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

AUG 2 6 2015

REPLY TO THE ATTENTION OF:

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

WW-16J

Dear Ms. Flood,

The U. S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for the Pomme de Terre (PdT) watershed including supporting documentation and follow up information. The PdT watershed is in the west-central portion of Minnesota, in the Minnesota River basin. The watershed drains portions of six counties (Otter Tail, Grant, Douglas, Big Stone, Swift and Stevens) in Minnesota. The TMDL addresses the aquatic life use impairment resulting from turbidity (total suspended solids (TSS) as surrogate); Fish Bioassessments, Aquatic Macroinvertebrate Bioassessments, Nutrient/Eutrophication Biological Indicators (total phosphorus as a surrogate); Dissolved Oxygen (total phosphorus and TSS as surrogates); and E.coli.

The TMDL meets 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 10 TMDLs for six segments in the PdT watershed. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting these TMDLs, and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch at 312-886-0236.

Sincerely yours,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Scott MacLean, MPCA
Jeff Risberg, MPCA

TMDL: Pomme de Terre River Watershed, Minnesota, Turbidity, E. coli, and Dissolved Oxygen, Third TMDL Report for the watershed

Effective Date: August 26, 2015

Decision Document for Approval of Pomme de Terre River Watershed, Turbidity, E. coli, and Dissolved Oxygen TMDL Report

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 Water body, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the water body as it appears on the State's/Tribe's 303(d) list. The water body 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 water body 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 water body. 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 water body 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 Pomme de Terre River (PdT) watershed is located in the west-central portion of Minnesota in the Northern Central Hardwood Forest (NCHF) and Northern Glaciated Plains (NGP) ecoregions. The PdT watershed covers 559,968 acres and drains portions of six counties (Otter Tail, Grant, Douglas, Big Stone, Swift and Stevens) in the Minnesota River basin. Morris and Appleton are the largest towns in the largely rural watershed. The PdT flows from north to south. The upper reach of the watershed is characterized by its relatively low gradient and prevalence of lakes and wetlands. The gradient increases moving downstream in the watershed as does the occurrence of development and row crop agriculture. Glacial sediments cover the entire PdT watershed. The subwatersheds that are discussed in this TMDL report are Dry Wood Creek, North Turtle Lake, Lake Christina, Perkins Lake, and Hattie Lake. Figure 1.1 of the TMDL is a map of the Pomme de Terre watershed indicating the waterbody locations and the nature of impairments.

Dry Wood Creek
Dry Wood Creek is a major tributary to the PdT River. The watershed is located in the NGP ecoregion and drains portions of Stevens, Big Stone and Swift counties in the southern reaches of the PdT watershed. The watershed is primarily rural and covers 61,778 acres. The TMDL stated that much of the watershed has been converted to cropland and the riparian area in the downstream section of the creek is heavily pastured.

North Turtle Lake Watershed
North Turtle Lake is located in the NCHF ecoregion in the northernmost reaches of the PdT watershed. A catchment area of over 7,100 acres drains to the 1,500 acre lake. The TMDL stated that the land use in the watershed is a mix of cropland, forest and rangeland. Four feedlots are in relatively close proximity to the lake. North Turtle Lake outlets via a pump that directs water to a culvert running under County Road 122. The water makes its way through a series of wetlands to South Turtle Lake.

Lake Christina Watershed
Lake Christina is located in the NCHF ecoregion in the northeastern PdT watershed. A catchment area of over 38,000 acres drains to the 3,955 acre lake. Land use in the watershed is primarily rangeland with a mix of forest and cropland. Lake Christina is nationally recognized as a critical staging area for migrating waterfowl and is managed as such. Rotenone treatments have been used to control fish populations and the lake has alternated between a macrophyte dominated clear water state and a turbid phase dominated by phytoplankton. Currently, activities are underway to draw down the water level in Lake Christina as a means for controlling the rough fish population,

harden bottom sediments and establish native macrophytes. Lake Christina's status as a staging area for migrating waterfowl increases the relative importance of wildlife delivered phosphorus during certain parts of the year through surface runoff and direct deposition. It is difficult to quantify the amount of phosphorus migrating waterfowl deliver to Lake Christina, and this TMDL did not attempt to do so. Phosphorus loading derived from wildlife is accounted for in the load allocation of the TMDL. Management of the lake for waterfowl has and likely will continue to provide a net benefit to the water quality of Lake Christina through control of rough fish populations and establishment of macrophytes.

Perkins Lake Watershed
Perkins Lake is a small (504 acre), shallow, turbid lake on the PdT mainstem in Stevens County. The lake is located in the NGP ecoregion, though most of its 266,000 acre catchment is located in the NCHF ecoregion. Approximately 50% the land use in the catchment is cropland with a mix of rangeland and forest making up the bulk of the remaining land use. Perkins Lake has been characterized by MPCA as having poor water quality, a lack of submerged macrophytes and degraded aquatic habitat since the initial lake survey report in 1947.

Hattie Lake Watershed
Hattie Lake is a shallow, turbid, hypereutrophic lake located in the southern reaches of the PdT watershed within the NGP ecoregion. The 454 acre lake has a catchment area in excess of 8,800 acres resulting in a large catchment to surface area ratio (19:1). Gorder Lake (493 acres) is included in the Hattie Lake watershed. Cropland is the dominant land use in the watershed. Hattie Lake was used as a NGP reference lake in the 1980s.

Table 1: Land use percentages in the Pomme de Terre Watershed and sub-watersheds discussed in this TMDL.

Watershed/ Catchment	Percent Open Water	Percent Developed	Percent Barren/Mining	Percent Forest/Shrub	Percent Pasture/ Hay/ Grassland	Percent Cropland	Percent Wetland
Pomme de Terre River Watershed	8.9	7.6	< 1	6.9	17.1	52	7.5
Dry Wood Creek	7.1	6.3	< 1	1	6.6	69	9.9
North Turtle Lake	29.5	5.5	< 1	20.5	23.1	12.1	9.2
Lake Christina	18.7	6.2	< 1	20.2	40.8	7.9	6.3
Perkins Lake	14.8	7.2	< 1	13.2	23.5	34	7.2
Hattie Lake	15.0	6.6	0	1.0	5.7	64.1	7.5

Problem Identification/Pollutant(s) of Concern: As part of the MPCA Watershed Approach, streams, lakes, and wetlands throughout the PdT watershed were monitored for impacts to aquatic recreation, aquatic life, and aquatic consumption. A stream is considered impaired for impacts to aquatic life if the fish Index of Biotic Integrity (IBI), macroinvertebrate IBI, dissolved oxygen, turbidity, or certain chemical standards are not met. Streams are considered impaired for impacts to aquatic recreation if bacteria standards are not met. Lakes are considered impaired for impacts to aquatic recreation if total phosphorus, chlorophyll-A, or secchi depth standards are not met.

This TMDL addresses the aquatic life use for two segments and the aquatic recreation use for five segments (Table 7 of this Decision Document). Both uses are affected for Dry Wood Creek. The other five waterbodies have only one impaired use. The TMDL includes pollutant loads for *E. coli*, total suspended solids, and total phosphorus, to address the following impairments: Fish Bioassessments, Turbidity, *E. coli*, Aquatic Macroinvertebrate Bioassessments, Dissolved Oxygen (DO), and Nutrient/Eutrophication Biological Indicators.

As identified in Minnesota's 2012 approved 303(d) impaired waters list the mainstem of the PdT River was initially listed in 2006. Dry Wood Creek subwatershed was initially listed in 2010 with additional impairments identified in 2012. The lakes were all listed in 2010 except Hattie Lake which was included on the list in 2012.

Source Identification: Section 4.1 of the TMDL report discusses the sources for Dry Wood Creek and Pomme de Terre River impairments. Section 5.1 of the TMDL report discusses source contribution for the lakes. MPCA cites to several reports which have been developed for different monitoring and assessments for the PdT watershed which are summarized in the submitted TMDL report.

Nonpoint Sources

Turbidity (TSS)-Dry Wood Creek is the only segment in this TMDL report that is being developed to address impairment due to turbidity. TSS is being used as a surrogate pollutant to address the turbidity impairments for the Creek. The TMDL report states that increased livestock trampling of streambanks and decreased riparian and bank vegetation contributes to the increase of sediment load to the waterbodies, thus increasing turbidity. Riparian buffers serve to trap sediment before it reaches a waterbody, and the lack of riparian vegetation also allows increased streambank erosion. Channelization of reaches throughout the watershed has led to changes in the hydrological and geomorphological condition of streams by increasing flow velocities, which increase erosion rates as well as disrupt natural stream sediment processes. These changes in erosion rates have led to an increase in turbidity. North Drywood Lake contributes sestonic (suspended) algae and high phosphorus concentrations that may cause increased algae blooms in Dry Wood Creek. Currently North Drywood Lake is not listed on the impaired waters list and information is being reviewed to determine if the water should be listed in the next listing cycle. The determination for this water will be made in the next PdT assessment cycle. Because no final determination has been made, North Drywood Lake is not addressed in this TMDL report. Impoundments and channel alteration in Dry Wood Creek have led to bank instability creating increased erosion.

E. coli - MPCA identified likely sources of bacteria in the Dry Wood Creek watershed to include manure from livestock and inadequate subsurface sewage treatment systems (SSTS). Both feedlots and pasture are present in the Dry Wood Creek Watershed. Livestock can contribute bacteria to the watershed through runoff from poorly managed feedlots as well as direct loading if allowed access to streams or lakes. Additional runoff can occur through manure applications on agricultural fields.

SSTS compliance with the county's ordinance was estimated for each county in the PdT River Watershed. Compliance rates ranged from 25%-75%. Inadequate SSTS can contribute to the *E.coli* impairment when septic effluent ponds on the surface due to such problems as soil compaction in the drainfield, mechanical breakdowns, or poor drainage. The effluent can then enter nearby streams.

Phosphorus - Poor riparian condition was also considered to be a stressor pathway for phosphorus in the PdT River Watershed Biotic Stressor Identification report. The riparian buffers along Dry Wood Creek are minimal in some areas. This can allow excessive amounts of nutrients, sediment and fertilizer from fields to enter adjacent streams and rivers. Phosphorus can attach to soils particles, and therefore sediment washed in to the waterbodies can carry phosphorus into the system. Manure contains significant amounts of phosphorus, and when used as a fertilizer on farm fields, can be washed into streams and lakes. Manure from pasture land adjacent to the stream and from cattle with direct stream access are other sources of phosphorus to the impaired section of Dry Wood Creek.

Point Sources

The two NPDES permitted facilities that discharge to the PdT are identified in Table 2 below. There are no permitted Municipal Separate Storm Sewer System (MS4) communities or permitted concentrated animal feeding operations in the watershed.

Table 2: Relevant WWTF permits in the TMDL

Facility	Permit Number	Sub Watershed	City	System Type
Ashby WWTF	MNG580087	Perkins Lake	Ashby	Pond
Barrett WWTF	MNG580173	Perkins Lake	Barrett	Pond

Construction stormwater from housing or road construction projects near streams or lakes in the watershed could be a minimal source of phosphorus to the waterbodies.

Priority Ranking: Minnesota does not include separate priority rankings for its waters in the TMDL. The MPCA's projected schedule for TMDL completions, as indicated on the 303(d) impaired waters list, implicitly reflects Minnesota's priority ranking of these TMDLs. Ranking criteria for scheduling the TMDL projects include, but are not limited to: impairment impacts on public health and aquatic life; public value of the impaired water resource; likelihood of completing the TMDL in an expedient manner, including a strong base of existing data and

restorability of the waterbody; technical capability and willingness locally to assist with the TMDL; and appropriate sequencing of TMDLs within a watershed or basin.

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

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

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the water body, 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: The applicable water body classifications and water quality standards are specified in Minn. R. Ch. 7050. The Minn. R. Ch. 7050.0470 lists water body classifications and Minn. R. Ch. 7050.222 lists applicable water quality standards. The impaired waters covered in this TMDL are classified as Class 2B or 2C, 3B, 3C, 4A, 5 and 6. Class 2B and 2C are the most stringent Classes for this watershed.

Class 2B waters – The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable.

Class 2C waters – The quality of Class 2C surface waters shall be such as to permit the propagation and maintenance of a healthy community of indigenous fish and associated aquatic life, and their habitats. These waters shall be suitable for boating and other forms of aquatic recreation for which the waters may be usable.

The water quality standards that apply to the PdT stream reaches are shown in Table 3 below. Lake water quality standards specific to ecoregion and lake type (depth) are shown in Table 4 below.

Table 3: Surface water quality standards for PdT stream reaches addressed in this report.

Parameter	Water Quality Standard	Units	Criteria	Period of Time Standard Applies
Escherichia coli	Not to exceed 126	org/100 ml	Monthly geometric mean	April 1 – October 31
	Not to exceed 1,260	org/100 ml	To be exceeded no more than 10% of the time	
Turbidity*	Not to exceed 25	NTU		Year round
Dissolved Oxygen	Daily minimum of 5.0	mg/L	100 percent of days above 7Q10 flow; 50 percent of days at 7Q10 flow	Year round

* - Replaced by the TSS criteria approved by EPA on January 23, 2015.

Table 4: Surface water quality standards for PdT Lakes addressed in this report.

Ecoregion/Type	Total Phosphorus Standard (µg/L)	Chlorophyll –a Standard (µg/L)	Secchi Depth (m)	Period of Time Standard Applies
NCHF/Shallow Lakes	< 60	< 20	>1.0	June 1 – September 30
NGP/Shallow Lakes	< 90	< 30	> 0.7	June 1 – September 30

NCHF = North Central Hardwood Forest
NGP = Northern Glaciated Plains

Surrogate Targets:
Total Suspended Solids
The numeric criterion for turbidity, based on a stream classification of a Class 2B, is a standard of 25 Nephelometric Turbidity Units (NTU). Turbidity, however, is a dimensionless measurement and thus loading capacities cannot be calculated. A TSS surrogate is used to calculate loading capacity and to determine allocations. MPCA analyzed turbidity and corresponding TSS data for the PdT watershed to determine the relationship between turbidity and TSS. Based on the NTU and Nephelometric Turbidity Ratio Units (NTRU) data the TSS surrogate numeric target was determined to be **52 mg/L.** Detailed information can be found in Section 3.1 of the TMDL report.

MPCA recently developed criteria for TSS to replace the criteria for turbidity. The new TSS criteria were approved by the EPA on January 23, 2015. Although this TMDL was developed to attain the turbidity criteria, a review was made comparing the TSS and turbidity tragets to ensure

the TMDL loading for TSS would meet the new TSS criteria. The TMDL TSS target is 52 mg/L, which is below the newly promulgated TSS criteria of 65 mg/L (the applicable criteria for PdT). Attainment of the TMDL target will ensure the attainment of the newly promulgated TSS criteria.

Other Targets

TP

Modeling results developed by MPCA determined that low dissolved oxygen is related to the high phosphorus loadings. High phosphorus loads to the streams cause excessive production of algae. At night, bacterial, plant and animal respiration depletes oxygen. Because of the high phosphorus loads to the streams, this cycle is exacerbated which causes extreme diurnal dissolved oxygen swings. TP levels for Dry Wood Creek were determined to be exceeding the Water Quality Standard for rivers and streams of 0.15 mg/l[1] as a June through September mean value, and the Northern Glacial Plains ecoregion annual mean of 0.218 mg/L. Reducing phosphorus levels in the HSPF model to 0.15 mg/l increases the amount of dissolved oxygen in the reach, indicating that in this system, excess phosphorus is a driver for high dissolved oxygen flux. MPCA indicated that large (greater than 4 mg/L) diurnal swings in dissolved oxygen were measured in Dry Wood Creek on several occasions in 2008 and 2009.

The TP above the 0.15 mg/l was also found by MPCA to be the stressor to fish and macroinvertebrates in portions of the watershed (Dry Wood Creek and the listed segment of the Pomme de Terre River). The Stressor Identification Study showed that the fish and macroinvertebrate community in the impaired sections of PdT River segment and Dry Wood Creek are below the expected levels, and that phosphorus and the related low DO levels were a primary cause. Reducing the TP loads will result in improved DO levels, and together with improvements in TSS loads will result in improved biology. HSPF model scenarios were used to determine the phosphorus load reductions necessary to meet the low dissolved oxygen standard and thereby support aquatic life for these segments.

E.coli

The *E.coli* target for Dry Wood Creek The target is the standard as stated above, for both the geometric mean portion and the daily maximum portion, which is applicable from April 1st through October 31st. However, the focus of this TMDL is on the "chronic" standard of not to exceed 126 org/100 ml. This results in the greatest reductions in the watersheds, and MPCA believes that the geometric mean is the more relevant value in determining water quality. While the TMDL will focus on the geometric mean portion of the WQS, compliance is required with both parts of the WQS as identified in Table 3 above.

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

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1 At the time of the submittal of the TMDL the TP standard for rivers and stream was not final. MPCA indicated in the TMDL Report that this was a draft standard. The final standard was approved by EPA on January 23, 2015. The approved TP standard for the Northern Glacial Plains ecoregion is 0.15mg/l is the target used for this TMDL.

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:
Loading Capacity for Streams:

Turbidity/TSS loading capacity for Dry Wood Creek
As mentioned above in Section 2 of the Decision Document, turbidity is a dimensionless unit. TSS was chosen by MPCA as a surrogate to calculate loading allocations and capacities for turbidity impairments. MPCA determined the loading capacities through the use of the Load Duration Curve (LDC) method.

Load duration analysis method:

- A flow duration curve was developed using the full range of hydrological conditions from data collected using 1996-2009 daily average flow data provided by the PdT River Watershed HSPF model. The resultant curve shows flow values and the frequency that the flow is exceeded. All flow conditions are represented.
- The load duration curve was developed using the flow multiplied by the standard or target concentration (52 mg/l TSS). The curve in Appendix A of the TMDL Report and additional submittal of the curve on March 13, 2015 represents the loads meeting the turbidity criteria as translated to TSS. The points above the curve are pollutant exceedences. Review of the Load Duration Curve indicates that under mid-range to very

high flow conditions the criteria load was exceeded. In addition, the 90th percentile values, and the median values are shown for each flow regime. The curve demonstrates that the 52mg/l TSS value is exceeded under wet weather conditions. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target.

In Table 4.2 of the TMDL report only five points on the entire loading capacity curve are depicted (the midpoints of the designated flow zones). However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire curve. The load duration curve method can be used to display collected TSS monitoring data and allows for estimation of load reductions necessary for attainment of the turbidity water quality standard.

Using this method, daily loads were developed based upon the flow in the waterbody. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 5 below identifies the loading capacity for the waterbody for each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL. The method used for determining these turbidity TMDLs is consistent with EPA technical memos.[2]

Table 5 TSS Loading Capacity for Dry Wood Creek

Flow Zone (percent of flow)	TSS Loading Capacity (lbs/day)
High (0-10%)	14.91
Moist (10-40%)	3.12
Mid (40 – 60%)	1.19
Dry (60 -90%)	.40
Low (90 – 100%)	0.027

E. coli loading capacity for Dry Wood Creek
The duration curve approach was also utilized to address the E. coli impairments.

Load duration analysis method:
A flow duration curve was developed using the full range of hydrological conditions from data collected using April through October, 1996 through 2009 daily average flow data. The resultant curve shows flow values and the frequency that the flow is exceeded. All flow conditions are represented.

The load duration curve was developed using the flow multiplied by the standard or target concentration (126 org/100ml *E. coli*). The curve in Appendix A of the TMDL Report and additional submittal of the curve on March 13, 2015 represents the loads meeting the *E. coli* criteria. The points above the curve are pollutant exceedences. Review of the Load Duration Curve indicates that under high flow to very high flow conditions the criteria load was exceeded.

[2] See U.S. Environmental Protection Agency, August 2007, *An Approach for Using Load Duration Curves in the Development of TMDLS,* Office of Water. EPA-841-B-07-2006, Washington, D.C.

In addition, the 90th percentile values, and the median values are shown for each flow regime. The curve demonstrates that the 126 org/100ml *E. coli* value is exceeded under wet weather conditions. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target.

Flow zones were determined for very high, high, mid, low and very low flow conditions. The mid-range flow value for each flow zone was then multiplied by the standard of 126 org/100ml to calculate the loading capacity. The method used for determining these *E. coli* TMDLs is consistent with EPA technical memos.[3]

Total phosphorus for Dry Wood Creek and Pomme de Terre River
MPCA used the calibrated Hydrologic Simulation Program – FORTRAN (HSPF) to develop the TMDLs for the waterbodies impaired for low DO and impaired biologic community. HSPF is a comprehensive model that simulates watershed hydrology and water quality for conventional and toxic pollutants. HSPF incorporates watershed-scale run-off models into a basin-scale framework that includes fate-and-transport of pollutants in the waterbodies. It accounts for a variety of runoff processes along with in-stream hydraulic and sediment-chemical interactions. Within a delineated subwatershed, areas with similar land uses are aggregated and a uniform set of parameter values are applied to that land category. Upland responses within a subwatershed are simulated on a per-acre basis and converted to net loads to stream reaches it represents. Within each subwatershed, the upland areas are separated into multiple land use categories. Within the PdT River watershed, dissolved oxygen, runoff, phosphorus and flow simulated output were used for analysis and TMDL calculations.

The HSPF model was used to identify the pollutant of concern causing the low dissolved oxygen. Model scenarios demonstrated that dissolved oxygen is sensitive to phosphorus. In addition the PdT River Watershed Biotic Stressor Identification report determined that excess phosphorus, through one or more stressor pathways, contributes to the biological impairments in the impaired stream reaches addressed in the TMDL report. HSPF model scenarios were used to determine the phosphorus load reductions necessary to meet the dissolved oxygen standard and thereby support aquatic life.

Allocations were subsequently developed in consideration of model results. Continuous output for the 10 year period 2000 through 2009 from Dry Wood Creek and the mainstem of the PdT River from Barrett Lake to North PdT Lake were analyzed. The 7Q10 flows for each reach (seven-day consecutive low flow with a 10 year return frequency) were calculated using a statistical flow analysis tool named DFLOW, found in EPA's Better Assessment Science Integrating point and Non-point Sources (BASINS) package.

Given reasonable modeling assumptions regarding algal growth, algal respiration, and in-stream re-aeration rate, the TP allocation for Dry Wood Creek was calculated to be **18.4 lbs/day**. The PdT River Watershed Biotic Stressor Identification report also lists other stressor pathways found to affect dissolved oxygen in Dry Wood Creek. These stressor pathways are impoundments,

[3] *Ibid*

riparian condition, and source water pollution from North Drywood Lake. MPCA indicated that North Drywood Lake will likely be listed as impaired in the next PdT Watershed Assessment cycle. The TP allocations will be determined for the lake at that time.

Given reasonable modeling assumptions regarding algal growth, algal respiration, and in-stream re-aeration rate, the TP allocation for PdT River from Barrett Lake to North PdT was calculated to be **45 lbs/day**. In the PdT River from Barrett Lake to North PdT Lake, the calibrated HSPF model predicts an average daily load to be 53 lbs/day of TP for the period 2000 through 2009.

Loading Capacity for all Lakes:

Excess Nutrients

The U.S. Army Corps of Engineers (USACE) BATHTUB model was used in the determination of the loading for nutrients. The BATHTUB model applies a series of empirical equations derived from assessments of lake data and performs steady state water and nutrient calculations based on lake morphometry and tributary inputs. The BATHTUB model requires fairly simple inputs to predict phosphorus loading. The model accounts for pollutant transport, sedimentation, and nutrient cycling. The model was used to determine both the current load and the load needed to meet water quality standards for each lake (Section 3.1 of the TMDL).

The Canfield-Bachmann subroutine was used in the BATHTUB model to determine how each lake responded to the TP loading. The model parameters were adjusted until the model predictions fit the sample data. Once the data were calibrated, the source load inputs were reduced until the in-lake concentration met the appropriate WQS (Section 4.1.1.7 of the TMDL)

The BATHTUB version 6.14 model framework was used as a basis for modeling phosphorus and water loading for lakes within the PdT watershed. The watershed was subdivided into several segments based on lake assessment data, flow linkages and location of monitoring stations. Except for cases where segments (lakes) were hydrologically isolated from the rest of the PdT watershed, the segments were linked into a larger network that allowed for a more comprehensive model framework for the entire PdT watershed. This linkage made use of monitored flow and TP data that were available at the outlet of the PdT River as well as sites upstream.

Data requirements for development of the model framework included precipitation, evaporation, lake morphometry, lake water quality, animal units, watershed area, land use, flow and water quality, septic systems and NPDES dischargers.

The first order decay model within the BATHTUB framework provided relatively good agreement between predicted and observed TP, chlorophyll-a and Secchi depth for the lakes modeled in the PdT watershed. Observed TP concentrations in each of these lakes exceeds the ecoregion/lake type standard. In order to calculate the phosphorus loading capacity of each lake, external phosphorus inputs were reduced within the model framework until the predicted in-lake concentration matched the appropriate standard. Table 3.3 of the TMDL report identifies the observed and modeled lake conditions and the loading estimates for observed conditions and loading capacities to meet the phosphorus standards. The TMDL summaries for North Turtle

Lake, Lake Christine, Perkins Lake, and Hattie Lake are in Tables 11-14 at the end of the document.

Critical Condition:
TSS/Turbidity
The duration curve approach uses multiple years of flow data. Analysis of the load duration curve demonstrated that the highest turbidity levels occur during high flow events. To address the loads at this critical condition, MPCA will concentrate the implementation efforts on these high flow regimes.

E. coli
The critical condition for the E. coli is the summer recreation season, when the recreational use is in place. Analysis of the load curve will allow MPCA to address the causes and exceedences during the summer months.

Total Phosphorus
Daily minimum dissolved oxygen concentrations are at their lowest in the summer low flow season, both in the PdT River and Dry Wood Creek. TMDL allocations assigned during the summer growing season will protect the lakes and streams during the worst water quality conditions of the year. During the summer, temperatures and algal/plant growth are high, contributing to stress on the waterbodies. Modeling TP reductions under the summer conditions will ensure that standards are attained during these critical times.

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.

Comments:
Load Allocation: The load allocations are discussed in Sections 4 and 5 of the TMDL report. MPCA determined that nonpoint sources of TSS, TP, and *E. coli* include: agricultural run-off (often due to minimal buffers), livestock trampling of stream banks, livestock in streams, and decrease in riparian and bank vegetation. Descriptions of each loading type are discussed in Section 1 of this document. Although MPCA identified several land uses and processes that can contribute the pollutants, LAs were calculated as gross allocations.

MPCA determined available LAs by calculating the loading capacity and subtracting the wasteload allocations and a 10% margin of safety. Each load allocation includes nonpoint

pollution sources that are not subject to an NPDES permit as well as "natural background" sources such as wildlife. Tables 7 through 14 at the end of this document identify the LA for each segment.

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

5. Wasteload Allocations (WLAs)

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

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

Comments:
NPDES discharges for Perkins Lake for TP
The WLA is discussed in Sections 5 of the TMDL submittal. There are two municipal wastewater treatment facilities in the watershed that have the potential to affect the impaired waters (Table 6 below). These two facilities discharge to Perkins Lake. The WLAs for TP were calculated by multiplying the design flow by an assumed effluent concentration of 2.0 mg/L. MPCA noted that pond systems rarely have effluent limits for TP, and therefore an assumed concentration needed to be developed. The 2.0 mg/L assumed concentration is based upon similar pond systems in the state. As these facilities are pond systems, they are permitted to discharge from March 1 to June 30 and from September 1 to December 31. Table 6 below summarizes the WLAs.

Table 6 WLAs for TP for dischargers in the Perkins Lake watershed

	Design flow (MGD)	Assumed concentration mg/L	WLA lb/day
Ashby WWTF	0.1011	2.0	1.69
Barrett WWTF	0.106	2.0	1.77

The Barrett WWTF discharge was also analyzed in relation to the PdT River, which is listed as impaired due to poor biology and low DO. MPCA determined that the Barrett WWTF has the potential to contribute excessive loadings to the PdT River in the month of June. MPCA will seek to modify the NPDES permit to prohibit discharge during the month of June (page 28 of the TMDL). MPCA also analyzed the discharge from the Ashby WWTF, and determined that because the discharge flows through several lakes and a portion of the PdT River, the discharge has no impact on the impaired portion of the PdT River (Section 4.1 of the TMDL)

Stormwater WLA in the PdT Watershed
There are no MS4 permitted communities within the PdT watershed. Consideration was given to construction stormwater and industrial stormwater permits. MPCA has included a 0.1% allocation for TSS and TP as an aggregated loading of the total capacity for each segment in the PdT watershed covered by this TMDL.

Construction Stormwater
For construction sites required to obtain NPDES permit coverage for their stormwater discharge, the permittee must obtain coverage under the Construction General Permit and properly select, install and maintain all Best Management Practices (BMPs) required under the permit, or meet local construction stormwater requirements if they are more restrictive than requirements of the State General Permit.

Industrial Stormwater
Industrial facilities required to obtain NPDES permit coverage for their stormwater discharges must obtain coverage under the industrial general stormwater permit issued by the state or a general sand and gravel general permit (MNG49) under the NPDES program and select, install and maintain all BMPs required under the permit. This TMDL assumes that any future land area designated for industrial stormwater is implicitly combined with the land area designated for construction activities.

Minnesota also analyzed the land use and potential for future growth in the watershed to determine if a reserve capacity was needed. MPCA does not expect significant growth in the watershed, and therefore no reserved capacity was calculated for the segments in this PdT TMDL report. Tables 8 through 15 at the end of this document identifies the WLA for each segment.

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

6. Margin of Safety (MOS)

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

Comments:
E. coli for Dry Wood Creek
The use of the LDC approach minimized variability associated with the development of the PdT bacteria TMDL because the calculation of the loading capacity was a function of flow multiplied by the target value. The MOS was set at 10% to account for uncertainty due to field sampling error and assumptions made during the TMDL development process.

Challenges associated with stormwater *E. coli* loads include the dynamics and complexity of bacteria in urban streams. Factors such as die-off and re-growth contribute to general uncertainty that makes stormwater bacteria loads particularly difficult. The MOS for the PdT bacteria TMDL also incorporated certain conservative assumptions in the calculation of the TMDLs. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. MPCA determined that it was more conservative to use the WQS (126 cfu/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

As stated in *EPA's Protocol for Developing Pathogen TMDLs* (EPA 841-R-00-002), many different factors affect the survival of pathogens, including the physical condition of the water. These factors include, but are not limited to sunlight, temperature, salinity, and nutrient deficiencies. These factors vary depending on the environmental condition/circumstances of the water, and therefore it would be difficult to assert that the rate of decay caused by any given combination of these environmental variables was sufficient enough to meet the WQS of 126 cfu/100 mL. Thus, it is more conservative to apply the State's WQS as the MOS, because this standard must be met at all times under all environmental conditions.

TSS and TP for Dry Wood Creek and PdT River
The use of the LDC approach minimized variability associated with the development of the PdT TSS and TP TMDLs because the calculation of the loading capacity was a function of flow multiplied by the target value. The MOS was set at 10% to account for uncertainty due to field sampling error and assumptions made during the TMDL development process.

TP (all lakes)
An explicit MOS of 10% was used for the TP lake TMDLs in the PdT watershed. Calibration and validation of the BATHTUB model shows the model adequately represents the lake systems. MPCA therefore determined, and EPA agrees no additional MOS is needed.

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

7. Seasonal Variation

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

Comments:
E. coli for Dry Wood Creek
Concentrations of E. coli vary throughout the summer in Dry Wood Creek. The data idicate that June-October is the critical time period for exceedances of the E. coli standard in the Dry Wood Creek subwatershed. MPCA determined, and EPA agrees, that duration curve approach using multiple years of flow data and the applicable time period of the standard should provide sufficient water quality protection during the critical summer period.

Turbidity/total suspended solids for Dry Wood Creek
MPCA stated that data available for the PdT River Watershed Biotic Stressor Identification report indicated that for two locations in Dry Wood Creek, the pattern of TSS in 2007 started high in spring and early summer and dropped to lower levels beginning in mid-summer. However, this pattern is not present in all years. The data from the Dry Wood Creek outlet site for 2010 and 2011 show that TSS is lowest in the spring and early summer and peaks in mid to late summer, with levels exceeding standards persisting through the fall. The reasons for this variation are likely differing sources contributing to the TSS in different years. The duration curve approach using multiple years of flow data helps to account for some of this variation. MPCA determined, and EPA agrees, that this approach should provide adequate protection during the differing times of the year.

Total phosphorus for all segments
Water quality monitoring results indicate that TP values in the watershed are elevated at most times during the spring, summer and fall. TP patterns tend to follow TSS patterns fairly closely in this watershed. In some years, TP is highest in the spring and then falls through the rest of the year, but in others, the highest concentrations are found in the summer months. The reasons for this are likely differing sources contributing to the TP in different years. MPCA determined, and EPA agrees, that the approach taken in this TMDL should provide adequate protection during the differing times of the year.

Dissolved oxygen for Dry Wood Creek and PdT River
Information stated in the Pomme de Terre River Watershed Biotic Stressor Identification report that DO concentrations change seasonally and daily in response to shifts in ambient air and water temperature, along with various chemical, physical, and biological processes within the water column. If dissolved oxygen concentrations become limited or fluctuate dramatically, aerobic aquatic life can experience reduced growth or fatality. In most streams and rivers, the critical conditions for stream DO usually occur during the late summer season when water temperatures are high and stream flows are reduced to base flow. As temperatures increase, the saturation levels of dissolved oxygen decrease. Based on information in the TMDL MPCA indicated that daily minimum dissolved oxygen concentrations are at their lowest in the summer low flow season, both in the PdT and Dry Wood Creek. The dissolved oxygen data for these two segments demonstrate a large diurnal swing. MPCA determined, and EPA agrees, that this approach should provide adequate protection during the differing times of the year.

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

8. Reasonable Assurances

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

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

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comments:
Section 8 of the TMDL report discusses mechanisms that give reasonable assurance that the TMDL will be met. MPCA has stated that several agencies and non-profit groups have been and continue to work toward the goal of reducing pollutant loads in the PdT Watershed. Strong partnerships between the Pomme de Terre River Association (PdTRA), counties and soil and

water conservation districts (SWCDs) have led to watershed wide implementation of conservation practices. Development of the Minnesota Agricultural Water Quality Certification Program (AWQCP) will strengthen the relationship between PdT landowners and state and federal agencies and provide additional incentives to attain water quality improvements. The PdTRA has also been actively implementing BMPs in the watershed. In the past year alone through a federal 319 grant, four buffer projects were approved by the board totaling 111 acres including 71.5 acres along Dry Wood Creek. A prescribed grazing project was also completed through EQIP in Stevens County for 111 acres.

In addition to the federal 319 grant, the PdTRA received state implementation funds through the Minnesota Board of Water and Soil Resources. Over the past two years, these grants have resulted in the installation of rain gardens, shoreline stabilization and restoration projects, grassed waterways, alternative tile intakes, livestock exclusion fences, and water and sediment control basins. The PdTRA also obtained funding for a streambank repair project near a dam in a city park in Morris, Minnesota, a project which had widespread public interest and support.

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, and water management. 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 to jointly use 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 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 adequately 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 nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:
Section 6 of the TMDL report discusses the monitoring efforts that will continue in the watershed by MPCA based on MPCA's monitoring cycle. MPCA employs an intensive watershed monitoring schedule that provides comprehensive assessments of all of the major watersheds (HUC 8 digit) on a ten-year cycle. This schedule provides intensive monitoring of streams and lakes within each major watershed to identify overall health of the water resources, to identify impaired waters, and to identify those waters in need of additional protection to prevent future impairments. The monitoring and assessment work described in the TMDL report and other associated reports identified in the TMDL will be repeated beginning in 2017 or 2018. Long term load monitoring at watershed outlets is in place and additional long term intermediate scale load monitoring began in 2013.

EPA finds that the TMDL document submitted by MPCA adequately addresses 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 information to discuss the implementation activities are identified in Section 7 of the TMDL report, which refers to MPCA's PdT River Watershed Report. The MPCA PdT River Watershed Report identifies the monitoring, assessment and stressor ID work performed in the PdT Watershed. The monitoring, assessment and stressor ID work have identified the practices and geographic areas that should be priorities for implementation. The implementation table that has been developed from this work can be found in the MPCA PdT River Watershed Report. The restoration and protection strategies are outlined below:

· Focus conservation and land management on the floodplain of the PdT River and its major tributaries.
· Focus conservation and land management on the shoreland of lakes and wetlands.
· Promote short and long term water storage at different scales.
· Place special emphasis on comprehensive land and water management within the Dry Wood Creek subwatershed.
· Ensure free passage of fish throughout the watershed.
· Ensure that wastewater treatment plants discharge at or below permit limits.
· Feedlot inspections and BMP promotion.
· Urban BMPs. Encourage cities to enroll in GreenStep program.
· Industrial BMPs.
· Increase septic compliance, especially in shoreland areas.

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

11. Public Participation

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

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

Comments:
Section 9 of the TMDL report discusses public participation. MPCA indicated that the PdT River Association (PdTRA) has completed two TMDLs (bacteria and turbidity[4]) in the past five years. Both of these approved TMDL actions and the TMDLs covered in this submittal have had active stakeholder participation and numerous public meetings. These meeting were as follows:

- In 2011, the PdTRA held several stakeholder meetings at their normal monthly Technical Advisory Committee meetings with respect to impaired waters and implementation practices in the watershed.

[4] MPCA has submitted two additional TMDLs for the PdT watershed which were developed by the PdTRA. On December 7, 2007 EPA approved a bacteria TMDL for the PdT River from Muddy Creek to March Lake segment 07020002-501. On September 21, 2011 EPA approved a TSS TMDL for PdT River from Muddy Creek to March Lake segment 07020002-501.

- In January 2012 Impairments in the neighboring Chippewa River watershed and the PdT River and the approach used to address them were the focus of the meeting held in Benson, Minnesota.
- In the spring of 2012 an overview of the development of the TMDLs was discussed at the PdTRA annual meeting. The TMDLs and restoration and protection strategies to address the TMDLs were the focus of group discussions, and input on the strategies was gathered from the participants.
- The PdTRA also hosted a Citizen's Watershed Academy in early 2012, where citizens of the watershed learned about water biology, impaired waters, and TMDLs. The PdTRA intends to host this academy again in the future to further increase citizen understanding of water quality topics. Through these activities, citizens in the watershed have gained an understanding of and provided input to the development of TMDLs in the watershed.

MPCA held a public comment period on the TMDLs in this submittal from August 18, 2014, to September, 17, 2014. MPCA received two comment letters and one phone call, and responded to these comments. EPA believes these comments were addressed adequately.

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 water body, and the pollutant(s) of concern.

Comment:
The transmittal letter was dated February 23, 2015 from Rebecca J. Flood, Assistant Commissioner, MPCA, to Tinka Hyde, Water Division Director, EPA Region 5. The letter stated that this was a TMDL submittal for final approval of eight TMDLs addressing ten impairments in the Pomme de Terre River Watershed.

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 TMDL for the PdT Watershed satisfies all of the elements of an approvable TMDL. This approval document is for six water body segments

impaired for at least one of the following: turbidity, Fish Bioassessments, E.coli, Aquatic Macroinvertebrate Bioassessments, Dissolved Oxygen, and Nutrient/Eutrophication Biological Indicators as identified in Table 7. There are 10 TMDLs which address impairments from the final approved 2012 Minnesota 303(d) list. EPA's approval of this document 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 CWA Section 303(d) for those waters.

Table 7 Waterbodies covered by this TMDL

Reach	Description	Assessment Unit ID/DNR Lake #	Affected Use	Surrogate Pollutant	Impairment addressed
Pomme de Terre River	Barrett Lake to North Pomme de Terre Lake	07020002-563	Aquatic Life	TP	Fish Bioassessments
Dry Wood Creek	Dry Wood Lake to Pomme de Terre River	07020002-556	Aquatic Life	TSS	Turbidity
Dry Wood Creek	Dry Wood Lake to Pomme de Terre River	07020002-556	Aquatic Recreation		E.coli
Dry Wood Creek	Dry Wood Lake to Pomme de Terre River	07020002-556	Aquatic Life	TP	Aquatic Macroinvertebrate Bioassessments
Dry Wood Creek	Dry Wood Lake to Pomme de Terre River	07020002-556	Aquatic Life	TP	Fish Bioassessments
Dry Wood Creek	Dry Wood Lake to Pomme de Terre River	07020002-556	Aquatic Life	TP TSS	Dissolved Oxygen
North Turtle	Lake or Reservoir	56-0379-00	Aquatic Recreation	TP	Nutrient/Eutrophication Biological Indicators
Christina	Lake or Reservoir	21-0375-00	Aquatic Recreation	TP	Nutrient/Eutrophication Biological Indicators
Perkins	Lake or Reservoir	75-0075-00	Aquatic Recreation	TP	Nutrient/Eutrophication Biological Indicators
Hattie	Lake or Reservoir	75-0200-00	Aquatic Recreation	TP	Nutrient/Eutrophication Biological Indicators

Table 8 Loading Capacity for Pomme de Terre River 07020002-563 for TP

Total Phosphorus	**lbs/day**
Loading Capacity	**45.00**
Wasteload Allocation*	
Wastewater treatment facilities Barrett WWTF	1.77**
Construction and Industrial Stormwater and Industrial Process Wastewater	0.033
Livestock facilities requiring NPDES permits	0
"Straight Pipe" Septic Systems	0
Load Allocation	**40.47**
MOS	**4.5**

*No Communities Subject to MS4 NPDES requirements are located in this reach.
** This facility is not permitted to discharge during the most critical (low flow, late summer) period for the dissolved oxygen stressor.

Table 9: Loading Capacity for TSS and allocations for AUID#07020002-556. Dry Wood Creek (Drywood Lake to Pomme de Terre River)

Total Suspended Solid	**Flow Zones**				
	Very High	High	Mid	Low	Very Low
	Tons per Day				
Loading Capacity	**14.91**	**3.12**	**1.19**	**0.40**	**0.027**
Wastload Allocation*					
Construction and Industrial Stormwater and Industrial Process Wastewater	0.015	0.003	0.001	0.0004	0.00003
Load Allocation	**13.41**	**2.80**	**1.07**	**0.36**	**0.024**
MOS	**1.49**	**0.31**	**0.12**	**0.04**	**0.003**

*No WWTF, NPDES Permitted Feedlots or Communities Subject to MS4 NPDES requirements are located in this reach.

Table 10: Loading Capacity for *E. coli* and allocations for AUID#07020002-556. Dry Wood Creek (Drywood Lake to Pomme de Terre River)

E. coli	**Flow Zones**				
	Very High	High	Mid	Low	Very Low
	Billion Organisms per day				
Loading Capacity	**378**	**96**	**37**	**13**	**1.6**
Wastload Allocation*					
"Straight pipe" Septic Systems	0	0	0	0	0
Load Allocation	**340**	**86**	**33**	**12**	**1.5**
MOS	**38**	**10**	**3.7**	**1.3**	**0.16**

*No WWTF, NPDES Permitted Feedlots or Communities Subject to MS4 NPDES requirements are located in this reach.

Table 11: Loading Capacity for TP and allocations for AUID#07020002-556. Dry Wood Creek (Drywood Lake to Pomme de Terre River)

Total Phosphorus	**Lbs per day**
Loading Capacity	**18.4**
Wasteload Allocation*	
Construction and Industrial Stormwater and Industrial Process Wastewater	0.02
Livestock facilities requiring NPDES permits	0
"Straight Pipe" Septic Systems	0
Load Allocation	**16.54**
MOS	**1.84**

*No WWTF, NPDES Permitted Feedlots or Communities Subject to MS4 NPDES requirements are located in this reach.

Table 12: Loading Capacity for TP and allocations for AUID#56-0379-00 North Turtle Lake

Total Phosphorus	**Lbs per day**
Loading Capacity	**4.85**
Wasteload Allocation*	
Construction and Industrial Stormwater and Industrial Process Wastewater	0.0044
Livestock facilities requiring NPDES permits	0
"Straight Pipe" Septic Systems	0
Load Allocation	**4.37**
MOS	**0.485**

*No Communities Subject to MS4 NPDES requirements are located in this reach.

Table 13: Loading Capacity for TP and allocations for AUID#21-0375-00 Lake Christina

Total Phosphorus	**Lbs per day**
Loading Capacity	**11.9**
Wasteload Allocation*	
Construction and Industrial Stormwater and Industrial Process Wastewater	0.011
Livestock facilities requiring NPDES permits	0
"Straight Pipe" Septic Systems	0
Load Allocation	**10.7**
MOS	**1.19**

*No Communities Subject to MS4 NPDES requirements are located in this reach.

Table 14: Loading Capacity for TP and allocations for AUID#75-0075-00 Perkins Lake

Total Phosphorus	**Lbs per day**	**Lbs/yr**
Loading Capacity	**37.08**	**13,534.2**
Wasteload Allocation*		
Wastewater treatment facilities Ashby WWTF Barrett WWTF	 1.69 1.77	 616.9 646.1
Construction and Industrial Stormwater and Industrial Process Wastewater	0.033	12.05
Livestock facilities requiring NPDES permits	0	0
"Straight Pipe" Septic Systems	0	0
Load Allocation	**29.88**	**10,905.8**
MOS	**3.71**	**1,353.4**

*No Communities Subject to MS4 NPDES requirements are located in this reach.

Table 15: Loading Capacity for TP and allocations for AUID#75-0200-00 Hattie Lake

Total Phosphorus	**Lbs per day**
Loading Capacity	**3.03**
Wasteload Allocation*	
Construction and Industrial Stormwater and Industrial Process Wastewater	0.003
Livestock facilities requiring NPDES permits	0
"Straight Pipe" Septic Systems	0
Load Allocation	**2.727**
MOS	**0.30**

*No Communities Subject to MS4 NPDES requirements are located in this reach.