EPA Region 7 TMDL Review

TMDL ID	369	*Water Body ID*	IA 04-LDM-00490-L
Water Body Name	Easter Lake		
Pollutant	Nutrients and Siltation		
Tributary	Yeacer Creek, unnamed creeks (2)		
State	IA	*HUC*	0710000815
Basin	Des Moines River		
Submittal Date	2/22/2005		
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.

A letter received by EPA on February 22, 2005 formally submitted this TMDL for approval. A revised version was submitted by email attachment on 02/28/05.

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.

Loading capacity for nutrients is calculated as pounds of phosphorus per year to attain a Carlson's trophic state index (TSI) of less than 65 for phosphorus, chlorophyll and Secchi transparency. The TSI targets are used to describe water quality that will meet Iowa's narrative water quality standards. In this TMDL the annual phosphorus load is set at 2,540 pounds. This will require a load reduction of 1,710 pounds per year. From the modeling provided in this TMDL the targeted reductions should result in the attainment of applicable water quality standards.

The loading capacity for addressing the siltation impairment is set at 5,400 tons per year. This will require a reduction of 1,600 tons per year. The target is set such that the

sediment delivered to Easter Lake will result in the loss of less than one third of the original lake volume in its 100 year design life. The targeted reduction should result in the attainment of applicable water quality standards.

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.

Easter Lake is designated for primary contact recreation (Class A1) and aquatic life support (Class B(LW)). Excess nutrients and siltation have impaired aesthetic and aquatic life water qualtiy narrative criteria (567 IAC 61.3(2)) and hindered designated uses. The TSI is used to relate nutrient loading to chlorophyll and Secchi depth which are used to address narrative criteria that "such waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor, or other aesthetically objectionable conditions."

Excessive sediment deposition impairs normal aquatic life through reductions in fish habitat, increased susceptability to summer algal blooms, and increases in rough fish populations. For siltation, Easter Lake must lose no more than one third of its original lake volume over its design life (100 years). The TMDL assigns an annual load for sediment that will ensure this goal.

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 nutrient targets are linked to the TSI for Secchi and chlorophyll. The TSI for phosphorus is set at <65 which in this lake, based on the relationships shown, should result in TSI scores for Secchi transparency and chlorophyll of <65. These targets for Secchi transparency and chlorophyll are used to link to the narrative criteria as a surrogate target.

The link for siltation is direct. The amount of sediment delivered to Easter Lake must not result in the loss of one third or more of the original lake volume over the design life of the lake. The design life of Easter Lake is set in the TMDL as 100 years.

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 phosphorus loading to Easter Lake are identified as regulated storm water, nonpoint sources, atmospheric deposition (background) and internal recycling within the

lake. The regulated stormwater sources are from two sources in the watershed, The City of Des Moines MS4 (Iowa NPDES Permit # 77-27-0-07) and the Des Moines International Airport (Iowa NPDES Permit # 77-27-0-08). From the loading source model the most significant nonpoint source of phosphorus load was from urban landuse. Other significant sources are cropland, grassland, and forest landuses. Other potential sources were noted such as pet wastes and wildlife which will be addressed as required in phase two of the TMDL. It appears all significant sources of phosphorus loading have been considered.

The sediment sources are identified as regulated stormwater and nonpoint sources. The regulated stormwater source is from The City of Des Moines MS4 Permit (Iowa NPDES Permit # 77-27-0-07). The Des Moines International Airport (Iowa NPDES Permit # 77-27-0-08) is not considered a significant source of sediment. Nonpoint sources were given as areas outside the City of Des Moines NPDES control area. Both point and nonpoint sedimet delivery originates from sheet and rill erosion and erosion associated with construction and development activities. Nonpoint sources also include shoreline erosion and stream channel erosion. The submittal addresses assumptions used in the calculations and source assessments. Natural background sources were not separated from the total point and nonpoint sources for this TMDL. It appears all significant sources of sediment loading have been 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 nutrient allocations target loading from point and nonpoint sources to attain TSI targets that support the narrative water quality standards. Both point and nonpoint sources are addressed in this TMDL and are given in the appropriate sections.

The sediment allocations are also targeted for both point and nonpoint sources. The submittal discusses historic siltation and estimates present loading to Easter Lake as well. The allocations are based on the amount of sediment that can be loaded to Easter Lake during the remainder of its design life

WLA Comment

The WLA is set at 2,200 pounds of phosphorus per year and distributed as 2,090 pounds allocated to the City of Des Moines and 110 pounds allocated to the Des Moines International Airport.

For siltation the WLA is set at 2,100 tons per year and allocated to the City of Des Moines NPDES control area under its MS4 NPDES permit.

LA Comment

The LA for phosphorus is set at 90 pounds per year and distributed as 30 pounds per year to portions of the watershed outside the City of Des Moines corporate limits and 60 pounds per year for atmospheric deposition. The LA for sediment is set at 2,760 tons per year.

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 phosphorus MOS is explicit and set at 250 pounds per year. This is 10% of the calculated allowable load.

The MOS for siltation is set at 540 tons per year, this is also a 10% reduction of the loading capacity.

Seasonal Variation and Critical Conditions

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

The phosphorus loading model used calculated annual load resulting in a growing season mean phosphorus concentration. This relates to the time frame when the TSI targets result in use attainment. The siltation targets are annual and correspond to the annual amount of sediment the lake can receive and conform to the stated uses.

Public Participation

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

A public meeting was held in Des Moines on January 27, 2005 to present a draft TMDL for public comment. Comments were received from the City of Des Moines, the Des Moines International Airport, and the Polk County Conservation Board. In their replies to these comments IDNR modified the TMDL to include statements calling for further investigations into the loss of lake volume in the upper-reaches to account for discrepencies between the present lake surface area and the design surface area estimates from 1976. IDNR also removed streambank erosion from the WLA for the City of Des Moines MS4 permit and added it to the LA for nonpoint source loading. The TMDL was also modified to incorporate a statement that the targeted annual load is an average for the remaing period of the lake's design life.

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).

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010 containing 3 lake samples per year for three years or 10 lake samples over a two year period. Additional data will be collected to better define the upper-reach areas of the lake that have completely sedimented in to more accurately define the siltation target and historic sediment delivery.

Iowa State University is also currently working on methodology to better estimate the contribution of rainfall loaded phosphorus and this data will be reviewed for incorporation

into phase II of this TMDL.

Reasonable assurance

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

Both WLA and nonpoint reductions are required. The nonpoint reductions are not required to meet the waste load allocations. No allowances were made for new sources of phosphorus or sediment loading. The City of Des Moines has constructed stormwater control facilities and has plans for additional retention basins.