EPA Region 7 TMDL Review Form

TMDL ID	39		
Water Body Name	James River		
Pollutant	Nutrients/unknown		
Tributary	Pearson Creek, Wilson Creek, Finley Creek		
Water Body ID	2347, 2362, 2365		
State	MO		
HUC	11010002		
Basin	James Basin		
Submittal Date	3/30/01	*Completion Date*	5/1/01
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.*

Letter to EPA dated March 30, 2001, formally submitting this TMDL for approval under section 303(d) of the Clean Water Act.

***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 impairment of the James River is based on exceedence of the general criteria contained in Missouri's WQS which state: Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses; and, Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses. Phase 1 of this TMDL used best professional judgement, in part obtained through a literature review, to establish a loading capacity numeric target for benthic algae for substrates of the James River. Phase 1 monitoring will confirm the selection of this parameter for potential revision in Phase 2. Allocations for total nitrogen (TN) and total phosphorus (TP), through Phase 2 revisions, should result in WQS attainment.

***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.*

Applicable WQS, beneficial uses and applicable narrative criteria are fully described. The target goal of this TMDL is to reduce the frequency of benthic algal blooms in excess of 100 mg/m2 chlorophyll-a (chl-a) through in-stream nutrient limits on TP and TN. This target goal was determined through a literature review, analysis of current water quality data, and discussions with academic experts and professionals in the fields of limnology and aquatic ecology in EPA Region 7.

***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 State (and EPA) have not yet determined the appropriate numeric criteria for nutrients and there has yet to be determined a precise predictive relationship between TP, TN and chl-a biomass in lotic waters. TP and TN targets were identified using the available literature that provides insight to nutrient and algal relationships both nationally and regionally, and through analysis of the existing water quality data using the Redfield ratio method to determine the limiting nutrient; determination of the benthic chl-a target considered light, temperature, hydrologic disturbance and invertebrate grazing. Expert opinion on the numeric target and associated nutrient loads was provided by the University of Missouri and considered by MDNR.

***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 TMDL describes and lists the land uses, point sources, and the compliance schedule for facilities required to meet a TP discharge requirement by the year 2007; the result of concerns for Table Rock Lake at the bottom of the watershed. The TMDL also provides an extensive description of the hydrologic and geological characteristics of the watershed, as well as information on soil runoff and erosion potential, source tributaries and urban runoff. Information on the NPS contribution to the nutrient impairment will be further defined as the monitoring plan to be initiated this year gets underway during this first Phase of the TMDL. Phase 2 will provide clarification on the NPS contribution to the impairment.

***Allocation**: Submittal identifies appropriate waste load allocations for point, and load allocations for non point sources. If no point sources are present or planned, the waste load allocation is zero. If no non point sources are present, the load allocation is zero.*

The loading capacity for Phase 1 of this TMDL is based upon current knowledge of the relationships between nutrient loading and chl-a in lotic waters. The waste load allocation (WLA) for both TN and TP is based on the design flows for each of the wastewater facilities in the watershed and the desired condition for existing or impending TP permit limits for those dischargers. The load allocation (LA) is based upon that capacity remaining after taking into account the point sources; as further information is gained through monitoring efforts during Phase 1, the WLA and LA may be revised for Phase 2 of this TMDL.

***Waste Load Allocation**:*

The TP load expected to be discharged by 23 facilities in the watershed is 197 pounds/day, corresponding to a probability flow value of 488 cfs, and the probability that loads will be exceeded 56% of the time. The WLA is demarcated by the area under each TMDL load duration curve, respectively, bounded from 56% to 100%. To meet the target TN load at Galena, the same probability WLA demarcation value (56%) on the TN TMDL load duration curve shows a WLA for TN of 3,949 pounds per day.

***Load Allocation**:*

NPS contributions tend to become dominant under higher flow conditions, therefore, the area under each load duration curve bounded from 0 to 56% constitutes the LA for this TMDL.

***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.*

An implicit MOS is based on the documentation that the effectiveness of phosphorus removal at upgraded wastewater treatment facilities results in a lower phosphorus load at the end of pipe than the stated permit limit of 0.5 mg/L TP. Also, an additional MOS is identified as a conservative assumption made in WLA calculations for individual facilities, based on the design flows for the plants and not their actual discharge levels, which are significantly lower than the design flows the majority of the time. These two factors result in a wasteload calculation that exceeds the actual loading to the system - the margin between the actual load and the calculated load represents the implied MOS.

***Seasonal Variation and Critical Conditions**: Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

Seasonal variation and critical conditions are considered and discussed in the context of aesthetic impacts due to algal growth during the growing season and diatom blooms which can impact aesthetics during late fall and even early winter. The conservative nature of TP bound in sediments is also considered. The TMDL targets for TP and TN are recommended to remain in effect year-round thereby taking into account seasonal variation.

***Public Participation**: Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

A Public Notice of the Draft James River nutrient TMDL and a fact sheet, were posted on the MDNR website on January 19, 2001, for a 30 day public comment period. Comments were received from at least 4 entities and EPA. The draft TMDL was revised taking into account some of these comments. However, revisions based on these comments rendered the TMDL unapprovable under section 303(d). EPA worked with MDNR to correct the problems, resulting in final EPA approval.

James River TMDL discussions also occurred during public meetings held August 18-September 22, 1998; MO TMDL Policy Advisory Committee meetings held November, 21, 2000, January 16 and March 13, 2000; a meeting held with Watershed Partnerships, County Commissioners and other local leaders on Janaury 19, 2001; a public meeting held February 8, 2001; through TV, radio, newspaper interviews & associated articles as asked; MDNR News release issued the week of January 29, 2001, and an MDNR Water Quality Coordinating Committee meeting held February 20, 2001.

***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).*

A rigorous monitoring plan to help clarify the relationship between nutrient loadings and benthic chl-a biomass was developed with sampling which will address benthic algal biomass, macroinvertebrate populations, riparian vegetation cover, as well as more traditional water quality parameters. Critically high flows will also be sampled in order to capture NPS loadings and new or reissued permits will require ambient monitoring above and below effluent where this is possible.

***Reasonable Assurance**: Reasonable assurance only applies when reductions in non point source loading is required to meet the prescribed waste load allocations.*