EPA Region 7 TMDL Review

TMDL ID	346	*Water Body ID*	14
Water Body Name	Big Creek		
Pollutant	Copper		
Tributary	North Big Creek 16, Varvel Creek 43, Dinner Creek 823		
State	KS	*HUC*	11070204
Basin	Neosho		
Submittal Date	01/13/2005		
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 received by EPA January 13, 2005, formally submitting this TMDL for approval under Section 303(d).

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 loading capacity is defined by the numeric water quality criterion for copper which is hardness-dependent. The endpoint is for total copper concentrations to remain below the acute copper criterion (19.98 ug/L) at all flows. Representative data for chronic conditions did not support a 2002 303(d) listing for Big Creek; the listing was based on the acute criterion only. However, analyses explained in the TMDL indicate compliance with the acute criterion would be adequately protective of chronic toxicity as well. The TMDL was developed using the acute copper criterion using the 90 percent lower confidence limit total hardness concentration (approximately 146 mg CaCO3/L); this results in an 86 percent reduction in copper loading which should result in water quality standards (WQS) attainment and achievement of the expected aquatic life use.

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 TMDL describes all applicable WQS and the beneficial uses; the impaired use is the expected aquatic life use. The target is the water quality criterion for acute copper toxicity.

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 target is the water quality criterion for acute copper toxicity; the link between the target and the criterion is hardness-dependent. The Generalized Watershed Loading Function (GWLF) model was used to calculate the watershed yield for sediment, and copper concentrations in soils were derived from several USGS studies in Kansas. The source assessment determined copper was a non-point source pollutant load in the watershed, therefore, the anticipated average load allocation (LA) reduction was calculated by subtracting the LA from the GWLF non-point loading estimate. The load duration curve was used to calculate the TMDL in general because it relies on measured water quality data and paired water hardness data, and a wide range of "flow exceedance" data representing a complete range of flows anticipated in Big Creek. In calculating the TMDL the average condition was considered across the seasons to establish goals of the endpoint and desired reductions. Therefore, the target average copper level was multiplied by the average daily flow for Big Creek across all hydrologic conditions which is represented graphically by the integrated area under the copper load duration curve.

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.

Land use and sources in the watershed are described. Several studies were evaluated for potential copper sources such as automobile brake deposits, building materials, and copper-based pesticides and feed or fertilizers. Due to the low density of humans populations in the watershed, agricultural land uses involving copper are suspected as the significant contributors. All significant sources are discussed.

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 allocation of wasteloads (WLAs) and load allocations (LAs) are made in terms of total copper reductions. Allocations relate to the average copper levels seen in the Big Creek system at station 615 for the critical higher flow conditions. The average loading capacity is identified as 0.937 pounds/day. The area under the load duration curve is segregated into allocated areas assigned to point sources (WLA) and non-point sources (LA).

WLA Comment

The WLA is 0.0057 pounds/day total copper; no reduction is necessary based upon a nationwide study of copper discharges in treated wastewater.

LA Comment

The LA is an average 0.837 pounds/day total copper; an 86% reduction.

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 explicitly set at 10 percent of the loading capacity, or 0.0937 pounds/day total copper.

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 in the use of the load duration curve methodology which accounts for loads at all flow conditions.

Public Participation

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

Public meetings to discuss TMDLs in the Neosho Basin were held January 9, 2002, in Burlington, March 4, 2002, in Council Grove, and July 30, 2004, in Marion. Public hearings were held in Burlington and Parsons on June 3, 2002. The Neosho Basin Advisory Committee met to discuss the TMDLs in the basin on October 2, 2001, January 9, March 4, and June 3, 2002. The TMDL was public noticed on the KDHE TMDL website: http://www.kdhe.state.ks.us/TMDL.

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).

KDHE will continue to collect bimonthly samples at rotational Station 615 in 2004 and 2008 including total copper samples. More intensive sampling may be conducted if monitoring

indicates continued impaired status. Use of USEPA Method 1669 - Sampling Ambient Water for Trace Metals at USEPA Water Quality Criteria Levels for ultra-clean copper sampling and analysis could help to further define potentially bioavailable and toxic forms of copper in the subwatershed.

Reasonable assurance

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

Reasonable assurance, although not necessary for this TMDL since the point source contribution is inconsequential, includes numerous authorities and funding through the Kansas Water Plan.