UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

14 JUL 2004

Jim Hull, Director
Water Pollution Control Program
Water Protection and Soil Conservation Division
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Dear Mr. Hull:

Re: Approval of TMDLs for Manacle Creek and Cedar Creek

This letter responds to the submission from Missouri received by the Environmental Protection Agency (EPA) on June 18, 2004, for three Total Maximum Daily Loads (TMDLs), for impairments identified on the 1998 and the 2002 Missouri §303(d) lists. These submissions fulfill the Clean Water Act statutory requirement to develop TMDLs for those impairments listed on a state's §303(d) list. The specific impairments (water body segments and pollutants) are:

Water Body Name	WBID	Listed pollutant	TMDL pollutant
Manacle Creek	0742	pH, sulfate	pH, sulfate
Cedar Creek	0737	sulfate	sulfate

EPA has completed its review of the three TMDLs with supporting documentation and information. By this letter, EPA approves the three TMDLs submitted. Enclosed with this letter are Region 7 TMDL Decision Documents which summarize the rationale for EPA's approval of each of these TMDLs. EPA believes the separate elements of the TMDLs described in the enclosed forms adequately address the pollutants of concern, taking into consideration seasonal variation and a margin of safety.

EPA is currently engaged in consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service regarding these TMDLs. While EPA is approving these three TMDLs at the present time, EPA may decide that changes to the TMDLs are warranted based upon the results of the consultation when it is completed.

EPA appreciates the thoughtful effort that Missouri has put into these TMDLs, and will continue to cooperate with and assist, as appropriate, in future efforts by Missouri to develop the remaining TMDLs.

Sincerely,

for Leo J. Alderman
Director
Water, Wetlands, and Pesticides Division

Enclosures

cc: Ann Crawford
TMDL Coordinator, Jefferson City, MO

Phil Schroeder
MO Dept of Natural Resources, Jefferson City, MO

EPA Region 7 TMDL Review

TMDL ID	301	*Water Body ID*	MoWBID 0742
Water Body Name	Manacle Creek		
Pollutant	pH and Sulfate		
Tributary			
State	MO *HUC*	10300102-190001	
Basin	Lower Missouri-Moreau		
Submittal Date	6/18/2004		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Received on June 18, 2004; submitted as a final TMDL document which also includes a second TMDL for Cedar Creek for sulfate, under a cover letter dated June 16, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The pH water quality standards require contaminants shall not cause the pH to be outside the range of 6.5 to 9.0 SU. Sulfate and chloride criteria for the protection of aquatic life are linked in Missouri's Water Quality Standards (WQS) where it's stated the concentration of chloride plus sulfate in each creek shall not exceed 1000 mg/L; the beneficial use is the protection of aquatic life. The allocations are set with a margin of safety, at the WQS criteria levels, which are adequate to result in attainment of the applicable WQS.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The beneficial uses of Manacle Creek are described, and the WQS for those beneficial uses are described. The targets are taken directly from the water quality criteria in Missouri's water quality standards for sulfate plus chloride and pH. An additional target of alkalinity was established for the impairment caused by excess acidity to assure the pH target would be attained in Manacle Creek.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The numeric targets are the water quality criteria for pH and sulfate/chloride. The relationship between the numeric targets and the pollutants is direct. The alkalinity target was derived using in-stream chemistry data and performing a correlation analysis to the pH WQS; the alkalinity target assures the load capacity for acidity (low pH) is not exceeded.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

The sources of acid (pH) and sulfate are described. The major contribution was determined to be abandoned mine drainage. The submittal demonstrates that all significant sources of acidity (pH) and sulfate were identified and considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Manacle Creek will have to meet in-stream WQS for pH (6.5-9.0 SU) and an alkalinity target of 40 mg/L or greater, as well as a chloride plus sulfate concentration of 960 mg/L.

WLA Comment

The WLA is zero.

LA Comment

The load allocation for pH is established as within the range of 6.5 to 9.0 SU. The load allocation for the second acid-related endpoint, alkalinity, is established as 40 mg/L calcium carbonate or greater. The load allocation for sulfate plus chloride is 960 mg/L under all flow conditions.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is 4% of the sulfate plus chloride criterion of 1000 mg/L. This explicit MOS is based on the mean chloride concentrations found in Cedar Creek and Manacle Creek (flows directly into Cedar Creek) and best professional judgement regarding the uncertaintly in the knowledge of the link between the allocation and the water quality in Manacle Creek. An implicit MOS is identified for the low pH impairment as using a secondary target of alkalinity since it is a measurable characteristic in Manacle Creek and can be linked to the pH water quality criterion; alkalinity has units of mg/L as calcium carbonate as discussed in Standard Methods for the Examination of water and Wastewater.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation was considered, and critical conditions were indentified. Since the water quality standards for pH and sulfate do not distinguish between seasons, the allocations apply year round.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

This TMDL was placed on public notice from April 23 to May 23, 2004; two comments were received and addressed.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Manacle Creek is included in MDNR's continuous monitoring plan and is sampled twice per year.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Not required.

EPA Region 7 TMDL Review

TMDL ID	302	*Water Body ID*	MoWBID 0737
Water Body Name	Cedar Creek		
Pollutant	Sulfate		
Tributary			
State	MO *HUC*	10300102-190001	
Basin	Lower Missouri-Moreau		
Submittal Date	6/18/2004		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Received on June 18, 2004; submitted as a final TMDL document which also includes a second TMDL for Manacle Creek for pH and sulfate, under a cover letter dated June 16, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Sulfate and chloride criteria for the protection of aquatic life are linked in Missouri's Water Quality Standards (WQS) where it's stated the in-stream concentration of chloride plus sulfate in each creek will not exceed 1000 mg/L; the beneficial use is the protection of aquatic life. Allocations are set with a 4% margin of safety, thereby setting the in-stream target lower than the WQS criterion for the pollutants, which will result in attainment of the applicable beneficial uses.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The beneficial uses of Cedar Creek are described, and the water quality standards for those beneficial uses are described. The targets are taken directly from the water quality criteria in Missouri's water quality standards.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The numeric targets are the water quality criteria for sulfate/chloride. The relationship between the numeric targets and the pollutant is direct.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

The sources of sulfate are described. The major contribution was determined to be abandoned coal mine drainage. The submittal demonstrates that all significant sources of sulfate were identified and considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The load capacity is identified as the sulfate plus chloride criterion, the MOS is explicitly set at 4% of that concentration, thereby setting the allocation targets lower than the WQS criterion.

WLA Comment

The waste load allocation is zero.

LA Comment

The load allocation is 960 mg/L sulfate plus chloride under all flow conditions.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is 4% of the sulfate plus chloride criterion of 1000 mg/L. This explicit MOS is based on the mean chloride concentrations found in Cedar Creek and Manacle Creek (flows directly into Cedar Creek) and best professional judgement regarding the uncertainty in the knowledge of the link between the allocation and the water quality in Cedar Creek.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation was considered, and critical conditions were identified. Since the water quality standards for sulfate do not distinguish between seasons, the allocations apply year round.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

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Cedar Creek is included in MDNR's continuous monitoring plan and is sampled twice per year.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Not required.