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

NOV 2 5 2013

REPLY TO THE ATTENTION OF:

WW-16J

Rebecca J. Flood, Assistant Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 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 Peltier Lake and Centerville Lake, including supporting documentation and follow-up information. The lakes are located in the central portion of the Rice Creek Watershed District (RCWD), which lies entirely within the North Central Hardwood Forest Ecoregion. The TMDLs address impairment of the aquatic recreation beneficial use due to elevated levels of total phosphorus.

The TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's 2 TMDLs for total phosphorus for Peltier Lake and Centerville Lake. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting the 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,

for Tinka G. Hyde
Director, Water Division

Enclosure

cc: Celin Lyman, MPCA
Chris Zadak, MPCA

wq-iw11-02g

TMDL: Peltier and Centerville Lakes, Minnesota
Date: NOV 2 5 2013

DECISION DOCUMENT FOR Peltier and Centerville Lakes TMDLs, Minnesota

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:

Peltier Lake (DNR Lake # 02-0004-00) and Centerville Lake (DNR Lake # 02-0006-00) are located in the central portion of the Rice Creek Watershed District (RCWD), which lies entirely within the North Central Hardwood Forest Ecoregion. Portions of 13 cities/townships and three counties are contained in the Peltier Lake watershed, while the Centerville Lake watershed contains portions of two cities and one county.

The Minnesota Pollution Control Agency (MPCA) placed Peltier and Centerville Lakes on the State of Minnesota's 303(d) Impaired Waters List in 2002. Table 1 below identifies the waterbody segments covered by the TMDLs as they appear on the Minnesota 2012 303(d) list. The lakes are identified for not meeting the Class 2B designation of aquatic life and recreational use due to exceedances of the total phosphorus (TP) criteria. This decision document approves one TMDL for Peltier Lake and one TMDL for Centerville Lake for a total of **2** TMDLs.

Table 1. 303(d) List Summary for George Watch, Marshan, Reshanau, Rice and Baldwin Lakes

Waterbody Name	DNR Lake Number	Listing Year	Pollutant	Designated Use
Peltier Lake	02-0004	2002	Total Phosphorus	Aquatic Life and Recreational Use
Centerville Lake	02-0006	2002	Total Phosphorus	Aquatic Life and Recreational Use

Location Description/Spatial Extent:

Lakes: The Peltier Lake watershed is located in the central portion of the Rice Creek watershed in southern Anoka County and is a sub-watershed of the Upper Mississippi Watershed. The Peltier Lake watershed is 67,835 acres. This area lies entirely within the North Central Hardwood Forest Ecoregion. Peltier Lake is located partially in the City of Lino Lakes and partially in the City of Centerville, and the watershed spans 13 municipalities and three counties (Anoka, Ramsey, and Washington). The main tributaries to Peltier Lake are Upper Rice Creek, which enters the lake from the north, Hardwood Creek, which also enters the lake from the north, and Clearwater Creek, which enters the lake from the southeast.

Centerville Lake is located within the watershed of Peltier Lake and is directly connected to it via a culvert under County Road 14. Like Peltier Lake, Centerville Lake is also located partially in the City of Lino Lakes and partially in the City of Centerville. Its watershed size, which includes the area of the lake, is 961 acres and is completely within Anoka County. The drainage area within Centerville Lake watershed to Centerville Lake is 466 acres and the lake size is 495 acres. There are no other streams or lakes within the Centerville Lake watershed. Anoka County Ditch 25 used to flow into the lake from the south, but it has been diverted away from Centerville Lake and into Reshanau Lake.

The physical details for the lakes are in Table 2 below. Based upon the physical data and lake morphology, Peltier Lake is classified by MPCA as a shallow lake (Either the maximum depth is less than 15 ft or the littoral zone for areas where water depth is less than 15 ft is greater than 80%. Peltier Lake meets the latter requirement) while Centerville Lake is classified as a deep lake.

Table 2. Lake Characteristics[1]

Parameter	Peltier Lake	Centerville Lake
Surface Area (ac)	483	495
Average Depth (ft)	7	12
Maximum Depth (ft)	16	19
Volume (ac-ft)	3,381	5,940
Drainage area (mi^2)	106	0.7
Watershed: lake area	140	0.9
Littoral Area (%)	89	61

Flow reversal takes place between Centerville and Peltier Lakes. Under low flow conditions, the small watershed draining to Centerville Lake feeds Peltier Lake. Following a storm, the volume of water flowing through Peltier Lake increases to the point that, as the water level of Peltier rises, its elevation is higher than that of Centerville Lake, and water flows from Peltier Lake to Centerville Lake. As water recedes from the system, the flow reverses again and water flows from Centerville Lake to Peltier Lake. The flow from Peltier Lake to Centerville Lake during storm events is a source of TP to Centerville Lake.

Population and Future Growth:
To account for future growth in the watershed, future land use was used for TMDL calculations. MPCA did not calculate a "set aside" portion of the load to account for future growth for NPDES-regulated point sources and for future discharges in addition to future land use. Reserve capacity was implicitly included in the TMDL calculations by basing the calculations on future land use assumptions (Section 6D of the TMDL). Population is expected to increase in many of the cities and townships that intersect the Peltier Lake watershed (including the Centerville Lake watershed), with the greatest percent increases projected to occur in Lino Lakes, Forest Lake, and Hugo. It is projected that Hugo will experience the largest population increase at 529% from 2000 to 2030, then Forest Lake at 127%, Lino Lakes at 89%, and Centerville at 47%. Details on population growth can be found in Table 8 of the TMDL report.

Priority Ranking:
Minnesota does not include separate priority rankings for its waters in the TMDL. MPCA prioritizes its waters during the development of the impaired waters list.

Land Use:
As seen in Table 3 below, the dominant land uses in the Peltier Lake watershedare undeveloped (39%), agricultural (19%), single family residential (16%), open water (12%), and park/recreation areas (8%). This means that the major source of the runoff comes from undeveloped areas, followed by agricultural and single family residential, with smaller runoff contributions from park/recreational sources. The dominant land uses in the Centerville Lake watershed are residential, parkland and undeveloped (in that order). Figure 5 in the TMDL report provides further information on existing land uses in the Peltier and Centerville Lakes watershed.

[1] Table 12, page 29, of the TMDL report.

MPCA evaluated actual and expected changes in land use in the Peltier Lake and Centerville Lake watersheds from 2005 to 2020. In 2020, the Peltier Lake watershedis expected to have an increase in impervious cover and a decrease in agricultural and natural areas. Six categories of impervious cover have been defined under the land cover: 0% to 10% impervious cover, 11% to 25% impervious cover, 26% to 50% impervious cover, 51% to 75% impervious cover, 76% to 100% impervious cover, and impervious cover (unknown percentage). Peltier Lake watershed is projected to have a 211% increase in the 51% to 75% impervious cover category and 209% increase in the 0% to 10% impervious cover category, while agricultural land, shrubland, and maintained grassland are projected to be reduced by 65%, 73%, and 68%, respectively. Fewer changes are expected in the Centerville Lake watershed, with reductions in agricultural, grasslands, and woodlands, and a projected 297% increase in the 11% to 25% impervious cover category. Table 7 of the TMDL report provides further details of the future land uses.

Section 1B of the TMDL provides further detailed information and land use and land cover.

Problem Identification/Pollutant of Concern:
The pollutant of concern for these lake TMDLs is total phosphorus (TP). Levels of phosphorus are above water quality targets, limiting all types of aquatic recreation, including fishing and swimming. Excess phosphorus stimulates excessive plant growth (algae and nuisance plants/weeds). This enhanced plant growth reduces dissolved oxygen in the water when dead plant material decomposes, and can cause other organisms to die. The TMDLs also include water quality data and information for the nutrient indicators chlorophyll-a and Secchi depth. Chlorophyll-a is a primary pigment in aquatic algae. Chlorophyll-a (Chl-a) levels correlate well with algal production. Secchi depth (SD) is an indicator for water clarity and quality and is measured by lowering a Secchi discinto the water until it can no longer be seen from the surface (Section 1C of the TMDL). MPCA defined 1997 to 2006 data as current conditions for Peltier Lake and 2000 to 2006 data as current conditions for Centerville Lakes for the TMDL assessment.

Total Phosphorus Data Results:
Total phosphorus (TP) water quality samples were taken at both lakes during the summer months from 1997 to 2006 for Peltier Lake, and 2000 to 2006 for Centerville Lake. The summer average water column TP concentration was 235 µg/l for Peltier Lake and 59 µg/l for Centerville Lake. The summer TP concentrations for both lakes demonstrate that the lakes consistently exceeded their respective lake eutrophication standard: Peltier Lake exceeded MPCA's shallow lake eutrophication standard of 60 µg/l and Centerville Lake exceeded MPCA's deep lake eutrophication standard of 40 µg/l. The summer TP concentrations also indicate high inputs from the watershed or in-lake sources.

For more information, see Tables 13 and 14, Figures 15 and 24, and Sections 3B and 3C of the TMDL Report.

Chlorophyll-a Data Results:
Chl-a measurements were taken at Peltier Lake during the summer months of 1997 to 2006 and 2000 and 2006 at Centerville Lake. The summer average water column Chl-a concentration for Peltier Lake was 84 µg/l, and for Centerville Lake was 36 µg/l. The summer Chl-a concentrations demonstrate that Peltier Lake consistently exceeded MPCA's shallow lake eutrophication standard of 20 µg/l, and that Centerville Lake consistently exceeded MPCA's deep lake eutrophication standard of 14 µg/l. The high Chl-a concentrations in the lakes are indicative of high levels of algal growth and nuisance algal blooms.

For more information, see Tables 13 and 14, Figures 16 and 25, and Sections 3B and 3C of the TMDL Report.

Secchi Depth Data Results:
Secchi depth measurements were taken at Peltier Lake during the summer months of 1997 to 2006 and 2000 and 2006 for Centerville Lake. The summer average Secchi depth measurement was 0.83 m for Peltier Lake, and 1.0 for Centerville Lake. The summer Secchi depth measurements for Peltier Lake demonstrate that it consistently exceeded MPCA's shallow lake eutrophication standard of > 1.0 m. The summer Secchi depth measurements for Centerville Lake demonstrate that it consistently exceeded MPCA's deep lake eutrophication standard of >1.4 m.

For more information, see Table 13 and 14, Figures 17 and 26, and Sections 3B and 3C of the TMDL Report.

Fish Population Data Results:
The lakes are identified as not meeting the Class 2B designation of aquatic life and recreational use due to exceedances of total phosphorus (TP) criteria. The fish population data collected by Minnesota Department of Natural Resources (DNR) for Peltier and Centerville Lakes indicates the lakes do not support the Class 2B designation of aquatic life and recreational use. The DNR performed fish surveys at both lakes in 2007. Carp, forage species, top predators, rough fish, and pan fish have been collected at both lakes. Although the DNR regularly stocks catfish and walleye in Peltier Lake, and regularly stocks walleye in Centerville Lake, none were caught in the 2007 survey. Data from the fish surveys from both lakes show improvement is still needed in fish trophic balance.
Carp and rough fish cause increased nutrients in the watercolumn by uprooting aquatic macrophytes during feeding and spawning. The uprooting causes resuspension of bottom sediment and nutrients resulting in increased nuisance algal blooms. Catfish and walleye are predators for rough fish and used as a means to control rough fish populations.

Sections 3B and 3C of the TMDL Report provide further details.

Aquatic Plants Data Results:
The lakes are identified as not meeting the Class 2B designation of aquatic life and recreational use due to exceedances of total phosphorus (TP) criteria. The vegetation survey data collected by DNR for Peltier Lake and Centerville Lake do not support the Class 2B designation of aquatic life and recreational use. High abundance and density in aquatic plants limit recreation activities and result in excess nutrients. Excess nutrients lead to non-native, invasive aquatic plants in a lake. This ultimately leads to a shift in the fish community since high densities of one aquatic plant species favors one fish species over another.

Eurasian watermilfoil and curlyleaf pondweed, both invasive species, are present in Peltier Lake and Centerville Lake. Vegetation surveys at Peltier Lake were taken by DNR during May 2005 and May 2008. The 2005 survey found that the greatest extent of the curlyleaf pondweed lies at the northern portion of Peltier Lake. The 2008 survey found that curlyleaf pondweed was detected at a 52% frequency, eurasian milfoil at 18%, and coontail at 68%. The 2008 survey also found that sprigs of curlyleaf pondweed were found at all depths sampled up to 12 feet and that the main vegetative blanket faded out at 6 feet in depth.

Curly-leaf pondweed and eurasian watermilfoil increase TP concentrations resulting in eutrophication. DNR's observations of curly-leaf pondweed and eurasian watermilfoil in both lakes supports the lakes being listed as impaired for not meeting the Class 2B designation of aquatic life and recreational use.

Sections 3B and 3C of the TMDL report provide further information on aquatic vegetation data.

Source identification:
The nonpoint sources for Peltier Lake are:

- Watershed runoff
- Internal loading
- Atmospheric deposition
- Groundwater discharge

The nonpoint sources for Centerville Lake are:

- Watershed runoff
- Backflow from Peltier
- Groundwater discharge
- Atmospheric deposition

The main phosphorus sources to Peltier Lake are watershed runoff and internal loading, which represent 37% and 62% of the total load to the lake, respectively. The main phosphorus sources to Centerville Lake are watershed runoff, backflow from Peltier Lake, and atmospheric deposition which represent 25%, 46%, and 29% of the total load to the lake, respectively (Table 19 in the TMDL report).

The point sources for Peltier Lake are:

- Anoka County, MS400066
- Birchwood Village, MS400004
- Centerville, MS400078
- Dellwood, MS400084
- Forest Lake, MS400262
- Grant, MS400091
- Hugo, MS400094
- Lino Lakes, MS400100
- Mahtomedi, MS400031
- Ramsey County Public Works, MS400191
- Washington County, MS400160
- White Bear Lake ,MS400060
- White Bear Township, MS400163
- Willernie, MS400061
- Construction stormwater
- Industrial stormwater
- MNDOT Metro District, MS400170
- Forest Lake Water Treatment Plant, MNG640118
- St. Croix Forge Industrial WWTP, MN0069051

The point sources for Centerville Lake are:

- Anoka County, MS400066

- Centerville, MS400078
- Lino Lakes, MS400100
- Construction stormwater
- Industrial stormwater

TP point source contributions are very low in the watershed. MPCA determined that point sources contribute less than 1% of the TP loading for the watershed. There are no CAFOs in the Peltier and Centerville watershed (Tables 9, 10, and 19, and Figure 7 in the TMDL report).

MPCA concluded that groundwater discharge was not a significant source of TP loading to either lake and was not factored into the TMDLs (Section 4D).

Sections 1B and 4.0 of the TMDL report provide details on phosphorus loads from point and nonpoint sources to the Peltier and Centerville Lakes.

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

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

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

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

Comment:

Designated Use of Waterbody: Peltier Lake and Centerville Lake are classified under Minnesota Rule 7050.0430 as Class 2B waters. Minnesota Rules Chapter 7050.0140 Water Use Classification for Waters of the State reads:

> Subp. 3. Class 2 waters, aquatic life and recreation. Aquatic life and recreation includes all waters of the state which do or may support fish, other aquatic life, bathing, boating, or other recreational purposes, and where quality control is or may be necessary to protect aquatic or terrestrial life or their habitats, or the public health, safety, or welfare.

Water Quality Standard:
Peltier Lake and Centerville Lake are subject to MinnesotaEutrophication Standards, North Central Hardwood Forests Ecoregion. Numeric standards are given in Minnesota's Rule 7050.0222, with narrative standards in Minnesota's Rule 7050.0222 subpart 4a. According to the MPCA definition, a lake is considered shallow if its maximum depth is less than 15 ft or if the littoral zone for areas where water depth is less than 15 ft is greater than 80%. Based upon the physical data and lake morphology, Peltier Lake is classified by MPCA as a shallow lake,and Centerville Lake is subject to the general eutrophication standard (Table 4).

Table 4. Minnesota Eutrophication Standards, North Central Hardwood Forests Ecoregion[2]

Parameter	Eutrophication Standard, General	Eutrophication Standard, Shallow Lakes
TP (ug/L)	TP < 40	TP < 60
Chlorophyll-a (ug/L)	Chl-a < 14	Chl-a < 20
Secchi depth (m)	SD > 1.4	SD > 1.0

Targets: To achieve the designated use and the applicable eutrophication criteria, all three parameters must be met by the TMDLs (Section 2B of the TMDL).

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a 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

[2] Table 11, page 27, of the TMDL report.

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:

Table 5 presents the loading capacity for Peltier Lake and Centerville Lake. The TMDLs were calculated using average growing season TP loads during 2001.

Table 5. Loading capacity for Peltier Lake and Centerville Lake

Lake and TP standard	Wasteload TP Allocation (lbs/day)	Load TP Allocation (lbs/day)	Margin of Safety	Total Phosphorus TMDL (lbs/day)
Peltier Lake, 60 µg/l	4.86	10.3	Implicit	**15.2**
Centerville Lake, 40 µg/l	0.21	0.57	Implicit	**0.8**

Four models were used to assess nutrient loading and to determine loading capacities for both lakes, including: USGS Load Estimator (LOADEST) model; the Nürnberg equation (2004); wet and dry deposition rates from MPCA's Detailed Assessment of Phosphorus Sources to Minnesota Watersheds; and BATHTUB for the analyses.

The LOADEST model was used to calculate TP loading from inflow drainage areas and upstream lakes. The Nürnberg equation (2004) was used to calculate TP loading from internal loading. Wet and dry deposition rates from MPCA's Detailed Assessment of Phosphorus Sources to Minnesota Watersheds were used to calculate TP loadings from atmospheric deposition. Outputs from these were used as model inputs to the BATHTUB modelwhich was used to calculate in-lake water quality resulting from the phosphorus loads.

Watershed loading: The LOADEST model was used to estimate water and nutrient loads on a watershed scale. Daily TP loads from the tributaries were estimated based on stream flow and TP concentration (monitoring data) using LOADEST. LOADEST was developed by the United States Geological Survey and estimates constituent loads in streams based on a time series of stream flow and constituent concentration. LOADEST develops a regression model that predicts constituent load based on flow. TP and flow data from 1999 to 2006 for Upper Rice Creek, Clearwater Creek, and Hardwood Creek were used to develop the regression model, and daily loads for the selected time periods were calculated based on that relationship. TP data were available for all three tributaries in 2001, and for all tributaries except for Upper Rice Creek in 2004. The Upper Rice Creek 2004 loading estimate was based on 2004 flow data and the regression model developed between flow and TP from the other years of data (2001, 2002, and 2006). To estimate the average TP concentration from the Peltier Lake direct drainage area, the average of all three tributaries (219 µg/l) was used. To estimate the average TP concentration for Centerville Lake, the flow-weighted average concentration (222 µg/l) was calculated. Thus, the average watershed runoff concentration for Peltier Lake was 219 µg/l and the average watershed runoff concentration for Centerville Lake was 222 µg/l.

Further details on the LOADEST model can be found in Section 4A in the TMDL report.

Atmospheric Load: Atmospheric loads of phosphorus to the lakes were determined with deposition rates (lb/ac/yr) from BATHTUB using the default rate of 0.27 lbs/ac-yr (30 kg/km^2-yr). MPCA found atmospheric deposition to be a small percentage of the total load. The atmospheric load during the growing season for Peltier Lake was 43 lbs/year, and was 44 lbs/yr for Centerville Lake. Section 4E of the TMDL report provides more information on atmospheric loads.

Internal loading for Peltier Lake and Backflow for Centerville Lake: Total phosphorus is released from sediments under anoxic conditions. Internal loading was estimated by using the anoxic factor and sediment release rate. The anoxic factor estimates the amount of time during which anoxic conditions exist over the sediments. This indicates the amount of time (days) that TP would be released from sediments. DO data are used to determine the anoxic factor. The DO data for both lakes indicate that low DO concentrations were present within 1-2 meters of the lake bottom. The anoxic factor combined with the sediment release rate resulted in the internal TP loading. Appendix E of the TMDL report presents the sediment release rates, anoxic factors, and TP internal loading for the lakes. MPCA used a release rate of 4.5 mg/m^2-day for Peltier Lake and 1.9 mg/m^2-day for Centerville Lake. The average growing season TP load for Peltier Lake was 7,875 lbs/growing season and 70 lbs/growing season for Centerville Lake (Table 24 of the TMDL report).

Loading Capacity: 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 left the coefficients at default values and no calibration factors were applied to the response model. Six years were modeled for all lakes. Predicted, modeled and monitored TP values are presented in Appendix F of the TMDL report. The resulting loading capacities are shown in Tables 5 and 6 (Section 5C, Table 25 of the TMDL report).

Linking targets to water quality standards: The total phosphorus loading capacities were input to the Canfield-Bachmann (BATHTUB) model. This time, the model calculated in-lake concentrations of phosphorus and Chl-a, and Secchi depth as if each lakes' phosphorus input were equal to the proposed loading capacity. The model results showed that if the phosphorus TMDL were met for each lake, the phosphorus, Chl-a, and Secchi depth water quality criteria would be achieved (Appendix C of the TMDL report).

Table 5. Total Phosphorus TMDL for Peltier Lake[3]

Load Allocation (lbs/day)		Wasteload Allocation (lbs/day)		Margin of Safety (MOS) (lbs/day)	TMDL (lbs/day)
Non-MS4 stormwater	9.9	MS4 stormwater categorical, industrial stormwater, construction stormwater	4.78	**Implicit**	**15.2**
Centerville Lake outflow	0.090	Stormwater load-MN/DOT	0.03		
Atmospheric	0.35				
Internal Load	0	Forest Lake Water Treatment Plant	0.01		
		St. Croix Forge	0.03		
Total	**10.3**	Total	**4.86**		

The current TP loading is 104 lbs/day and a TP reduction of 85% is needed to meet the TP water quality standard of 60 µg/L for Peltier Lake.

Table 6. Total Phosphorus TMDL for Centerville Lake[4]

Load Allocation (lbs/day)		Wasteload Allocation (lbs/day)		Margin of Safety (MOS) (lbs/day)	TMDL (lbs/day)
Non-MS4 stormwater load	0.090	MS4 stormwater categorical, industrial stormwater, construction stormwater	0.21	**Implicit**	**0.8**
Peltier Lake backflow	0.12				
Atmospheric	0.36				
Total	**0.57**	Total	**0.21**		

The current TP loading is 1.2 lbs/day and a TP reduction of 37% is needed to meet the TP water quality standard of 40 µg/L for Centerville Lake.

EPA supports the data analysis and modeling approach utilized by MPCA to calculate wasteload allocations, load allocations and margin of safety for the Peltier and Centerville Lakes TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA in the Peltier Lake and Centerville Lake TMDLs.

[3] Tables 30 and 33 of the TMDL report.
[4] Tables 31 and 35 of the TMDL report.

Critical conditions:
Page 62 of the TMDL report, and data presented in the TMDL report state that the critical conditions at Peltier Lake and Centerville Lake occur in the summer when TP concentrations peak and clarity is at its lowest, often in late July and August. Since the phosphorus water quality standard is based on June through September water quality averages, the water quality standard addresses the lakes during critical conditions. The load reduction is designed so that both lakes will meet the water quality standard over the course of the growing season (June through September).

Further detail on Load Capacity can be found in Section 6.0 of the TMDL report.

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

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future 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:

Section 6C of the TMDL report states that the LA is comprised of non-MS4 stormwater, Centerville Lake outflow, atmospheric loads for Peltier Lake, and non-MS4 stormwater load, Peltier Lake backflow, and atmospheric loads for Centerville Lake. The non-MS4 stormwater areas are portions of MS4 communities that are not technically covered under NPDES permits (i.e., areas that are either agricultural or otherwise not projected to be served by stormwater conveyances, such as open space, park and recreation, and rural residential). The City of Columbus and May Township are non-MS4 stormwater areas. The Centerville Lake outflow, Peltier Lake backflow, and internal loads were calculated using anoxic factors and sediment release rates. In addition, internal loading was based on the lake load response model (Bathtub model). Atmospheric deposition (both wet and dry) was based on the load estimate in the existing conditions model. It was assumed that atmospheric deposition would remain constant, and that load reductions in atmospheric deposition were not achievable. Table 10 presents the load allocation for both lakes. EPA concurs with the State's approach in determining the LA for the Peltier and Centerville Lakes TMDLs.

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

Table 10. Total Phosphorus Load Allocation

Lake and Standard	Load Allocation (lbs/day)	Source (lbs/day)	
Peltier Lake (60 µg/L)	**10.3**	Non-MS4 stormwater	9.9
		Centerville Lake outflow	0.090
		Atmospheric	0.35
		Internal Load	0
Centerville Lake (40 µg/L)	**0.57**	Non-MS4 stormwater load	0.090
		Peltier Lake backflow	0.12
		Atmospheric	0.36

Section 6.0 in the TMDL report provides further detail on load allocation calculation by source.

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

MPCA determined a categorical WLA for industrial and construction stormwater, and NPDES permitted MS4s. In a categorical WLA, multiple entities receive the same WLA. Categorical WLAs are typically used only for stormwater discharges covered by general permits (industrial and construction stormwater) and not for those covered under individual permits. For this TMDL, MPCA decided to include

individual permit holders (i.e., MS4 NPDES permittees) in the categorical WLA because there was not enough information available to assign individual loads to each individual permit holder. MPCA decided that general and individual permitees will receive a categorical WLA. This means all MS4s listed on page 6 of the decision document, industrial stormwater and construction stormwater permittees will receive the same WLA. MS4/construction/industrial allocations are based upon the overall phosphorus reductions needed to achieve the phosphorus criteria applied to the land area for the MS4 permits. MPCA calculated individual WLAs for MN/DOT for lake watersheds having roads. Thus, a MN/DOT WLA was calculated for Peltier Lake. The WLA for the Forest Lake WTP was determined by multiplying the estimated maximum flow by the estimated discharge concentration (Section 6B of the TMDL) There are no CAFOs within the watershed. EPA concurs with the State's approach in determining the WLA for which the Peltier and Centerville Lake TMDLs have been established. Table 11 presents the WLAs for Peltier Lake and Centerville Lake.

Table 11. Total Phosphorus Wasteload Allocation

Lake and Standard	Wasteload Allocation (lbs/day)	Source (lbs/day)	
Peltier Lake (60 µg/L)	**4.86**	MS4 stormwater, industrial stormwater, construction stormwater	4.78
		Stormwater load-MN/DOT	0.03
		St. Croix Forge	0.03
		Forest Lake Water Treatment Plant	0.01
Centerville Lake (40 µg/L)	**0.21**	MS4 stormwater, industrial stormwater, construction stormwater	0.21

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

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

6. Margin of Safety (MOS)

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

conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comment:

MPCA used an implicit MOS for the TMDLs for the lakes. Conservative modeling assumptions included applying sedimentation rates from the Canfield-Bachmann model that likely underpredict the sedimentation rate for shallow lakes. Zooplankton grazing plays a large role in algal and subsequent phosphorus sedimentation in shallow lakes. However, the Canfield-Bachmann equation does not account for the expected higher sedimentation rates (and thus phosphorus lost to the water column) expected in healthy shallow lake systems.

Additionally, empirical relationships used to predict chlorophyll-a and Secchi transparency are more established for deep lakes and do not account for zooplankton grazing critical to maintaining a clear water state in shallow lakes. Consequently, the models likely underpredict the clarity response of the lakes to reduced phosphorus concentrations. As water quality improves zooplankton consumes higher amounts of algae, thereby removing it from the system. The model therefore overestimates the phosphorus concentration in the lakes, and correspondingly overestimates the reductions needed to achieve the WQS.

Section 6A of the TMDL report provides further information on MOS.

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

7. Seasonal Variation

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

Comment:

Seasonal variation was accounted for via loading capacity based on growing season averages and by developing targets during the summer period (i.e., critical conditions). The TMDLs were set to meet TP standards during the summer period which is the most protective since critical conditions occur at both lakes during the summer months. BATHTUB incorporates precipitation data and flow data over time thus capturing seasonal variations such as spring rain, snowmelt, and summer low flows.

Section 7 of the TMDL report provides further information on seasonal variation.

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

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R.

122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and 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:

Reasonable assurance is discussed in detail in Section 10.0 of the TMDL report. MPCA reasonably assures that the TP water quality standard will be achieved for both lakes via the following:

1) 2010 RCWD Watershed Management Plan. The 2010 RCWD Watershed Management Plan includes implementation projects aimed at improving and restoring water quality at Peltier and Centerville Lakes. Details of the plan can be found at the Rice Creek Watershed District website under reports and plans subheading (http://www.ricecreek.org/index.asp?Type=B_BASIC&SEC={28FBDA95-21DC-43C7-B00F-874ABE5945FA}).
2) New RCWD Rules and Resource Management Plan (RMP) Rules. RCWD adopted a new set of rules on February 13, 2008. These rules will affect how programs are implemented and managed within the RCWD, including nonpoint source and point source control work. The RMP rules are specific programmatic efforts to improve water quality within the Peltier and Centerville Lakes watershed.
3) Implementation Plan for Peltier and Centerville Lakes. Following approval of the TMDLs for Peltier and Centerville Lakes, MPCA will work with the RCWD and others to develop and approve an implementation plan within one year. The implementation plan will include the use of federal and state programs to improve and restore water quality in the lakes.
4) RCWD Capital Improvement Plan (CIP). The RCWD CIP is a source of funding for implementation projects identified in the Implementation Plan for Peltier and Centerville Lakes. The RCWD CIP calls for $250,000 per year from 2010 to 2015 to fund the implementation projects.
5) Regulatory programs under NPDES program. The NPDES Phase II stormwater permittees are required to develop and implement a Stormwater Pollution Prevention Program (SWPPP) document, identify BMPs and measurable goals associated with each control measure. Entities that are subject to providing SWPPPs that include BMPs with measurable goals are MS4s, all cities and townships draining to Peltier and Centerville Lakes, RCWD, Anoka County, Ramsey County, and MN/DOT.
6) St. Paul Regional Water Service (SPRWS) support for implementation of effective clean-up programs. Centerville Lake, part of the SPRWS water supply system, is a drinking water source for emergency purposes. Because the SPRWS water supply system entity has a major influence

on what occurs at Peltier and Centerville Lakes, believes the lakes are an important source of drinking water, and is perceived as a major stakeholder by MPCA, it is expected that clean-up activities will occur at Peltier and Centerville Lakes with the support of and possibly initiated by SPRWS.

7) 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).

EPA finds that the TMDL document submitted by MPCA addresses this eighth element.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and 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:

The RCWD will start monitoring upon completion of TMDL implementation activities. TP, soluble reactive phosphorus, nitrogen, chlorophyll-a, transparency, and depth profiles for DO and temperature will be sampled and analyzed on a biweekly basis during the summer. Once the TMDL implementation activities are completed, RCWD plans to obtain one year of nitrate data at Peltier Lake to assess nitrogen loading to the lake. RCWD plans to take macrophyte surveys at both lakes in the spring and mid-summer on an annual basis. The spring sampling event will collect macrophytes at the time when curlyleaf pondweed is at its peak and the summer sampling event will collect macrophytes at a time when curlyleaf has died off and Eurasian watermilfoil is abundant. Zooplankton and fish surveys will be collected every five years.

Section 8.0 of the TMDL report provides further information on monitoring.

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

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comment:

The MPCA policy is to require an Implementation Plan within one year of EPA approval of the TMDL. The MPCA reviews and approves the Implementation Plans. The RCWD has completed a draft TMDL Implementation Plan for Peltier and Centerville Lakes. Final approval of the Implementation Plan by MPCA will occur once EPA finalizes the TMDL.

Section 7.0 of the TMDL report includes efforts to reduce internal and external TP loadings to each lake. Implementation of activities such as monitoring, internal load reduction efforts, wetland and manure management projects, and fish population assessment and management is planned for Peltier and Centerville Lakes in partnership with the local governments in the watershed and MPCA. Further detail on the type and extent of activities for all lakes is described in Section 7.0 of the TMDL report.

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

11. Public Participation

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

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

Comment:

Three Technical Advisory Committee meetings took place during the course of TMDL development: December 12, 2006, March 1, 2007, and May 1, 2008. Participants included RCWD, cities, MDNR, MN/DOT, Anoka County Parks, Blue Water Science, and contractors.

Two stakeholder meetings took place throughout the TMDL development process. The first stakeholder meeting took place on November 19, 2007. The second meeting took place on July 31, 2008. The stakeholders in attendance were lakeshore and farm residents, MPCA, DNR, RCWD, MN/D●T, local officials, representatives from lake associations, and local governing agencies.

The Peltier and Centerville Lakes TMDL report was posted on the MPCA's website for public comment and review for a 30-day public comment period. The public comment period took place from January 30, 2012 to February 29, 2012. During this time the MPCA received and responded to three comment letters from the public. MPCA submitted the public comments with the TMDL report. EPA has reviewed these comments, and believes that MPCA has appropriately addressed the comments.

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

12. Submittal Letter

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

Comment:

On August 29, 2013, EPA received the Peltier and Centerville Lakes TMDLs, and a submittal letter dated August 23, 2013, signed by Rebecca J. Flood, Assistant Commissioner, addressed to Tinka Hyde, U.S. EPA, Region 5, Water Division. MPCA stated in the submittal letter, "I am pleased to submit the Total Maximum Daily Load (TMDL) studies for impairment excess nutrients for Peltier Lake, Centerville Lake, ... to the U.S. Environmental Protection Agency (EPA) for final approval." The submittal letter included the name and location of the waterbodies and the pollutant of concern.

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

13. Conclusion

After a full and complete review, EPA finds that the TP TMDLs for Peltier Lake (DNR Lake # 02-0004-00) and Centerville Lake (DNR Lake # 02-0006-00) satisfy all of the elements of an approvable TMDL. This decision document addresses **2** TMDLs for **2** waterbodies as identified on Minnesota's 303(d) list (Table 1 above).

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