



### **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 narrative standards and the designated beneficial uses are described. The numeric targets for water bodies in Kansas are described in "A Primer on Lake Eutrophication and Related Pollution Problems" (KDHE 1998) and "The Lake and Wetlands Program Monitoring Report" (KDHE 1999), which are incorporated by reference into all Kansas eutrophication TMDLs. For the Primary Contact Recreation designated beneficial use, the numeric target for the chlorophyll-a concentration is 12 ug/l or less.

A regression of 2000-2001 lake data and 1997-2000 wetland data was used to determine the current in-lake nitrogen concentration and to calculate how much of a nutrient reduction was needed to meet 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 link between the numeric target for chlorophyll-a concentration and phosphorus loading is provided in a Memorandum dated August 5, 1999 from Ed Carney (KDHE) to Tom Stiles (KDHE), with two attachments. This memo is included by reference into all Kansas eutrophication TMDLs. This memo describes a study of 173 water bodies that are not light-limited, and provides the regression relationships between total phosphorus and chlorophyll-a used to establish loadings. Modeling (BATHTUB/CNET) and regional coefficients were used to estimate lake phosphorus carrying capacity and load reductions necessary to meet chlorophyll-a targets. The nitrogen model uses an average chlorophyll a concentration to estimate the nitrogen concentration of a lake or wetland. A regression was calculated for the 2000 and 2001 lake data and 1997 to 2000 wetland data. The following total nitrogen to chlorophyll a model is used in all lake and wetland TMDLs requiring a total nitrogen endpoint:  $\text{Log TN} = 0.4738(\text{Log Chl}) + 2.2807$ .

A full description of the methodology used for Kansas lake TMDLs can be viewed on the KDHE TMDL website (<http://www.kdhe.state.ks.us/tmdl/eutro.htm>).

### **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.*

Source inventory and assessment includes descriptions of land use and the potential for non-point source pollutants; there are no point sources in the watershed. Winter grazing density is high and runoff from agricultural lands where nitrogen and phosphorus have

been applied is also a contributing factor. The Olpe City Lake siltation TMDL also identifies a high sediment load, which could also carry a large phosphorus load. There are 2,063 septic systems in Lyon County, accounting for 14% of the sewage systems present in the county. All significant sources have been discussed 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 loading capacity for the pollutant was determined using the relationships between the chlorophyll-a numeric target and the pollutant levels using the CNET model and the regression model. The loading capacity is identified as 310 pounds/year phosphorus. The explicit margin of safety was subtracted from the loading capacity, and the remainder was given to the Load Allocation.

#### **WLA Comment**

The WLA is zero.

#### **LA Comment**

The LA is established as 279 pounds per year of total phosphorus, a 48% reduction; there is a proportional decrease of 32% in nitrogen loading.

#### **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 explicit Margin of Safety was set to compensate for the lack of knowledge about the relationship between the allocated loadings and the resulting water quality. The MOS is 31 #/yr of total phosphorus; an additional 4% reduction in nitrogen is also identified.

#### **Seasonal Variation and Critical Conditions**

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

Seasonal variation is considered in the document "Lake and Wetlands Monitoring Program 1998 Annual Report" by C. Edward Carney dated May 1999, and included by reference in all eutrophication TMDLs. For example, page 24 discusses sampling during times representative of "normal" summer conditions. Seasonal variation and critical conditions are accounted for by conducting seasonal sampling and by considering the magnitude of runoff which is chiefly generated when the rainfall rate is greater than the rate at which rain can infiltrate the soil.

#### **Public Participation**

*Submittal 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 and March 4, 2002 in Council Grove. A KDHE Internet Web site allows users to view specific TMDLs in the Neosho Basin and more general information on the establishment of TMDLs. A public hearing on the TMDLs of the Neosho Basin was held in Burlington and Parsons on June 3, 2002 and the Neosho Basin Advisory Committee met to discuss TMDLs in the basin on October 2, 2001, January 9, March 4, June 3, 2002, and July 30, 2004.

**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).*

Sampling and evaluation will occur once before 2007 to assess nutrient ratios, source loading, and mean summer lake trophic states, and twice between 2007 and 2011.

**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.

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