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

FEB 2 6 2015

REPLY TO THE ATTENTION OF:
WW-16J

Rebecca J. Flood, Assistant Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Ms. Flood:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for segments impaired due to excessive nutrients (phosphorus) in the Rice Creek Watershed District (RCWD), including support documentation and follow up information. The RCWD is located in central Minnesota in parts of Anoka, Hennepin and Ramsey Counties. The RCWD nutrient TMDLs address impaired aquatic recreation due to excessive nutrients.

EPA has determined that the RCWD nutrient TMDLs meet 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 seven nutrient TMDLs. 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 these TMDLs 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: Celine Lyman, MPCA

wq-iw11-19g

TMDL: Rice Creek Watershed District nutrient TMDLs, Anoka, Hennepin and Ramsey Counties, Minnesota
Date: February 26, 2015

DECISION DOCUMENT FOR THE RICE CREEK WATERSHED DISTRICT NUTRIENT TMDLS, ANOKA, HENNEPIN & RAMSEY COUNTIES, 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:

The Rice Creek Watershed District Southwest Urban lakes nutrient Total Maximum Daily Load (TMDL) study addresses impaired segments in the southwestern portion of the Rice Creek Watershed District (RCWD). The TMDL study area (i.e., the RCWD southwestern watershed) is located in parts of Anoka, Hennepin and Ramsey counties. The RCWD lies north of Minneapolis in east-central Minnesota within the Mississippi River-Twin Cities watershed (HUC-8, 07010206). The seven lakes addressed by this study include: Island Lake (North Basin), Island Lake (South Basin), Little Lake Johanna, Long Lake (South Basin), Moore Lake (East), Pike Lake and Lake Valentine (Table 1 of this Decision Document).

The seven lakes of this study are included on the Minnesota Pollution Control Agency (MPCA) draft 2014 303(d) Impaired Waters List. Table 1 of this Decision Document identifies the segments covered by this TMDL as they appear on the draft 2014 Minnesota 303(d) list. The seven lakes of this TMDL study were identified as not meeting the Class 2B designation of aquatic life and recreational use due to excessive nutrients (total phosphorus (TP)).

Table 1: 303(d) List Summary of the RCWD Southwest Urban lakes Nutrient TMDLs

Water body Name	Lake ID	Affected Use	Pollutant or Stressor	TMDL
Island Lake (North Basin)	62-0075-02	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Island Lake (South Basin)	62-0075-01	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Little Lake Johanna	62-0058-00	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Long Lake (South Basin)	62-0067-00	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Moore Lake (East)	02-0075-01	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Pike Lake	62-0069-00	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus
Lake Valentine	62-0071-00	Aquatic Recreation	Excess Nutrients (Total Phosphorus)	Total Phosphorus

The MPCA classified four of the seven lakes as shallow lakes according to its shallow lake definition. MPCA's shallow lakes definition is dependent on the maximum depth of the lake or the littoral area of the lakes. The littoral zone is defined as the area in the lake where the depth of the lake is less than 15 feet. Specifically, if the lake's maximum depth is less than 15 feet, or if the littoral zone covers at least 80% of the lake's surface area, the lake shall be considered a *shallow lake*. MPCA classified Island Lake (North Basin), Island Lake (South Basin), Pike Lake and Lake Valentine as shallow lakes. MPCA classified Little Lake Johanna, Long Lake (South Basin) and Moore Lake (East) as deep lakes. The physical characteristics of the impaired lakes are listed in Table 2 of this Decision Document.

Table 2: Physical characteristics of the RCWD southwest urban lakes nutrient TMDLs

Water body Name	Surface Area	Littoral Area	Maximum Depth	Mean depth	Fetch	Watershed area (including lake area)	Watershed area : surface area
	(acres)	(% of total area)	(feet)	(m)	(km)	(acres)	
Island Lake (North Basin)	18.6	100	9	0.86	0.44	256	14 : 1
Island Lake (South Basin)	43.6	100	9	1.43	0.71	128	3 : 1
Little Lake Johanna	17.3	67	28	3.04	0.41	1703	98 : 1
Long Lake (South Basin)	118.9	44	24	3.44	1.24	12986	109 : 1
Moore Lake (East)	29.5	79	22	1.65	0.82	638	22 : 1
Pike Lake	37.2	91	16	1.87	0.59	5215	141 : 1
Lake Valentine	63.9	100	14	1.05	1.05	2540	40 : 1

Land Use:

Land use in the RCWD's southwestern watershed was assessed using the Multi-Resolution Land Characteristics Consortium 2006 National Land Cover Dataset (NLCD). A majority of the land use in the RCWD's southwestern watershed can be characterized as developed lands (Table 3 of this Decision Document).

Table 3: Land use in the RCWD's southwestern watershed

Water body Name	Developed Lands	Forested Lands	Grassland / Pasture Lands	Open Water	Wetlands	Cropland
	percentage of total land area in lake subwatershed					
Island Lake (North Basin)	72.0	11.0	1.1	15.0	1.0	0.0
Island Lake (South Basin)	62.0	9.0	0.0	29.0	0.0	0.0
Little Lake Johanna	94.0	4.0	0.0	2.0	1.0	0.0
Long Lake (South Basin)	71.0	13.0	0.1	13.0	3.0	0.0
Moore Lake (East)	86.0	9.0	0.0	4.0	1.0	0.0
Pike Lake	91.0	5.0	0.0	3.0	1.0	0.0
Lake Valentine	81.0	9.0	0.0	9.0	1.0	0.0

Problem Identification:

The seven lakes are found on the draft 2014 303(d) list for impaired aquatic recreation due to nutrient exceedances (phosphorus). While phosphorus is an essential nutrient for aquatic life, elevated concentrations of total phosphorus can lead to nuisance algal blooms that negatively impact aquatic life and recreation (fishing, swimming, boating, etc.). Algal decomposition depletes oxygen levels within the water column which stress fish and macroinvertebrates species. Excess algae can shade the water column which limits the distribution of aquatic vegetation. Aquatic vegetation stabilizes bottom sediments, and also is an important habitat for macroinvertebrates and fish. Furthermore, depletion of oxygen can cause phosphorus release from bottom sediments (i.e. internal loading).

Degradations in aquatic habitats or water quality (ex. low dissolved oxygen) can negatively impact aquatic life use. Increased turbidity, brought on by elevated levels of nutrients within the water column, can reduce dissolved oxygen in the water column, and cause large shifts in dissolved oxygen and pH

throughout the day. Shifting chemical conditions within the water column may stress aquatic biota (fish and macroinvertebrate species). In some instances, degradations in aquatic habitats or water quality have reduced fish populations or altered fish communities from a fish community which supports sport fish species to a community which supports more tolerant, 'rough' fish species (ex. carp).

Priority Ranking:
The water bodies addressed by the RCWD southwest urban lakes nutrient TMDLs were 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 TMDLs in an expedient manner, the inclusion of a strong base of existing data and the restorability of the water bodies, the technical capability and the willingness of local partners to assist with the TMDLs, and the appropriate sequencing of TMDLs within a watershed or basin. Areas within the RCWD southwestern watershed are popular locations for aquatic recreation. Water quality degradation has led to efforts to improve the overall water quality within the RCWD, and to the development of TMDLs for these water bodies.

Pollutant of Concern:
The pollutant of concern for these seven lake TMDLs is total phosphorus.

Source Identification (point and nonpoint sources):

Point Source Identification: The potential point sources to the RCWD southwestern watershed are:

National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute nutrient loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there is one NPDES discharger within the Pike Lake subwatershed which impacts the nutrient wasteload allocation (WLA) for the Pike Lake (62-0069-00) TP TMDL. This facility is the New Brighton Water Treatment Facility (MNG640068) and it was assigned a portion of the WLA for the Pike Lake TP TMDL (Table 11 of this Decision Document).

Municipal Separate Storm Sewer System (MS4) communities: There are fourteen regulated MS4 permittees within the RCWD southwestern watershed (Table 4 of this Decision Document). Thirteen of the fourteen MS4 permittees received a portion of the WLA under a categorical WLA. The categorical WLA allows those permittees covered under the categorical WLA to share the burden of reducing nutrient contributions to achieve the loading capacity for each lake TMDL. The Minnesota Department of Transportation (MN-DOT) requested that their nutrient WLA be separated from the categorical WLA. MN-DOT was assigned an individual WLA for the nutrient TMDLs (Tables 6 to 12 of this Decision Document). Stormwater from MS4s can transport phosphorus to surface water bodies during or shortly after storm events.

Table 4: Regulated MS4 Permittees in the RCWD southwestern watershed assigned a portion of the WLA

Regulated MS4 Permittees	NPDES Permit ID
Anoka County MS4	MS400066
Arden Hills City MS4	MS400002
Columbia Heights City MS4	MS400010
Falcon Heights City MS4	MS400018

Fridley City MS4	MS400019
Hennepin County MS4	MS400138
MN-DOT - Metro District MS4	MS400170
New Brighton City MS4	MS400038
Ramsey County Public Works MS4	NMS400191
Rice Creek WD MS4	MS400193
Roseville City MS4	MS400047
Shoreview City MS4	MS400121
St. Anthony Village City MS4	MS400051
University of Minnesota MS4	MS400212

Permitted construction and industrial areas: Construction and industrial sites may contribute phosphorus via sediment runoff during storm events. These areas within the RCWD southwestern watershed must comply with the requirements of the MPCA's NPDES Stormwater Program. The NPDES Stormwater Program requires construction and industrial sites to create a Stormwater Pollution Prevention Plan (SWPPP) that details how stormwater contributions from construction or industrial sites will be minimized. MPCA expects that those MS4 communities with existing SWPPPs will update their SWPPP following the approval of the TMDL.

Combined Sewer Overflows (CSOs): There are no CSO communities in the RCWD southwestern watershed. CSOs may deliver nutrients to waterways during or shortly after storm events.

Concentrated Animal Feedlot Operations (CAFOs): There are no CAFOs within the RCWD southwestern watershed.

The potential nonpoint sources to the RCWD southwestern watershed are:

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus via physical disturbance from benthic fish (rough fish, ex. carp), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying curly-leaf pondweeds, may all contribute internal phosphorus loading to the lakes in the RCWD southwestern watershed. Phosphorus may build up in the bottom waters of the lake and may be resuspended or mixed into the water column when the thermocline decreases and the lake water mixes.

Atmospheric deposition: Phosphorus may be added via particulate deposition. Particles from the atmosphere may fall onto lake surfaces or other surfaces within the RCWD southwestern watershed. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

Contributions from upstream lake subwatersheds: Upstream lakes may contribute nutrient loads via water flow between hydrologically connected upstream and downstream lake systems. Upstream lakes may contribute nutrient loads to downstream lakes via non-regulated stormwater runoff into the upstream lakes, nutrient contributions from wetland areas and forested areas into the upstream lakes, internal loading in upstream lakes, etc. These nutrient sources can all add nutrients to hydrologically connected downstream lake waters.

Non-regulated stormwater runoff: Non-regulated stormwater runoff can add phosphorus to the lakes in the RCWD southwestern watershed. The sources of phosphorus in stormwater include: decaying vegetation (leaves, grass clippings, etc.), domestic and wild animal wastes, soil particles, atmospheric deposited particles, and phosphorus containing fertilizers.

Wildlife: Wildlife is a known source of nutrients in water bodies as many animals spend time in or around water bodies. Deer, geese, ducks, raccoons, and other animals all create potential sources of nutrients. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

Future Growth:
MPCA outlined its expectations for any potential MS4 expansion within the RCWD southwestern watershed (Section 4.1.6.1 in the final TMDL document). MPCA anticipates that in the future if a MS4 permittee were to expand, MPCA would work with the MS4 permittee to transfer nutrient loading from the load allocation (LA) to WLA of the applicable lake TMDL. MPCA calculated WLA transfer rates for each subwatershed in the RCWD southwest area (Table 17 of the final TMDL document). MPCA did not incorporate a specific future grown component as part of the loading capacity for the RCWD southwest urban lakes nutrient TMDLs.

The EPA finds that the TMDL document submitted by 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:
Water quality standards (WQS) are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes

Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Chapters 7050 and 7052), MPCA has identified designated uses to be protected in each of its drainage basins and the criteria necessary to protect these uses.

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the RCWD southwest urban lakes nutrient TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use. The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

> *"Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare."*

Standards:

Narrative Criteria: Minnesota Rule 7050.0150 (3) set forth narrative criteria for Class 2 waters of the State:

> *"For all Class 2 waters, the aquatic habitat, which includes the waters of the state and stream bed, shall not be degraded in any material manner, there shall be no material increase in undesirable slime growths or aquatic plants, including algae, nor shall there be any significant increase in harmful pesticide or other residues in the waters, sediments, and aquatic flora and fauna; the normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters."*

The seven lakes of the RCWD southwest urban lakes nutrient TMDLs were all classified under Minnesota Rule 7050.0430 as Class 2B waters. Minnesota Rules Chapter 7050.0140

Numeric criteria: *For nutrient impaired waters*

Numeric criteria for TP, chlorophyll-*a* (chl-*a*), and Secchi Disk (SD) depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the RCWD southwest urban lakes nutrient TMDLs are found in Table 5 of this Decision Document.

Table 5: Minnesota Eutrophication Standards, North Central Hardwood Forests Ecoregion

Parameter	Eutrophication Standard, General	Eutrophication Standard, Shallow Lakes
TP (µg/L)	TP < 40	TP < 60
Chlorophyll-a (µg/L)	chl-a < 14	chl-a < 20
Secchi depth (m)	SD > 1.4	SD > 1.0
Lakes	Little Lake Johanna, Long Lake (South Basin), Moore Lake (East)	Island Lake (North Basin), Island Lake (South Basin), Pike Lake, Lake Valentine

In developing the lake nutrient standards for Minnesota lakes, MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the TP concentrations of 40 µg/L and 60 µg/L, the response variables chl-*a* and SD will be attained and the lakes addressed by the RCWD southwest urban lakes nutrient TMDLs will achieve their designated beneficial uses. For lakes to achieve their designated beneficial use, the lake must not exhibit signs of eutrophication and must allow water-related recreation, fishing and aesthetic enjoyment. MPCA views the control of eutrophication as the lake enduring minimal nuisance algal blooms and exhibiting desirable water clarity.

Nutrient TMDL Targets:
MPCA selected TP targets of 40 µg/L and 60 µg/L to develop TP TMDLs for the lakes addressed by the RCWD southwest urban lakes nutrient TMDL study. MPCA selected TP as the appropriate target parameter to address eutrophication problems because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. EPA feels the nutrient targets employed in the RCWD southwest urban lakes nutrient TMDLs are reasonable.

The EPA finds that the TMDL document submitted by 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 water body 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:
MPCA used the BATHTUB model to calculate the loading capacities for each of the nutrient impaired lakes of Table 1 of this Decision Document. The BATHTUB model was utilized to link observed phosphorus water quality conditions and estimated phosphorus loads to in-lake water quality estimates. MPCA has previously employed BATHTUB successfully in many lake studies in Minnesota. BATHTUB is a steady-state annual or seasonal model that predicts a lake's growing season (June 1 to September 30) average surface water quality. BATHTUB utilizes annual or seasonal time-scales which are appropriate because watershed TP loads are normally impacted by seasonal conditions.

BATHTUB has built-in statistical calculations which account for data variability and provide a means for estimating confidence in model predictions. BATHTUB employs a mass-balance TP model that accounts for water and TP inputs from tributaries, direct watershed runoff, the atmosphere, and sources internal to the lake, and outputs through the lake outlet, water loss via evaporation, and TP sedimentation and retention in the lake sediments. BATHTUB provides flexibility to tailor model inputs to specific lake morphometry, watershed characteristics and watershed inputs. The BATHTUB model also allows MPCA to assess different impacts of changes in nutrient loading. BATHTUB allows choice among several different mass-balance TP models.

The loading capacity of the lake was determined through the use of BATHTUB and the Canfield-Bachmann subroutine and then allocated to the WLA, LA, and Margin of Safety (MOS). To simulate the load reductions needed to achieve the WQS, a series of model simulations were performed. Each simulation reduced the total amount of TP entering each of the water bodies during the growing season (or summer season, June 1 through September 30) and computed the anticipated water quality response within the lake. The goal of the modeling simulations was to identify the loading capacity appropriate (i.e., the maximum allowable load to the system, while allowing it to meet WQS) from June 1 to September 30. The modeling simulations focused on reducing the TP to the system.

The BATHTUB modeling efforts were used to calculate the loading capacity for each lake. The loading capacity is the maximum phosphorus load which each of these water bodies can receive over an annual period and still meet the deep and shallow lake nutrient WQS (Table 5 of this Decision Document). Loading capacities on the annual scale (kg/year) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses the RCWD southwest urban lakes for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities.

Loading capacities were determined using Canfield-Bachmann equations from BATHTUB. The model equations were originally developed from data taken from over 704 lakes. The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity, the model is rerun, each time reducing current loads to the lake until the model result shows that in-lake total phosphorus would meet the applicable water quality standards.

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Tables 6 to 12 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect the RCWD southwestern urban lakes during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

Tables 6 to 12 of this Decision Document outline MPCA's estimates of the reductions required for the RCWD southwestern urban lakes nutrient TMDLs to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where their designated uses are no longer considered impaired.

Table 6: Nutrient TMDL for Island Lake (North Basin) (62-0075-02) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Shoreview City MS4 (MS400121), Rice Creek WD MS4 (MS400193) & Ramsey County Public Works MS4 (MS400191)	25.40	14.00	0.038	11.4	45%
	Construction Stormwater (MNR100001)	0.10	0.10	0.000	0.0	0%
	Industrial Stormwater (MNR50000)	0.10	0.10	0.000	0.0	0%
	MN-DOT Stormwater (MS400170)	2.00	2.00	0.005	0.0	0%
	WLA Totals	***27.60***	***16.20***	***0.044***	***11.4***	--
Load Allocation	Internal Load	8.70	0.00	0.000	8.7	100%
	Atmospheric Load	2.30	2.30	0.0063	0.0	0%
	Upstream Impaired Lake: Island Lake (South Basin)	9.70	6.80	0.019	2.9	30%
	LA Totals	***20.70***	***9.10***	***0.025***	***11.6***	
Margin Of Safety (5%)		--	1.30	0.004	--	--
Loading Capacity (TMDL)		**48.30**	**26.60**	**0.073**	**23.0**	**48%**

Table 7: Nutrient TMDL for Island Lake (South Basin) (62-0075-01) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Shoreview City MS4 (MS400121), Rice Creek WD MS4 (MS400193) & Ramsey County Public Works MS4 (MS400191)	19.90	9.70	0.027	10.2	51%
	Construction Stormwater (MNR100001)	0.06	0.06	0.000	0.0	0%
	Industrial Stormwater (MNR50000)	0.06	0.06	0.000	0.0	0%
	MN-DOT Stormwater (MS400170)	1.30	1.30	0.004	0.0	0%
	WLA Totals	***21.32***	***11.12***	***0.030***	***10.2***	--
Load Allocation	Internal Load	22.40	10.20	0.028	12.2	54%
	Atmospheric Load	5.30	5.30	0.0145	0.0	0%
	LA Totals	***27.70***	***15.50***	***0.042***	***12.2***	--
Margin Of Safety (5%)		--	1.40	0.004	--	--
Loading Capacity (TMDL)		**49.02**	**28.02**	**0.077**	**22.4**	**46%**

Table 8: Nutrient TMDL for Little Johanna (62-0058-00) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Arden Hills MS4 (MS400002), Falcon Heights City MS4 (MS400018), Roseville City MS4 (MS400047), University of Minnesota MS4 (MS400212), Rice Creek WD MS4 (MS400193) & Ramsey County Public Works MS4 (MS400191)	380.60	201.60	0.552	179.0	47%
	Construction Stormwater (MNR100001)	1.20	1.20	0.003	0.0	0%
	Industrial Stormwater (MNR50000)	1.20	1.20	0.003	0.0	0%
	MN-DOT Stormwater (MS400170)	38.00	20.10	0.055	17.9	47%
	WLA Totals	***421.00***	***224.10***	***0.614***	***196.9***	--
Load Allocation	Internal Load	79.90	0.00	0.000	79.9	100%
	Atmospheric Load	2.10	2.10	0.0058	0.0	0%
	LA Totals	***82.00***	***2.10***	***0.006***	***79.9***	--
Margin Of Safety (5%)		--	11.90	0.033	--	--
Loading Capacity (TMDL)		**503.00**	**238.10**	**0.652**	**276.8**	**55%**

Table 9: Nutrient TMDL for Long Lake (South Basin) (62-0067-00) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Arden Hills MS4 (MS400002), New Brighton City MS4 (MS400038), Roseville City MS4 (MS400047), Shoreview City MS4 (MS400121), Rice Creek WD MS4 (MS400193) & Ramsey County Public Works MS4 (MS400191)	307.50	167.40	0.459	140.1	46%
	Construction Stormwater (MNR100001)	0.90	0.90	0.002	0.0	0%
	Industrial Stormwater (MNR50000)	0.90	0.90	0.002	0.0	0%
	MN-DOT Stormwater (MS400170)	19.90	10.80	0.030	9.1	46%
	WLA Totals	***329.20***	***180.00***	***0.493***	***149.2***	*--*
Load Allocation	Internal Load	83.10	0.00	0.000	83.1	100%
	Atmospheric Load	14.40	14.40	0.039	0.0	0%
	Upstream Impaired Lake: Little Lake Johanna	110.90	110.90	0.304	0.0	0%
	Upstream Impaired Lake: Lake Valentine	157.90	135.40	0.371	22.5	14%
	Upstream Impaired Lake: Pike Lake	489.50	322.70	0.884	166.8	34%
	LA Totals	***855.80***	***583.40***	***1.598***	***272.4***	*--*
Margin Of Safety (5%)		--	40.20	0.110	--	--
Loading Capacity (TMDL)		**1185.00**	**803.60**	**2.202**	**421.6**	**36%**

Table 10: Nutrient TMDL for Moore Lake (East) (02-0075-01) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Fridley City MS4 (MS400019), New Brighton City MS4 (MS400038), Rice Creek WD MS4 (MS400193), Anoka County MS4 (MS400066) & Ramsey County Public Works MS4 (MS400191)	131.30	97.50	0.267	33.8	26%
	Construction Stormwater (MNR100001)	0.30	0.30	0.001	0.0	0%
	Industrial Stormwater (MNR50000)	0.30	0.30	0.001	0.0	0%
	MN-DOT Stormwater (MS400170)	1.90	1.90	0.005	0.0	0%
	WLA Totals	***133.80***	***100.00***	***0.274***	***33.8***	*--*
	Atmospheric Load	3.60	3.60	0.0099	0.0	0%
	LA Totals	***3.60***	***3.60***	***0.010***	***0.0***	*--*
Margin Of Safety (5%)		--	5.50	0.015	--	--
Loading Capacity (TMDL)		**137.40**	**109.10**	**0.299**	**33.8**	**25%**

Table 11: Nutrient TMDL for Pike Lake (62-0069-00) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Arden Hills City (MS400002), Columbia Heights City MS4 (MS400010), Fridley City MS4 (MS400019), New Brighton City MS4 (MS400038), Roseville City MS4 (MS400047), St. Anthony Village City MS4 (MS400051), Rice Creek WD MS4 (MS400193), Anoka County MS4 (MS400066), Hennepin County MS4 (MS400138) & Ramsey County Public Works MS4 (MS400191)	685.50	371.10	1.017	314.4	46%
	Construction Stormwater (MNR100001)	2.00	2.00	0.005	0.0	0%
	Industrial Stormwater (MNR50000)	2.00	2.00	0.005	0.0	0%
	MN-DOT Stormwater (MS400170)	49.90	27.00	0.074	22.9	46%
	New Brighton Water Treatment Facility (MNG640068)	0.20	0.20	0.001	0.0	0%
	WLA Totals	***739.60***	***402.30***	***1.102***	***337.3***	--
Load Allocation	Internal Load	62.60	0.00	0.000	62.6	100%
	Atmospheric Load	4.50	4.50	0.0123	0.0	0%
	Upstream Impaired Lake: Silver Lake	41.80	39.80	0.1090	2.0	5%
	LA Totals	***108.90***	***44.30***	***0.121***	***64.6***	--
Margin Of Safety (5%)		--	23.50	0.064	--	--
Loading Capacity (TMDL)		**848.50**	**470.10**	**1.288**	**401.9**	**47%**

Table 12: Nutrient TMDL for Lake Valentine (62-0071-00) in the RCWD southwestern watershed

Allocation	Source	Existing TP Load	TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Categorical MS4 stormwater: Arden Hills MS4 (MS400002), Shoreview City MS4 (MS400121), Rice Creek WD MS4 (MS400193) & Ramsey County Public Works MS4 (MS400191)	332.70	229.50	0.629	103.2	31%
	Construction Stormwater (MNR100001)	1.30	1.30	0.004	0.0	0%
	Industrial Stormwater (MNR50000)	1.30	1.30	0.004	0.0	0%
	MN-DOT Stormwater (MS400170)	34.80	24.00	0.066	10.8	31%
	WLA Totals	***370.10***	***256.10***	***0.702***	***114.0***	--
Load Allocation	Atmospheric Load	7.80	7.80	0.021	0.0	0%
	Upstream Lake contribution: Karth Lake	6.20	6.20	0.017	0.0	0%
	Upstream Lake contribution: Round Lake	17.80	17.80	0.049	0.0	0%
	Upstream Impaired Lake: Island Lake (North Basin)	23.90	14.00	0.038	9.9	41%
	LA Totals	***55.70***	***45.80***	***0.125***	***9.9***	--
Margin Of Safety (5%)		--	15.90	0.044	--	--
Loading Capacity (TMDL)		**425.80**	**317.80**	**0.871**	**123.9**	**29%**

Tables 6 to 12 show the current TP loading, WLA, LA and MOS (5%) and the necessary TP reductions needed to meet the TP water quality standard for each lake. EPA supports the data analysis and modeling approach utilized by MPCA in their calculation of wasteload allocations, load allocations and margin of safety for the seven lakes of the RCWD southwestern urban lakes nutrient TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA in the RCWD southwestern urban lakes nutrient TMDLs. EPA finds MPCA's approach for calculating the loading capacity for the RCWD southwestern urban lakes nutrient TMDLs to be reasonable and consistent with EPA guidance.

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

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 non-point 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 non-point sources.

Comment:
MPCA determined the LA calculations for each of the TMDLs based on the applicable WQS. MPCA recognized that LAs for each of the individual TMDLs addressed by the RCWD southwestern urban lakes nutrient TMDLs can be attributed to different nonpoint sources.

MPCA divided the LA for the RCWD southwestern urban lakes nutrient TMDLs between different nonpoint sources. These nonpoint sources included; internal loading sources, atmospheric deposition and nutrient contributions from upstream lakes. MPCA calculated estimated percent reductions for different LA sources. These reductions represent the estimated decreases necessary to meet the nutrient WQS (Tables 6 to 12 of this Decision Document). The reductions necessary from nonpoint sources ranged from 5% to 100%.

EPA finds MPCA's approach for calculating the LA to be reasonable.

The EPA finds that the TMDL document submitted by 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.

individual construction stormwater permits into one 'categorical' WLA (page 30 and Table 13 of the final TMDL document). The industrial stormwater WLA was set equal to the construction stormwater WLA to account for industrial stormwater contributions within the RCWD southwest urban lakes nutrient TMDLs (Tables 6 to 12 of this Decision Document).

MPCA expects that BMPs and other stormwater control measures should be implemented at active construction sites to limit the discharge of pollutants of concern. Those BMPs and control measures are defined in the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL.

Industrial sites within the RCWD are expected to comply with the requirements of the State's NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000). In the final TMDL document MPCA explained that if a facility owner/operator obtains coverage under the appropriate NPDES/SDS General Stormwater Permit and properly selects, installs and maintains all BMPs required under the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR050000 and MNG490000.

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the RCWD southwest urban lakes nutrient TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

There are no CSOs and no CAFOs within the RCWD southwestern watershed, therefore, CSOs and CAFOs were assigned a WLA of zero (WLA = 0). CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003).

EPA finds the MPCA's approach for calculating the WLA for the RCWD southwest urban lakes nutrient TMDLs to be reasonable and consistent with EPA guidance.

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

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:
MPCA identified the New Brighton Water Treatment Facility (MNG640068) as an NPDES permitted facility within the Pike Lake (62-0069-00) subwatershed. MPCA assigned this facility a portion of the WLA (0.001 kg/day) for the Pike Lake TP TMDL (Table 11 of this Decision Document).

MPCA chose to use a categorical WLA to assign nutrient WLAs to MS4 permittees in the RCWD southwestern watershed. MPCA appointed a categorical WLA to thirteen of the fourteen MS4 permitees in the RCWD southwestern watershed (Tables 6 to 12 of this Decision Document). MN-DOT (MS400170) requested that the MPCA assign MN-DOT a separate WLA and assign it individual WLA's for each nutrient TMDL of the RCWD southwest urban lakes nutrient TMDLs. MPCA agreed MN-DOT's request and calculated individual WLAs based on MN-DOT's right-of-way regulated area in each lake subwatershed (Table 16 of the final TMDL document).

The use of a categorical nutrient WLA for nutrient TMDLs in the RCWD southwestern watershed is consistent with aspects of MPCA guidance for incorporating MS4 stormwater programs into TMDLs. MPCA has explained that a categorical WLA is appropriate when each permittee can perform the same stormwater management activities to accomplish the requirements of the TMDL. This situation also occurs when the TMDL prescribes a set of best management practices (BMPs) for more than one stormwater entity and those BMPs alone will achieve the WLA.[1]

MPCA has explained that a categorical WLA may be appropriate when a single MS4 or other entity, such as the RCWD can track BMPs implementation and associated load reductions. MPCA explained that the RCWD and MS4 permittees within the RCWD southwestern watershed have worked together on various nutrient reduction projects prior to the RCWD southwestern urban lakes nutrient TMDL study. MPCA explained that it anticipates these positive working relationships to carry forward into the post TMDL implementation efforts of the RCWD southwest urban lakes nutrient TMDLs.

MPCA calculated a portion of the WLA and assigned it to construction stormwater and industrial stormwater. MPCA's calculation for the construction stormwater WLA was based on areal coverage of construction permitted from January 1, 2007 to October 6, 2012 (5 year period). MPCA combined

[1] Minnesota Pollution Control Agency, October 2011. *Supporting Material for Guidance and Policy for Incorporating Stormwater Language into Total Maximum Daily Loads*. Document Number: wq-strm7-03. St. Paul, MN.

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:
MPCA used an explicit MOS of 5% for the nutrient TMDL calculations based on the following factors:

- The use of a robust water quality dataset which included lake water quality monitoring data collected over multiple years;
- The strong correlation between the predicted water quality values from modeling efforts and the observed water quality values in the RCWD (i.e., MPCA explained that the modeling results represented the water quality conditions in the RCWD southwestern watershed reasonably well); and
- MPCA's confidence in the Canfield-Bachmann model's performance during the development of nutrient TMDLs.

The EPA finds that the TMDL document submitted by 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:
The nutrient targets employed in the RCWD southwest urban lakes nutrient TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality targets were designed to meet the nutrient eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the RCWD nutrient TMDL development efforts, the WLA and LA estimates were calculated from modeling efforts which incorporated mean growing season total phosphorus values. Nutrient loading capacities were set in the TMDL development process to meet the WQS during the most critical period. The mid-late summer time period is typically when eutrophication standards are exceeded and water quality within the RCWD southwestern watershed is deficient. By calibrating the modeling efforts to protect these water bodies during the worst water quality conditions of the year, it is assumed that the loading capacities

established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

The EPA finds that the TMDL document submitted by 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 non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that non-point 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 non-point sources. However, EPA cannot disapprove a TMDL for non-point 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 RCWD southwest urban lakes nutrient TMDLs provide assurance that actions identified in the implementation strategy (Section 7.0 of the final TMDL document) and existing *Lake Management Action Plans* (LMAP) for the southwestern watershed of the RCWD will be successful at attaining the loading capacities and allocations calculated. The recommendations made by MPCA and the RCWD within LMAP will be successful at improving water quality as long as local groups take on the burden of implementation and outreach activities. Local groups, such as the RCWD, and other partners in the RCWD southwestern watershed must work together to implement the recommendations made in the final TMDL document as well as the LMAP.

The Rice Creek Watershed District was created in 1967 via the Minnesota Watershed District Act of 1955. This act required the newly created watershed districts to integrate water management efforts among city, county and state agencies within the boundaries of the watershed district. The RCWD is the local unit of government responsible for managing and protecting the water resources of the RCWD southwestern watershed. The RCWD will be the main point of contact for water quality improvement and mitigation efforts in the RCWD southwestern watershed.

The overall goals of restoring impaired water resources and protecting water resources in the RCWD southwestern watershed will require active and collaborative partnerships between the RCWD and local

government units (LGUs). The RCWD consists of all the cities and townships whose jurisdiction areas are within the boundaries of the Rice Creek watershed. RCWD is expected to be actively engaging with partner LGUs to improve water quality in the Rice Creek watershed. Through the development of the RCWD southwest urban lakes nutrient TMDL, the RCWD has been working with LGUs on shared implementation efforts with the goal being to meet the watershed pollutant goals described in the RCWD nutrient TMDLs and the RCWD's *2009 Southwest Urban Lakes Study* (i.e., the 2009 Study) (www.ricecreek.org).

MPCA is responsible for applying federal and state regulations to protect and enhance water quality within the TMDL study area. MPCA oversees all regulated MS4 entities (ex. cities of Arden Hills, Columbia Heights etc., MN-DOT, Hennepin County, and the RCWD) in stormwater management accounting activities. MS4 permits require permittees to implement BMPs to reduce pollutants in stormwater runoff to the Maximum Extent Practicable (MEP).

All regulated MS4 communities are required to satisfy the requirements of the MS4 general permit which requires the permittee to develop a SWPPP which addresses all permit requirements, including the following six minimum control measures:

- Public education and outreach;
- Public participation;
- Illicit Discharge Detection and Elimination (IDDE) Program;
- Construction-site runoff controls;
- Post-construction runoff controls; and
- Pollution prevention and municipal good housekeeping measures.

The MS4 General Permit, which became effective August 1, 2013, requires permittees to develop compliance schedules for any TMDL that received U.S. EPA-approval prior to the effective date of the General Permit. This schedule must identify BMPs that will be implemented over the five-year permit term, timelines for their implementation, an assessment of progress, and a long term strategy for continued progress toward ultimately achieving those WLAs. Because this TMDL will be approved after the effective date of the General Permit, MS4s will not be required to report on WLAs contained in this TMDL until the effective date of the next General Permit, expected in 2018.

A SWPPP is a management plan that describes the MS4 permittee's activities for managing stormwater within their jurisdiction or regulated area. In the event a TMDL study has been completed, approved by EPA prior to the effective date of the general permit, and assigns a wasteload allocation to an MS4 permittee, that permittee must document the WLA in their application and provide an outline of the best management practices to be implemented in the current permit term to address any needed reduction in loading from the MS4.

MPCA requires applicants to submit their application materials and SWPPP documentation to MPCA for review. Prior to extension of coverage under the general permit, all application materials are placed on 30-day public notice by the MPCA, to ensure adequate opportunity for the public to comment on each permittee's stormwater management program. Upon extension of coverage by the MPCA, the permittees are to implement the activities described within their SWPPP, and submit annual reports to MPCA by June 30 of each year. These reports document the implementation activities which have been

completed within the previous year, analyze implementation activities already undertaken, and outline any changes within the SWPPP from the previous year.

MPCA referenced the RCWD's *2009 Southwest Urban Lake Study* in its discussion of reasonable assurance for the calculated internal load reductions (Tables 6-12 of this Decision Document). The 2009 Study outlined various strategies for local partners to potentially employ in the RCWD to reduce internal load contributions to the lakes of the RCWD's southwestern watershed. Some of those strategies include the removal phosphorus laden lake sediments, chemical treatment of lake bottom sediments to seal the sediment in situ sealing, and fish and vegetation management. The RCWD is continuing to work with local partners to implement some of these BMPs to minimize internal loading from lakes in the RCWD southwestern watershed.

The 2009 Study also highlighted the contribution of nutrients from upstream lakes. The RCWD outlined various strategies and BMPs for mitigating nutrient transport from upstream areas which included the construction of infiltration cells at various locations in the watershed to filter upstream lake contributions and maintenance of existing weir structures to capture sediment from upstream areas. The RCWD is continuing to implement some of these practices within the RCWD southwestern watershed to mitigate contributions from upstream sources.

Various funding mechanisms will be utilized to execute the recommendations made in the implementation section of this TMDL. MCPA is in the process of developing a Watershed Restoration and Protection Strategy (WRAPS) at various locations throughout the state. MPCA anticipates that prior TMDL efforts (ex. the RCWD Southwest Urban Lakes Nutrient TMDLs) and watershed studies will contribute to the water quality targeting discussion, the loading discussion and the implementation discussion of WRAPS documents. Funding for implementation efforts will be a mixture of local, state and federal funding vehicles. Local funding may be through SWCD cost-share funds, Natural Resources Conservation Service (NRCS) cost-share funds, and local government cost-share funds. Federal funding, via the Section 319 grants program, may provide money to implement voluntary nonpoint source programs within the RCWD. State efforts may be via Clean Water Legacy Act (CWLA) grant money and the Minnesota Clean Water Partnership program.

Clean Water Legacy Act (CWLA): The CWLA is a statute passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the process to be used in Minnesota to develop TMDL implementation plans, which detail the restoration activities needed to achieve the allocations in the TMDL. The TMDL implementation plans are required by the State to obtain funding from the Clean Water Fund. The Act discusses how MPCA and the involved public agencies and private entities will coordinate efforts regarding land use, land management, water management, etc. Cooperation is also expected between agencies and other entities regarding planning efforts, and various local authorities and responsibilities. This would also include informal and formal agreements and to jointly utilize technical educational, and financial resources. MPCA expects the implementation plans to be developed within a year of TMDL approval.

The CWLA also provides details on public and stakeholder participation, and how the funding will be used. The implementation plans are required to contain ranges of cost estimates for both point and nonpoint source load reductions, as well as monitoring efforts to determine effectiveness. MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review

Combined Checklist and Comment, MPCA), which includes cost estimates, general timelines for implementation, and interim milestones and measures. The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).

The 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 non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur. Such a TMDL should provide assurances that non-point 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 6 of the final TMDL document outlines the water monitoring efforts in the RCWD southwestern watershed. Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. MPCA anticipates that monitoring will be completed by the RCWD staff and members of the Citizen Assisted Monitoring Program (CAMP).

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts used in the RCWD southwestern watershed. Water quality information will aid the RCWD and other watershed managers in understanding how BMP pollutant removal efforts are impacting water quality within the RCWD southwestern watershed. Water quality monitoring combined with an annual review of BMP efficiency will provide information on the success or failure of BMP systems designed to reduce pollutant loading into water bodies of the RCWD southwestern watershed. Watershed managers will have the opportunity to reflect on the progress or lack of progress, and will have the opportunity to change course if progress is unsatisfactory. Review of BMP efficiency is expected to be completed by the local and county partners.

The lakes of the RCWD southwestern watershed have all been periodically monitored by RCWD staff and CAMP volunteers over the years. Some lake tributary monitoring has been completed on the inlets to the lakes and may be important to continue as implementation activities take place throughout the subwatersheds. MPCA expects that water quality monitoring will continue at certain locations in the RCWD southwestern watershed (Section 6.2 of the final TMDL document). These monitoring activities should continue until water quality goals are met.

The 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:
Section 7.0 of the final TMDL report describes TMDL implementation strategies which will merge with existing *Lake Management Action Plans* which have already been completed for each lake in the RCWD southwest urban lakes nutrient TMDL study. These LMAP were developed by the RCWD in 2009 as part of RCWD's *2009 Southwest Urban Lakes Study*. The main components of each of the LMAP is the reduction of external nutrient loading, internal loading management (ex. carp mitigation measures), water quality monitoring and field reconnaissance, educational outreach, and BMP installation and adaptive management.

Further detail on the type and extent of RCWD nutrient implementation actions in the RCWD southwestern watershed may focus on the following:

Urban/Residential nutrient reduction strategies: Urban BMPs should focus on volume reduction, under the presumption that decreased stormwater flows will also result in reduced TP loads. Controlling runoff associated with development typically consists of end-of-pipe measures such as stormwater detention and retention, or on-site (decentralized) stormwater management, which increases infiltration and reduces runoff generation by decreasing imperviousness. Decentralized BMPs that promote infiltration and filtration, also referred to as green infrastructure, include bioretention, bioswales, rain gardens, green roofs, infiltration basins and trenches, underground storage, permeable pavement, and stormwater wetlands. Reducing peak flow stormwater inputs within the RCWD southwestern watershed may be accomplished via reducing impervious cover or employing other low impact development/ green technologies which allow stormwater to infiltrate, evaporate or evapotranspire before reaching the stormwater conveyance system.

Municipal activities: Municipal programs, such as street sweeping, can also aid in the reduction of nutrients to surface water bodies within the RCWD southwestern watershed. Municipal partners can team with the RCWD to assess how best to utilize their monetary resources for installing new stormwater BMPs (ex. vegetated swales) or retro-fitting existing stormwater BMPs.

Riparian Area and Lake Shoreline Management Practices: Protection of streambanks, wetlands and lake shoreline areas within the watershed will help to mitigate phosphorus and sediment introduction to the surface waters of the RCWD southwestern watershed. Protection strategies could include the planting of vegetated/buffer areas with grasses, legumes, shrubs or trees which will stabilize streambanks and shoreline areas. These stabilization efforts will also aid in the filtration of stormwater runoff. Wetland areas should be protected against unnecessary stormwater introductions, which could potentially turn wetland areas from nutrient sinks to nutrient sources. MPCA advises that local partners complete a

wetlands assessment to determine which wetland areas in the watershed should be prioritized for restoration.

Internal Loading Reduction Strategies: Internal nutrient loads may be addressed to meet the TMDL allocations outlined in the RCWD southwestern watershed nutrient TMDLs. MPCA recommends that before any strategy is put into action, an intensive technical review, to evaluate the costs and feasibility of internal load reduction options be completed. Several options should be considered to manage internal load inputs to each of the water bodies addressed in this TMDL.

- *Management of fish populations:* Monitor and manage fish populations to maintain healthy game fish populations and reduce rough fish (i.e. carp, bullheads, fathead minnows) populations.
- *Vegetation management:* Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity. Controlling the vitality of curly-leaf pondweeds via chemical treatments (herbicide applications) will reduce one of the significant sources of internal loading, the senescence of curly-leaf plants in the summer months.
- *Chemical treatment:* The addition of chemical reactants (ex. aluminum sulfate) to lakes of the RCWD southwestern watershed in order for those reactants to permanently bind phosphorus into the lake bottom sediments. This effort could decrease phosphorus releases from sediment into the lake water column during anoxic conditions.

Public Education Efforts: Public programs will be developed to provide guidance to the general public on nutrient reduction efforts and their impact on water quality. These educational efforts could also be used to inform the general public on what they can do to protect the overall health of surface waters in the RCWD southwestern watershed.

The EPA finds that this criterion has been adequately addressed. The 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 8 of the final TMDL document. Throughout the development of the RCWD southwest urban lakes nutrient TMDLs the public

was given various opportunities to participate. MPCA encouraged public participation through public meetings and small group discussions with members of local governments, Section 8 of the final TMDL document outlines a list of local governments which were invited to participate in the TMDL development process for the RCWD nutrient TMDLs. MPCA hosted two public meetings in 2013 and 2014 during which MPCA discussed the progress of the RCWD nutrient TMDLs, wasteload and load allocation strategies, phosphorus reduction targets and implementation strategies.

The draft TMDL was posted online by MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period was started on September 22, 2014 and ended on October 21, 2014. MPCA received 2 public comments during the public comment period.

One comment was submitted by MN-DOT and requested that MPCA reexamine MN-DOT WLAs for the Little Lake Johanna, Long Lake (South Basin), Pike Lake and Lake Valentine nutrient TMDLs. MN-DOT did not agree with the reduction request of MN-DOT right-of-way lands within these subwatersheds and felt MPCA had unfairly asked MN-DOT to reduce a greater percentage of nutrient load than the other municipal entities. MPCA revisited the WLA calculations and found that it had fairly assigned the WLA for the four lake TMDLs and explained that the WLA were assigned based on the percentage of total drainage area in each subwatershed. MPCA clarified that it had assigned the same percent reduction to all entities in each subwatershed.

The Minnesota Department of Agriculture (MDA) submitted a comment which requested that MPCA include local golf courses as sources of fertilizer runoff and reference the Minnesota Phosphorus (P) Lawn Fertilizer Law within the final TMDL document. MPCA added language to the final TMDL document which referenced the Minnesota Lawn Fertilizer Law and included discussion and updates to relevant figures to address MDA's request to include local golf courses as potential fertilizer sources. MPCA recommended that MDA consult with the RCWD for future discussions related to phosphorus reduction efforts within the watershed.

EPA believes that MPCA adequately addressed each of these comments and updated the final TMDL with appropriate language to address these comments. The MPCA submitted all of the public comments and responses in the final TMDL submittal packet received by the EPA on January 15, 2015.

The EPA finds that the TMDL document submitted by 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 EPA received the final Rice Creek Watershed District Southwest Urban lakes nutrient TMDL study, submittal letter and accompanying documentation from the MPCA on January 15, 2015. The transmittal letter explicitly stated that the final TMDLs for the seven lakes addressed in the RCWD Southwest Urban Lakes Nutrient TMDL study were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for 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 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 EPA finds that the TMDL transmittal letter submitted by the MPCA for the Rice Creek Watershed District's seven nutrient TMDLs satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, EPA finds that the seven nutrient TMDLs for the Rice Creek Watershed District Southwest Urban Lakes TMDL study satisfy all elements for approvable TMDLs. This Decision Document addresses **7 TMDLs** for 7 **waterbodies** as identified on Minnesota's 303(d) list (Table 1 of this Decision Document).

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.