UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAY 12 2009

REPLY TO THE ATTENTION OF:
WW-16J

Paul Eger, Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Eger:

The U. S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for the Groundhouse River watershed, including supporting documentation and follow up information. The Groundhouse River is located in east-central Minnesota, in Mille Lacs and Kanabec Counties. The TMDLs address the Aquatic Recreation Use impairment due to excessive fecal coliform, and the Aquatic Life Use due to excessive sediment.

The TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's five TMDLs for fecal coliform and sediment for the Groundhouse River watershed. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting these TMDLs and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Kevin Pierard, Chief of the Watersheds and Wetlands Branch, at 312-886-4448.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Chris Klucas, MPCA
Dave Johnson, MPCA

wq-iw6-02g

TMDL: Groundhouse River TMDL, Minnesota
Date:

DECISION DOCUMENT FOR THE GROUNDHOUSE RIVER WATERSHED, MINNESOTA TMDL

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable. These TMDL review guidelines are not themselves regulations. They are an attempt to summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. Any differences between these guidelines and EPA's TMDL regulations should be resolved in favor of the regulations themselves.

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

(1) the spatial extent of the watershed in which the impaired waterbody is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;

(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comments:

Location Description: The Minnesota Pollution Control Agency (MPCA) developed TMDLs for the Groundhouse River watershed in east-central Minnesota. By implementing measures to reduce fecal coliform and sediment loadings, the TMDLs will address impairments of the aquatic recreation use and aquatic life use in the watershed. Table 1, below, identifies the waterbody segments covered by the TMDL Study as they appear on the Minnesota 2008 303(d) list. Minnesota's priority rankings for TMDL waters are reflected by the target dates for start and completion of TMDL studies. For the Groundhouse River, the target completion date is 2008.

Table 1. 2008 303(d) List Summary (modified from Table 1 of the TMDL Study)

River ID	Name	Designated Uses	Basis of Impairment	Pollutant
07030004-512	Groundhouse River: From South Fork Groundhouse River to Snake River	Aquatic Recreation	Fecal Coliform	Fecal coliform
07030004-513	Groundhouse River: Headwaters to South Fork Groundhouse River	Aquatic Life Aquatic Recreation	Fish and Invertebrate IBIs Fecal Coliform	Sediment Fecal coliform
07030004-573	South Fork Groundhouse River: Headwaters to Groundhouse River	Aquatic Life Aquatic Recreation	Fish and Invertebrate IBIs Fecal Coliform	Sediment Fecal coliform

The Groundhouse River watershed is located in east-central Minnesota. The TMDL addresses parts of two counties: Mille Lacs and Kanabec (Figure 1 of the TMDL). The overall watershed is 139 square miles in size, and the portion of the river listed for both fecal coliform and sediment is 72 square miles in size. The South Fork Groundhouse River flows into the mainstem of the Groundhouse River, and drains an area of 51 square miles. For modeling purposes, the watershed was subdivided into 10 subwatersheds (Table 5 of the TMDL). The Groundhouse River flows east into the Snake River, which flows into the St. Croix River, and eventually into the Mississippi River.

Topography and Land Use: The major land use in the watershed is forest, with over 47% of the land in this category (Appendix B of the TMDL). Agricultural use covers 32%, wetland covers 13%, and urban is 6%. The largest city in the watershed is Ogilvie, with a population of approximately 500.

Pollutant of concern: The pollutants of concern for these TMDLs are fecal coliform, and sediment.

Fecal coliform: As discussed in Section 2.3 and Appendix A of the TMDL, MPCA has used data from 1987-2005 to develop the TMDLs. Review of the data shows that several sampling sites exceeded the water quality standards.

Sediment: The upstream two segments of the Groundhouse River were determined to have both impaired fish and macroinvertebrate communities. Section 2.2 and Appendix D of the TMDL discuss the biota impairment in the watershed. MPCA determined that the pollutant causing the impairments is sediment; specifically, fine sediments covering the riverbed. Other secondary causes were identified, and although no TMDLs were developed for these secondary causes, MPCA will include implementation measures to address the secondary causes as well as the primary sediment cause.

Pollutant sources:

Fecal coliform: Several sources for fecal coliform were identified in the TMDL (Section 3 of the TMDL). Point sources include the City of Ogilvie wastewater treatment plant on the mainstem of the Groundhouse River. The discharge permit for this facility requires disinfection, and therefore MPCA does not believe that the facility is a major contributor to the fecal coliform impairment. There are no MS4 sites in the watershed, and the only other permitted dischargers are construction sites and gravel quarries. Neither are considered to be significant sources of fecal coliform.

Non-point sources include run-off from pasture lands and feedlots, failing septic systems, cattle in streams, and run-off from manure spreading on cropland. MPCA believes that wildlife is a very small source of fecal coliform. Section 4.2 of the TMDL discusses the process used by MPCA to determine the current loading from the various sources. Based upon these data, livestock are the dominant source of bacteria. Smaller, less-regulated feedlots, as well as surface-applied manure, are the most likely source for livestock bacteria entering the waterbodies. Failing septic systems may be a significant source during dry weather.

Sediment: Several sources for sediment were identified in the TMDL (Section 3 of the TMDL). Point sources include the City of Ogilvie wastewater treatment plant on the mainstem of the Groundhouse River. Total suspended solids (TSS) is monitored for this facility, and the records indicate that the facility is not a major source of sediment (Section 5.1.2 of the TMDL). As stated previously, there are no MS4 sites in the watershed, and the only other permitted dischargers are construction sites and gravel quarries. MPCA believes the permit requirements for construction facilities are sufficient to reduce sediment loads. Gravel quarries are not allowed to directly discharge water from the pit to a waterbody, but instead to a holding pond. MPCA believes the pits are not major sources of sediment to the Groundhouse River.

Non-point sources include run-off from pasture lands and feedlots, streambank erosion from a variety of causes, and erosion from row crops. Section 4.2 of the TMDL discusses the process used by MPCA to determine the current loading from the various sources. Based upon these data, streambank erosion and runoff from row crops are the two largest sources of sediment in the two subwatersheds. Pasture lands represent a smaller portion of the load (Figures 21-22 of the TMDL).

Future growth trends: As stated in Section 5.1.6 (sediment) and Section 5.2.6 (fecal coliform) of the TMDL, future growth was not considered significant in developing the allocations. No explicit amount of load was set aside for any of the pollutants to account for future growth.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this first element.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)). EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comments:
Section 2 of the TMDL describes the designated uses and numeric criteria applicable to this watershed.

Use Designation:
The Groundhouse River watershed is designated as either Class 2B or 2C for aquatic life use and recreation (MN. R. 7050.0222). From Section 2.1 of the TMDL;

> Class 2B waters. The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water.
>
> Class 2C waters. The quality of Class 2C surface waters shall be such as to permit the propagation and maintenance of a healthy community of indigenous fish and associated aquatic life, and their habitats. These waters shall be suitable for boating and other forms of aquatic recreation for which the waters may be usable.

Numeric Standards:
Fecal coliform: For fecal coliform, the water quality standard (WQS) for both Class 2B and 2C is found in MN R. Ch 7050.0222. Fecal coliform, between April 1 and October 31 shall:

- not exceed 200 organisms/100ml geometric mean of not less than five samples in any given calendar month,
- nor shall be more than 10% of all samples taken during any calendar month individually exceed 2000 organisms/100ml.

Sediment: MPCA does not have a numeric criterion for sediment.

Targets:
Fecal coliform: the target is same as the WQS, 200 organisms/100 ml geometric mean of not less than five samples in any given calendar month, and not to exceed more than 2000 organisms/100ml in more than 10% of all samples taken during any calendar month.

Sediment: the target for sediment is <25% fine sediment.

To determine if the aquatic life use is being met, MPCA uses an Index of Biological Integrity (IBI) (Section 2.2 of the TMDL). The IBI measures the types and qualities of fish or macroinvertebrates found in a location, and assigns a score that can be used to determine the health of a fish or macroinvertebrate community. Table 3 of the TMDL shows the fish and macroinvertebrate scores needed to meet the aquatic life use designations. The data show that two sites failed to meet the IBI targets (Figures 4 and 5 of the TMDL). To determine the pollutant that is causing the impairment, MPCA used the Stressor Identification process (Section 2.2 of the TMDL). Based upon this process, MPCA determined that fine sediment was the pollutant causing the biota impairments. Based upon the data, MPCA determined that the target for fine sediment is <25% fine sediment (Section 5.1 and Appendix D of the TMDL). MPCA believes that achieving this target in the watershed will result in the IBI scores improving, and the aquatic life use to be attained.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

TMDLs must take into account *critical conditions* for steam flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comments:
Loading capacity: The loading capacities were calculated for each waterbody, and are found in Section 5 of the TMDL. Tables 2-12 below are a summary of the loading capacities for each of the pollutants for each impaired waterbody in the watershed. For fecal coliform, loadings were calculated for several sampling sites in the segments.

Method for cause and effect relationship:
Fecal Coliform: The loading capacities for these pollutants for impaired segments of the Groundhouse were determined by MPCA using the load duration curve method (LDC) (Section 4 and Appendix E of the TMDL; Tables 2-10 below). Pollutant concentrations were measured at water quality monitoring stations in the watershed (Appendices A and E of the TMDL). A very simplified explanation is provided below.

1. Flow data - First, continuous flow data are required. There was one flow gage in the watershed, at sampling site S003-532, located on the Groundhouse River. This gage provided data from 1999-2003 and 2005. To ensure this relatively short period of flow monitoring was appropriate for use in the LDC process, MPCA compared the Groundhouse River flow data tot the flow data from a USGS gage on the nearby Snake River (approximately 15 miles away). MPCA noted that the comparison showed that the data to be consistent, with some divergence at the very high (<1%) or the very low (>95%) flows. MPCA believes, and EPA concurs, that the Groundhouse River flow data is appropriate for use in the LDC process.
2. Water Quality data - This dataset is the monitored pollutant data from 1999-2005.
3. Load Duration Curves - The plots are derived from the flow data and water quality data described above. Existing monitored water pollutant loads, represented by the points on the plot, are compared to target loads, the water quality standard line. If the existing loads are below (less than) the target line, no reduction needs to occur. Conversely, if the existing loads are above (greater than) the target load, a reduction is necessary to reach the target.
4. Analysis - The final step is to link the geographic locations of load reductions needed to the flow conditions under which the exceedences occur. Specific flow regimes contributing to pollutant loads, represented by the graph, are identified to determine under what flow conditions the pollutant exceedences are occurring. The LDCs in the TMDL show that the exceedences occur under varied flow conditions. By knowing the flow conditions under which exceedences are occurring, MPCA can focus implementation activities on those sources most likely to contribute loads.

Using the load duration curve approach allows MPCA to determine which implementation practices are most effective for reducing pollutant loads based on flow magnitude. For example, if loads are significant during storm events, implementation efforts can target those best management practices (BMPs) that will most effectively reduce runoff. This allows for a more efficient implementation effort. These TMDLs are concentration-based, and tie directly into Minnesota's water quality standard for the pollutants. The target for these TMDLs is the water quality standard, and therefore meeting this loading capacity should result in attainment of water quality standards. The load duration curve is a cost-effective TMDL approach, to address the reductions necessary to meet WQS for these pollutants.

Weaknesses of the TMDL analysis are that non-point source (NPS) load allocations were not assigned to specific sources within the watershed, and the identified sources of the pollutants were assumed based on the data collected in the watershed, rather than determined by detailed monitoring and sampling efforts. Moreover, specific source reductions were not quantified. However, EPA believes the strengths of the State's proposed TMDL approach outweigh the weaknesses and that this methodology is appropriate based upon the information available. In the event that the pollutant levels do not meet WQSs in response to implementation efforts described in the TMDL submittal, the TMDL implementation strategy may be amended as new information on the watershed is developed, to better account for contributing sources of the impairment and to determine where reductions in the Groundhouse watershed are most appropriate.

Sediment: MPCA calculated the loading capacity for sediment in the mainstem Groundhouse River as **11.51 tons/day,** and the loading capacity for the South Branch Groundhouse River as **11.06 tons/day** (Tables 11 and 12 below).

The loading capacity determination used for the two segments of the Groundhouse River is based on the GWLF (Generalized Watershed Loading Function) model (Section 4 of the TMDL). GWLF is a watershed model of medium complexity that estimates overland loading of various pollutants as well as loading from groundwater discharge. It works for both urban and agricultural land uses. Inputs include temperature, precipitation, streamflow, land use types, soil-loss factors, and chemical parameters. Curve numbers are used to determine the impacts of precipitation on the soil types and land uses present.

MPCA subdivided the watershed into 10 subwatersheds, with an average size of 14 square miles. Several additions were made to the GWLF model, based upon source type. The Ogilvie WWTP was given a waste load allocation based upon the permitted discharge rate (0.23 million gallons per day) and the appropriate permit limits (see Section 5 below for more details). Gravel pits were located and assessed. On-site wastewater systems were assessed as well. The number of systems was estimated for each subwatershed, and the failure rate was estimated. This loading was for both fecal coliform and sediment.

Streambank erosion was determined by MPCA to be a significant source of sediment in the watershed (Section 4.2.4 of the TMDL). The GWLF model does not simulate loading from streambanks, and therefore MPCA determined the loading separately. Using the channel surface area, length, width, bank height, and values for erosion rates, ranges of bank erosion were

calculated. Streambank erosion is estimated to contribute 54% of the sediment load for the mainstem of the Groundhouse River, and 39% of the sediment load to the South Fork Groundhouse River load.

Sediment loads were then simulated for the time period of 1996-2005. The current sediment load to the Groundhouse River was calculated to be 6,074 tons/yr, and 6,661 tons/yr for the South Fork Groundhouse River. Figures 21 and 22 of the TMDL show graphically the various contributions from land uses in the watershed.

Critical conditions:
Fecal coliform and TSS: MPCA determined that the critical condition for fecal coliform is during high flow events (Section 5.2.5 of the TMDL). The load duration process allows the state to determine the flow conditions where exceedences occur, and then develop best management practices to reduce these loads..

Sediment: The critical condition for the Groundhouse River sediment TMDLs are the summer storm events (Section 5.1.5 of the TMDL). Significant storm events cause the streambank erosion, adding sediment to the system. In addition, the storm events increase the overland runoff. MPCA reviewed the total suspended solids (TSS) data, and determined that TSS levels were generally elevated after storm events, suggesting that sediment loads increased during and after storm events. MPCA believes that the GWLF model accounts for this, as it uses precipitation data to determine loading.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this third element.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Comments:
Fecal coliform : Load allocations for the segments are in Tables 2-10 below. To determine the LAs, MPCA calculated the load for point sources (Section 5 below), and subtracted that and the Margin of Safety (MOS; Section 6 below) from the total loading capacity as calculated in Section 3 above (Section 5.2.3 of the TMDL).

Although allocations were not developed for components of the load allocation, MPCA did determine the amount of current loading from these components for fecal coliform. Section 4.2.5 of the TMDL discusses the process used by MPCA to determine the loads of fecal coliform from animals in the watershed. This includes the impacts from pets and agricultural animals. These impacts can be used by MPCA to determine the appropriate implementation measures.

Sediment:
The LA for the mainstem Groundhouse River is **11.45 tons/d**, and the LA for the South Fork Groundhouse River is **11.05 tons/d** (Tables 11 and 12 below). To determine the LAs, MPCA calculated the load for point sources (Section 5 below), and subtracted that and the Margin of Safety (MOS; Section 6 below) from the total loading capacity as calculated in Section 3 above (Section 5.1.3 of the TMDL).

Although allocations were not developed for components of the load allocation, MPCA did determine the amount of current sediment loading from various sources. Section 4.2 of the TMDL discusses the results from MPCA's review, and provides information that MPCA can use to determine the impacts from potential sources. Estimations of the current loads from streambank erosion and failing septic systems were developed, and the results from the GWLF modeling shows the loadings from various land uses (Section 4.3 and Appendix B of the TMDL). These impacts can be used by MPCA to determine the appropriate implementation measures.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this fourth element.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permittees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comments:
Fecal coliform: The WLAs for fecal coliform is **1,741 million organisms per day** (Section 5.2.2 of the TMDL). There is one facility discharging fecal coliform in the watershed; the Ogilvie WWTP (MN0021997). The WLA was based upon multiplying the permitted design flow (0.23) by the concentration limit of 200 organisms/100ml.

Livestock facilities that are designated as Confined Animal Feeding Operations (CAFOs) were given a WLA = 0. Straight-pipe septic systems were given a WLA of 0. There are no MS4 facilities in the watershed.

Sediment: The WLAs for sediment is **0.06 tons per day** (Section 5.1.2 of the TMDL). There is one individual facility discharging sediment in the watershed; the Ogilvie WWTP (MN0021997). The WLA for the WWTP is **0.04 tons per day**. This WLA is based upon the TSS permit limit of 45 mg/l multiplied by the permitted flow of 0.23 MGD.

A WLA was determined for permitted construction sites in the watershed, **0.02 tons per day**. The WLA was determined by multiplying the percent acreage of construction sites in the watershed by the loading capacity. This results in the WLA for construction sites. MPCA set the WLA for the gravel pit operations, CAFOs, and straight pipe dischargers to 0.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this fifth element.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comments:
Fecal coliform: For fecal coliform, MPCA used an explicit MOS of 5% (Section 5.2.4 of the TMDL; Tables 2-10 below). The margin of safety is appropriate because the use of the LDC provides an accurate account of existing stream conditions (calculated by multiplying daily flows by existing pollutant levels), and an accurate account of the stream's loading capacity (calculated by multiplying daily flows by the appropriate water quality target). In other words, there is a good fit between observed (existing) data and predicted data using the LDC approach, thus providing a relatively accurate determination of the TMDL reductions needed. MPCA accounts for any uncertainty in this method, by incorporating the MOS.

In addition, for fecal coliform, an additional implicit MOS is that MPCA compared individual sample results to the 200 cfu/100 ml geometric mean component of the WQS. MPCA considered this conservative as the WQS is based upon a geometric mean of 5 samples taken over a 30 day period. This in effect increases the reductions needed to meet the WQS.

Sediment: MPCA used implicit MOS for the TMDL (Section 5.1.4 of the TMDL). MPCA noted that there a number of best management practices (BMPs) that have already been implemented in the watershed. Since the model was run based upon data from 1996-2005, impacts from new BMPs are not included. In addition, the GWLF model overestimated flow by

7%, thus overestimating the existing loads and consequently the amount of reduction needed to achieve the water quality standards. MPCA also determined that the pollutant causing the impairment was excessive fine sediments. However, the TMDL loads are for total sediments, and therefore achieve greater improvements in the watershed.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this sixth element.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variations. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Comments:
MPCA used the Load Duration Curve method for fecal coliform, which inherently accounts for seasonal variation by using daily flows over a multi-year year period (Section 4 and Appendices A and E of the TMDL). EPA agrees that this properly accounts for seasonal variations.

MPCA properly accounted for seasonality for sediment by using the GWLF model, which uses precipitation and flows from over a multi-year period (Section 4 and Appendix B of the TMDL). EPA agrees that this properly accounts for seasonal variations.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this seventh element.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of

reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comments:
Reasonable Assurance is discussed in Section 6.4 of the TMDL Study. A summary is provided below:

Watershed Management: The Snake River Watershed Management Board was formed to improve water quality in the Snake River watershed, which includes the Groundhouse River.

Programs: MPCA listed several programs that could be used to improve water quality. These include:

- Environmental Quality Incentives Program (EQIP) through the NRCS;
- Conservation Reserve Program (CRP) through the USDA;
- Wetlands Reserve Program through the NRCS;
- Wildlife Habitat Incentives Program (WHIP) through NRCS

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this eighth element.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:
MPCA is proposing that future monitoring be done for fish and invertebrates every 6-10 years until compliance is achieved. The Snake River Watershed Management Board is expected to begin a surface water monitoring program which includes the Groundhouse River basin in the near future (Section 6.3 of the TMDL).

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this ninth element.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that

other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comments:
The submitted TMDL Study does not contain a formal implementation plan, since it is not required as a condition for TMDL approval under the current U.S. EPA regulations. However, Section 6 of the TMDL Study does discuss an overview of the implementation options available to MPCA. The formal TMDL implementation plan will be developed by MPCA upon approval of the Groundhouse TMDL.

Potential activities, identified by MPCA, for controlling the pollutants in the Groundhouse watershed are listed in Section 6 of the TMDL. Numerous BMPs are listed, as well as their potential impacts and costs. More detail is present in Appendix F.

EPA reviews, but does not approve, implementation plans. EPA finds that this criterion has been adequately addressed.

11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Comments:
Several stakeholder meetings were held by MPCA in order to involve interested stakeholders. The invitees included local cities, representatives from the county boards, Soil and Water Conservation Districts, and local residents. All meetings were open to the public. Meetings were held on June 29, 2006; October 24, 2006; February 6, 2007; July 31, 2008 and September 2, 2008. The September 2, 2008 meeting was to discuss the implementation plan.

MPCA placed the Draft Groundhouse TMDL on public notice from February 9, 2009 to March 11, 2009, to provide an opportunity for public comment. The draft TMDL was posted at: http://www.pca.state.mn.us/water/tmdl/tmdl-draft.html, the MPCA's TMDL web site. EPA sent MPCA comments on the draft TMDL, and the comments were adequately addressed in the final TMDL. Two sets of comments were received during the TMDL public notice period. The comments and MPCA's responses were included in the TMDL submittal. Public comments were addressed appropriately by MPCA.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this eleventh element.

12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a *technical review* or *final review and approval*. Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

Comments:
On April 9, 2009, EPA received the Groundhouse River TMDL, and a submittal letter dated April 2, 2009, signed by Paul Eger, Commissioner, addressed to Tinka Hyde, U.S. EPA, Region 5, Water Division. In the submittal letter, MPCA stated "I am pleased to submit the Groundhouse River Total Maximum Daily Load (TMDL) study for fecal coliform and impaired biota to the U.S. Environmental Protection Agency (EPA) for final approval". The submittal letter included the names and locations of the waterbodies and the pollutants of concern.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this twelfth element.

13. Conclusion

After a full and complete review, EPA finds that the fecal coliform and sediment TMDLs for the Groundhouse River watershed satisfy all of the elements of an approvable TMDL. This decision document addresses 5 TMDLs for 3 waterbody segments as identified on Minnesota's 2008 303(d) list (Table 1 above).

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 2. Fecal coliform loads for S003-532, Groundhouse River (River ID 07030004-512)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 456.6 cfs	Moist (10-40) 131.9 cfs	Mid-Range (40-60) 54.1 cfs	Dry (60-90) 29.5 cfs	Low (90-100) 11.8 cfs
TMDL= LA+WLA+MOS	1,939,815	1,256,368	212,394	141,452	36,732
LA	1,841,083	1,191,809	200,033	132,638	33,154
WLA: Ogilvie WWTP	1,741	1,741	1,741	1,741	1,741
MOS	96,991	62,818	10,620	7,073	1,837

Table 3. Fecal coliform loads for S001-0097, Groundhouse River (River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 258.9 cfs	Moist (10-40) 74.8 cfs	Mid-Range (40-60) 30.7 cfs	Dry (60-90) 16.7 cfs	Low (90-100) 6.7 cfs
TMDL= LA+WLA+MOS	1,099,953	437,885	120,436	90,511	25,185
LA	1,043,214	414,250	112,673	84,244	22,185
WLA: Ogilvie WWTP	1,741	1,741	1,741	1,741	1,741
MOS	54,998	21,894	6,022	4,526	1,259

Table 4. Fecal coliform loads for S001-099, Groundhouse River (River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 222.9 cfs	Moist (10-40) 64.4 cfs	Mid-Range (40-60) 26.4 cfs	Dry (60-90) 14.4 cfs	Low (90-100) 5.8 cfs
TMDL= LA+WLA+MOS	947,095	613,409	168,642	80,498	21,685
LA	897,999	580,998	158,469	74,732	18,860
WLA: Ogilvie WWTP	1,741	1,741	1,741	1,741	1,741
MOS	47,355	30,670	8,432	4,025	1,084

Table 5. Fecal coliform loads for S001-0152, Groundhouse River (River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 212.6 cfs	Moist (10-40) 61.4 cfs	Mid-Range (40-60) 25.2 cfs	Dry (60-90) 13.7 cfs	Low (90-100) 5.5 cfs
TMDL= LA+WLA+MOS	929,150	585,066	157,000	71,582	20,683
LA	882,693	555,813	149,150	68,003	19,649
WLA: No Upst. Facilities	0	0	0	0	0
MOS	46,457	29,253	7,850	3,579	1,034

Table 6. Fecal coliform loads for S003-640, Groundhouse River(River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 101.7 cfs	Moist (10-40) 58.3 cfs	Mid-Range (40-60) 23.9 cfs	Dry (60-90) 13.0 cfs	Low (90-100) 5.2 cfs
TMDL= LA+WLA+MOS	779,194	341,140	148,936	52,504	19,621
LA	740,234	324,083	141,489	49,879	18,640
WLA: No Upst. Facilities	0	0	0	0	0
MOS	38,960	17,057	7,447	2,625	981

Table 7. Fecal coliform loads for S003-639, Groundhouse River (River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 40.4 cfs	Moist (10-40) 11.7 cfs	Mid-Range (40-60) 4.8 cfs	Dry (60-90) 2.6 cfs	Low (90-100) 1.1 cfs
TMDL= LA+WLA+MOS	171,635	111,163	29,830	10,516	3,930
LA	163,053	105,605	28,338	9,990	3,734
WLA: No Upst. Facilities	0	0	0	0	0
MOS	8,582	5,558	1,492	526	196

Table 8. Fecal coliform loads for S003-641, Groundhouse River (River ID 07030004-513)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 153.4 cfs	Moist (10-40) 44.3 cfs	Mid-Range (40-60) 18.2 cfs	Dry (60-90) 9.9 cfs	Low (90-100) 4.0 cfs
TMDL= LA+WLA+MOS	670,245	422,039	113,253	43,616	12,339
LA	636,733	400,937	107,590	41,435	11,722
WLA: No Upst. Facilities	0	0	0	0	0
MOS	33,512	21,102	5,663	2,181	617

Table 9. Fecal coliform loads for S003-638, South Branch Groundhouse River (River ID 07030004-573)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 176.3 cfs	Moist (10-40) 50.9 cfs	Mid-Range (40-60) 20.9 cfs	Dry (60-90) 11.4 cfs	Low (90-100) 4.6 cfs
TMDL= LA+WLA+MOS	748,924	485,059	133,355	48,589	18,257
LA	711,478	460,806	126,687	46,160	17,344
WLA: No Upst. Facilities	0	0	0	0	0
MOS	37,446	24,253	6,668	2,429	913

Table 10. Fecal coliform loads for S003-664, South Branch Groundhouse River (River ID 07030004-573)

TMDL Component (Million Org/Day)	Flow Zone				
	High (0-10) 82.5 cfs	Moist (10-40) 23.8 cfs	Mid-Range (40-60) 9.5 cfs	Dry (60-90) 5.3 cfs	Low (90-100) 2.1 cfs
TMDL= LA+WLA+MOS	318,620	189,083	38,367	25,669	9,411
LA	302,689	179,629	36,449	24,386	8,940
WLA: No Upst. Facilities	0	0	0	0	0
MOS	15931	9454	1918	1283	471

Table 11. Sediment loads for the Groundhouse River (River ID 07030004-513)

Component	Load (US ton/yr)	Load (US ton/d)
Current Load	6,074.4	16.64
TMDL= LA+WLA+MOS	4,203.5	11.51
LA	4,182.0	11.45
WLA: Facilities	15.8	0.04
WLA: Construction Sites	5.7	0.02
MOS	Implicit	Implicit
TMDL Reduction (percent)	30.8	30.8

Table 12. Sediment loads for the South Fork Groundhouse River (River ID 07030004-573)

Component	Load (US ton/yr)	Load (US ton/d)
Current Load	6,661.1	18.25
TMDL= LA+WLA+MOS	4,036.6	11.06
LA	4,031.2	11.05
WLA: Facilities	0	0
WLA: Construction Sites	5.4	0.01
MOS	Implicit	Implicit
TMDL Reduction (percent)	39.4	39.4