent with federal regulations and the Clean Water Act. All waters of the state receive protection in state regulation from pollutants and conditions that would cause violations of Missouri's general (narrative) criteria, therefore no water of the state is left without protection. No changes were made as a result of this comment.

COMMENT #12: Lorin Crandall, Missouri Coalition for the Environment, commented that his experience with watersheds and CAFOs reveals that many waters would not receive designated uses and criteria protections. This impacts citizens in their ability to litigate under the Clean Water Act. Mr. Crandall also provided information on Kiefer Creek and the high bacteria amounts in the water body. The comment also included information on the uneven density of 1:100,000 scale NHD stream segments in southwest and northwest Missouri.

RESPONSE: The department believes the current rulemaking is consistent with federal regulations and the Clean Water Act. The department acknowledges there are density distribution issues with the NHD data layer in the southwest and northwest portions of the state, but will be working with the United States Geological Survey and others to ensure even coverage of applicable water bodies statewide. Regarding Kiefer Creek, as the commenter indicated the water body has been listed as impaired on the 2010 Missouri 303(d) list. A TMDL for the bacteria impairment of Kiefer Creek is under development and the department encourages Missouri Coalition for the Environment's participation in the review and implementation of this important TMDL. No changes were made as a result of this comment.

COMMENT #13: Peter Goode, Washington University/Missouri Coalition for the Environment, commented that the current rulemaking does not address the application of Clean Water Act use designations to headwater and ephemeral streams, lakes and ponds not on the 1:100,000 NHD extent, and wetlands. These three types of waters are unique and harbor aquatic life that must be protected under Missouri's regulation. A previous version of the rule that applied "fishable/swimmable" uses to all waters of the state would address these concerns.

RESPONSE: Again, the department believes the proposed framework provides for application of "fishable/swimmable" uses in a manner consistent with the goals of the Clean Water Act. The department acknowledges that the three water body types mentioned in the comment are critical to fully functioning ecosystems within a watershed. However, these waters are not without protection under the current and proposed rule. Due to the unique nature of these water bodies, the department will be initiating stakeholder discussions to discuss what additional protections or designated uses (if any) are necessary for these waters. Any changes as a result of tiered aquatic life use and wetlands discussions will be included in a future triennial review. No changes were made as a result of this comment.

COMMENT #14: Leslie Holloway, Missouri Farm Bureau, commented on the history of the development of the stream classification network and the involvement of stakeholders in the process. The comment also included the sequence of events to address deficiencies in Missouri's water quality standards. The department has taken significant steps toward addressing the deficiencies raised by EPA. The current proposed rulemaking is being forced through the process and goes beyond what is necessary with potential costs ranging from astronomical to unknown. The regulatory impact report and fiscal note underscore the magnitude of the proposal and nowhere in the proposal is an estimate of costs to farmers, ranchers and other rural landowners. These regulations are not necessary and will result in public and private resources being shifted from real water quality issues and be extremely costly and ineffective.

RESPONSE: The department believes the current proposal applies the "fishable/swimmable" rebuttable presumption of the federal Clean Water Act in a reasonable and defensible way. As noted in previous responses, the proposed rulemaking is necessary to comply with the fundamental protections of federal and state clean water law. As also noted previously, the department does not regulate non-point sources of pollution and will continue to encourage voluntary implementation of best management practices as well as offer cost share funding to reduce sources of non-point source pollution. Therefore, no additional costs are anticipated for farmers, ranchers and other rural landowners under the proposed rule. No changes were made as a result of this comment.

COMMENT #15: Jeff Theerman, Metropolitan St. Louis Sewer District (MSD), commented that MSD supports the department's decision to retain secondary contact recreation and associated bacteria

criteria for the 28.6 mile segment of the Mississippi River near St. Louis from North Riverfront Park to the confluence of the Meramec River. MSD provided a large amount of supporting data, documentation and information and appreciates the department's efforts on the issue.

RESPONSE: The department appreciates the responsiveness of MSD and its consultant to provide supplementary data, documentation and information with which to support the current proposal. No changes were made as a result of this comment.

COMMENT #16: John Carter, citizen, commented that the proposed framework for applying presumed "fishable/swimmable" uses includes water bodies on his property that do not have permanent flow or permanent pools. The department or EPA should have to prove that there are uses and that there is actually something to be protected. The Clean Water Act has done a lot of good and the department and EPA have done good things by requiring treatment plants but things are reaching the point of requiring too stringent limits. We should need to step back and look at what's actually happened out there and be real proud of what has been accomplished.

RESPONSE: The Clean Water Act and implementing regulations at 40 CFR 131 provide for a rebuttable presumption of "fishable/swimmable" uses for the nation's waters. The department and EPA are not required to rebut the presumption of "fishable/swimmable" prior to application of these uses. However, the Clean Water Act and state regulation provide the necessary framework for rebutting the presumption of "fishable/swimmable" through the use attainability analysis process. The department appreciates the comment and Mr. Carter's dedication and involvement in the water quality standards development process. No changes were made as a result of this comment.

GENERAL WRITTEN COMMENT #1: R. Burkhardt; T. Bush; J. Carter; C. & B. Crutchfield; M. Fick; J. Geske; C. & J. Graeler; R. Hoelscher; P. Martin; D. Mertz; D. Miller; B. Moll; J. Pitts; O. Smith; R. Sprock; W. Stemme; B. Stolte; D. Whiteside; Kuehner Farms; Caldwell Co. Farm Bureau; Callaway Co. Farm Bureau; Dunklin Co. Farm Bureau; Gasconade Co. Farm Bureau; Greene Co. Farm Bureau; Lincoln Co. Farm Bureau; Madison Co. Farm Bureau; Mercer Co. Farm Bureau; Reynolds Co. Farm Bureau; St. Francois Co. Farm Bureau; Missouri Chamber of Commerce; Missouri Pork Association; City of Independence; City of Springfield; and Missouri Coalition for the Environment commented that application of Clean Water Act Section 101(a) "fishable/swimmable" uses to the 1:100,000 National Hydrography Dataset (NHD) spatial extent is arbitrary, excessive, unnecessary or will be extremely costly.

RESPONSE: The Department received a number of comments from citizens and county farm bureaus that were strongly opposed to the proposed application of presumed Clean Water Act Section 101(a) uses to more Missouri waters. The commenters felt the "reclassification of Missouri streams" under the proposed rule would arbitrarily set new water quality standards for many small streams and subject many small communities and rural citizens to increased regulatory costs and restrictions. The commenters also felt the current proposal is "excessive, unnecessary and will be extremely costly to everyone" and urged the department to resume working on the matter in a fair and open manner.

The application of presumed Clean Water Act Section 101(a) "fishable/swimmable" uses to more Missouri waters is in response to an August 8, 2000 letter from the United States Environmental Protection Agency (EPA) to the department. This letter contained a determination that Missouri's water quality standards regulation (10 CSR 20-7.031) did not fully reflect the national goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water", wherever attainable. To satisfy this determination, the department is

proposing to apply "fishable/swimmable" uses to rivers and streams spatially represented by the 1:100,000 scale National Hydrography Dataset (NHD) extent. Additionally, the Department is proposing "fishable/swimmable" presumed uses for all perennial rivers and streams and intermittent streams with permanent pools, regardless of spatial extent. To ensure complete protection of surface waters in the state, the Department is also proposing application of presumed Section 101(a)(2) uses to all lakes and reservoirs that spatially intersect or are connected to the flowlines of the rivers and streams identified above. The Department believes this rulemaking is necessary and the approach consistent with the goals and objectives of the federal Clean Water Act (CWA).

Biological data collected by the department and Missouri Department of Conservation indicate that presumed "fishable/swimmable" uses are attainable for the spatial extent and type of waters proposed to receive them. In this sense, the proposed spatial extent of presumed uses is supported by peer-reviewed data and information of attainability. Other spatial extents may or may not have data available that can be used to determined attainability of presumed uses. The department is supportive of the current proposal as a means to represent those waters requiring protection under the federal Clean Water Act without excessively adding waters that may not require such protection. Waters in the proposed rule that do not attain "fishable/swimmable" uses can have those uses removed, where they are not an existing use, using the Use Attainability Analysis (UAA) provisions in federal regulation at 40 CFR 131.10(g) and in the proposed rule.

As required by Missouri Revised Statutes (RSMo) Chapter 640.015, the department drafted and provided for public comment a Regulatory Impact Report (RIR) that estimated the environmental and economic costs and benefits of the proposed rule. The department used the most current available peer-reviewed and published data to develop the estimates of environmental and economic costs and benefits. Comments on the RIR and the department's responses can be found on the Water Protection Program's "Rules in Development" website: http://dnr.mo.gov/env/wpp/rules/wpp-rule-dev.htm. The RIR estimates costs for upgraded wastewater treatment facilities and provides a listing of facilities that may be affected by the proposed rule. Rate payers and those in charge of wastewater treatment facility upgrades as a result of this rulemaking will be most directly impacted. No regulations are being proposed that would result in increased economic costs or burden to private citizens or landowners not associated with these facilities. Moreover, the application of presumed uses to more Missouri waters under this rulemaking will not result in additional regulatory burden or permit requirements for agricultural non-point sources. The department believes the economic costs of the proposed rulemaking are appropriate and necessary to meet the minimum regulatory requirements prescribed by the federal CWA.

The department notes that the process for selecting the regulatory framework for applying Clean Water Act Section 101(a) "fishable/swimmable" uses was open and inclusive of all viewpoints interested in the rulemaking. The department agrees that "good policy comes with an open deliberative process" and believes the current rulemaking provided ample opportunity for collaborative input and deliberation on the proposed rule. The department looks forward to continued engagement with interested citizens and stakeholders as the proposed rule is adopted and implemented.

GENERAL WRITTEN COMMENT #2: Barr Engineering; REGFORM; City of Independence; City of Springfield; United States Environmental Protection Agency; and Missouri Coalition for the Environment questioned the extent and/or applicability of the 1:100,000 National Hydrography Dataset (NHD) in satisfying the requirements of the Clean Water Act Section 101(a) and the "rebuttable presumption". Some comments also indicated the application of presumed uses remains unclear.

RESPONSE AND EXPLANATION OF CHANGE: Section 101(a)(2) of the federal Clean Water Act (CWA) establishes the national goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water", wherever attainable. This section is often referred to as the "fishable/swimmable" goal of the CWA. EPA's regulation at 40 CFR 131 interprets and implements these provisions by requiring that state water quality standards provide for a default use designation of "fishable/swimmable", unless those uses have been shown to be unattainable through a use attainability analysis. In short, waters of the United States are presumed to have a default use designation of "fishable/swimmable" as a rebuttable presumption. The proposed rule language at 10 CSR 20-7.031(2) establishes and implements default "fishable/swimmable" uses in Missouri's water quality standards.

It is the department's intention to apply presumed "fishable/swimmable" uses beyond those already contained within Tables G and H of 10 CSR 20-7.031, having received notice from EPA in its letter of September 8, 2000, that the existing extent was insufficient. To resolve this issue, the department is proposing to apply default "fishable/swimmable" uses to rivers and streams spatially represented by the 1:100,000 scale National Hydrography Dataset (NHD) extent. Additionally, the department is proposing "fishable/swimmable" presumed uses for all perennial rivers and streams and intermittent streams with permanent pools, regardless of spatial extent. Biological stream survey data collected by the Department and Missouri Department of Conservation indicate that presumed "fishable/swimmable" uses can not be satisfactorily rebutted for these two types of waters. To ensure complete protection of surface waters in the state, the department is also proposing application of presumed Section 101(a)(2) uses to all lakes and reservoirs that spatially intersect or are connected to the flowlines of the rivers and streams identified above. The department believes this approach is consistent with the goals and objectives of the federal CWA in applying default "fishable/swimmable" uses. A comment by the EPA indicates these actions will "move the state closer to the Clean Water Act's requirement to assign default uses." In response to a related EPA comment on the Use Designation Dataset, the dataset will contain refined locational information (i.e., latitude and longitude and segment length) and uses for newly designated waters in 10 CSR 20-7.031(2)(A) as well as those currently contained in Tables G and H of the rule. Additionally, the use designation dataset language has been revised to indicate that the department will both "create and maintain" the spatial dataset.

It is important to note that Section 101(a)(2) of the federal CWA presumes that waters of the United States meet "fishable/swimmable" uses. No demonstration, use attainability analysis, "on-ramp" or other procedure is required to apply presumed use designations to Missouri waters under the rebuttable presumption. Having such a procedure would undermine and run counter to the "fishable/swimmable" goal set forth by the United States Congress in 1972. However, the department recognizes that use attainability analysis frameworks need to be available to the department and stakeholders. To this end, the department has included reference to both stream classification and recreational UAA guidance approved by the Commission in the proposed rule. These guidance form the basis for current and future discussions on use attainability for newly designated waters subject to this rulemaking.

Regarding the issue of applying presumed uses to headwater streams, lakes and ponds not on the proposed 1:100,000 NHD and wetlands, the department will be convening a stakeholder group to address designating and applying beneficial use protections to these unique systems during a future triennial review.

GENERAL WRITTEN COMMENT #3: Little Blue Valley Sewer District; Metropolitan St. Louis Sewer District; City of Springfield; City Utilities of Springfield; City of St. Joseph; Missouri Pork Association; and United States Environmental Protection Agency commented that a new water classification framework has been proposed without approved implementation procedures.

RESPONSE AND EXPLANATION OF CHANGE: The Department received comments from municipalities, sewer districts and other interested parties requesting that approved implementation procedures be developed and adopted prior to implementation the proposed use designation framework. Implementation procedures would be used to evaluate the removal or addition of waters to the Use Designation Dataset created by this rulemaking and maintained by the department. In essence, the comments request that approved aquatic life and recreational use attainability analysis procedures be developed and made available prior to implementation of the proposed rule.

It is the department's preference that application of presumed "fishable/swimmable" uses to more Missouri waters be conducted at the state, rather than federal, level. Federal regulation at 40 CFR 131.10(k) states that, "A State is not required to conduct a use attainability analysis under this regulation whenever designating uses which include those specified in section 101(a)(2) of the Act." As a result, the department will not be conducting individual UAAs prior to implementation of the proposed rule. However, the department recognizes that UAA procedures are an accepted and necessary means to ensure Missouri waters receive appropriate protection under federal and state clean water law. The department's current recreational use attainability analysis protocol, and any future use attainability analysis protocols developed by the state, may be used to provide evidence for both the removal of a use, as well as the addition of a use. UAAs intended for recreation in and on the water shall be performed in accordance with methods and procedures as found in "Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol, December 19, 2007" which has been incorporated into rule by reference. UAAs intended for aquatic life protection shall be performed in accordance with methods and procedures approved by the Missouri Clean Water Commission (Commission). To date, no formal aquatic life protection UAA survey and assessment protocol has been approved by the Commission.

The department remains committed to working with interested stakeholders to develop an aquatic life protection UAA survey and assessment protocol. In the interim, the Commission approved stream classification protocol "Final Guidelines for Water Body Classification, March 2, 2005" may be used to begin assessment discussions of aquatic life use attainment. To facilitate these discussions, language referencing the approved stream classification protocol has been added to 10 CSR 20-7.031(2)(H) of the proposed rule. Future aquatic life protection UAA survey and assessment protocols developed through the stakeholder process will replace and supersede this protocol once available and approved by the Commission. The department appreciates the additional stream network data and information provided by municipalities, sewer districts and interested stakeholders in their comments and encourages continued participation in the process.

GENERAL WRITTEN COMMENT #4: Barr Engineering; City of Independence; City of Springfield; Newman, Comley & Ruth P.C. on behalf of the Doe Run Company; and John Carter commented that the proposed revisions to 10 CSR 20-7.031 subsection (2)(D), the Use Designation Dataset, and subsection (1)(Z), "waters of the state", result in several water bodies inaccurately receiving presumed "fishable/swimmable" uses.

RESPONSE: A few comments provided locational data and information regarding waters or structures found on the 1:100K National Hydrography Dataset spatial extent that do not meet the proposed definition of "waters of the state" found in the current rulemaking. If accurate, these waters should not receive presumed "fishable/swimmable" uses or be included in the "Use Designation Dataset". The department appreciates this additional data and information and will consider it when compiling the Use Designation Dataset for publication. Waters retained in the Use Designation Dataset may be investigated in the future using applicable UAA protocols for the removal of aquatic life and/or recreational uses. No changes were made in response to these comments.

GENERAL WRITTEN COMMENT #5: Barr Engineering and Missouri Public Utility Alliance commented that the fiscal notes were inadequate and the department should withdraw the fiscal note for the proposed rulemaking and base a new analysis on the 604(b) Statewide Wastewater Assessment Report, preliminary engineering reports and facility plans, and cost estimates contained in the current project list for participation in the State's Clean Water Revolving Fund.

RESPONSE AND EXPLANATION OF CHANGE: The Regulatory Impact Report (RIR) process outlined at 640.015 RSMo requires that the department develop a best estimate of costs based on available peer-reviewed and published data. The cost estimates and analyses presented in the RIR and subsequent public and private fiscal notes were the best available at the time of their development. Discussions with Financial Assistance Center staff indicated the cost estimates were reasonable and consistent with what staff had seen for state revolving fund projects. These discussions took place during normal business activities regarding the RIR and fiscal notes and no memoranda or documents were created. Future confirmations of cost estimates will generate such documents that will be included in the administrative record. Regarding the public and private fiscal notes in particular, the department has reviewed the most recent construction cost information available and updated the fiscal notes accordingly.

The public notice period for the RIR took place from June 12, 2011 until August 12, 2011 and the proposed rule and fiscal notes were filed with the Missouri Secretary of State on October 31, 2011. The 604(b) Statewide Wastewater Assessment Report was a draft product until submitted to the department in September 2011. Past stakeholder discussions regarding rulemaking and permit decisions have conveyed a strong message that draft guidance and information should not be used as the basis for department decisions. Because the 604(b) Statewide Wastewater Assessment Report was draft until just before filing the proposed rule, the department was not able to properly review, verify and disaggregate the information found in this report. For similar reasons, preliminary engineering reports and SRF cost estimates are considered draft until such time the wastewater treatment plant is bid and all costs related to the system have been estimated. Even then, many facilities are bid as lump sum and actual line-item costs for disinfection are not available until much later in the process. The department recognizes, however, that needs surveys and engineering report costs can be used to compare estimated with actual costs for select facilities following completion of wastewater treatment plant upgrades.

As noted in the response to comments for the Regulatory Impact Report (RIR), it is not the intention of the RIR to calculate each individual facility's potential costs as the circumstances, physical properties, and regulated populations vary greatly. Rather, the RIR requires a best estimate of the costs and impacts of the proposed rule. The Department documents estimates of the potential costs of the proposed rule with the realization that actual costs may in fact be higher or lower for any specific individual facility. For both the RIR and public and private fiscal notes, cost estimates did not take into

account other legislative and regulatory measures that may defer or provide relief from new requirements. Affordability legislation and considerations, extension of compliance schedules, variances and social/economic use attainability analyses are all means at the department and permitted facilities' disposal to reduce the potential burden of system upgrades.

GENERAL WRITTEN COMMENT #6: Barr Engineering; Little Blue Valley Sewer District; Metropolitan St. Louis Sewer District; City of Springfield; City Utilities of Springfield; City of St. Joseph commented that the department did not support the proposed rule with a Regulatory Impact Report (RIR) that captures all readily estimated costs.

RESPONSE AND EXPLANATION OF CHANGE: A number of comments revisited perceived technical shortcomings in the development of the RIR that supports the proposed rulemaking. The comments also point out that the RIR and subsequent fiscal notes did not use "recent and representative" data from the Missouri Public Utilities Alliance (MPUA). In addition, the comments point out that the RIR did not estimate or consider potential impacts to regulated entities and the state due to potential impairment decisions and resulting Total Maximum Daily Load (TMDL) studies resulting from adoption of new water quality criteria.

Regarding the latter concern, the proposed revisions to federal Section 304(a) criteria are in response to changes in EPA guidance establishing appropriate pollutant thresholds that prevent toxic effects to aquatic life and human health. Because Missouri is adopting federal criteria for these pollutants, environmental and economic costs and benefits are determined by actions at the federal level and not the state. Section 536, RSMo does not require a cost and benefit analysis when federal requirements are adopted without modification. Additionally, it is difficult to estimate the impacts due to potential impairment decisions and TMDLs when such determinations are hypothetical and absent the public participation process for impairment listing, delisting and TMDL decisions. Regardless, such determinations are not necessary when ensuring state standards are equivalent to, and as protective as, federal standards.

For responses to comments regarding the use of MPUA and other data for cost estimates, please see the response to general comment #5. As noted previously, the department has revised the public and private fiscal notes and will revisit the estimated costs found in the fiscal notes as required by state statute following implementation of the proposed rule. As also noted previously, affordability considerations and compliance schedules will be used to ensure the proposed rulemaking is implemented in a reasonable manner.

GENERAL WRITTEN COMMENT #7: Associated Industries of Missouri; Barr Engineering; Missouri Chamber of Commerce; REGFORM; Little Blue Valley Sewer District; Metropolitan St. Louis Sewer District; City of Springfield; City Utilities of Springfield; City of St. Joseph; and United States Environmental Protection Agency commented that proposed Section 304(a) criteria found in Table A (now A1, A2 and A3) are not appropriate and should be deferred to a later rulemaking. Additionally, insufficient time was provided to review these changes.

RESPONSE: A number of organizations provided comments on the proposed changes to Table A (now Tables A1, A2 and A3) of 10 CSR 20-7.031. Section 303(c) of the federal Clean Water Act requires that the state from time to time (but at least once every three years) review its applicable water quality standards and, as appropriate, modify and adopt new or revised standards. As part of Missouri's triennial review process, the department reviews and incorporates applicable numeric water quality

criteria developed by the EPA under Section 304(a) of the CWA. The proposed revisions to federal Section 304(a) criteria in Table A are in response to changes in EPA guidance establishing appropriate pollutant thresholds that prevent toxic effects to aquatic life and human health. Some of these changes necessitated the expansion of the "Human Health Protection – Fish Consumption" designated use and column in Table A to human health protection designated use columns for consumption of aquatic organisms only, as well as consumption of aquatic organisms plus water from the same source. Revisions of the human health protection designated use and criteria are consistent with EPA guidance *"Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)" EPA-822-B-00-004.* These changes are required by the federal CWA to ensure that state water quality standards are consistent and comparable to federal standards. Similar constructs toward protection of consumption of aquatic organisms and consumption of aquatic organisms plus water can be found in other state water quality standards nationally and EPA Region 7. The department notes the comment from EPA supporting the incorporation of revised Section 304(a) criteria with this rulemaking.

The need for revisions to individual Section 304(a) criteria was initially brought to the department's attention in 2007 by EPA Region 7. The department provided stakeholders with recommendations for needed revisions through the Water Protection Forum in March 2011. These recommendations were subsequently provided as draft tables for comment during the Regulatory Impact Report and proposed rule stages of the current rulemaking. The proposed rule revisions used the Missouri Secretary of State's notation for displaying additions and deletions to rules using bold text and bracketed italicized text, respectively. The department believes ample opportunity has been provided during this rulemaking to gather informed, meaningful input from stakeholders on the proposed Table A criteria changes. Because Missouri is adopting federal criteria for Section 304(a) pollutants, environmental and economic costs and benefits are determined by actions at the federal level and not the state. Section 536, RSMo does not require a cost and benefit analysis when federal requirements are adopted without modification.

As noted above, the proposed changes that update and incorporate federal Section 304(a) criteria in Missouri's Water Quality Standards were presented to stakeholders in March 2011. The proposed amendments to 10 CSR 20-7.031 were published in the Missouri Register on December 1, 2011, which opened a 45-day (plus) public notice and comment period on the proposed rule. The department believes a 45-day public notice period is sufficient time to review and provide informed comments on the draft rule. Stakeholders have had ample opportunity to review drafts of the proposed rule and accompanying tables prior to publication in the Missouri Register through the Regulatory Impact Report and Water Protection Forum processes. The department has also accommodated multiple meetings with stakeholders during the rule drafting and public notice/comment period. Extensions to public notice and comment periods may be granted provided the department can accommodate the extension and still meet its obligations under federal and state clean water law. Unfortunately, the department could not accommodate an extension to the public notice/comment period in this case. Several of the proposed amendments are time-critical revisions and any delay in establishing and filing the proposed rule would limit the state's ability to draft and implement water quality standards on its own terms. The department appreciates the comment and all stakeholder interest and participation in the water quality standards rulemaking process. No changes were made in response to this comment.

GENERAL WRITTEN COMMENT #8: Little Blue Valley Sewer District; Metropolitan St. Louis Sewer District; REGFORM; City of Springfield; City Utilities of Springfield; City of St. Joseph; United States Environmental Protection Agency commented that several proposed criteria are discretionary, not well

supported, not required by the Clean Water Act, and may lead to unnecessary determinations of impairment (organoleptic pollutants, arsenic, aluminum and trichloromethane).

RESPONSE AND EXPLANATION OF CHANGE: The Department received comments from municipalities, sewer districts and other interested parties regarding promulgation of new numeric water quality criteria based upon Section 304(a) recommendations from the EPA. As noted in the response to general comment #7, the department routinely reviews and adopts numeric water quality criteria during Missouri's water quality standards triennial review process to ensure state standards are equivalent to federal standards. EPA's movement from a solely fish consumption basis for human health protection to one that is inclusive of all potential exposure pathways (i.e., organism (fish) consumption plus consumption of water) necessitated the updates to Table A of Missouri's water quality standards. The department notes, however, that many comments are correct in that federal guidance states that the use of "organism + water" criteria are appropriate for only those waters used for both fishing and drinking water supply. Therefore, the department affirms that the "organism + water" criteria will apply only to those waters used and designated for both fishing (Aquatic Life Protection) and drinking water supply uses. The definition for "Human Health Protection" at 10 CSR 20-7.031(1)(F)3. already includes language to this effect where it defines human health protection for consumption of aquatic organisms and water "from a single source." The department notes the comment from EPA supporting the incorporation of revised Section 304(a) criteria with this rulemaking. The department also notes the comment from EPA regarding assumptions used to derive the Section 304(a) human health criteria found in this rulemaking. No changes were made as a result of EPA's comment regarding criteria derivation assumptions at this time. However, review the human health protection criteria during future water quality standards reviews may lead to changes in this provision.

Many of the comments also expressed concern that some of the new criteria are organoleptic (i.e., taste and odor) and considered discretionary in application, non-enforceable and have no toxicological basis. In particular, many comments requested the removal of newly proposed organoleptic criteria for manganese, total dissolved solids and iron. Manganese, total dissolved solids and iron are non-priority pollutants that are naturally occurring in the environment and may exceed the proposed criteria due to natural background levels. Federal regulations for non-priority pollutants at 40 CFR 131.11 require that states adopt criteria for these pollutants based on a sound scientific rationale that covers sufficient parameters to protect designated uses and both numeric and narrative criteria may be applied to meet these requirements. Upon further review, the department does not believe the proposed criterion represent the level needed to protect human health and may lead to unnecessary impairment listings due to naturally occurring conditions. Additionally, Missouri's general (narrative) criteria at 10 CSR 20-7.031(4) are sufficient to protect designated uses from the potential human health impacts related to the consumption of iron and manganese in drinking water and fish. For these reasons, the department is withdrawing the proposed "organism only" and "organism + water" criteria for manganese and iron. The department is also withdrawing the proposed total dissolved solids criterion for drinking water supply for similar reasons. The department notes, however, that the aquatic life criterion for iron will remain in effect for protection of aquatic life uses. Also due to a comment from Barr Engineering, the department will no longer be proposing an aquatic life protection value for alkalinity.

A number of comments expressed concern that the proposed human health protection criteria for arsenic are not well supported and may lead to unnecessary 303(d) listings. To support these assertions, comments provided statistics regarding the compliance rate of United States Geological Survey (USGS) gaging stations with the proposed criteria. The department cautions the use of such analyses to determine compliance with proposed water quality standards as such analyses have not been

considered or incorporated into department and Commission approved methodologies for assessing water quality. However, the department notes that further evaluation of the proposed arsenic criteria may be prudent prior to promulgation in Missouri's water quality standards. The proposed national criteria include assumptions that reflect consumption of saltwater oysters that are not endemic to Missouri streams. The proposed human health protection criteria for arsenic must reflect species and assumptions that reflect conditions in Missouri waters. To this end, the department is withdrawing the proposed human health criteria for arsenic and will include revised criteria in a subsequent triennial review. These revised criteria will reflect fish consumption criteria for freshwater (rather than saltwater) shellfish and finfish, and include assumptions (e.g., bioaccumulation factors) based upon available peer-reviewed literature and data for freshwater systems.

A number of comments also expressed concern that the proposed aquatic life protection chronic criterion for aluminum are not well supported and may lead to unnecessary 303(d) listings. While the proposed chronic criterion for aluminum was established under Section 304(a), further research by the department has determined that the chronic criterion may not be appropriate at this time. Questions on the scientific validity of the studies used to develop the chronic criterion (i.e., brook trout and striped bass studies) and the potential misapplication of criteria development protocols in preparing the criterion give the department pause. For these reasons, the department is withdrawing the proposed aquatic life protection chronic criterion for aluminum. The department notes, however, that the aquatic life acute criterion for aluminum will remain in effect for protection of aquatic life uses.

One comment (REGFORM) requested that recent draft EPA criteria for trichloromethane (chloroform) be used in lieu of the current Section 304(a) criteria for this pollutant. While the department acknowledges that the draft guidance for this pollutant is available, it is hesitant to incorporate draft criteria into Missouri's water quality standards. Once the proposed draft criteria become final, the department may promulgate those criteria (or other scientifically-supported criteria) into rule.

One comment (EPA) requested the total recoverable criterion for selenium be displayed as a dissolved criterion to obtain consistency with 10 CSR 20-7.031(5)(B)2.A.II. The total criterion for selenium (5 micrograms per liter) was converted to an equivalent dissolved concentration (4.6 µg/L) as recommended in the comment.

GENERAL WRITTEN COMMENT #9: Barr Engineering, Boone County Regional Sewer District and United States Environmental Protection Agency commented that the deadline for compliance with new permit requirements under the proposed "fishable/swimmable" rule at 10 CSR 20-7.031(2)(I) are in conflict with revised schedule of compliance provisions found at 10 CSR 20-7.031(11).

RESPONSE AND EXPLANATION OF CHANGE: In the proposed rule, a June 30, 2020 deadline was given for permitted facilities affected by the expansion of "fishable/swimmable" designated uses to come into compliance with new permit requirements. This deadline is similar to those established by previous rulemakings when compliance schedules longer than 3 years were required to ensure compliance with the regulation. However, the current rulemaking removes the long-standing 3 year compliance schedule provision in rule at 10 CSR 20-7.031(11) and replaces it with language referencing the federal compliance schedule regulation at 40 CFR Part 122.47. The addition of the June 30, 2020 deadline to the proposed rule limits the flexibility of the department to develop schedules of compliance that encompass and consider all regulatory requirements for affected permitted facilities, including affordability. As a result, the June 30, 2020 deadline will be removed from 10 CSR 20-7.031(2)(I) and

permits affected by this rule will receive compliance schedules consistent with 10 CSR 20.7.031(11) and federal regulation.

The department notes the comment from EPA directing attention to 40 CFR 122.47 and the May 10, 2007 memorandum from James Hanlon of EPA regarding compliance schedules. The department is aware of the implementing regulations and guidance and affirms these sources will form the basis for granting compliance schedules in Missouri. Notwithstanding other provisions of the Clean Water Act (i.e., variances), compliance schedules will be applicable to facilities that require to comply with new or revised standards established after 1977. Details and durations of compliance schedules will be site-specific and engineered to ensure water quality standards are achieved as soon as possible.

GENERAL WRITTEN COMMENT #10: Newman, Comley & Ruth P.C.; REGFORM; and United States Environmental Protection Agency commented on the variance authorizing provisions contained in the proposed rule at 10 CSR 20-7.031(12). Newman, Comley & Ruth and REGFORM believe the variance provisions are limiting and subject entities to the same tests for performance of a Use Attainability Analysis (UAA). The United States Environmental Protection Agency believes the UAA provisions are necessary and fundamental for inclusion in variance authorizing provisions and made other recommendations for language changes.

RESPONSE: The department included variance authorizing provisions in the proposed rule to ensure that variances result in improvements in water quality, gain efficiencies in the permitting and water quality standards administration process, and add general clarification of applicability to the rule. The proposed variance authorizing provisions provide permitted facilities the opportunity to seek a temporary modification to the designated use and associated water quality criteria that would otherwise be applicable without the variance. The variance is granted for a specific pollutant and beneficial use and does not otherwise modify the underlying water quality standard for the receiving water.

Federal regulation at 40 CFR 131.13 states that "States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances." The regulation goes on to state that "Such policies are subject to EPA review and approval." Past EPA guidance and memoranda have elaborated on or clarified the role of variances in administration of state water quality standards. Such clarification included providing information regarding what factors must be considered when granting variances (e.g., Johnson 1985). While it is true that variance procedures involve the same substantive and procedural requirements as removing a designated use, variances are discharger and pollutant specific, time-limited and do not modify the underlying use. EPA has been clear in its expectations that variances from water quality standards can be approved, provided the state demonstrates that meeting the standard is unattainable based on one or more of the factors outlined in 40 CFR 131.10(g).

The variance authorizing provisions must ensure that existing uses of a water body are maintained and protected. Existing uses are uses that are actually attained in a surface water body or water body segment on or after November 28, 1975, whether or not they are included in the water quality standards. Examples of degradation of existing uses of waters that can not be allowed by variance include:

1. an action that would result in the deterioration of the existing aquatic community, such as a shift from a community of predominantly pollutant-sensitive species to pollutant-tolerant species or a loss of species diversity;

2. an action that would result in a loss of a resident or indigenous species whose presence is necessary to sustain commercial or recreational activities; or

3. an action that would preclude continued use of a surface water body or water body segment for a public water supply or for recreational or commercial fishing, swimming, paddling or boating.

In short, variances allow for site-specific and time-limited consideration of use attainability. The proposed variance authorizing provisions will play a key role in providing permitted facilities sufficient time to comply with new requirements now and in the future. In cases where affordability becomes an issue, a variance should be used instead of designated use removal as the standard can ultimately be attained given enough time or resources. By maintaining the standard rather than changing it, the department and Commission can ensure that progress is made in improving water quality and attaining the standard. With variances, operating permits can be written such that reasonable progress is made toward attaining applicable water quality goals without violating federal and state clean water law that require compliance with water quality standards. These provisions will ultimately prove to be mutually beneficial for both the department and interested permitted entities. No changes were made as a result of these comments.

GENERAL WRITTEN COMMENT #11: Barr Engineering and the United States Environmental Protection Agency both made recommendations and suggestions for edits, revisions or clarification in the proposed rule language.

RESPONSE: A number of comments requested edits, revisions or clarification in the proposed rule language. Because the changes requested may have had unintended consequences or required reconvening stakeholders, the suggested or recommended changes will not be made at this time. The department intends to commence a rulemaking immediately following this current effort. No changes were made as a result of these comments and the recommended edits, revisions or clarification will be proposed and discussed during this subsequent review.

Such recommendations pertain, but are not limited to, Class E (ephemeral) waters, variance definition and language, downstream use language, "maximum" chronic toxicity language, and limits for radionuclides and other criteria. No changes were made as a result of these comments; however, these recommendations and suggestions for edits will be taken up during a future water quality standards triennial review.

SPECIFIC WRITTEN COMMENT #1: The City of Poplar Bluff Municipal Utilities and City Cable, Geosyntec Consultants and Lathrop and Gage submitted comments in support of site-specific dissolved oxygen criteria found in Table K of 10 CSR 20-7.031 for Pike Creek and Main Ditch, Bulter County. The Missouri Department of Conservation provided comments of concern regarding the site-specific criteria.

RESPONSE: The site-specific dissolved oxygen daily average criterion of 4.7 mg/L and daily minimum criterion of 2.6 mg/L for Pike Creek and Main Ditch were developed using a reference condition approach and represent the highest attainable criteria for these water bodies. The department appreciates the support of the City of Poplar Bluff and its representatives on this matter and looks

forward to working with the city to implement the criteria once approved. No changes were made as a result of this comment.

The department notes the comment provided by the Missouri Department of Conservation expressing concern that the proposed criteria do not take into account early life stages of fish. The department acknowledges that while early life stages were not included as a component of the criteria as proposed, the development methodology of the criteria based upon regional reference streams should ensure the proposed criteria are protective of these sensitive life stages. Future analyses of site-specific dissolved oxygen for these streams will include a more thorough analysis of early life stages. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #2: Newman, Comley & Ruth P.C. on behalf of Missouri Agribusiness Association commented in support of revised sulfate and chloride criteria in Table A2, 10 CSR 20-7.031.

RESPONSE: The department appreciates the support of the Missouri Agribusiness Association on this matter and is pleased to satisfy the petition submitted to the Missouri Clean Water Commission requesting these revisions. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #3: Ameren Services; Barr Engineering; REGFORM commented that the expanded dissolved oxygen criteria in Table A3 of the proposed rule require additional discussion and development. The Missouri Department of Conservation commented in support of a framework for determination of early life stages.

RESPONSE AND EXPLANATION OF CHANGE: The department included expanded dissolved oxygen criteria in Table A3 of the proposed rule to address stakeholder and Commission concerns that the current dissolved oxygen minimum criterion found in rule is overprotective or unattainable in some Missouri streams. A number of external stakeholders representing municipal, industrial and agricultural interests have expressed concern regarding the expansion of dissolved oxygen criteria in Table A3 of the proposed rule. In particular, stakeholders have concerns that the details for making determinations of early life stages present (or absent) have not been thoroughly developed or vetted for comment. The department acknowledges that while details for making early life stages determinations have been discussed, they have not been fully developed or discussed such that stakeholder consensus has been obtained. For these reasons, the department will defer implementation of the proposed expanded dissolved oxygen criteria until such time that early life stage determination procedures have been developed. The department notes, however, that the lack of expanded dissolved oxygen criteria may result in additional impairment listings for waters where the existing dissolved oxygen criterion may not be appropriate.

Regarding early life stages in general, the department notes and appreciates the support and involvement of the Missouri Department of Conservation in developing a framework for determination of early life stages. The department looks forward to working with MDC and other interested stakeholders to resolve this issue.

SPECIFIC WRITTEN COMMENT #4: Newman, Comley & Ruth, P.C. commented that the department should withdraw the proposed addition of subparagraph 4, 10 CSR 20-7.031(5)(C)4. that applies bacteria criteria to losing streams.

RESPONSE: As noted in the comment, the current Water Quality Standards state that the *E. coli* count shall not exceed one hundred twenty-six (126) per one hundred milliliters (100 mL) of water at any time in losing streams. The framework for this particular standard dates back to the Water Quality Standards published August 1, 1984. Those standards stated *"the fecal coliform count shall not exceed a geometric mean of two hundred (200) colonies per one hundred milliliters (100 ml) during the recreational season from April 1 to October 31 in waters designated for whole-body-contact recreation* or ***at any time in losing streams*** (bold emphasis added). The intent of the current triennial review was not to change or revise this provision. Rather, the changes found in the "Bacteria" section of the rule, including those found at 10 CSR 20-7.031(5)(C), reformat the effective provisions to increase their clarity and to accommodate changes to the existing Table A.

Any change in the magnitude, duration or frequency of the bacteria provision for losing streams would require an examination of economic and environmental costs and benefits. Because the Regulatory Impact Report did not estimate the economic and environmental costs and benefits of removing the instantaneous maximum bacteria criterion for losing streams, the request to remove this provision from rule cannot be considered at this time. However, the Department agrees that the bacteria criterion for losing streams merits further review and intends to review and revise (if applicable) this provision during a subsequent water quality standards triennial review. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #5: The Metropolitan St. Louis Sewer District (MSD) provided a letter of support for the department's decision to retain the Secondary Contact Recreation (SCR) use designation for the 28.6 mile segment of the Mississippi River from North Riverfront Park to the Meramec. The United States Environmental Protection Agency requests all available data and information in order to review the decision.

RESPONSE: The department's decision to retain SCR for this segment of the Mississippi River was the result of discussions and review of additional data and information supplied by MSD in the report, "Supplemental Information for the Mississippi River Whole Body Contact Recreational Use Attainability Analysis." The department appreciates the comment and cooperation of MSD as the data and information were being reviewed. No changes were made as a result of this comment.

In regard to the United States Environmental Protection Agency request for all available data and information, the department intends to provide documentation containing this information in support of the decision upon submittal of the water quality standards package. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #6: The Metropolitan St. Louis Sewer District (MSD) commented that the department should remove the whole body contact recreation (swimming) designated use from the 1.6 mile segment of Black Creek in St. Louis.

RESPONSE: Available data and information for the water body indicate the whole body contact recreation use can not be satisfactorily rebutted for this water body based on depth measurements greater than 1 meter taken during a 2007 stream survey. While the measurements in question were taken before the current "Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol, December 19, 2007", the measurements were obtained using standard and defensible methods.

The situation for Black Creek is similar to a number of other waters addressed during the 2009 water quality standards triennial review [Missouri Register, September 15, 2009, Vol. 34, No. 18, page 2007] and the department's decision with respect to Black Creek is consistent with this earlier rulemaking. The department was able to verify the method used to collect the maximum depth measurement (i.e., measured, not visual observation) and the data were collected during appropriate conditions (i.e., during base flow conditions). To corroborate this information, the 2008 UAA data were again reviewed by the department. Recorded depths of up to 0.9 meters during the 2008 UAA were measured during a very dry period, with only 0.98 inches of measurable precipitation in the 31 days preceding the UAA. Such conditions make rebutting the 1 meter measurement obtained a year earlier difficult. For these reasons, the department retained the whole body contact recreation use for Black Creek for this rulemaking. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #7: The Missouri Department of Conservation, United States Environmental Protection Agency, and Missouri Coalition for the Environment commented that the department should recognize and protect the unique diversity of warm, cool, and cold water fisheries, communities and biota found in the state and define those designated uses. Barr Engineering commented that the department should develop tiered aquatic life framework before promulgating the proposed rulemaking and that the exceptional aquatic community use designation not be assigned.

RESPONSE: The department appreciates the refinements in rule language provided by MDC that would recognize the diversity of fishery and aquatic communities in the state. Because the department intends on convening a wider stakeholder group on tiered aquatic life use designations in the near future, the refinements provided by MDC will be added to that administrative record. The department appreciates and welcomes the participation of MDC and other interested stakeholders in this extremely important workgroup. The department acknowledges and appreciates MDC's support for the new exceptional aquatic community designated use found in the proposed rule. Because it provides for designation of unique aquatic communities, the definition will not be removed from the proposed rulemaking. However, the tired aquatic life protection framework will contain the required methodology for applying this designated use.

Because tiered aquatic life use designations will involve categorizing and defining aquatic assembledges, the department is deferring refinement or revision of the warm, cool and cold water fishery definitions (and that of recreationally important fish species) to a future water quality standards triennial review when these topics will be addressed in more detail. No changes were made as a result of this comment.

SPECIFIC WRITTEN COMMENT #8: Kingsford Manufacturing Company submitted a comment requesting the department amend the Table J (Losing Streams) entry for Dry Fork Creek, Maries County.

RESPONSE AND EXPLANATION OF CHANGE: Available information, data and GIS coverages provided by Kingsford and the department's Division of Geology and Land Survey (DGLS) indicate a change in the legal description and mileage of the losing segment of Dry Fork Creek is appropriate. The single entry of Dry Fork Creek, Maries County in Table J of 10 CSR 20-7.031 will be amended into two entries for the water body. Information from the comment letter and GIS data for gaining/losing streams result in the following entries, where deletions are in bracketed italics and additions are in bold:

Stream Name	Counties	Miles	From	To
Dry Fk.	Maries Gasconade	*[11.0]* **7.7**	*[SE SE SE 25 40N 08W]* **NE NE NW 05 40N 7W**	SE SW NW 29 41N 06W

Dry Fk.	**Maries**	**5.6**	**SE SE SE 25 40N 08W**	**SE SE NE 07 40N 07W**

Based on available GIS coverages, the total gaining segment of Dry Fork Creek would be 1.8 miles, not 2 miles as is stated in the comment. This mileage was calculated using available GIS data for this stream, which according to DGLS, is accurate. The department appreciates the opportunity to amend the entry for Dry Fork Creek with this rulemaking.

10 CSR 20-7.031 Water Quality Standards

(2) Designation of Uses.

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

1. All perennial rivers and streams;
2. All intermittent streams with permanent pools;
3. All rivers and streams spatially represented by the 1:100,000 scale National Hydrography Dataset (NHD); and
4. All lakes and reservoirs that spatially intersect or are connected to the flowlines of rivers and streams identified in paragraph (2)(A) 3;

support the following designated uses: General warm-water fishery; Human health protection; Whole body contact recreation Category B; Secondary contact recreation; Livestock and wildlife protection; and Irrigation uses, as defined in this rule. The Commission shall designate such water bodies accordingly, unless this presumption is properly rebutted through a Use Attainability Analysis as described below.

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

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

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

(E) In accordance with 40 CFR 131.10(j), a use attainability analysis (UAA) must be performed when the Commission:

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

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

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

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

(H) Use attainability analyses intended for aquatic life protection shall be performed in accordance with methods and procedures as found in "Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol, December 19, 2007". The Department shall maintain a copy of the referenced document and shall make it available to the public for inspection and copying at no more than the actual cost of reproduction. A copy of this document may be obtained by writing to the Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102.

(I) Schedule of Compliance. Notwithstanding the provisions for complying with bacteria requirements under 10 CSR 20-7.015(9)(H), any new effluent limitations for discharges affected by subsection (2)(A) of this rule shall be implemented within a reasonable time schedule for achieving full compliance, as described in a permit or other legally enforceable mechanism.

Also see separate tables A1, A2 and A3 as attachments.

REVISED PUBLIC COST: This proposed amendment will cost publicly owned, domestic wastewater-treatment facilities $47,572,669 in the aggregate for the construction of wastewater treatment system upgrades as required by this rulemaking, and, $46,827,031 annually thereafter for operation and maintenance.

REVISED PRIVATE COST: This proposed amendment will cost privately owned, domestic wastewater-treatment facilities $39,496,328 in the aggregate for the construction of wastewater treatment system upgrades and, $26,089,726 annually thereafter for operation and maintenance.

FISCAL NOTE
PUBLIC COST

I. RULE NUMBER

Rule Number and Name:	10 CSR 20-7.031 Water Quality Standards
Type of Rulemaking:	Proposed Amendment

This rulemaking includes revisions that ensure that state water quality standards (WQS) are functionally equivalent to federal standards and that improve the clarity, specificity and effectiveness of the rule. In summary, the revisions include the following:

Clean Water Act Section 101(a) use designations: The department is providing a recommendation which responds to the U.S. Environmental Protection Agency (EPA) request that Missouri expand its classification system to currently unclassified waters, or otherwise satisfy the rebuttable presumption of "fishable/swimmable" uses as required by Section 101(a) of the federal Clean Water Act. EPA notified the department of this deficiency by letter on September 8, 2000 following a previous triennial review. More recently, on February 16, 2012 federal court found that the water quality standards, as submitted in 2005, did not meet the requirements of the Clean Water Act;

Clean Water Act use designation definitions: Addition of a new use designation for Exceptional Aquatic Community will allow for better implementation and protection of aquatic communities in rule. No water body segments are being proposed for this new use designation with this rulemaking;

Addition of variance authorizing provisions: This provision would provide the basis for recommending variances to WQS when standards are not achievable through traditional regulatory approaches;

Revision of schedule of compliance language: This revision removes the current three-year maximum duration for complying with water quality-based effluent limitations. The department is revising the existing language to provide consistency with federal regulations at 40 CFR 122.47;

New or revised Clean Water Act Section 304(a) numeric water quality criteria: Additions and revisions to state water quality criteria based on review of federal criteria developed pursuant to Section 304(a) of the federal Clean Water Act. This modification would bring Missouri's WQS up-to-date with the latest version of federal Section 304(a) criteria for most pollutants;

Revised numeric water quality criteria for phenol: In response to an October 12, 2010 petition to the Missouri Clean Water Commission by the Associated Industries of Missouri, the department is proposing revised numeric water quality criteria for phenol. This revision will follow the approach and methods used by EPA in developing new Section 304(a) criteria for phenol;

Revised numeric water quality criteria for sulfate and chloride: In response to a February 5, 2010 petition to the Missouri Clean Water Commission by the Missouri Agribusiness Association, the department is proposing revised numeric water quality criteria for sulfate and chloride. This revision will follow the approach and methods used by the State of Iowa to revise its water quality criteria for these parameters;

Addition of Missouri Department of Conservation and Other Lakes: This revision would add 8 lakes managed by the Missouri Department of Conservation (MDC), and 38 other lakes with existing uses identified by the department, to the classified waters in Table G;

Changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: These changes are results from the last series of Use Attainability Analyses (UAAs) conducted in 2007 and 2008. This action would include adding whole body contact recreation (WBC) use to 23 stream segments where this use is attainable or existing, designating secondary contact recreation (SCR) to 219 stream segments where existing SCR uses were observed, and removing the WBC use on 111 stream segments where this use is unattainable;

Responding to EPA's October 29, 2009 decision on the Mississippi River: The department is also responding to EPA's October 29, 2009 decision that new or revised water quality standards are needed to satisfy the requirements of the federal Clean Water Act for a 28.6-mile segment of the Mississippi River around St. Louis that flows from North Riverfront Park to the confluence with the Meramec River. Based on an overall weight of evidence, the department affirms the current designation of Secondary Contact Recreation (SCR) and associated SCR bacteria criterion for this segment;

Revised delineation and mileages of water body segments: These improvements use more accurate Geographic Information System (GIS) data to refine delineations of start and end points of water body segments and recalculate stream mileages; and

Correction of Typographical Errors: These changes would correct several typographical errors discovered after the effective date of the last revisions to the WQS in 2009.

II. SUMMARY OF FISCAL IMPACT

This proposed amendment will cost public entities up to $47,572,669 in the aggregate for the construction of wastewater treatment system upgrades. In addition, public entities will pay up to $46,827,031 in the aggregate annually for system operation, maintenance and reporting. It is anticipated that the operation, maintenance and reporting costs will recur over the life of the rule and will vary with inflation. The majority of costs to public entities are from implementation of federal Clean Water Act Section 101(a) presumed "fishable/swimmable" uses for currently unclassified waters; no other revisions are anticipated to cost public entities.

Tables G, H and Use Designation Dataset – Clean Water Act Section 101(a) Use Designations and Changes to the Designation of Whole Body Contact Recreation and Secondary Contact Recreation as a Result of Use Attainability Analyses

Estimate of the number of entities by class which would likely be affected by the adoption of the proposed rule.	*Classification by types of the business entities which would likely be affected.*	*Estimate in the aggregate as to the cost of compliance with the rule by the affected entities.*
425 facilities may be required to install a disinfection system to comply with the bacteria standard applicable to waters with recreational uses.	Publicly owned facilities operating domestic wastewater treatment facilities (WWTFs) under a state discharge permit. Examples include: municipal and government-owned facilities with wastewater treatment.	Construction Cost = $47,572,669 Operation and Maintenance (O&M) Cost = $46,827,031 - see further breakdown of costs in worksheets below -
185 (137 - Chlorination, 48 - Ultraviolet Light)	Public facilities that do not presently disinfect wastewater discharges with design flows of less than or equal to 0.05 million gallons per day (mgd)	Construction Cost = $5,659,605 O&M Cost = $5,294,606
228 (174 - Chlorination, 54 – Ultraviolet Light)	Public facilities that do not presently disinfect wastewater discharges with design flows of greater than 0.05 mgd but less than or equal to 1.0 mgd	Construction Cost = $15,398,647 O&M Cost = $39,574,884
12 (5 - Chlorination, 7 – Ultraviolet Light)	Public facilities that do not presently disinfect wastewater discharges with design flows of greater than 1.0 mgd but less than or equal to 20.0 mgd	Construction Cost = $26,514,417 O&M Cost = $1,957,541
0	Public facilities that do not presently disinfect wastewater discharges with design flows of greater than 20.0 mgd	$0

Table A1, A2, and A3 - Changes to the Numeric Criteria for Section 304(a), phenol, sulfate and chloride

Estimate of the number of entities by class which would likely be affected by the adoption of the proposed rule.	*Classification by types of the business entities which would likely be affected.*	*Estimate in the aggregate as to the cost of compliance with the rule by the affected entities.*
0	Because these changes make the state's criteria consistent with the federal criteria, the fiscal impact of these changes are a result of federal regulations, and therefore already exist. No increase in fiscal impact is expected from this proposed state rule.	$0

III. WORKSHEET

Disinfection Systems - Cost Estimates

Chlorination

Public Entities ≤ 0.05 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 2,025		
Dechlorinator	$ 2,025		
Contact Basin	$ 9,450		
Subtotal	$ 13,500		
x 137 Entities	$ 1,849,500		
Chemicals		$ 27,000	
Misc.		$ 2,700	
Subtotal		$ 29,700	
x 137 Entities		$ 4,068,900	
25% Contingency	**$ 2,311,875**	**$ 5,086,125**	
Testing - Fecal Coliform			$ 35,978
Testing - Total Residual Chlorine			$ 22,718
Subtotal			**$ 58,695**
Total Construction Costs	**$ 2,311,875**		
Total Annual O&M and Testing Costs		**$**	**5,144,820**

Public Entities ≥ 0.05 mgd - ≤ 1.0 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 3,375		
Dechlorinator	$ 3,375		
Contact Basin	$ 14,985		
Subtotal	$ 21,735		
x 174 Entities	$ 3,781,890		
Chemicals		$ 165,817	
Misc.		$ 13,500	
Subtotal		$ 179,317	
x 174 Entities		$ 31,201,071	
25% Contingency	**$ 4,727,363**	**$ 39,001,339**	
Testing - Fecal Coliform			$ 57,092
Testing - Total Residual Chlorine			$ 36,050
Subtotal			**$ 93,142**
Total Construction Costs	**$ 4,727,363**		
Total Annual O&M and Testing Costs		**$**	**39,094,481**

Disinfection Systems - Cost Estimates
Chlorination (Continued)

Public Entities ≥ 1.0 mgd - ≤ 20 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 1,667,160		
Dechlorinator	$ 523,476		
Uniform Fire Code	$ 214,591		
Subtotal	$ 2,405,227		
x 5 Entities	$ 12,026,133		
O&M Cost		$ 183,627	
x 5 Entities		$ 918,135	
25% Contingency	**$ 15,032,666**	**$ 1,147,669**	
Testing - Fecal Coliform			$ 13,134
Testing - Total Residual Chlorine			$ 8,293
Subtotal			**$ 21,427**
Total Construction Costs	**$ 15,032,666**		
Total Annual O&M and Testing Costs		**$**	**1,169,096**

Disinfection Systems - Cost Estimates
Ultraviolet (UV) Light

Public Entities ≤ 0.05 mgd

	Capital Costs	O&M Costs	Testing Costs
UV Lamps	$ 18,725		
UV Lamp Installation	$ 18,347		
Facility Building/Structure	$ 18,725		
Subtotal	$ 55,796		
x 48 Entities	$ 2,678,184		
O&M Cost		$ 2,363	
x 48 Entities		$ 113,400	
25% Contingency	**$ 3,347,730**	**$ 141,750**	
Testing - Fecal Coliform			**$ 8,036**
Total Construction Costs	**$ 3,347,730**		
Total Annual O&M and Testing Costs		**$**	**149,786**

Disinfection Systems - Cost Estimates
Ultraviolet (UV) Light (Continued)

Public Entities ≥ 0.05 mgd - ≤ 1.0 mgd

	Capital Costs	O&M Costs	Testing Costs
UV Lamps	$ 53,055		
UV Lamp Installation	$ 51,983		
Facility Building/Structure	$ 53,055		
Subtotal	$ 158,093		
x 54 Entities	$ 8,537,027		
O&M Cost		$ 6,691	
x 54 Entities		$ 361,292	
25% Contingency	**$ 10,671,284**	**$ 451,616**	
Testing - Fecal Coliform			**$ 28,788**
Total Construction Costs	**$ 10,671,284**		
Total Annual O&M and Testing Costs		**$**	**480,403**

Public Entities ≥ 1.0 mgd - ≤ 20 mgd

	Capital Costs	O&M Costs	Testing Costs
UV Lamps	$ 520,151		
UV Lamp Installation	$ 401,936		
Facility Building/Structure	$ 390,114		
Subtotal	$ 1,312,200		
x 7 Entities	$ 9,185,401		
O&M Cost		$ 88,544	
x 7 Entities		$ 619,807	
25% Contingency	**$ 11,481,751**	**$ 774,758**	
Testing - Fecal Coliform			**$ 13,687**
Total Construction Costs	**$ 11,481,751**		
Total Annual O&M and Testing Costs		**$**	**788,445**

IV. ASSUMPTIONS

The costs assume that all installations are accomplished over a one-year period. Because most facilities will be allowed a schedule of compliance to complete construction of modified treatment systems, the estimated cost will likely be incurred over a multi-year period.

Chlorination Disinfection Systems

Cost Estimates were derived from cost estimate data provided by a National Small Flows Clearinghouse fact sheet entitled, 'Chlorine Disinfection.' Cost estimates from outside manufacturers of chlorinating tablet feeders were also used for the smaller WWTFs. The numbers in the 'Chlorine Disinfection' document were from 1995. All of the cost estimates given below have been adjusted to reflect the cost of equipment, O&M costs, and installation

cost for year 2012 using the Engineering News Record Construction Cost Index (CCI). The current 2012 CCI is 9198 (February 2012).

Analytical testing costs were established by averaging the cost of fecal coliform and total residual chlorine testing from ten (10) laboratories in Missouri and neighboring states that provide services to facilities from Missouri. The monitoring frequency of each facility is currently established in their permits and was gathered from a Department of Natural Resources database. The cost of analytical testing of fecal coliform and total residual chlorine was based on these monitoring frequencies.

Assumptions:

- For flows <= 0.05 mgd, the average daily discharge flow (ADDF) is 36,000 gallons per day (gpd) and peak flow is 144,000 gpd (peak factor of 4).
- For flows >0.05 mgd and <= 1 mgd, the ADDF is 255,000 gpd and peak flow is 894,000gpd (peak factor of 3.5).
- Chlorine dose based on peak flows.
- 10 mg/L dosing concentration.
- Tablet chlorination/dechlorination.

UV Disinfection Systems

Cost estimates were derived from cost estimate data provided by an U.S. Environmental Protection Agency document entitled, 'Ultraviolet Disinfection Technology Assessment.' The numbers in this document were from 1990. All of the cost estimates given below have been adjusted to reflect the cost of equipment, O&M costs, and installation cost for year 2012 using the Engineering News Record Construction Cost Index (CCI). The current 2012 CCI is 9198 (February 2012).

Assumptions:

- For flows <= 0.05 mgd, the ADDF is 36,000 gpd and peak flow is 144,000 gpd (peak factor of 4).
- For flows >0.05 mgd and <= 1 mgd, the ADDF is 255,000 gpd and peak flow is 894,000 gpd (peak factor of 3.5).
- For flows > 1.0 mgd, the ADDF is 3.6 mgd and peak flow is 10.81 mgd (peak factor of 3).
- 58-inch arc UV lamps were used.
- UV lamps need replacement once per year.
- 1 UV kilowatt = 37 lamps/1 mgd.
- Number of lamps are based on peak flows.
- Cost for constructing a building is approximately equals the cost of lamps for facilities using less than 100 lamps.
- Cost for constructing a building is approximately 75% the cost of lamps for facilities using more than 100 lamps.
- Lagoons were not used for UV disinfection cost.
- Includes redundancy and additional spare lamps.

FISCAL NOTE
PRIVATE COST

I. RULE NUMBER

Rule Number and Name:	10 CSR 20-7.031 Water Quality Standards
Type of Rulemaking:	Proposed Amendment

This rulemaking includes revisions that ensure that state water quality standards (WQS) are functionally equivalent to federal standards and that improve the clarity, specificity and effectiveness of the rule. In summary, the revisions include the following:

Clean Water Act Section 101(a) use designations: The department is providing a recommendation which responds to the U.S. Environmental Protection Agency (EPA) request that Missouri expand its classification system to currently unclassified waters, or otherwise satisfy the rebuttable presumption of "fishable/swimmable" uses as required by Section 101(a) of the federal Clean Water Act. EPA notified the department of this deficiency by letter on September 8, 2000 following a previous triennial review. More recently, on February 16, 2012 federal court found that the water quality standards, as submitted in 2005, did not meet the requirements of the Clean Water Act;

Clean Water Act use designation definitions: Addition of a new use designation for Exceptional Aquatic Community will allow for better implementation and protection of aquatic communities in rule. No water body segments are being proposed for this new use designation with this rulemaking;

Addition of variance authorizing provisions: This provision would provide the basis for recommending variances to WQS when standards are not achievable through traditional regulatory approaches;

Revision of schedule of compliance language: This revision removes the current three-year maximum duration for complying with water quality-based effluent limitations. The department is revising the existing language to provide consistency with federal regulations at 40 CFR 122.47;

New or revised Clean Water Act Section 304(a) numeric water quality criteria: Additions and revisions to state water quality criteria based on review of federal criteria developed pursuant to Section 304(a) of the federal Clean Water Act. This modification would bring Missouri's WQS up-to-date with the latest version of federal Section 304(a) criteria for most pollutants;

Revised numeric water quality criteria for phenol: In response to an October 12, 2010 petition to the Missouri Clean Water Commission by the Associated Industries of Missouri, the department is proposing revised numeric water quality criteria for phenol. This revision will follow the approach and methods used by EPA in developing new Section 304(a) criteria for phenol;

Revised numeric water quality criteria for sulfate and chloride: In response to a February 5, 2010 petition to the Missouri Clean Water Commission by the Missouri Agribusiness Association, the department is proposing revised numeric water quality criteria for sulfate and chloride. This revision will follow the approach and methods used by the State of Iowa to revise its water quality criteria for these parameters;

Addition of Missouri Department of Conservation and Other Lakes: This revision would add 8 lakes managed by the Missouri Department of Conservation (MDC), and 38 other lakes with existing uses identified by the department, to the classified waters in Table G;

Changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: These changes are results from the last series of Use Attainability Analyses (UAAs) conducted in 2007 and 2008. This action would include adding whole body contact recreation (WBC) use to 23 stream segments where this use is attainable or existing, designating secondary contact recreation (SCR) to 219 stream segments where existing SCR uses were observed, and removing the WBC use on 111 stream segments where this use is unattainable;

Responding to EPA's October 29, 2009 decision on the Mississippi River: The department is also responding to EPA's October 29, 2009 decision that new or revised water quality standards are needed to satisfy the requirements of the federal Clean Water Act for a 28.6-mile segment of the Mississippi River around St. Louis that flows from North Riverfront Park to the confluence with the Meramec River. Based on an overall weight of evidence, the department affirms the current designation of Secondary Contact Recreation (SCR) and associated SCR bacteria criterion for this segment;

Revised delineation and mileages of water body segments: These improvements use more accurate Geographic Information System (GIS) data to refine delineations of start and end points of water body segments and recalculate stream mileages; and

Correction of Typographical Errors: These changes would correct several typographical errors discovered after the effective date of the last revisions to the WQS in 2009.

II. SUMMARY OF FISCAL IMPACT

This proposed amendment will cost private entities up to $39,496,328 in the aggregate for the construction of wastewater treatment system upgrades. In addition, private entities will pay up to $26,089,726 in the aggregate annually for system operation, maintenance and reporting. It is anticipated that the operation, maintenance and reporting costs will recur over the life of the rule and will vary with inflation. The majority of costs to private entities are from implementation of federal Clean Water Act Section 101(a) presumed "fishable/swimmable" uses for currently unclassified waters; no other revisions are anticipated to cost private entities.

Tables G, H and Use Designation Dataset – Clean Water Act Section 101(a) Use Designations and Changes to the Designation of Whole Body Contact Recreation and Secondary Contact Recreation as a Result of Use Attainability Analyses

Estimate of the number of entities by class which would likely be affected by the adoption of the proposed rule.	*Classification by types of the business entities which would likely be affected.*	*Estimate in the aggregate as to the cost of compliance with the rule by the affected entities.*
917 facilities may be required to install a disinfection system to comply with the bacteria standard applicable to waters with recreational uses.	Privately owned facilities operating domestic wastewater treatment facilities (WWTFs) under a state discharge permit. Examples include: subdivisions and privately-owned facilities with wastewater treatment.	Construction Cost = $39,496,328 Operation and Maintenance (O&M) Cost = $26,089,726 - see further breakdown of costs in worksheets below -
880 (544 - Chlorination, 336 - Ultraviolet Light)	Private facilities that do not presently disinfect wastewater discharges with design flows of less than or equal to 0.05 million gallons per day (mgd)	Construction Cost = $32,614,110 O&M Cost = $21,428,342
36 (19 - Chlorination, 17 – Ultraviolet Light)	Private facilities that do not presently disinfect wastewater discharges with design flows of greater than 0.05 mgd but less than or equal to 1.0 mgd	Construction Cost = $3,875,684 O&M Cost = $4,431,571
1 (1 - Chlorination)	Private facilities that do not presently disinfect wastewater discharges with design flows of greater than 1.0 mgd but less than or equal to 20.0 mgd	Construction Cost = $3,006,534 O&M Cost = $229,813
0	Private facilities that do not presently disinfect wastewater discharges with design flows of greater than 20.0 mgd	$0

Table A1, A2, and A3 - Changes to the Numeric Criteria for Section 304(a), phenol, sulfate and chloride

Estimate of the number of entities by class which would likely be affected by the adoption of the proposed rule.	*Classification by types of the business entities which would likely be affected.*	*Estimate in the aggregate as to the cost of compliance with the rule by the affected entities.*
0	Because these changes make the state's criteria consistent with the federal criteria, the fiscal impact of these changes are a result of federal regulations, and therefore already exist. No increase in fiscal impact is expected from this proposed state rule.	$0

III. WORKSHEET

Disinfection Systems - Cost Estimates
Chlorination

Private Entities ≤ 0.05 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 2,025		
Dechlorinator	$ 2,025		
Contact Basin	$ 9,450		
Subtotal	$ 13,500		
x 544 Entities	$ 7,344,000		
Chemicals		$ 27,000	
Misc.		$ 2,700	
Subtotal		$ 29,700	
x 544 Entities		$ 16,156,800	
25% Contingency	**$ 9,180,000**	**$ 20,196,000**	
Testing - Fecal Coliform			$ 106,321
Testing - Total Residual Chlorine			$ 67,135
Subtotal			**$ 173,456**
Total Construction Costs	**$ 9,180,000**		
Total Annual O&M and Testing Costs		**$**	**20,369,456**

Private Entities ≥ 0.05 mgd - ≤ 1.0 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 3,375		
Dechlorinator	$ 3,375		
Contact Basin	$ 14,985		
Subtotal	$ 21,735		
x 19 Entities	$ 412,965		
Chemicals		$ 165,817	
Misc.		$ 13,500	
Subtotal		$ 179,317	
x 19 Entities		$ 3,407,014	
25% Contingency	**$ 516,206**	**$ 4,258,767**	
Testing - Fecal Coliform			$ 2,709
Testing - Total Residual Chlorine			$ 1,710
Subtotal			**$ 4,419**
Total Construction Costs	**$ 516,206**		
Total Annual O&M and Testing Costs		**$**	**4,263,186**

Disinfection Systems - Cost Estimates
Chlorination (Continued)

Private Entities ≥ 1.0 mgd - ≤ 20 mgd

	Capital Costs	O&M Costs	Testing Costs
Chlorinator	$ 1,667,160		
Dechlorinator	$ 523,476		
Uniform Fire Code	$ 214,591		
Subtotal	$ 2,405,227		
x 1 Entities	$ 2,405,227		
O&M Cost		$ 183,627	
x 1 Entities		$ 183,627	
25% Contingency	**$ 3,006,534**	**$ 229,534**	
Testing - Fecal Coliform			$ 172
Testing - Total Residual Chlorine			$ 108
Subtotal			**$ 280**
Total Construction Costs	**$ 3,006,534**		
Total Annual O&M and Testing Costs		**$**	**229,814**

Disinfection Systems - Cost Estimates
Ultraviolet (UV) Light

Private Entities ≤ 0.05 mgd

	Capital Costs	O&M Costs	Testing Costs
UV Lamps	$ 18,725		
UV Lamp Installation	$ 18,347		
Facility Building/Structure	$ 18,725		
Subtotal	$ 55,796		
x 336 Entities	$ 18,747,288		
O&M Cost		$ 2,363	
x 336 Entities		$ 793,800	
25% Contingency	**$ 23,434,110**	**$ 992,250**	
Testing - Fecal Coliform			**$ 66,636**
Total Construction Costs	**$ 23,434,110**		
Total Annual O&M and Testing Costs		**$**	**1,058,886**

Disinfection Systems - Cost Estimates
Ultraviolet (UV) Light (Continued)

Private Entities ≥ 0.05 mgd - ≤ 1.0 mgd

	Capital Costs	O&M Costs	Testing Costs
UV Lamps	$ 53,055		
UV Lamp Installation	$ 51,983		
Facility Building/Structure	$ 53,055		
Subtotal	$ 158,093		
x 17 Entities	$ 2,687,583		
O&M Cost		$ 6,691	
x 17 Entities		$ 113,740	
25% Contingency	**$ 3,359,478**	**$ 142,175**	
Testing - Fecal Coliform			**$ 26,210**
Total Construction Costs	**$ 3,359,478**		
Total Annual O&M and Testing Costs		**$**	**168,385**

IV. ASSUMPTIONS

The costs assume that all installations are accomplished over a one-year period. Because most facilities will be allowed a schedule of compliance to complete construction of modified treatment systems, the estimated cost will likely be incurred over a multi-year period.

Chlorination Disinfection Systems

Cost Estimates were derived from cost estimate data provided by a National Small Flows Clearinghouse fact sheet entitled, 'Chlorine Disinfection.' Cost estimates from outside manufacturers of chlorinating tablet feeders were also used for the smaller WWTFs. The numbers in the 'Chlorine Disinfection' document were from 1995. All of the cost estimates given below have been adjusted to reflect the cost of equipment, O&M costs, and installation cost for year 2012 using the Engineering News Record Construction Cost Index (CCI). The current 2012 CCI is 9198 (February 2012).

Analytical testing costs were established by averaging the cost of fecal coliform and total residual chlorine testing from ten (10) laboratories in Missouri and neighboring states that provide services to facilities from Missouri. The monitoring frequency of each facility is currently established in their permits and was gathered from a Department of Natural Resources database. The cost of analytical testing of fecal coliform and total residual chlorine was based on these monitoring frequencies.

Assumptions:

- For flows <= 0.05 mgd, the average daily discharge flow (ADDF) is 36,000 gallons per day (gpd) and peak flow is 144,000 gpd (peak factor of 4).
- For flows >0.05 mgd and <= 1 mgd, the ADDF is 255,000 gpd and peak flow is 894,000gpd (peak factor of 3.5).

- Chlorine dose based on peak flows.
- 10 mg/L dosing concentration.
- Tablet chlorination/dechlorination.

UV Disinfection Systems

Cost estimates were derived from cost estimate data provided by an U.S. Environmental Protection Agency document entitled, 'Ultraviolet Disinfection Technology Assessment.' The numbers in this document were from 1990. All of the cost estimates given below have been adjusted to reflect the cost of equipment, O&M costs, and installation cost for year 2012 using the Engineering News Record Construction Cost Index (CCI). The current 2012 CCI is 9198 (February 2012).

Assumptions:

- For flows <= 0.05 mgd, the ADDF is 36,000 gpd and peak flow is 144,000 gpd (peak factor of 4).
- For flows >0.05 mgd and <= 1 mgd, the ADDF is 255,000 gpd and peak flow is 894,000 gpd (peak factor of 3.5).
- For flows > 1.0 mgd, the ADDF is 3.6 mgd and peak flow is 10.81 mgd (peak factor of 3).
- 58-inch arc UV lamps were used.
- UV lamps need replacement once per year.
- 1 UV kilowatt = 37 lamps/1 mgd.
- Number of lamps are based on peak flows.
- Cost for constructing a building is approximately equals the cost of lamps for facilities using less than 100 lamps.
- Cost for constructing a building is approximately 75% the cost of lamps for facilities using more than 100 lamps.
- Lagoons were not used for UV disinfection cost.
- Includes redundancy and additional spare lamps.

Table A1		Aquatic Life Protection			Human Health Protection			DWS		IRR/LWP
POLLUTANT	**CAS #**	**Acute (µg/l)**	**Chronic (µg/l)**		**Org. + Water (µg/l)**	**Org. Only (µg/l)**				
METALS (µg/L)										
Aluminum (pH 6.5-9.0)	7429905	750								
Antimony	7440360				**5.6**	*[4,300]* **640**		6		
Arsenic	7440382	**340**	*[20]* **150**					*[50]* **10**		100
Barium	7440393				**1,000**			2,000		
Beryllium	7440417		*[5]*					4		100
Boron	7440428									2,000
Cadmium	7440439	**Table A2**	**Table A2**					5		
Chromium (Total)	7440473							100		100
Chromium (III)	16065831	**Table A2**	**Table A2**							
Chromium (VI)	18540299	*[15]* **16**	*[10]* **11**							
Cobalt	7440484									1,000
Copper	7440508	**Table A2**	**Table A2**		**1,300**			1,300		500

Iron	7439896		1,000							
Lead	7439921	**Table A2**	**Table A2**					15		
Manganese	7439965									
Mercury	7439976	*[2.4]* **1.4**	*[0.5]* **0.77**					2		
Methylmercury	22967926					**0.3 mg/kg**				
Nickel	7440020	**Table A2**	**Table A2**		**610**	**4,600**		*[100]*		
Selenium	7782492		4.6		**170**	**4,200**		50		
Silver	7440224	**Table A2**						*[50]*		
Thallium	7440280				**0.24**	*[6.3]* **0.47**		2		
Zinc	7440666	**Table A2**	**Table A2**		**7,400**	**26,000**		*[5000]*		
OTHER INORGANIC SUBSTANCES (µg/L)										
Ammonia	7664417	**Table B1**	**Tables B2 & B3**							
Asbestos	1332214				**7 million fibers/L**			7 million fibers/L		
Chloride	16887006	**Table A2**	**Table A2**					250,000		
Chlorine, Total Residual (Coldwater Aquatic Community)	7782505		2							
Chlorine, Total Residual (Warmwater Aquatic Community)	7782505	19	*[10]* **11**							

Cyanide	57125	22	*[5]* **5.2**		**140**	**140**		**200**		
E. coli Bacteria			**10 CSR 20-7.031(4)(C)**							
Fluoride								4,000		
Gases, Total Dissolved (percent saturation)		**110%**	**110%**							
Hydrogen Sulfide	7783064		2							
Nitrates	14797558				10,000			10,000		
Oil and Grease			10,000							
Oxygen, Dissolved	7782447	**Table A3**	**Table A3**							
pH			6.5 - 9							
Solids Suspended and Turbidity			**Narrative Statement**							
Sulfate		**Table A2**	**Table A2**					250000		
Temperature		**10 CSR 20-7.031(4)(D)**	**10 CSR 20-7.031(4)(D)**							
ORGANIC SUBSTANCES (µg/L)										
Benzenes										
Benzene	71432				**2.2**	*[71]* **51**		5		
Chlorobenzene	108907				**130**	*[21,000]* **1,600**		100		

1,2-Dichlorobenzene (ortho-dichlorobenzene)	95501				**420**	*[2,600]* **1,300**		600		
1,3-Dichlorobenzene (meta-dichlorobenzene)	541731				**320**	*[2,600]* **960**		600		
1,4-Dichlorobenzene (para-dichlorobenzene)	106467				**63**	*[2,600]* **190**		75		
1,2,4-Trichlorobenzene	120821				**35**	*[940]* **70**		70		
1,2,4,5-Tetrachlorobenzene	95943				**0.97**	*[2.9]* **1.1**		*[2.3]*		
Pentachlorobenzene	608935				**1.4**	*[4.1]* **1.5**		*[3.5]*		
Hexachlorobenzene	118741				**0.00028**	*[0.00074]* **0.00029**		1		
Ethylbenzene	100414		*[320]*		**530**	**2,100**		700		
Nitrobenzene	98953				**17**	*[1,900]* **690**		*[17]*		
Styrene (Vinyl Benzene)	100425							100		
Chlorinated Hydrocarbons										
Carbon Tetrachloride (Tetrachloromethane)	56235				**0.23**	*[5]* **1.6**		5		
1,2-Dichloroethane	107062				**0.38**	*[99]* **37**		5		
1,1,1-Trichloroethane	71556							200		
1,1,2-Trichloroethane	79005				**0.59**	*[42]* **16**		5		
1,1,2,2-Tetrachloroethane	79345				**0.17**	*[11]* **4.0**		*[0.17]*		
Hexachloroethane	67721				**1.4**	*[8.7]* **3.3**		*[1.9]*		

1,1-Dichloroethylene	75354				**330**	*[3.2]* **7,100**		7		
cis-1,2-Dichloroethylene	156592							70		
trans-1,2-Dichloroethylene	156605				**140**	*[140,000]* **10,000**		100		
Trichloroethylene	79016				**2.5**	*[80]* **30**		5		
Tetrachloroethylene	127184				**0.69**	*[8.85]* **3.3**		*[0.8]* **5**		
1,2-Dichloropropane	78875				**0.5**	*[39]* **15**		*[0.52]* **5**		
1,3-Dichloropropene (Dichloropropene)	542756				**0.34**	*[1,700]* **21**		*[87]*		
Other Halogenated Hydrocarbons										
Ethylene Dibromide (1,2-Dibromoethane)	106934							0.05		
Methyl Bromide (Bromomethane)	74839				**47**	*[4,000]* **1,500**		*[48]*		
[Methyl Chloride (Chloromethane)]	74873					*No STD [470]*		*[5]*		
Methylene Chloride (Dichloromethane)	75092				**4.6**	*[1,600]* **590**		*[4.7]* **5.0**		
Total Trihaloacetic Acids (HAA5)								**60**		
Total Trihalomethanes (TTHMs)								80		
Chlorodibromomethane	124481				**0.4**	*[34]* **13**		*[0.41]*		
Dichlorobromomethane	75274				**0.55**	*[46]* **17**		*[0.56]*		
Tribromomethane (Bromoform)	75252				**4.3**	*[360]* **140**		*[4.3]*		

Trichloromethane (Chloroform)	67663				**5.7**	470		*[5.7]*		
[Dichlorodifluoromethane]	*75718*		*[570,000]*							
[Trichlorofluoromethane]	*75694*		*[860,000]*							
Vinyl Chloride	75014				**0.025**	*[525]* **2.4**		2		
Ethers										
Bis(2-Chloroethyl) Ether	111444				**0.03**	*[1.4]* **0.53**		*[0.03]*		
Bis(2-Chloroisopropyl) Ether	108601				**1,400**	*[4,360]* **65000**		*[1400]*		
Bis(Chloromethyl) Ether	542881				**0.00010**	*[0.00078]* **0.00029**		*[0.00013]*		
Miscellaneous Organics										
2,3,7,8-Tetrachlorodibenzo-p-dioxin 2,3,7,8-TCDD (Dioxin)	1746016				**5.00E-09**	*[1.4E-8]* **5.1E-9**		1.3 E-08		
Di(2-ethylhexyl) adipate	103231							400		
Isophorone	78591				**35**	*[2,600]* **960**		*[36]*		
Polychlorinated Biphenyls (PCBs)			**0.014**		**0.000064**	*[0.000045]* **0.000064**		0.5		
Tributyltin (TBT)		**0.46**	**0.072**							
Nitrogen Containing Compounds										
Nitrosamines					**0.0008**	**1.24**				
N-Nitrosodibutylamine	924163				**0.0063**	**0.22**				

N-Nitrosodiethylamine	55185				**0.0008**	**1.24**				
N-Nitrosodimethylamine	62759				**0.00069**	*[8]* **3.0**		*[0.0007]*		
N-Nitrosodiphenylamine	86306				**3.3**	*[16]* **6.0**		*[5]*		
N-Nitrosodi-n-propylamine	621647				**0.0050**	*[1.4]* **0.51**				
N-Nitrosopyrrolidine	930552				**0.016**	*[91.9]* **34**				
Acrylonitrile (2-propenenitrile)	107131				**0.051**	*[0.65]* **0.25**		*[0.058]*		
Benzidine (4,4'-diaminobiphenyl)	92875				**0.000086**	*[0.00053]* **0.00020**		*[0.00012]*		
3,3'-Dichlorobenzidine	91941				**0.021**	*[0.08]* **0.028**		*[0.04]*		
1,2-Diphenylhydrazine	122667				**0.036**	*[0.54]* **0.2**		*[0.04]*		
Polynuclear Aromatic Hydrocarbons (PAHs)										
Acenaphthene	83329				**670**	*[2,700]* **990**		*[1,200]*		
Anthracene	120127				**8,300**	*[110,000]* **40,000**		*[9,600]*		
Benzo-a-Anthracene	56553				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
Benzo-a-Pyrene	50328				**0.0038**	*[0.049]* **0.018**		0.2		
Benzo-b-Fluoranthene	205992				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
Benzo-k-Fluoranthene	207089				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
2-Chloronaphthalene	91587	*[4300]*			**1,000**	**1,600**				

Chrysene	218019				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
Dibenzo-a-h-Anthracene	53703				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
Fluoranthene	206440				**130**	*[370]* **140**		*[300]*		
Fluorene	86737				**1,100**	*[14,000]* **5,300**		*[1,300]*		
Ideno(1,2,3-cd)Pyrene	193395				**0.0038**	*[0.049]* **0.018**		*[0.0044]*		
Pyrene	129000				**830**	*[11,000]* **4,000**		*[960]*		
Phthalate Esters										
Bis(2-Ethylhexyl) Phthalate	117817				**1.2**	*[5.9]* **2.2**		6		
Butylbenzyl Phthalate	85687				**1,500**	*[5,200]* **1,900**		*[3,000]*		
Diethyl Phthalate	84662				**17,000**	*[120,000]* **44,000**		*[23,000]*		
Dimethyl Phthalate	131113				**270,000**	*[2,900,000]* **1,100,000**		*[313,000]*		
Di-n-Butyl Phthalate	84742				**2,000**	*[12,000]* **4,500**		*[2,700]*		
Phenolic Compounds										
2-Chlorophenol	95578				**81**	*[400]* **150**		*[0.1]*		
2,4-Dichlorophenol	120832		*[7]*		**77**	*[790]* **290**		*[93]*		
2,4-Dimethylphenol	105679				**380**	*[2,300]* **850**		*[540]*		
2-Methyl-4,6-Dinitrophenol	534521				**13**	*[765]* **280**		*[13]*		

2,4-Dinitrophenol	51285				**69**	*[14,000]* **5,300**		*[70]*		
Dinitrophenols	25550587				**69**	**5,300**				
Pentachlorophenol	87865	**Table A2**	**Table A2**		**0.27**	*[8]* **3.0**		1		
Phenol	108952	**10,200**	*[100]* **2,560**		**10,000**	**860,000**		*[100]*		
2,4,5-Trichlorophenol	95954				**1,800**	*[9,800]* **3600**		*[2,600]*		
2,4,6-Trichlorophenol	88062				**1.4**	*[6.5]* **2.4**		*[2]*		
Toluenes										
2,4-Dinitrotoluene	121142				**0.11**	*[9]* **3.4**		*[0.11]*		
Toluene	108883				**1,300**	*[200,000]* **15,000**		1,000		
Xylenes (Total)	1330207							10,000		
PESTICIDES										
Acrolein	107028	**3**	**3**		**6**	*[780]* **9**		*[320]*		
Alachlor	15972608							2		
Aldrin	309002	**3**	**1.3**		**0.000049**	*[0.000079]* **0.000050**		*[0.00013]*		
Atrazine	1912249							3		
Carbofuran	1563662							40		

Chlordane	57749	**2.4**	**0.0043**		**0.00080**	*[0.00048]* **0.00081**		2		
Chlorpyrifos	2921882	**0.083**	*[0.04]* **0.041**					*[20]*		
Chlorophenoxy Herbicide (2,4-D)	94757				**100**			70		
Chlorophenoxy Herbicide (2,4,5,-TP)	93721				**10**			50		
Dalapon	75990							200		
Demeton	8065483		0.1							
Diazinon	333415	**0.17**	**0.17**					*[0.6]*		
1,2-Dibromo-3-chloropropane (DBCP)	96128							0.2		
4-4'-Dichlorodiphenyldichloroethylene (DDE)	72559				**0.00022**	*[0.00059]* **0.00022**		*[0.00059]*		
4-4'-Dichlorodiphenyldichloroethane (DDD)	72548				**0.00031**	*[0.00084]* **0.00031**		*[0.00083]*		
4-4'-Dichlorodiphenyltrichloroethane (DDT)	50293	**1.1**	**0.001**		**0.00022**	*[0.00059]* **0.00022**		*[0.00059]*		
Dieldrin	60571	**0.24**	**0.056**		**0.000052**	*[0.000076]* **0.000054**		*[0.00014]*		
Dinoseb	88857							7		
Diquat	85007							20		
alpha-Endosulfan (Endosulfan)	959988	*[0.11]* **0.22**	0.056		**62**	**89**				
beta-Endosulfan (Endosulfan)	33213659	*[0.11]* **0.22**	0.056		**62**	**89**				
Endosulfan Sulfate	**1031078**				**62**	**89**				

Endothall	145733							100		
Endrin	72208	**0.086**	**0.036**		**0.059**	*[0.0023]* **0.060**		2		
Endrin Aldehyde	7421934				**0.29**	*[0.0023]* **0.30**		*[0.75]*		
Glyphosate	1071836							700		
Guthion	86500		0.01							
Heptachlor	76448	**0.52**	0.0038		**0.000079**	*[0.0002]* **0.000079**		0.4		
Heptachlor Epoxide	1024573	**0.52**	**0.0038**		**0.000039**	*[0.00011]* **0.000039**		0.2		
Hexachlorobutadiene	87683				**0.44**	*[50]* **18**		*[0.45]*		
Hexachlorocyclopentadiene	77474		*[0.5]*		**40**	**1,100**		50		
alpha-Hexachlorocyclohexane (alpha-BHC)	319846				**0.0026**	*[0.0074]* **0.0049**		*[0.0022]*		
beta-Hexachlorocyclohexane (beta-BHC)	319857				**0.0091**	*[0.0074]* **0.017**		*[0.0022]*		
gamma-Hexachlorocyclohexane (gamma-BHC; Lindane)	58899	**0.95**			**0.98**	*[0.062]* **1.8**		0.2		
technical-Hexachlorocyclohexane	608731				**0.0123**	**0.0414**				
Malathion	121755		0.1							
Methoxychlor	72435		0.03		**100**			40		
Mirex	2385855		0.001							
Oxamyl (Vydate)	23135220							200		

Picloram	1918021							500		
Parathion	56382	**0.065**	*[0.04]* **0.013**							
Simazine	122349							4		
Toxaphene	8001352	**0.73**	**0.0002**		**0.00028**	*[0.000073]* **0.00028**		3		
HEALTH ADVISORY LEVELS										
Aldicarb	**116063**							**7**		
Aldicarb sulfone	**1646884**							**7**		
Aldicarb sulfoxide	**1646873**							**7**		
Ametryn	834128							60		
Ammonium sulfamate	**7773060**							**2000**		
Baygon	114261							3		
Bentazon	25057890							*[20]* **200**		
Bis(2-Chloroisopropyl) Ether	108601							300		
Bromacil	314409							*[90]* **70**		
Bromobenzene	**108861**							**70**		
Bromochloromethane	74975							90		

Bromomethane (Methyl Bromide)	74839							10		
Butylate	2008415							*[350]* **400**		
Carbaryl	63252							700		
Carboxin	5234684							700		
Chloramben	133904							100		
2-Chlorophenol	95578							**40**		
ortho-Chlorotoluene	95498							100		
para-Chlorotoluene	106434							100		
Chlorpyrifos	2921882							*[20]* **2**		
Cyanazine	**21725462**							**1**		
DCPA (Dacthal)	1861321							*[4,000]* **70**		
Diazinon	333415							*[0.6]* **1**		
Dicamba	1918009							*[200]* **4,000**		
Dichlorodifluoromethane	75718							*[570,000]* **1,000**		
2,4-Dichlorophenol	120832							**20**		
Diisopropyl methylphosphonate	1445756							600		
Dimethrin	**70382**							**2,000**		

Dimethyl methylphosphonate	756796							100		
1,3-Dinitrobenzene	99650							1		
1,4-Dioxane (para-Dioxane)	**123911**							**200**		
Diphenamid	957517							200		
[Diphenylamine]	*[122394]*							*[200]*		
Disulfoton	298044							*[0.3]* **0.7**		
1,4-Dithiane	505293							80		
Diuron	330541							10		
Ethylene glycol	107211							**14,000**		
Fenamiphos	22224926							*[2]* **0.7**		
Fluometuron	2164172							90		
Fonofos	944229							10		
Formaldehyde	**50000**							**1,000**		
Hexachloroethane	67721							1		
Hexazinone	51235042							*[200]* **400**		
HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	2691410							**400**		
Isophorone	78591							100		

Isopropyl methylphosphonate	1832548							**700**		
Malathion	121755							*[200]* **500**		
Maleic hydrazide	123331							4,000		
MCPA (4(chloro-2-methoxyphenoxy) acetic acid)	94746							*[10]* **30**		
Methomyl	**16752775**							**200**		
Methyl ethyl ketone	**78933**							**4,000**		
Methyl parathion	298000							*[2]* **1**		
Metolachlor	51218452							*[70]* **700**		
Metribuzin	21087649							*[100]* **70**		
Naphthalene	91203							*[20]* **100**		
Nitroguanidine	556887							700		
para-Nitrophenol	100027							60		
Paraquat	1910425							30		
Phenol	108952							*[100]* **2,000**		
Prometon	**1610180**							**400**		
[Pronamide]	23950585							*[50]*		
[Propachlor]	1918167							*[90]*		

Propazine	139402							10		
Propham	122429							100		
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	121824							2		
2,4,5-T (Trichlorophenoxy-acetic acid)	93765							70		
Tebuthiuron	34014181							500		
Terbacil	5902512							90		
Terbufos	13071799							*[0.9]* **0.4**		
1,1,1,2-Tetrachloroethane	630206							70		
Trichlorofluoromethane (fluorotrichloromethane)	75694							2,000		
1,3,5-Trichlorobenzene	**108703**							40		
1,2,3-Trichloropropane	96184							40		
Trifluralin	1582098							*[5]* **10**		
Trinitroglycerol	55630							5		
2,4,6-Trinitrotoluene (Trinitrotoluene)	118967							2		

Table A2

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

Nickel	7440020	Acute = $e^{(0.8460*\ln(Hardness) + 2.255647)} * 0.998$
		Chronic = $e^{(0.8460*\ln(Hardness) + 0.058978)} * 0.997$
Silver	7440224	Acute = $e^{(1.72*\ln(Hardness) - 6.588144)} * 0.850$
Zinc	7440666	Acute = $e^{(0.8473*\ln(Hardness) + 0.884)} * 0.98$
		Chronic = $e^{(0.8473*\ln(Hardness) + 0.884)} * 0.98$
OTHER POLLUTANTS (mg/L) - Hardness Dependent		
Chloride	16887006	Acute = $287.8 * (Hardness)^{0.205797} * (Sulfate)^{-0.07452}$
		Chronic = $177.87 * (Hardness)^{0.205797} * (Sulfate)^{-0.07452}$
Sulfate		

	Chloride (Cl-), mg/L		
Hardness (H), mg/L	Cl- < 5	5 ≤ Cl- < 25	25 ≤ Cl- ≤ 500
H < 100	500	500	500
100 ≤ H ≤ 500	500	S1	S2
H > 500	500	2,000	2,000

		$S1 = [-57.478 + 5.79\ (hardness) + 54.163\ (chloride)] * 0.65$ $S2 = [1276.7 + 5.508\ (hardness) - 1.457\ (chloride)] * 0.65$
OTHER POLLUTANTS (µg/L) - Equation Dependent		
Pentachlorophenol	87865	Acute = $e^{((1.005 * (pH)) - 4.869)}$
		Chronic = $e^{((1.005 * (pH)) - 5.134)}$

Table A3

POLLUTANT	
DISSOLVED OXYGEN (mg/L)	

	Cold-water Fishery	Warm-water and Cool-water Fishery
Minimum[1]	6 mg/L	5 mg/L

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