UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

MAY 10 2013

Ms. Sara Parker Pauley, Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

Dear Ms. Pauley:

On December 11, 2012, the U.S. Environmental Protection Agency received the Missouri Department of Natural Resources' submission of new and revised water quality standards under a cover letter dated December 10, 2012.[1] The new and revised WQS were approved by the Missouri Clean Water Commission on March 9, 2012, were published in the Code of State Regulations on May 31, 2012, and became effective under state law on June 30, 2012. The submission package included a certification letter from the Missouri Attorney General's Office, dated November 16, 2012. On January 25, 2013, the EPA partially approved and partially disapproved revisions to the compliance schedule authorizing provision found in the WQS at 10 CSR 20-7.031(10). Today's letter addresses new site-specific dissolved oxygen criteria adopted in Table K of the WQS. The EPA will continue to review other components of the WQS submission and will act on those components at a later date.

BACKGROUND

On December 1, 2011, the MDNR proposed a number of changes to the state's WQS (36 MoReg 2521). A public hearing on the proposed changes was held in Jefferson City on January 4, 2012, and written comments on the proposed changes were accepted by the MDNR through January 18, 2012. The Commission adopted six new or revised WQS provisions on March 9, 2012, but the final rule, published on May 31, 2012, included only five new or revised provisions. These included (1) sulfate and chloride criteria in Table A, (2) phenol criteria in Table A, (3) site-specific DO criteria in Table K, (4) stream use designation changes for whole body contact recreation and secondary contact recreation in Table H and (5) an amended compliance schedule authorizing provision at 10 CSR 20-7.031(10).

Under Section 303(c) of the Clean Water Act (33 U.S.C. § 1313(c)) and Title 40, parts 131.20 and 131.21 of the Code of Federal Regulations, states must review their WQS at least every three years and submit any new or revised WQS to the EPA for review and approval or disapproval. Water quality standards submissions containing new or revised site-specific criteria must include the methodologies and analyses used to develop these criteria (40 CFR §§ 131.6(b) and 131.20(c)). Under Section 303(c), the EPA must determine whether the criteria are based on sound science and protect the applicable designated uses (40 CFR §§ 131.5(a), 131.6, 131.11 and 131.21(b)).

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[1]Some supporting electronic files were inadvertently omitted from the original WQS submission package, but these were subsequently forwarded by the MDNR and arrived at the EPA regional office in Lenexa on January 30, 2013.

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TODAY'S DECISION

As Director of the Water, Wetlands and Pesticides Division, I am charged with the responsibility of reviewing and approving or disapproving new and revised water quality standards under Section 303(c) of the Clean Water Act. With this letter, the EPA is disapproving the new site-specific dissolved oxygen criteria for the protection of aquatic life found in Table K of the Missouri WQS. The EPA's rationale for this action is presented below.

Description of criteria and supporting documentation

Site-specific DO criteria for the protection of aquatic life were developed for a 0.1-mile segment of Pike Creek and a 14-mile segment of Main Ditch in Butler County. Both stream segments are designated in the Missouri WQS for warm-water aquatic life use, in addition to other uses. The new criteria are expressed in the WQS as a daily average concentration (4.7 mg/L) and a daily minimum concentration (2.6 mg/L) applicable only during the summer (July through September) under base flow conditions.

The WQS submission package includes an electronic (Microsoft Excel) file containing raw and summarized DO data for Pike Creek, Main Ditch, and three streams used as reference waterbodies for criteria derivation purposes. In response to a follow-up inquiry from the EPA, the MDNR confirmed, on December 24, 2012, that the Excel file forms "the basis of the site-specific DO criteria found in Table K of the WQS rule effective June 30, 2012."

In the May 15, 2012, order of rulemaking (37 MoReg 745), the MDNR reported that the site-specific criteria for Pike Creek and Main Ditch "were developed using a reference condition approach and represent the highest attainable criteria for these water bodies." In the absence of a written report on the criteria development methodology, the EPA has examined the submitted Excel file, reconstructed the criteria derivation procedures, and weighed the adequacy of the criteria against (a) national criteria recommendations, (b) published guidance on the development of site-specific criteria and (c) published guidance on the application of the reference condition concept.

Review of Criteria Development Methodology

Under 40 CFR § 131.11(a)(1), all criteria must be based on a sound scientific rationale and must protect the applicable designated uses. The Excel file provided by the MDNR, and underpinning the site-specific DO criteria, contains monitoring data obtained during the summers of 2007 and 2008 from the following purported reference streams: Cypress Ditch (Ripley County), Main Ditch (Dunklin County) and Maple Slough Ditch (Mississippi County). Daily average and daily minimum DO values are presented for two locations in each stream and used to calculate the 25th percentile daily average and daily minimum DO concentrations. These concentrations are averaged arithmetically across streams to arrive at the final site-specific criteria concentrations. Missouri's procedure is analogous to the nationally recommended approach for developing nutrient criteria, which relies on the 75th percentile reference condition (EPA-822-B-00-002, July 2000). However, the site-specific criteria developed for Pike Creek and Main Ditch (Butler County) suffer from the following shortcomings:

(1) These criteria are not based on a sound scientific rationale. Pike Creek and Main Ditch are perennially flowing waterbodies downstream of Poplar Bluff. Although data from six reference sites are used to calculate the criteria, only two sites (MDD1, MDD2), and possibly a third (MS2), are located on perennially flowing stream reaches. Discrete flow measurements performed during the summers of 2007 and 2008 documented stagnant (zero flow) conditions on 18 out of 18 monitoring dates at CD1, on five out of nine monitoring dates at CD2, and on 1 out of 13 monitoring dates at MS1 (see *Aquatic Life Use and Site-Specific Dissolved Oxygen Criteria Findings for Main Ditch in Butler County,* Geosyntec Consultants, August 2011). By comparing these dates to the water quality monitoring dates, it becomes apparent that most DO records for CD1 and CD2, and some records for MS1, were obtained under hydrological conditions differing dramatically from those occurring in Pike Creek and Main Ditch. If records for CD1, CD2 and MS1 are removed from the criteria calculations, the remaining records yield a 25th percentile daily average DO concentration of 6.7 mg/L and a 25th percentile daily minimum DO concentration of 5.5 mg/L.

(2) The MDNR has not demonstrated that the site-specific criteria are protective of the designated warm-water aquatic life use. The submitted daily minimum DO criterion is much less protective of aquatic life than the corresponding criterion recommended by the EPA (see *Ambient Water Quality Criteria for Dissolved Oxygen*, EPA 440/5-86-003, April 1986). The recommended criterion concentration ranges from 3.0 mg/L (when early life stages of fish are absent) to 5.0 mg/L (when early life stages of fish are present). Missouri's current statewide DO criterion (5 mg/L minimum) comports with this recommendation. As stated in EPA's 1986 criteria document, "absolutely no anthropogenic dissolved oxygen depression in the potentially lethal area below the [recommended daily minima] should be allowed unless special care is taken to ascertain the tolerance of resident species to low dissolved oxygen." Some stakeholders in Missouri have questioned the adequacy of the site-specific criteria adopted for Pike Creek and Main Ditch, calling for the collection of additional biological data. These stakeholders notably include Robert Ziehmer, Director, Missouri Department of Conservation, who wrote to the MDNR on January 17, 2012. According to Mr. Ziehmer,

> "Site-specific dissolved oxygen criteria in the proposed rule are not protective of early life stages of fish. The MDC recommends incorporating criteria for early life stages of fish in future proposed site-specific criteria.... Future site-specific criteria studies should also include assessment of fish populations in reference and subject streams in addition to macroinvertebrate assessments."

The following response from the MDNR appeared in the May 15, 2012, order of rulemaking:

> "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 [in the criteria] were made as a result of this comment."

Missouri's methodology does not guarantee that the site-specific DO criteria adequately protect the early life stages of resident fish species, because no fish community data or age-class data were collected or compiled during development of these criteria. However, the WQS submission package does include MDC data on freshwater mussels. These show that Butler County is home to at least 46 species of mussels, including the pink mucket, a federally listed species, and the rabbitsfoot, a federal candidate species. The lower reaches of Main Ditch likewise "support several species of mussels" (see 2011 Geosyntec report). Aquatic life criteria applied to this stream must provide for the protection of these animals, the fishes serving as their biological hosts, and other resident invertebrate and vertebrate species. Missouri has provided no analysis demonstrating that the submitted site-specific criteria meet this requirement.

SUMMARY FINDINGS

Based on its review of the materials included in the Missouri WQS submittal, the EPA finds that the adopted site-specific criteria for Pike Creek and Main Ditch are not based on a sound scientific rationale and are not protective of the designated aquatic life use. Therefore, these criteria are not approvable in their current form. In developing future site-specific criteria, the MDNR is encouraged to follow procedures recognized in the EPA WQS handbook and other appropriate guidance documents. For example, if the MDNR prefers to use a reference condition approach, then all reference streams used in the analysis should exhibit a size and constancy of flow comparable to that of the subject streams. Additionally, an effort should be made to obtain data on the animal species and life stages occurring in the reference and subject streams. The water quality requirements of these species and life stages should be factored into the development of the final criteria. Finally, all future WQS submissions containing new or revised site-specific criteria must be accompanied by a written report that describes and defends the criteria derivation methodology.

The EPA appreciates Missouri's continuing efforts to protect and restore water quality and its overall commitment to the triennial WQS review and revision process. We look forward to working with the MDNR, the Commission and interested stakeholders on future WQS revisions. Should you have any questions or comments regarding today's action, please contact John DeLashmit, Chief, Water Quality Management Branch, at (913) 551-7821.

Sincerely,

Karen A. Flournoy

Karen A. Flournoy
Director
Water, Wetlands and Pesticides Division

cc: Mr. John Madras, Director, Water Protection Program, MDNR

Mr. Corey Buffo, EPA HQ