



## EPA Region 7 TMDL Review

**TMDL ID:** IA 06-LSR-0300\_0  
**Document Name:** MILFORD CREEK

**State:** IA

**Basin(s):** LITTLE SIOUX RIVER  
**HUC(s):** 10230003  
**Water body(ies):** MILFORD CREEK  
**Tributary(ies):** UNNAMED TRIBUTARY  
**Pollutant(s):** PHOSPHORUS

**Submittal Date:** 9/18/2007

**Approved:** Yes

### Submittal Letter

*State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) 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 [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.*

The TMDL was submitted for approval by the Iowa Department of Natural Resources (IDNR) in a letter dated September 14, 2007, and received by the U.S. Environmental Protection Agency (EPA) on September 18, 2007. Revisions were made to the original submittal and the final version was submitted on April 30, 2008, and received by EPA on May 5, 2008.

### Water Quality Standards Attainment

*The water body's loading capacity (LC) 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 (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.*

Phosphorus is indirectly causing the violations of the state's numeric dissolved oxygen (DO) criteria through excessive algal growth and decomposition. An abundance of phosphorus in the stream promotes excessive algal growth. Excessive algal growth increases respiration and decay, which depletes the oxygen level in the stream. A QUAL2K model was developed and used to simulate the stream water quality under critical environmental conditions of low flow and high temperatures to set the limits of phosphorus loading which will result in the attainment of the DO targets of 5 mg/L for at least 16 hours per day and a minimum of not less than 4 mg/L. During critical environmental conditions, the LC is 7.0 pounds per day of phosphorus. This capacity should result in the achievement of WQS in the targeted segment.

### Numeric Target(s)

*Submittal describes applicable WQS, 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 applicable WQS is a DO concentration of 5 mg/L for at least 16 hours per day and an absolute minimum of 4 mg/L. The lower segment of Milford Creek (06-LSR-0300\_0) is designated for Warm

Water Aquatic Life, (Class B-WW2) and Primary Contact Recreation (A1). The impaired use is identified as Aquatic Life Uses (B).

The water quality model, QUAL2K, was calibrated for critical environmental conditions and used to establish the mechanistic linkage between phosphorus loads, algal growth and DO levels in the stream. The model was used to determine the reduction in phosphorus loads necessary to control algal growth that would lead to improvement in stream DO levels.

### **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 (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.*

Phosphorus targets are established through the use of a QUAL2K model calibrated for existing conditions. Phosphorus concentrations were determined iteratively through simulation to obtain the level necessary to reduce algal growth and the variability in DO concentrations. Reducing algal growth and decay leads to minimizing the in-stream demand for dissolved oxygen. Algal respiration and decomposition both deplete the oxygen level in the stream.

### **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, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.*

Under natural conditions, Milford Creek drains Lower Gar Lake and serves as the outlet for the entire chain of the Iowa Great Lakes. The total drainage area is approximately 93,766 acres. The major land uses are row crop (49%), water/wetlands (18%), and grassland (13%). The critical period identified in the document is when there is no flow from the upstream lakes. The area directly contributing to flow during this critical period is reduced to 4,065 acres. Under this condition, the contributing drainage area is 36% row crop, 20% pasture, 18% grassland, and 14% urban. The city of Milford is the primary urban area.

Nonpoint sources of phosphorus to the stream are identified as surface runoff from agricultural and urban areas, discharges from Lower Gar Lake during wet periods, and direct atmospheric deposition to the stream.

The two National Pollutant Discharge Elimination System (NPDES) sources identified are the Iowa Great Lakes Sanitary District wastewater treatment plant (IGLSD, IA0059765) and Derner's of Milford animal feeding operation (IA0077593). Based on monitoring data and model estimates, point sources can account for 75-93% of annual phosphorus loads in Milford Creek.

Point source loadings also vary seasonally according to tourism and climate in the area. The critical period identified in the submittal coincides with the time of greatest tourist visits. Daily phosphorus loads from IGLSD have been measured as high as 91.8 pounds per day.

EPA agrees that all known significant sources have been identified.

### **Allocation - Loading Capacity**

*Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are*

*present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.*

The maximum amount (LC) of total phosphorus that Milford Creek can tolerate under critical environmental conditions (low flow and high temperatures during June to October) is 7.0 pounds per day.

### **WLA Comment**

*Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.*

Under critical environmental conditions, the WLA for the point source wastewater is 6.9 pounds per day total phosphorus. This corresponds to an effluent phosphorus concentration limit of 0.5 mg/L from IGLSD. The WLA for the permitted open feedlot is zero, since the animal feeding operation is not allowed to discharge to surface waters. The submittal also provided WLA for high flow conditions.

### **LA Comment**

*Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.*

Under critical environmental conditions, the LA for nonpoint sources including background loading from atmospheric deposition is 0.1 pounds per day total phosphorus. The submittal also provided LA for high flow conditions.

### **Margin of Safety**

*Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. 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. If this is a phase II TMDL any differences in MOS will be documented in this section.*

The MOS for this TMDL is implicit based on conservative assumptions used in the modeling to define the allowable pollutant loading. The TMDL and WLA were established using a concentration-based target at critical environmental conditions, hence, it is ensured that WQS will be met at all other times of the year when receiving flows are higher and conditions are less suitable for algal response to phosphorus loads.

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

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.*

The maximum LC for the lower segment of Milford Creek was determined under critical conditions of seasonal low flow and high temperatures (June to October). LC under other conditions are also reported in the submittal.

### **Public Participation**

*Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].*

The original draft TMDL was presented at a public meeting at the Iowa Great Lakes Maritime Museum (IGLMM) on January 19, 2005. The revised draft was then made available for public

comment from August 2 through September 4, 2007, through the IDNR website. A subsequent public meeting was held on August 13, 2007, at the IGLMM. All comments obtained during the public meetings, the public comment period and those received from EPA were addressed in the final version submitted to EPA on April 30, 2008.

### **Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies a 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) [40 CFR § 130.7].*

Monitoring of the IGLSD facility will continue as required by the NPDES permit. Currently, monitoring includes reporting "CBOD5" and ammonia three times per week and average flow on a daily basis, plus various other parameters. The IGLSD also performs additional monitoring for effluent DO. Future monitoring requirements will include DO, total phosphorus, and total nitrogen.

Further monitoring is planned for Milford Creek to follow-up on the implementation of the TMDL. The proposed monitoring plan includes five components: once a week point source phosphorus monitoring, bi-weekly water chemistry sampling from March to November, annual biological and physical habitat assessments at low flow conditions, continuous DO and flow measurements (6-minute intervals) from June to October, and "snapshot" monitoring once during the early summer high flows and once in the late summer low flows.

### **Reasonable Assurance**

*Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.*

Reasonable assurances are not required as more stringent LAs are not being allocated in lieu of less stringent WLAs.