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

OCT 25 2010

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 Load (TMDL) for Wirth Lake (ID 27-0037), including support documentation and follow up information. Wirth Lake is located in central Minnesota in Hennepin County. The TMDL addresses the Aquatic Recreation Use impairment due to excessive nutrients.

EPA has determined that the Wirth Lake TMDL meets the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's phosphorus TMDL, addressing excess nutrients. 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 efforts in submitting this TMDL and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch, at 312-886-0236.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Dave Johnson, MPCA
Brooke Asleson, MPCA

TMDL: Wirth Lake, Hennepin County, MN
Date: October 25, 2010

DECISION DOCUMENT FOR THE WIRTH LAKE PHOSPHORUS TMDL, HENNEPIN COUNTY, MN

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.

Comment:

Location Description/Spatial Extent:

Wirth Lake (DNR ID 27-0037) is located within the Upper Mississippi River basin west of downtown Minneapolis, Minnesota. A majority of the Wirth Lake watershed (approx. total area of 347 acres) is located within the City of Golden Valley (Twin Cities Major Watershed HUC 07010206). The southern portion of the watershed is located in the City of Minneapolis. The shoreline around Wirth Lake is the property of the Minneapolis Park and Recreation Board (MPRB). Wirth Lake lies within the boundaries of the North Central Hardwood Forest Ecoregion (NCHF).

Wirth Lake has a surface area of 38 acres, a maximum depth of 26 feet, and an average depth of 14 feet. The lake is immediately bordered by MPRB parkland, open spaces, wetland areas, and surface roads. Wirth Lake is connected to Bassett Creek via a box culvert in the northeastern corner of the lake. The construction of the culvert maintains the water level in Wirth Lake (818.0 ft.) and prevents Bassett Creek (elevation 816.0-817.0 ft under normal flow conditions) from draining into Wirth Lake. On occasion, backflow from Bassett Creek has entered Wirth Lake. The MPCA estimated that bankfull conditions in Bassett Creek (approximately a 2-year frequency) would result in backflow events into Wirth Lake (page 5, of the final TMDL document).

For the purposes of this project, the Wirth Lake watershed was divided by the Minnesota Pollution Control Agency (MPCA) into five drainage districts (Section 2.3, pages 5-8 of the final TMDL document). Four of the sub-districts produce stormwater flow to Wirth Lake via stormwater conveyance structures (i.e. detention ponds, wetland, stormwater culverts, etc.). These four districts are: the Highway 55 Drainage District, the France Avenue Drainage District, the Southeast Wirth Park Drainage District, and the South Wirth Park Drainage District. The fifth district, Wirth Lake Direct Drainage District (WLDDD), drains directly to Wirth Lake without passing through any conveyance structure. The Wirth Lake watershed lies entirely within MS4 communities for the City of Golden Valley, the City of Minneapolis, Hennepin County, and Minnesota Department of Transportation (MNDOT) direct tributary watershed.

Land Use:

The Wirth Lake watershed encompasses approximately 347 acres within the boundaries of the City of Golden Valley and the City of Minneapolis. Land use in the Wirth Lake watershed is comprised of commercial/industrial land uses, highway areas, high density residential land uses, low-density residential land uses, and park and open space land uses. MPCA also provided the land use for each of the drainage districts (Section 2.3, pages 5-8 of the final TMDL document). The Highway 55 drainage district is composed of highway, multi-family, residential and parkland land uses. The France Avenue drainage district is composed of single and multi-family residential, office space, and undeveloped parkland land uses. The Southeast Wirth Park drainage district consists of entirely open space/parkland land uses. The WLDDD consists of open space/parkland land uses. The South Wirth Park drainage district is comprised of open space/parkland land uses.

Significant development is not expected by MPCA in the Wirth Lake watershed and therefore existing conditions are considered as the “ultimate” land use conditions for setting TMDL allocations. The waste

load allocations (WLA) for point sources, and load allocations (LA) for non point sources, were calculated for all current and future sources. Any expansion of nutrient sources in point or nonpoint sources will need to comply with the respective WLA and LA in the Wirth Lake TMDL.

Problem Identification:
Wirth Lake was originally listed on the 2002 Minnesota 303(d) list for excessive nutrients (phosphorus). Excess nutrients can lead to frequent algal overgrowth in lakes and hinder aquatic recreation activities (swimming, fishing, etc.). The Wirth Lake TMDL had a target start date of 2008 and is projected to be completed by 2010. It is currently on the draft 2010 Minnesota 303(d) list for excessive nutrients and impaired aquatic recreation.

Priority Ranking:
The Wirth Lake watershed was given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data and the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin (Executive Summary, page v of the final TMDL document). Wirth Lake is a popular location for aquatic recreation including aesthetic viewing, canoeing/kayaking, bird watching, fishing, and swimming. Water quality degradation has lead to efforts to improve the water quality within the Wirth Lake watershed, and to the development of a TMDL.

Pollutant of Concern:
The pollutant of concern is phosphorus.

Source Identification (point and nonpoint sources):
Point Source Identification: The potential point sources to the Wirth Lake watershed are:

Municipal Separate Storm Sewer Systems (MS4) – The MS4 communities were divided into direct tributary MS4 communities and MS4 communities that contributed phosphorus to Wirth Lake via Bassett Creek backflow events. The MS4 communities contributing phosphorus loads during backflow events are those MS4 communities that lie upstream of Bassett Creek (see Figure 6, page 21 of the final TMDL document). The MPCA calculated that the upstream MS4 communities, which contribute phosphorus during backflow events, contribute 37% of the annual total phosphorus load (page 19 of the final TMDL document). The MPCA estimated that MS4 communities from the direct tributary watershed contribute 45% of the total phosphorus load to Wirth Lake (page 19 of the final TMDL document).

The MS4 communities in the direct tributary watershed are:
- MNDOT MS4 community (MS400170)
- City of Golden Valley MS4 community (MS400021)
- City of Minneapolis and Hennepin County MS4 community (MN0061018)

The MS4 communities contributing during Bassett Creek backflow events are:
- MNDOT MS4 community (MS400170)
- City of Golden Valley MS4 community (MS400021)

- City of Minneapolis and Hennepin County MS4 community (MN0061018)
- City of Plymouth MS4 community (MS400112)
- City of Medina MS4 community (MS400105
- City of Minnetonka MS4 community (MS400035)
- City of Medicine Lake MS4 community (MS400104)
- City of New Hope MS4 community (MS400039)
- City of Crystal MS4 community (MS400012)
- City of Robbinsdale MS4 community (MS400046)
- City of St. Louis Park MS4 community (MS400053)

Permitted Industrial and Construction Areas – These areas do not represent a significant phosphorus loading input in the Wirth Lake watershed. The drainage areas for industrial and construction areas are relatively small and it is anticipated that the size of these drainage areas will not be expanding in the future.

Nonpoint Source Identification: The potential nonpoint sources to the Wirth Lake watershed are:

Internal sources – The release of phosphorus from sediment, macrophytes and/or benthic fish. Phosphorus builds up in the bottom water of the lake and can be resuspended or mixed into the water column when the thermocline decreases and the lake water mixes.

Atmospheric deposition – The addition of phosphorus from particulates in the atmosphere. Phosphorus can be bound to these particles which are deposited directly to the lake surface as they settle out of the atmosphere.

Future Growth:
Future Growth/Reserve Capacity description is found in Section 3.4.4 (page 23 of the final TMDL document). Significant development is not expected in the Wirth Lake watershed. Existing conditions were considered to be the "ultimate" land use conditions for calculating WLA and LA. The WLA and LA were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values in the TMDL.

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the first criterion.

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.

Comment:

Designated Uses:

The designated uses for the Wirth Lake waterbody are for aquatic recreation (swimming, fishing, canoeing/kayaking, etc.). Wirth Lake is designated as a Class 2B water (MN Rule 7050.0222 Subpart 4, Class 2B). The quality of Class 2B waters, relative to aquatic life and recreation, "*shall be 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."*

Standards:

The assessment for eutrophic conditions includes a narrative water quality standard and assessment factors from Minnesota Rule 7050.0150. The goal for the Wirth Lake TMDL is to achieve the total phosphorus (TP) criteria and either the chlorophyll-a (chl-a) or Secchi Disc (SD) depth criteria. Section 3.5 (page 24 of TMDL document) explains that the allocations for meeting the NCHF criteria will be accomplished by meeting the total phosphorus criteria and the Secchi Disc transparency criteria.

Wirth Lake lies within the boundaries of the NCHF and is classified as a deep lake. The MPCA's Deep Lake Eutrophication Standards for the NCHF ecoregion are:

- Total Phosphorus (µg/L) : 40 µg/L
- Chlorophyll-a (µg/L) : 14 µg/L
- Secchi Disc Depth (m): 1.4 m

The phosphorus target is calculated as an average phosphorus concentration (38 µg/L) over the summer season (June 1 through September 30) as the primary criteria, and the Secchi disc transparency (1.4 m) as the secondary target. MPCA used a lower phosphorus target to account for Margin of Safety (Section 6 below).

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the second criterion.

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.

Comment:

Formulation of the WLA and LA required a historical review of water quality data for TP, chl-a and SD depth by MPCA. Values for these three parameters were averaged over the growing season, which occurs in Minnesota in May through September, and were utilized as an assessment tool for measuring the water quality in Wirth Lake. The May through September growing season was chosen by MPCA because: it corresponds to the eutrophication criteria, contains the months that the general public typically uses Wirth Lake for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading (pages 8-10 of the final TMDL document). Historical water quality values from 1992-2008 were compiled. The historical water quality data generally showed improvements in water quality over the period of 1992-2008 (see Table 2, page 8 of the final TMDL document).

Modeling efforts were utilized to gain a better understanding of the water quality impairments in the Wirth Lake watershed. The P8 Urban Catchment Model (P8), the BATHTUB model and water balancing equations were used to determine water quality goals for meeting the NCHF eutrophication criteria. The modeled water quality calculations were then compared with existing phosphorus budgets in the Wirth Lake system to determine WLA and LA.

- The P8 model was used to generate runoff scenarios (i.e. inflows from the contributing watershed) from water data collected in 2005-06, designated as the calibration period, and 2006-07, designated as the validation period. Daily runoff volumes and phosphorus loading reductions were simulated based on default parameters for the watershed and Best Management Practices (BMP) inputs (ex. treatment basins/retention structures that have permanent pool storage volumes).
- The BATHTUB model was used to determine which phosphorus sedimentation model best fit the observed phosphorus concentrations from the 2005-06 water year (calibration period). The BATHTUB model linked phosphorus loadings from the watershed (generated in P8) with observed concentrations in Wirth Lake.

- Water balance equations were employed to calculate the inflows (derived from P8 work) and outflows of the Wirth Lake system. This determination was important because of the phosphorus loadings from Bassett Creek backflow events. These backflow events were seen as the primary contributor of phosphorus to Wirth Lake.

The modeling results, based on efforts in P8, BATHTUB and water balance equations, were compiled and compared to historical lake elevation data and Bassett Creek flow data. This comparison was used to estimate phosphorus influx concentrations from Bassett Creek during backflow events. The BATHTUB model was also employed to determine the modeling values for chl-a and SD. The modeled outputs for the TP, chl-a and SD, were utilized to set WLA and LA necessary to meet the NCHF eutrophication criteria. The modeled outputs were also vital in setting implementation strategies for reducing the overall total phosphorus loadings to Wirth Lake.

Table 1 of this document compares the water quality field observations ("Observed" column in Table 1) to the BATHTUB modeled results for the calibration (2005-06) and validation (2006-07) periods. The BATHTUB results were calculated for two scenarios. The first scenario included the phosphorus inputs from Bassett Creek backflow events, which was represented by the "Calibrated" column in the 2005-06 water year data. The second scenario did not include Bassett Creek backflow inputs, so that the conditions in Wirth Lake would be without the influence of phosphorus inputs from Bassett Creek. The second scenario was represented by the "Calibrated w/o Creek Backflow" under the 2005-06 water year data in Table 1 of this document. This second scenario was used as a predictor of what the water quality conditions in Wirth Lake would be if there were no backflow events from Bassett Creek. Under these conditions the TP concentration would be reduced to a growing season average of 38 µg/L and a Secchi Disk depth of 2.0 m, which would meet the NCHF eutrophication criteria (TP = less than 40 µg/L and SD = greater than 1.4 m). The modeling results were then used to determine the daily loads to achieve the water quality standards (Table 2 below).

Table 1: Results of Wirth Lake Water Quality Modeling

Water Quality Parameter	**2005-06 Water Year**			**2006-07 Water Year**	
	Observed	*Calibrated*	*Calibrated w/o Creek Backflow*	*Observed*	*Validated*
Total Phosphorus (ug/L)	46	46	38	34	36
Chlorophyll a (ug/L)	22	21	17	14	15
Secchi Disc (m)	2.1	1.6	2.0	2.2	2.2

Table 2: Wirth Lake Total Phosphorus Budgets, Wasteload and Load Allocations

Watershed TP Sources	Existing Annual TP Load (lbs/yr)	Annual TMDL WLA	Daily TMDL WLA	Percent Reduction of Existing Load (%)
		WLA (lbs/yr)	WLA (lbs/day)	
Direct Tributary Watershed MNDOT MS4 (#MS400170)	28	28	0.077	0
Direct Tributary Watershed Categorical MS4s (Golden Valley & Minneapolis)	38	38	0.104	0
Bassett Creek Backflow MS4s (shown in Figure 6 (pg. 21) & Table 4 (pg. 20 of the final TMDL document))	55	0	0.000	100
Total Load Sources	**121**	**66**	**0.181**	**45**
Internal & Atmospheric Sources	**Existing Annual TP Load (lbs/yr)**	**Annual TMDL LA**	**Daily TMDL LA**	**Percent Reduction of Existing Load (%)**
		LA (lbs/yr)	**LA (lbs/day)**	
Internal Sources	20	20	0.055	0
Atmospheric Sources	6	6	0.016	0
Total Load Sources	**26**	**26**	**0.071**	**0**
Margin of Safety (MOS)	NA	7	0.019	NA
OVERALL SOURCE TOTAL	**147**	**99**	**0.271**	**33**

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the third criterion.

4. Load Allocations (LA)

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.

Comment:

The loading allocations (LA) section is found on page 23 of the final TMDL document. LA were recognized as originating from internal sources and atmospheric sources loading. Internal loading was cited as a source upon examination of Figure 3 (page 11 of the final TMDL document) which shows Wirth Lake water quality during the 2008 growing season. The total phosphorus values in this figure increase near the end of the growing season (August-September 2008). This increase was attributed to the release of phosphorus from lake sediments, macrophytes and/or benthic fish.

Table 3: Wirth Lake Total Phosphorus Budgets, Wasteload and Load Allocations

Internal & Atmospheric Sources	Existing Annual TP Load (lbs/yr)	Annual TMDL LA LA (lbs/yr)	Daily TMDL LA LA (lbs/day)	Percent Reduction of Existing Load (%)
Internal Sources	20	20	0.055	0
Atmospheric Sources	6	6	0.016	0
Total Load Sources	26	26	**0.071**	0

Atmospheric (6 pounds = lbs.) and internal loading (20 lbs.) contributed an estimated 26 lbs of phosphorus to Wirth Lake in the 2005-2006 water year. Phosphorus load reduction strategies did not account for any reductions for the atmospheric or internal sources. The MPCA concluded that the WLA reductions would be sufficient for reducing the phosphorus concentrations and would meet the NCHF criteria.

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the fourth criterion.

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.

Comment:
The wasteload allocations (WLA) section is found on page 22 of the TMDL document. The WLA allocation was divided amongst the direct tributary watershed, which was then further split into direct tributary watershed MNDOT MS4 and the direct tributary watershed categorical MS4 communities, and the Bassett Creek backflow MS4 community (see Table 2 of this document).

The direct tributary watershed MNDOT MS4 (MS400170) was assigned a TP load of 0.077 lbs/day, the direct tributary watershed categorical MS4 was assigned a TP load of 0.104 lbs/day, and the Bassett

Creek backflow MS4 was assigned a TP load of 0.00 lbs/day. The Bassett Creek phosphorus inputs were identified and backflow events will be stopped in the future, resulting in a WLA of 0.00 lbs/day. The WLA load estimates for these three sources were estimated from data collected during the 2005-2006 water year (Table 4, page 20 of the final TMDL document).

The direct tributary watershed MNDOT MS4 includes:

- MNDOT MS4 (MS400170)

The direct tributary watershed categorical MS4s includes:

- Golden Valley MS4 community (MS400021)
- City of Minneapolis MS4 community (MN0061018)
- Industrial and Construction WLA

The Basset Creek MS4s includes:

- MNDOT MS4 community (MS400170)
- City of Golden Valley MS4 community (MS400021)
- City of Minneapolis and Hennepin County MS4 community (MN0061018)
- City of Plymouth MS4 community (MS400112)
- City of Medina MS4 community (MS400105
- City of Minnetonka MS4 community (MS400035)
- City of Medicine Lake MS4 community (MS400104)
- City of New Hope MS4 community (MS400039)
- City of Crystal MS4 community (MS400012)
- City of Robbinsdale MS4 community (MS400046)
- City of St. Louis Park MS4 community (MS400053)

Industrial and construction WLA sources were combined with a categorical WLA for Golden Valley, Minneapolis and Hennepin County under the direct tributary watershed categorical MS4s. Permitted industrial and construction areas did not represent a significant phosphorus loading source based on their small drainage areas. The categorical WLA was determined to be appropriate due to the similarities between each of the municipalities in use of land and municipal operations.

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the fifth criterion.

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.

Comment:
The Margin of Safety (MOS) section (page 23 of the TMDL document) outlines how the MOS was determined by MPCA. The Wirth Lake TMDL utilizes an explicit MOS set at a value of 5 percent lower than the total phosphorus criteria.

The MOS was set at 5 percent because eliminating the backflow from Bassett Creek will reduce the in lake phosphorus concentration to 38 µg/L, which is 5 % lower than the NCHF total phosphorus criteria (40 µg/L). The Wirth Lake TMDL contains other processes which reduce uncertainty in the monitoring data set. Reducing uncertainty allows for a smaller MOS. Processes unique to the Wirth Lake TMDL which reduce uncertainty were: the long-term water quality monitoring efforts by the MPRB in the Wirth Lake watershed result in a robust data set, total phosphorus allocations are calculated from data collected from a water year with high overall loading of in-lake phosphorous levels (2005-06 water year), and the calibration and validation process of the modeling efforts reduce error from erroneous assumptions (Section 3.3 of the TMDL). All of these conditions functioned to lower the level of uncertainty in setting the TMDL allocations for the Wirth Lake TMDL.

The U.S. EPA finds that the TMDL document submitted by the MPCA contains an appropriate MOS satisfying the requirements of the sixth criterion.

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)).

Comment:
Seasonal variation was considered in this TMDL as described in Section 3.6 (page 24) "Seasonal Variation". Water quality monitoring in Wirth Lake suggests that total phosphorus concentrations vary significantly over the growing season (May through September). Typically the total phosphorus concentrations peak in the month of August and exceed the NCHF deep lake eutrophication standards.

The MPCA TMDL guidelines state that total phosphorus values are defined as the mean concentration of phosphorus values measured during the growing season. In the Wirth Lake TMDL, the LA and WLA were calculated from modeling efforts which incorporated mean growing season (May through September) total phosphorus values. Nutrient loadings were calculated to meet the water quality standards during the most critical period (late summer) of the calendar year. Therefore, the TMDL will be protective of water quality during the remainder of the calendar year (October through April).

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the seventh criterion.

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.

Comment:

The Wirth Lake TMDL outlines reasonable assurance activities in Section 6.0 (page 31 of the final TMDL document). The reasonable assurance practices will be implemented over the next several years. Water quality monitoring by the MPRB will monitor the success or failure of BMP systems designed to reduce nutrient loading into Wirth Lake. Watershed managers will have the opportunity to reflect on the progress (positive progress, negative progress, or status quo) and will have the opportunity to change course if progress is unsatisfactory. A summary of the reasonable assurance activities is provided below.

- The installation of backflow prevention outlet structure at the Wirth Lake outlet to Bassett Creek will aid in the reduction of nutrients during high flow events. The Bassett Creek Watershed Management Council (BCWMC) has found a funding source for the construction of this structure and work may begin on its construction as early as 2012.
- Feedback from stakeholders, government agencies, technical experts and local citizens on monitoring efforts and BMP improvements. Watershed managers can use this feedback to assess the efficiency of current BMP structures and BMP practices and employ further nutrient reduction strategies.
- The continued water quality monitoring efforts by the MPRB to ensure that watershed management strategies are effective and efficient in reducing nutrient inflows to Wirth Lake.
- Reasonable assurance clauses from MS4, construction and industrial permits. These permits require that Stormwater Pollution Prevention Plans (SWPPP) be reviewed to ensure the adequacy of these plans in meeting the WLA and LA of the TMDL. If the SWPPP is not meeting the requirements of the TMDL, the permit holder must then modify their SWPPP to be in compliance with the TMDL within 18 months of the approved TMDL.

- New development, redevelopment, industrial or construction projects within the Wirth Lake watershed will need to be designed to maintain or improve on stormwater practices and BMP structures.
- An implementation plan for the Wirth Lake TMDL will be finalized within one year following the approval of the TMDL. The implementation plan will outline which BMP will be employed in the Wirth Lake watershed to achieve loading reductions and meet water quality standards. Individual nonpoint source permits (ex. SWPPP) will be modified according to the recommendations of the implementation plan.

The U.S. EPA finds that this criterion has been adequately addressed.

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.

Comment:

Section 4.0 of the TMDL submittal outlines the planned water monitoring efforts by the MPRB. The MPRB will continue to monitor water quality in Wirth Lake on an annual basis. The MPRB visits Wirth Lake 8-10 times a year between April to September in order to collect water quality measurements (dissolved oxygen, temperature, total phosphorus, chlorophyll-a and Secchi disc depth).

The MPRB has designed a water quality monitoring program post TMDL to assess water quality improvements in Wirth Lake and to test the efficiency of BMP phosphorus removal strategies. The MPRB will monitor the effectiveness of BMP structures and improvements to the backflow prevention structure at the Wirth Lake outlet to Bassett Creek. These structures will be checked periodically to ensure that they are functioning properly and reducing the inflow of phosphorus to Wirth Lake.

Phytoplankton (microscopic plant organisms), zooplankton (microscopic "animal" plankton that typically feed on phytoplankton), macrophyte (rooted aquatic plants) and fish surveys were also recommended to monitor water quality in Wirth Lake. These surveys will aid watershed managers in their understanding how BMP phosphorus removal efforts are impacting the ecological community in Wirth Lake. The MPCA recommends that the biological surveys be conducted during those years which water quality measurements are also collected, thus linking biological and chemical monitoring data.

The U.S. EPA finds that this criterion has been adequately addressed.

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.

Comment:

Implementation strategies are outlined in Section 5.0 (specifically sections 5.1 to 5.3) of the final Wirth Lake TMDL. The BCWMC will have the lead role in implementing the mitigation strategies suggested in the final TMDL. The BCWMC will focus on stormwater management activities that reduce the influx of phosphorus into Wirth Lake. These main strategies are: improving the flow structure that regulates the creek overflow from Bassett Creek, reducing stormwater runoff, improving BMPs within the Wirth Lake watershed, and implementing programs that reduce nutrient export.

The installation of a backflow prevention structure at the Wirth Lake outlet to Bassett Creek would prevent storm generated streamflow from over topping the structure and flowing into Wirth Lake during large flow events (i.e. large precipitation or spring melt events). This TMDL identified phosphorus contributions during large flow events to be a significant source of phosphorus to Wirth Lake.

Maintenance of existing structural and nonstructural stormwater systems is ongoing and will be documented in the MS4 Stormwater Pollution Prevention Plans (SWPPP). Phosphorus reduction strategies related to new development or redeveloped land areas involve installing stormwater detention basins or pervious surface infiltration areas that would allow the first 1-inch of rainfall to infiltrate into the subsurface. Other strategies include: evaluation of existing BMP structures and assessment of new technologies (ex. extended detention basins, infiltration basins, biofiltration basins, grit chambers) for removing phosphorus from stormwater, shoreline buffer BMP development projects, assessment of city sweeping activities, and water quality education programs for the general public.

Phosphorus load reductions for stormwater activities from construction sites were not targeted in this TMDL as long as construction stormwater practices are in compliance with their Construction General Permit. The Construction General Permit is a part of the NPDES program and involves the installation and maintenance of construction BMPs that may discharge stormwater to local waters. These BMPs must be maintained for the duration of the construction activities.

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

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.

Comment:

The public participation section of the TMDL submittal is found in Section 7.0. The MPCA hosted a public notice meeting on June 24, 2010, at Theodore Wirth Park Golf Chalet in Minneapolis, Minnesota. During this public meeting, the MPCA provided an overview of the draft Wirth Lake TMDL and granted members of the audience the opportunity to provide public comment. The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period was started on August 2, 2010 and ended on September 1, 2010. The MPCA received 1 public comment and adequately addressed this comment. The MPCA submitted all of the public comments and responses in the final TMDL submittal packet received by the U.S. EPA on October 13, 2010.

Additionally, the MPCA held a kickoff stakeholder meeting on February 17, 2009 at the Theodore Wirth Park Golf Chalet in Minneapolis, Minnesota. During this public meeting, the MPCA communicated the goals of the TMDL efforts in the Wirth Lake watershed, explained the TMDL development process and solicited contact information from stakeholders in attendance. A second stakeholder meeting was held on June 22, 2009 at the same location to discuss the progress of the TMDL project with watershed representatives and interested stakeholder groups. During the development of the TMDL, the MPCA created a Wirth Lake TMDL website, where interested parties could monitor the progress of the TMDL efforts. The MPCA also periodically briefed representatives from watershed and stakeholder groups via email on the project progress.

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the 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.

Comment:
The U.S. EPA received the final Wirth Lake nutrient TMDL document, submittal letter and accompanying documentation from the MPCA on October 13, 2010. The transmittal letter explicitly stated that the final Wirth Lake (DNR ID 27-0037) TMDL for excess nutrients was being submitted to U.S. EPA pursuant to Section 303(d) of the Clean Water Act for U.S. EPA review and approval. The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on the Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The U.S. EPA finds that the TMDL transmittal letter submitted for Wirth Lake by the MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After and full and complete review, the U.S. EPA finds that the TMDL for Wirth Lake satisfies all of the elements of an approvable TMDL. This approval is for one TMDL, addressing one waterbody for recreational use impairments, for Wirth Lake (DNR ID 27-0037).

The U.S. EPA's approval of this TMDL extends to the water bodies which are identified as Wirth Lake (DNR ID 27-0037), with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The U.S. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The U.S. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.