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

JUN 2 4 2019

REPLY TO THE ATTENTION OF

WW-16J

Glenn Skuta, Division Director
Water Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) and supporting documentation for the Cedar River Watershed (HUC 07010201), and Geneva Lake (HUC 24-0015-00), located in southeastern Minnesota. The headwaters include Cedar, Shell Rock, and Winnebago watersheds within the basin in Mower, Freeborn, Steele, and Dodge Counties.

The Minnesota Pollution Control Agency (MPCA) established 10 Total Suspended Solids (TSS) and 14 *E. coli* TMDLs to address Aquatic Life and Aquatic Recreation Use impairment by sediment and bacteria, respectively, and one TMDL to address excess phosphorus in the lake. These 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 25 TMDLs. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's 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. David Pfeifer, Acting Chief of the Watersheds and Wetlands Branch, at 312-353-9024.

Sincerely,

Joan M. Tanaka

Joan M. Tanaka
Acting Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Bill Thompson, MPCA

wq-iw7-46g

TMDL: Cedar River Watershed Minnesota TMDL
Date: June 2019

DECISION DOCUMENT FOR THE APPROVAL OF THE CEDAR RIVER WATERSHED MINNESOTA TMDL

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

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

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

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

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

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

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

Comment:
The Minnesota Pollution Control Agency (MPCA) has submitted this TMDL, appendices supporting the methodology of TMDL development, and a Watershed Restoration and Protection Strategy (WRAPS). This decision document primarily reviews the TMDL with Appendices, as the WRAPS addresses implementation plans which are not approved or disapproved in the TMDL decision document.

Location Description/Spatial Extent: The TMDL states that the Cedar River Watershed (HUC 07010201) basin is located in southeastern Minnesota and continues south as the Cedar River flows across the Iowa border, into the Iowa River, and eventually into the Mississippi River (Sections 1 and 3.2 of the TMDL). The headwaters of the watershed are located in Minnesota in Mower, Freeborn, Steele, and Dodge Counties. This TMDL, submitted by the MPCA, ends at the Iowa border, but studies were begun in the Charles City, Iowa portion of the watershed and continued northward into portions of the basin in Minnesota, including the town of Austin and Geneva Lake. The Cedar River has pollutant loadings from many rivers, streams and ditches that flow into it, from primarily an agricultural landscape. Section 3.2 of the TMDL also states that there are many dams on the River and tributaries, including upstream of Austin. Table 1 below is from the TMDL submittal and shows tributaries that flow into Cedar River, segments of the Cedar River, and Geneva Lake. The submittal includes 10 TMDLs for Total Suspended Solids (TSS) and 14 TMDLs for bacteria/*E. coli* in Cedar River and tributaries flowing into Cedar River, and one TMDL for excess phosphorus in Geneva Lake (24-0015-00).

Geneva Lake is located in the northwest portion of the Cedar River Watershed within the headwaters of Turtle Creek, not directly connected to Cedar River. The Lake connects with Turtle Creek via a dam in the southeast portion of the lake. The lake is categorized as a shallow lake, with a mean depth of 1.1 meters and maximum of 2.4 meters. A phosphorus TMDL allocation has been completed in the lake for this project.

Land use: Section 3.2 of the TMDL lists land use percentages in the TMDL study area. The watershed consists of 78% row crop agriculture, 3% water/wetlands, 3% urbanized, and 16% developed land and pasture for the remaining land use. The region overall is in the Western Corn Belt Plains Ecoregion (Section 2 of the TMDL). There are four soil types in the basin described as agroecoregions: rolling moraine, level plains, undulating plains, and alluvium and outwash.

- The rolling moraines are in the western portion of the basin, with steep to very steep well-drained fine-textured soils in two-thirds of the agroecoregion and one-third is flat and poorly drained.

- Soils in the level plains are finely textured and generally flat to moderately steep. Two-thirds are poorly drained and one third is well drained, located east of the Cedar River mainstem.
- Further to the east of Cedar River, the undulating plains are fine textured, and primarily located on moderately steep slopes, with a very high density of intermittent streams. Two-thirds of the soils are well drained and one-third poorly drained.
- Alluvium and outwash are either fine grained or course textured, respectively, well drained and located on flat to moderately steep slopes. They are mostly adjacent to rivers and creeks throughout the basin.

Table 1: Cedar River Watershed 303(d) impairments addressed in this report.

Waterbody	HUC12	AUID	Impairment(s)
Cedar River – Rose Cr to Woodbury Cr	JD No. 77 – Cedar River	07080201-501	TSS
Cedar River – Roberts Cr to Upper Austin Dam	Green Valley Ditch & City of Austin–Cedar	07080201-502	TSS
Cedar River – Turtle Cr to Rose Cr	City of Austin–Cedar River	07080201-515	TSS
Unnamed Creek – Unnamed Cr to Rose Cr	Lower Rose Creek	07080201-583	TSS*
Cedar River – Headwaters to Roberts Cr	Headwaters & Green Valley Ditch–Cedar	07080201-503	TSS*/Bact.-*E.coli* Bacteria/*E. coli*
Rose Creek – Headwaters to Cedar R	Upper & Lower Rose Creek	07080201-522	TSS/Bact.-*E.coli* Bacteria/*E. coli*
Unnamed Creek – Unnamed Cr to Cedar R	City of Austin–Cedar River	07080201-533	TSS*/Bact.-*E.coli* Bacteria/*E. coli*
Dobbins Creek – T103 R18W S36, east line to East	Dobbins Creek	07080201-535	TSS/Bact.-*E.coli* Bacteria/*E. coli*
Dobbins Creek – East Side Lk to Cedar R	Dobbins Creek	07080201-537	TSS/Bact.-*E.coli* Bacteria/*E. coli*
Turtle Creek – T102 R18W S4, north line to Cedar R	Turtle Creek	07080201-540	TSS/Bact.-*E.coli* Bacteria/*E. coli*
Orchard Creek – T101 R18W S5, north line to Cedar R	Orchard Creek	07080201-539	Bact.-*E. coli*
Woodbury Creek – Headwaters to Cedar R	Woodbury Creek	07080201-526	Bact.-*E. coli*
Otter Creek – Headwaters to MN/IA border	Otter Creek	07080201-517	Bact.-*E. coli*
Little Cedar River -- Headwaters to MN/IA border	Village Of Meyer–Little Cedar River	07080201-518	Bact.-*E. coli*
Cedar River – Dobbins Cr to Turtle Cr	City of Austin–Cedar River	07080201-514	Bact.-*E. coli*
Cedar River – Woodbury Cr to MN/IA border	Town of Otranto–Cedar River	07080201-516	Bact.-*E.coli*
Wolf Creek – Headwaters to Cedar R	City of Austin–Cedar River	07080201-510	Bact.-*E. coli*
Roberts Creek – Unnamed Cr to Cedar R	Roberts Creek	07080201-504	Bact.-*E. coli*
Geneva Lake	Geneva Lake	24-0015-00	Excess Nutrients/ Eutrophication

*Denotes AUIDs with a conclusive TSS stressor to biota, all resulting in MIBI impairments.

Problem Identification: The Executive Summary of the TMDL states that there are many hydrologic changes that have occurred over time in the watershed affecting all the contaminants addressed in this TMDL. The rivers are impaired for aquatic life and aquatic recreation use due to TSS and bacteria; the lake is impaired for aquatic life and aquatic recreation use due to excess phosphorus and lake eutrophication.

There are additional problems identified by MPCA but not addressed in this TMDL (Appendix I of the TMDL). Macro-invertebrates and fish are impaired based on measurements of several indices, and their stressors are bedded sediment and flow alteration. There is not a strong link developed between low DO and phosphorus loading in the watershed, but that link is suspected; another segment has phosphorus loading without a strong link to macroinvertebrate impairment due to no definitive dataset to develop the linkage (Section 1.1 of the TMDL). These impairments will remain on the Section 303(d) list of impaired waters until additional data and information is gathered.

TSS – The Executive Summary states that 58% of flood peaks in the Cedar River near Austin are from spring runoff, though the seven highest peaks have occurred outside of that timeframe. TSS loads at the highest flows are often 80-90% higher than the standards for the contaminant. Section 3.3 states that there are 23 publicly-administered, but privately owned, drainage systems (ditches) in the Cedar River Watershed, and many more ditches not publicly administered. The ditches and townships are identified in the TMDL in Section 3.3.3.

MPCA has established a strong link in three of the impaired waterbodies that the TSS stressor (Table 1 above) has impaired the biota and will be addressed if the TSS loads are reduced. The excess TSS degrades the streambeds, and causes endangerment of normal aquatic biota, including changing the species composition, propagation, or migration in the aquatic environment.

Bacteria – Bacteria enters the system through the tributaries at all flow intervals. Overall, Section 4.3.15 of the TMDL states that 86% of the river miles of the Cedar River in Minnesota are impaired for bacteria. The Cedar River impairment by *E. coli* (and historic fecal coliform, adjusted to equivalent *E. coli* values), indicators for pathogenic bacteria, exceeded both chronic and maximum water quality standards (Section 2 of the TMDL). At some larger river sites, flow regimes have an even distribution of exceedences. Some locations have higher bacteria concentrations at high and low flow regimes but not at mid-flows. MPCA was not able to make strong conclusions for bacterial contamination trends due to the small datasets at some sites.

Phosphorus - Excess phosphorus in Geneva Lake is due to the primarily agricultural row crop land use of the area around the lake. It is a shallow nutrient-enriched lake with both internal and external loading of phosphorus, located in the headwaters of the Turtle Creek subwatershed. Geneva Lake has high biological significance and the Department of Natural Resources (DNR) has identified both rare species and those of greatest conservation need. Therefore, the lake has a formal designation for its "primary wildlife use and benefit" under Minn. Stat 97A.101, subd. 2. With this designation, the DNR manipulates the Geneva Lake dam to change lake levels in order to decrease tolerant rough fish populations and increasing aquatic vegetation. After the decrease in fish through this biomanipulation (or kill event), the rough fish biomass increases over time and has a negative effect on the lake, with the rough fish population returning to previous levels after about a three- to five-year period. There was a major fish kill event in 2006-2007 which included drawdown of the water level and addition of a fish toxicant to kill more rough fish (Section 4.4 of the TMDL).

Pollutants of Concern: Pollutants of concern are TSS, *E. coli* and phosphorus. TMDLs are developed for TSS, *E. coli*, and phosphorus, respectively.
Source Identification: Section 3.3 of the TMDL describes overall watershed patterns over the years that contribute to the increase of contaminants as well as provides an overview of sources and relationships of flows and loads. The overall flow duration characteristics have a considerably

higher flow rate in the flow regimes compared to historical records. The Cedar River at Austin shows a 20-year average percent runoff statistical increase from 20% to about 34%.

Potential nonpoint sources for TSS, bacteria and phosphorus include:

- row crop agriculture,
- ditches/channelization/artificial drainage,
- poorly vegetated ravines and gullies,
- inadequate buffers,
- livestock in riparian zones,
- impervious surfaces,
- feedlots,
- individual sewage treatment systems (ISTS), and
- natural bacterial growth.

Of these nonpoint sources above, the influence of natural background is not definitive. Livestock is estimated at over 130,000 units, primarily swine at 77% of the total animal units. Phosphorus nonpoint source loading at Geneva Lake is from internal sources (internal lake loading), external sources (row crop agriculture), and atmospheric deposition.

Permitted point sources for TSS and bacteria include (from Section 3.3.2 of the TMDL):

- industrial and municipal wastewater treatment facilities (Table 8 below),
- construction and industrial wastewater,
- communities subject to MS4 requirements (Table 9 below), and
- Concentrated Animal Feeding Operation (Table 10 below).

Table 5. Permitted wastewater treatment plants in the Cedar River Watershed

Facility	NPDES Number	Discharge
Adams WWTP	MN0021261	Continuous
Arkema Inc	MN0041521	Continuous
Austin WWTP	MN0022683	Continuous
Blooming Prairie WWTP	MN0021822	Continuous
Brownsdale WWTP	MN0022934	Controlled
Elkton WWTP	MNG580013	Controlled
Hollandale WWTP	MN0048992	Controlled
Hormel Foods Corp/Quality Pork Proc. SD003	MN0050911	Continuous
Hormel Foods Corp/Quality Pork Proc. SD004	MN0050911	Continuous
Lansing Township WWTP	MN0063461	Controlled
Lyle WWTP	MN0022101	Controlled
Oakland Sanitary District WWTP	MN0040631	Controlled
Rose Creek WWTP	MN0024651	Controlled
Sargeant WWTP	MNG580214	Controlled
Waltham WWTP	MN0025186	Controlled

Table 9: Contributing MS4 area for each AUID

AUID	Name	Reach Description	Contributing Area, sq. mi.	Austin MS4 Area, sq. mi.	Austin MS4 Area, %
07080201-501	Cedar River	Rose Cr to Woodbury Cr	543.00	12.0	2.2
07080201-502	Cedar River	Roberts Cr to Upper Austin Dam	182.72	0.1	0.1
07080201-503	Cedar River	Headwaters to Roberts Cr	119.01	0.0	0.0
07080201-504	Roberts Creek	Unnamed cr to Cedar R	39.12	0.0	0.0
07080201-510	Wolf Creek	Headwaters to Cedar R	11.81	0.9	7.7
07080201-514	Cedar River	Dobbins Cr to Turtle Cr	243.95	6.6	2.7
07080201-515	Cedar River	Turtle Cr to Rose Cr	405.92	11.3	2.8
07080201-516	Cedar River	Woodbury Cr to MN/IA border	585.61	12.0	2.1
07080201-517	Otter Creek	Headwaters to MN/IA border	37.94	0.0	0.0
07080201-518	Little Cedar River	Headwaters to MN/IA border	47.82	0.0	0.0
07080201-522	Rose Creek	Headwaters to Cedar R	67.87	0.0	0.0
07080201-526	Woodbury Creek	Headwaters to Cedar R	42.00	0.0	0.0
07080201-533	Unnamed creek	Unnamed cr to Cedar R	5.22	0.0	0.0
07080201-535	Dobbins Creek	T103 R18W S36, east line to East Side Lk	37.51	1.3	3.4
07080201-537	Dobbins Creek	East Side Lk to Cedar R	38.41	2.1	5.6
07080201-539	Orchard Creek	T101 R18W S5, north line to Cedar R	31.88	0.7	2.2
07080201-540	Turtle Creek	T102 R18W S4, north line to Cedar R	153.00	3.4	2.2
07080201-583	Unnamed creek	Unnamed cr to Rose Cr	9.36	0.0	0.0

Table 10: Concentrated Animal Feeding Operation (CAFO) in the Cedar River Watershed, by HUC 11 subwatersheds.

Registration	Permit	Name	County	Township	T	R	S	AU	PS	C
07080201010 - Middle Fork Cedar River										
039-82079	MNG440956	Nick Masching Farm	Dodge	Westfield	105	18	12	1632	Swine	Y
039-112217	MNG441019	Jason Masching Farm	Dodge	Westfield	105	18	12	1440	Swine	Y
039-82084	MNG441024	Jim & Becky Masching Farm	Dodge	Westfield	105	18	15	1068	Swine	Y
039-125531	MNG441506	Jason & Kory Masching Farm	Dodge	Hayfield	105	17	33	990	Swine	Y
07080201020 - Roberts Creek										
099-83037	MNG441324	Todd M Hoeting Farm	Mower	Waltham	104	17	30	816	Swine	Y
07080201030 - Upper Cedar River										
099-60649	MN0069485	Bob Bartel Farm Sec 22	Mower	Udolpho	104	18	22	1920	Bovine	N
099-50007	MNG440065	Nielsen Farm Albert Lea	Mower	Lansing	103	18	20	1080	Swine	Y
147-50001	MNG440093	MJC Farms	Steele	Blooming Prairie	105	19	12	775	Swine	Y
047-96968	MNG441076	Johnson Finisher	Freeborn	Newry	104	19	29	900	Swine	Y
039-113809	MNG441149	Shane Masching Farm	Dodge	Westfield	105	18	7	1440	Swine	Y
099-100193	MNG441197	Dobbins Creek	Mower	Dexter	103	16	16	1333	Swine	Y
039-82082	MNG441462	Maple Lane Pork	Dodge	Westfield	105	18	15	840	Swine	Y
039-50003	MNG440322	Shane Masching Farm - Sec 8	Steele	Westfield	105	18	8	1080	Swine	Y
07080201040 - Turtle Creek										
047-96942	MN0070351	Scott Thompson Farm - Sec 2	Freeborn	Moscow	103	19	2	1165	Bovine	N
047-50005	MNG440205	Son D Max	Freeborn	Newry	104	19	21	1569	Swine	Y
047-50007	MNG440258	MHF of Freeborn County Inc - Farrowing	Freeborn	Newry	104	19	35	5539	Swine	Y
047-96991	MNG440258	MHF of Freeborn County Inc - Nursery	Freeborn	Newry	104	19	36	813	Swine	Y
047-96993	MNG440258	Dennis Magnuson Farm - Sec 35 NW	Freeborn	Newry	104	19	35	241	Swine	Y
047-50008	MNG440259	Dennis Magnuson Farm - Sec 23	Freeborn	Newry	104	19	23	2505	Swine	Y
047-68633	MNG440492	G & B Hog Farm	Freeborn	Moscow	103	19	1	1200	Swine	Y
047-111170	MNG440976	James O'Connor Feedlot	Freeborn	Newry	104	19	3	1440	Swine	Y
047-96951	MNG440740	Hanson Hog Farm	Freeborn	Bath	104	21	22	900	Swine	Y
07080201050 - Rose Creek										
099-50001	MNG440072	Geoff Stroup Hog Barns	Mower	Windom	102	17	15	1200	Swine	Y
099-83464	MNG440475	Yunker Farms	Mower	Marshall	102	16	20	1600	Swine	Y
099-93975	MNG440949	Justin Larson Farm - Sec 30	Mower	Marshall	102	16	10	840	Swine	Y
07080201065 - Lower Cedar River										
047-60153	MNG440206	Lukes Brothers Inc	Freeborn	London	101	19	12	2467	Swine	Y
099-63267	MNG440643	Hormel Foods Corporation - Austin Plant	Mower	Lansing	103	18	35	3625	Swine	Y
099-110100	MNG440941	The Santos Group - Kingston	Mower	Lyle	101	18	30	1096	Swine	Y
07080201075 - Otter Creek										
099-50002	MNG440068	David Reuter Farm	Mower	Nevada	101	17	22	1320	Swine	Y
099-50008	MNG440201	Steven Felten Farm	Mower	Nevada	101	17	11	1508	Swine	Y
099-83642	MNG441220	Jax Dairy Farm Inc	Mower	Nevada	101	17	25	1526	Bovine	N
099-83694	MNG441220	Jamie Jax Farm	Mower	Nevada	101	17	25	215	Bovine	N
07080201240 - Little Cedar River										
099-80380	MNG440450	John & Lori Smith Farm	Mower	Adams	101	16	20	1890	Swine	Y
099-100204	MNG440374	Gerald & Marlys Gerber Farm	Mower	Adams	101	16	13	1440	Swine	Y
099-115272	MNG441334	R & S Industries	Mower	Marshall	102	16	20	1440	Swine	Y
099-83048	MNG440466	James K Sathre Farm	Mower	Marshall	102	16	25	1200	Swine	Y
No CAFOs have been identified in: 07080201060 - West Beaver Creek, 07080201085 - Elk River, 07080201095 - Deer Creek										

TSS - As stated previously, 78% of the land use is row crop agriculture. About 40% of the sediment is from near channel sources. The area is heavily ditched and channelized, with initial construction occurring from 1900-1930; these modifications are all considered nonpoint sources but contribute to higher velocities, higher peak flow, and can increase peak rate of runoff downstream. Artificial drainage may dampen peaks but exacerbate overall volume. MPCA details other studies related to the contribution of snowmelt runoff to riverine sources of sediment, and instability of channels make it difficult to reach equilibrium when other anthropogenic modifications are made. Both sediment and phosphorus delivery can be affected by these anthropogenic influences.

The resultant TSS transport and delivery specific to the study area are described in Section 4.2.12 as erosion from streambanks and streambeds, sheets and rills, ravines and gullies, and concentrated flow in riparian zones, impervious areas, channelization of steams and overgrazed pasture near surface waters. There may be significant localized inputs, including the influence of algae to TSS downstream of reservoirs and impoundments.

Bacteria - Section 4.3.15 of the TMDL states that the overall bacterial loading from nonpoint sources is 75% of the total load under moderate flow conditions but can occur under all flow conditions; in the Cedar River nonpoint loading can be as high as 85% of the total load under higher flow conditions. In the entire Cedar River in Minnesota, nonpoint source loading contributes 50% or more to the total loading. Sources of bacteria from the nonpoint sources are from livestock feedlots, overgrazed pastures near surface waters, and runoff from fields with applied manure. There is also contribution from improperly treated human sewage from failing septics, impervious areas, and persistence of bacteria in streams and algal mats, of which any of these sources can be very significant on a localized scale.

The Austin WWTP is a significant point source under very low flow conditions. The contribution may be 66% of the loading due to the discharge from this point source.

Phosphorus - Section 4.4 of the TMDL states that sources of phosphorus in the lake are both external loading from row crop agricultural land use and internal sources. Though Geneva Lake is natural, there have been many manmade modifications in the area adjacent to and connected to the lake. There are discharges to the lake from upgradient catchments, streams and ditches which discharge into an upper bay of the lake. There is a reclaimed pond in the upper bay of the lake separated from the lake by a roadbed and culvert; the pond is hydrologically connected to the lake but does not mix with the lake as it should and was not included as part of the lake surface area for modeling purposes. The modification of water levels and lack of mixing in this shallow waterbody as described earlier in this document also add to the internal concentration of phosphorus.

Priority Ranking: Section 1.2 of the TMDL states that the priority ranking is in the TMDL schedule included in Minnesota's 303(d) list, but also the TMDL priorities are aligned with Minnesota's watershed approach and the WRAPS cycle. Minnesota also developed the TMDL Priority Framework Report to meet EPA's national measure and the Long-Term Vision. The impaired segments will be addressed by TMDLs by 2022 as part of the MPCA's prioritization plan.

Future growth: Section 4.5 of the TMDL states that in the future new nonpoint sources will have to comply with the LA provided in this TMDL and will need to prevent additional soil or sediment delivery to the system. As point sources may add TSS to future loads, their discharges may also add assimilative capacity beyond that which is required to offset the additional TSS load. Even though these point sources may meet standards due to the additional capacity, there remains additional loading of the contaminant, as well as the point sources having a greater impact under low flow conditions. MPCA will take these new or expanding wastewater discharges into account as it renews these permits (Section 4.5.2 of the TMDL submittal).

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

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

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

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

<u>Comment:</u>
Designated Use: Section 2 of the TMDL submittal states that all waters have protected beneficial uses in Minnesota and are assigned classes. The Cedar River use is aquatic life and recreation classified as 2B and 2C according to Minn. R. ch. 7050.0470.

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

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.

Geneva Lake has Class 2C use classification as well as Class 3C according to Minn. R. 7050.0223, subp. 4:

Class 3C waters. The quality of Class 3C waters of the state shall be such as to permit their use for industrial cooling and materials transport without a high degree of treatment being necessary to avoid severe fouling, corrosion, scaling, or other unsatisfactory conditions.

Rivers/Streams TSS Standards – The Standards Section 2 of the TMDL states that a **TSS concentration of 65 mg/L shall be exceeded no more than 10% of the time (April 1 through September 30).** Previous standards were for turbidity and current standards are for TSS. Minn. R. 7050.0222. Minnesota has completed the TMDL for TSS. MPCA noted that TSS is comprised of volatile suspended solids (organic portion) and the remaining sediment being non-organics, dominated by silts, clays, and fine sand particles.

Rivers/Streams Bacteria Standards - The standard for bacteria in Class 2B waters is: Minn. R. ch. 7050.0222, *E. coli* water quality standard for class 2B and 2C waters. *E. coli* shall not exceed **126 organisms per 100 milliliters as a geometric mean** of not less than five samples in any calendar month, **nor shall more than ten percent of all samples** taken during any calendar month individually **exceed 1,260 organisms per 100 milliliters**. The standard applies **between April 1 and October 31**. The river segment was originally listed for impairment by fecal coliform but in 2008 the standards were changed to the *E. coli* indicator used for development of this TMDL, using a regression equation for the conversion to *E. coli* when needed; MPCA believes this conversion is reasonable due to the relatively strong relationship between the two parameters.

Lake Phosphorus Standards – standards for lakes in Minnesota were revised in 2008. Minn. R. chs. 7050.0150 and 7050.0222. Geneva Lake is categorized as shallow (mean depth 1.1 meters, maximum depth 2.4 meters) and located in the Western Corn Belt Plains ecoregion. The lake eutrophication standard is comprised of three different concentration parameters which may not be exceeded, using summer averages from June 1 through September 30: **Phosphorus ≤ 90 µg/L, chlorophyll-*a* ≤ 30 µg/L, and Secchi depth ≥ 0.7meters.**

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

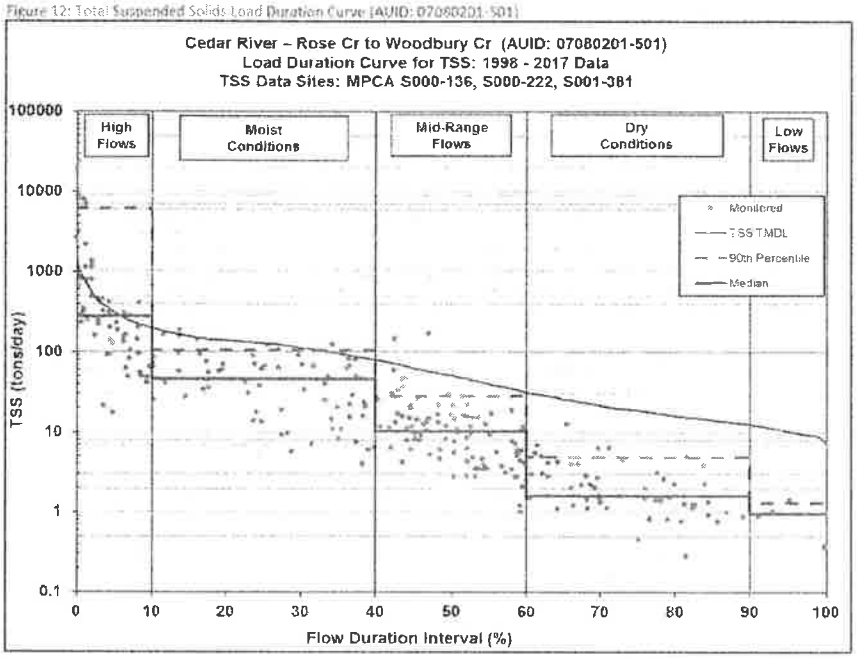
TMDLs must take into account *critical conditions* for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source 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:
The Loading Capacities for each contaminant are discussed in Section 4 of the TMDL submittal and are shown in the Tables at the end of this document. The Load Duration Curve (LDC) approach was used for TSS and *E. coli* in the streams and rivers, and two models are used for Geneva Lake.

Rivers/Streams TSS Methodology – The load duration curve approach was used for developing the TSS TMDL (Section 4.3 of the TMDL). First, continuous flow data are required and reflect a range of natural occurrences from extremely high flows to extremely low flows. Figure 12 from the TMDL submittal below shows the TSS water quality data points from one of the Assessment Units of the Cedar River Watershed combined with the flow duration curve. The sites and years of data collection are included within the plot. The various sampling locations are added to the curve and it can be determined which sites contribute loads above or below the average daily flow curve (cfs). The highest turbidity readings generally occur in high flow conditions in this example, not indicative of the entire watershed. The datapoints are the observed values, and many of the TSS points do not exceed the TMDL curve except at high flows. Some locations have much more data where continuous turbidity monitoring was used. Using the appropriate conversion factors to get a TSS load-based allocation, achievement of the resultant TMDL will result in water quality standards being attained. The final step is to determine where reductions need to occur, to achieve values that all occur below the curve.

Sources are attributed to both wet-weather (nonpoint) and dry-weather (point) events. Using the load duration curve approach allows MPCA to determine which implementation practices are most effective for reducing TSS loads based on flow regime. For example, if loads are significant during storm events, as shown in this location below in Figure 12, implementation efforts can target those BMPs that will most effectively reduce storm water run-off. This allows for a more

Figure 12: Total Suspended Solids Load Duration Curve (AUID: 07080201-501)



efficient implementation effort. The load duration curve is a cost-effective TMDL approach, while still addressing the reductions necessary to meet WQS for turbidity. The approach also aids in sharing the responsibility among various sources in the TMDL watershed, which encourages collective implementation efforts.

Weaknesses of the TMDL analysis are that nonpoint source load allocations were not assigned to specific sources within the watershed. However, EPA believes the weaknesses are outweighed by the strengths of the TMDL approach and is appropriate based upon the information available. If TSS levels do not meet WQS in response to implementation efforts, the TMDL strategy may be amended as new information on the watershed is developed, to better account for sources contributing to the impairment and determining where reductions in the Cedar River watershed are most appropriate.

TSS values were calculated using conversion factors determined using regressions from turbidity measurements, as well as Secchi tube and transparency tube measurements. Appendix A from the

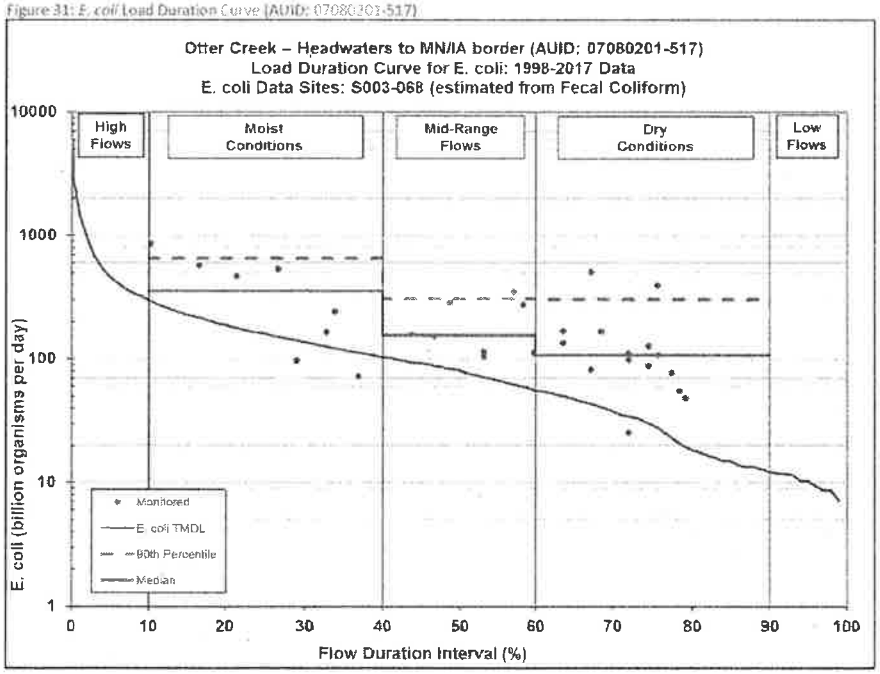
TMDL includes Table A-2 incorporated by reference, showing the turbidity/TSS and Secchi tube/TSS relationships, sources of data, and R^2 values.

Rivers/Streams Bacteria Methodology - Section 4.3 of the TMDL states that the load duration curve methodology was used for *E. coli* TMDLs as well as TSS TMDLs. Each of the five flow conditions (high, wet, mid-range, dry, and low) data are then multiplied by the *E. coli* standard of 126 cfu/100 ml. The LA is calculated by subtracting MOS and WLA from the TMDL. Note the example below in Figure 31 taken from the TMDL has exceedences of the TMDL curve under dry and low flow conditions and non-precipitation events on the right side of the plot, as well as at high flow conditions such as storm runoff on the left side of the plot. The TMDL approach is based upon the premise that all discharges (point and non-point) must meet the WQS when entering the waterbody. If all sources are meeting the WQS at discharge, then the waterbody will meet the WQS and the designated use. The plots show under what flow conditions the water quality exceedences occur.

In 2008 *E. coli* standards replaced fecal coliform. Calculations were performed to reach equivalent *E. coli* values from older fecal coliform samples, as shown below taken from Appendix A of the TMDL.

$$\text{E. coli concentration (equivalents)} = 1.80 \times (\text{Fecal Coliform Concentration})^{0.81}$$

Figure 31: *E. coli* Load Duration Curve (AUID: 07080201-517)



Lake Phosphorus Methodology - Phosphorus allocation in the lake was determined by using several models, including the Hydrologic Simulation Program FORTRAN (HSPF) and the Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) (Section 4.4 of the TMDL).

MINLEAP was used to determine the TP loading capacity for Geneva Lake (Table 57 of this Decision Document). The model estimates water and nutrient budgets and phosphorus loading, using reference data from regional lakes and Canfield Bachmann sedimentation modeling. The weakness of the approach overall is that very shallow lakes are difficult to model, and the approach does not explicitly account for internal loading from sediments or rough fish populations that disturb bottom sediment.

HSPF was used to determine loads and yields for the entire watershed, with resultant simulated data from 1996 through 2012. Water runoff, total phosphorus load, TSS load, and total nitrogen load were determined. The modeled output for Geneva Lake included two subwatersheds located within the total watershed that were modeled: 1) the drainage going into the lake at the west side of the upper bay through Freeborn County Ditch 8; and, 2) the immediate watershed surrounding the lake.

Upland subwatersheds modeled in HSPF yielded in-lake concentrations below standards for phosphorus loading. The calibration module in MINLEAP was then used to determine the TP that matched the current existing seasonal average in-lake TP (99 µg/L), and the reduction needed to reach the target concentration (90µg/L). If the TP target is achieved, it is expected that the chlorophyll *a* and Secchi depth will be met.

Critical Conditions
TSS: Section 4.1.3 of the TMDL states that the critical condition for TSS is reflected in the standards applying from April through September. These are open water months when important stages for biotic life in streams and riverbeds need to be considered. Excessive sediment transport and delivery into stream channel substrates is a significant stressor to the well-being of aquatic life.

Bacteria: For watershed contributions to the bacteria impairment in the river, Section 4.1.3 states that the critical condition is April through October, when humans and pets use the waters for primary contact recreational use, as well as being the timeframe when the standards apply. Generally, the critical condition is in wet weather conditions.

Under dry conditions there is contribution from improperly treated human sewage from failing septics, impervious areas, and persistence of bacteria in streams and algal mats, of which any of these sources can be very significant on a localized scale. Further, delivery potential from this source is high where manure is spread and where tiling exists. Section 4.3.15 of the TMDL submittal states that the highest WLA (66% of the loading capacity) for bacteria in the Cedar River is under very low stream flows due to the Austin WWTF and five other WWTFs in this AUID (-514). Standards are exceeded under all flow regimes except low flow where samples were not collected.

Phosphorus: Section 4.1.3 of the TMDL states that the critical condition for phosphorus is July and August. This is a portion of the growing season when low flow conditions result in higher concentration of contaminants in water due to nutrient runoff. Section 4.1.4 of the TMDL submittal states that the higher phosphorus, combined with higher temperatures in air and water, contribute to high variation in DO and higher frequency of algal blooms.

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

4. Load Allocations (LAs)

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

Comment:
The Load Allocations are as shown in the Tables at the end of this document. EPA finds MPCA's approach for calculating the LA to be reasonable and consistent with EPA guidance. Loading from nonpoint sources was calculated by subtracting the WLA and MOS from the loading capacity.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning 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 permitees 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 identifies point sources discharging the pollutants of concern in the Cedar River watershed and Geneva Lake. Tables 16 – 52 below show the individual WLAs by permittee. Note some reaches have no dischargers in the segment. The individual permittee wasteload values are then added for each AU's total WLA and is included in the TMDL tables at the end of this document. MPCA determined the *E. coli* WLAs by multiplying the 126 cfu/100ml geometric mean portion of the WQS by the permitted flow from each facility. For TSS, MPC noted that wastewater dischargers have two possible effluent limits for TSS – 30 mg/L for mechanical systems, and 45 mg/L for pond systems (Section 4.1.1 of the TMDL). The WLAs for TSS were calculated by multiplying the permitted effluent limit (30 mg/L or 45 mg/L by the permitted flow for each facility. For MS4s, the WLAs were determined based upon the areal coverage under the stormwater permit. In other words, if a MS4 covered 10% of the drainage area, then 10% of the runoff load was assigned to the MS4 (Section 4.1.1 of the TMDL).

MPCA calculated a categorical WLA for TSS and phosphorus for construction and industrial stormwater (Section 4.1.1 of the TMDL). The WLA is based upon an approximation of acreage currently under a stormwater permit. MPCA determined the WLA for these sources to be 0.05% of the LA. The WLAs are contained in Tables 17-31 and Table 57 at the end of this document. MPCA noted that WLAs for bacteria from construction and industrial stormwater were not determined, as the state expects runoff from these sources to not contain bacteria.

TSS

Cedar River – Rose Creek to Woodbury Creek

Table 16: Wastewater treatment facilities and associated WLAs (AUID: 07080201-501)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Austin WWTP	MN0022683	8.475	962.4	1.06
Blooming Prairie WWTP	MN0021822	0.899	102.1	0.113
Brownsdale WWTP	MN0022934	1.377	234.5	0.259
Elkton WWTP	MNG580013	0.163	27.8	0.0306
Hollandale WWTP	MN0048992	0.386	65.8	0.0725
Hormel Foods	MN0050911	1.448	164.4	0.181
Rose Creek WWTP	MN0024651	0.401	68.3	0.0753
Lansing TWP WWTP	MN0063461	0.204	34.7	0.0382
Oakland SD WWTP	MN0040631	0.088	15.0	0.0165
Sargeant WWTP	MNG580214	0.081	13.9	0.0153
Arkema Inc.	MN0041521	0.063	7.15	0.00789
Waltham WWTP	MN0025186	0.139	23.6	0.0260

Cedar River – Roberts Creek to Upper Austin Dam

Table 18: Wastewater treatment facilities and associated WLAs (AUID: 07080201-502)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Blooming Prairie WWTP	MN0021822	0.899	102.1	0.113
Brownsdale WWTP	MN0022934	1.377	234.5	0.259
Lansing TWP WWTP	MN0063461	0.204	34.7	0.0382
Sargeant WWTP	MNG580214	0.081	13.9	0.0153
Arkema Inc.	MN0041521	0.063	7.15	0.00789
Waltham WWTP	MN0025186	0.139	23.6	0.0260

Cedar River – Turtle Creek to Rose Creek

Table 20: Wastewater treatment facilities and associated WLAs (AUID: 07080201-515)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Austin WWTP	MN0022683	8.475	962.4	1.06
Blooming Prairie WWTP	MN0021822	0.899	102.1	0.113
Brownsdale WWTP	MN0022934	1.377	234.5	0.259
Hollandale WWTP	MN0048992	0.386	65.8	0.0725
Hormel Foods	MN0050911	1.448	164.4	0.181
Lansing TWP WWTP	MN0063461	0.204	34.7	0.0382
Oakland SD WWTP	MN0040631	0.088	15.0	0.0165
Sargeant WWTP	MNG580214	0.081	13.9	0.0153
Arkema Inc.	MN0041521	0.063	7.15	0.00789
Waltham WWTP	MN0025186	0.139	23.6	0.0260

Cedar River – Headwaters to Roberts Creek

Table 23: Wastewater treatment facilities and associated WLAs (AUID: 07080201-503)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Blooming Prairie WWTP	MN0021822	0.899	102.1	0.113
Arkema Inc.	MN0041521	0.063	7.15	0.00789
Waltham WWTP	MN0025186	0.139	23.6	0.0260

Rose Creek – Headwaters to Cedar River

Table 25: Wastewater treatment facilities and associated WLAs (AUID: 07080201-522)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Elkton WWTP	MNG580013	0.163	27.8	0.0306
Rose Creek WWTP	MN0024651	0.401	68.3	0.0753

Turtle Creek – T102 R18W S4, north line to Cedar River

Table 30: Wastewater treatment facilities and associated WLAs (AUID: 07080201-540)

Facility	NPDES Permit #	Discharge, mgd	TSS WLA, kg/day	TSS WLA, tons/day
Hollandale WWTP	MN0048992	0.386	65.8	0.0725
Oakland SD WWTP	MN0040631	0.088	15.0	0.0165

Bacteria

Cedar River – Woodbury Cr to MN/IA border

Table 32: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-516)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Austin WWTP	MN0022683	8.475	40.42
Blooming Prairie WWTP	MN0021822	0.899	4.29
Brownsdale WWTP	MN0022934	1.374	6.55
Elkton WWTP	MNG580013	0.163	0.78
Hollandale WWTP	MN0048992	0.387	1.85
Rose Creek WWTP	MN0024651	0.400	1.91
Lansing Township WWTP	MN0063461	0.205	0.98
Oakland Sanitary District WWTP	MN0040631	0.088	0.42
Sargeant WWTP	MNG580214	0.082	0.39
Waltham WWTP	MN0025186	0.139	0.66

Cedar River – Headwaters to Roberts Creek

Table 34: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-503)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Blooming Prairie WWTP	MN0021822	0.899	4.29
Waltham WWTP	MN0025186	0.139	0.66

Rose Creek - Headwaters to Cedar River

Table 36: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-522)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Elkton WWTP	MNG580013	0.163	0.78
Rose Creek WWTP	MN0024651	0.400	1.91

Turtle Creek – T102 R18W S4, north line to Cedar River

Table 41: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-540).

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Hollandale WWTP	MN0048992	0.387	1.85
Oakland Sanitary District WWTP	MN0040631	0.088	0.42

Otter Creek – Headwaters to MN/IA border

Table 45: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-517)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Lyle WWTP	MN0022101	1.579	7.53

Little Cedar River – Headwaters to MN/IA border

Table 47: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-518)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Adams WWTP	MN0021261	0.278	1.33

Cedar River – Dobbins Creek to Turtle Creek

Table 49: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-514)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Austin WWTP	MN0022683	8.475	40.42
Blooming Prairie WWTP	MN0021822	0.899	4.29
Brownsdale WWTP	MN0022934	1.374	6.55
Lansing Township WWTP	MN0063461	0.205	0.98
Sargeant WWTP	MNG580214	0.082	0.39
Waltham WWTP	MN0025186	0.139	0.66

Roberts Creek – Unnamed Creek to Cedar River

Table 52: Wastewater treatment facilities and associated bacteria WLAs (AUID: 07080201-504)

Facility	NPDES Permit #	Discharge, mgd	WLA (Billion organisms/day)
Brownsdale WWTP	MN0022934	1.374	6.55
Sargeant WWTP	MNG580214	0.082	0.39

MS4s account for 0 – 6.9% of the needed reduction per reach, and in some cases there are several aggregated MS4 values per segment AU. The table below is a summary of reach locations and percent of the total loading capacity allocated within those reaches. Reaches are not included if there are no MS4s in that reach.

Summary of MS4 percentage contribution in assessment units

contaminant	location	AUID 07080201-	Percent of reach allocated to MS4
TSS	Cedar River - Rose Cr to Woodbury Cr	501	1.6%
TSS	Cedar River - Roberts Cr to Upper Austin Dam	502	0.1%
TSS	Cedar River - Turtle Cr to Rose Cr	515	1.9%
TSS	Cedar River -Woodbury Cr to MN/IA border	516	1.5%
TSS	Dobbins Creek - T103 R18W S36, east line to East Side Lk	535	3.1%
TSS	Dobbins Creek - East Side Lk to Cedar R	537	5.0%
TSS	Turtle Creek - T102 R18W S4, north line to Cedar R	540	1.9%
Bacteria	Cedar River - Woodbury Cr to MN/IA border	516	1.2%
Bacteria	Dobbins Creek - T103 R18W S36, east line to East Side Lk	535	3.1%
Bacteria	Dobbins Creek - East Side Lk to Cedar R	537	5.0%
Bacteria	Turtle Creek - T102 R18W S4, north line to Cedar R	540	1.9%
Bacteria	Orchard Creek - T101 R18W S5, north line to Cedar R	539	2.0%
Bacteria	Cedar River - Dobbins Cr to Turtle Cr	514	0.7%
Bacteria	Wolf Creek - Headwaters to Cedar R	510	6.9%

EPA finds MPCA's approach for calculating the WLA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning 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:
Section 4.1.2 of the TMDL states that the MOS for all three contaminants is an explicit 10% in the Cedar River Watershed. This value is chosen as a conservative level because some locations have lower sample size, or there is difficulty with sampling such that all flow conditions cannot always be considered. The MOS provides an adequate accounting of uncertainty, and the WWTFs generally meet their operating conditions and permit limits.

EPA finds MPCA's approach for calculating the WLA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning 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:
Section 4.1.3 of the TMDL states that for the rivers, streams, and lake, sources varied seasonally. Allocations also varied seasonally to reflect changes from stream loads and concentrations under different flow and loading conditions. Using the LDC methodology accounts for variability in flow using five flow regimes: from high flows, such as flood events, to low flows, such as baseflow. TSS and bacteria loading was evaluated at actual flow conditions and was presented using five flow conditions to allow for the varied conditions and to assist in the best use of BMPs at the local levels. The focus and monitoring of TSS and bacteria is also focused on the season that is most important for runoff potential and for human contact, April through September, and April through October, respectively. Nutrient loading to the lake using HSPF and MINLEAP also considered precipitation and runoff conditions that included data from 1996 through 2012.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning 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.

Comment:
Section 7 of the TMDL submittal states that there is reasonable assurance that the TMDL will be implemented. There is a WRAPS document providing NPS implementation strategies for impaired waters that was approved on May 24, 2019. Local governments are working on plans under the "One Watershed, One Plan" effort to coordinate, streamline and prioritize what the various watersheds can do to improve land management and water quality. Some of the work has taken place over the past decade, including efforts by Mower Soil and Water Conservation District (SWCD) to increase watershed district capacity through funding and engineering assistance. Minnesota Statute 103D establishes watershed districts and watershed management project guidelines, and functions with other entities to reduce NPS pollution. Funding has been provided by the Natural Resource Conservation Service (NRCS) and Farm Service Agency, the Board of Water and Soil Resources (BWSR), the State of Minnesota, the Hormel Foundation, and National Wildlife Federation.

MPCA points out that significant work has been done on the hydrology and water quality in the CRW via its Capital Improvement Project (CIP). The CIP has 25 projects in the rural watersheds with the objective of reducing peak flows from 40-70% through implementation projects; the objective for the Lower Cedar River is 8% reduction, with a long-term target of 20% at Austin. The CRWD had a targeted watershed grant for hydrology and erosion control from the BWSR for various basin projects through 2018, as well as another BWSR Clean Water Assistance grant through 2019. Streamside buffer laws in Minnesota have been passed and have good compliance rates. There is also funding for compliance of Subsurface Sewage Treatment Systems (SSTS) including upgrades and inspections.

The Clean Water Legacy Act (CWLA) was passed in Minnesota for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed to protect, enhance, and restore water quality in Minnesota. The CWLA outlines how MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources.

The CWLA also provided details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop WRAPS. The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (*Chapter 114D.26*; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (*Chapter 114D.26*, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table and are considered "priority areas" under the WRAPS process (*Watershed Restoration and Protection Strategy Report Template,* MPCA). https://www.pca.state.mn.us/sites/default/files/wq-ws4-03.docx). This Table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the action. MPCA has developed guidance on what is required in the WRAPS. As stated above, Section 7 of the TMDL states that a WRAPS was completed as a companion document to this TMDL https://www.pca.state.mn.us/sites/default/files/wq-ws4-59a.pdf.

In an update described in this TMDL, Minnesota voters approved the CWLA amendment in 2008, which increased the state sales and use tax rate by three-eighths of 1% on all taxable sales, starting July 1, 2009, and continuing through 2034. Approximately one third of the funds have been dedicated to a Clean Water Fund to, "protect, enhance, and restore water quality in lakes, rivers, streams, and groundwater, with at least 5% of the fund targeted to protect drinking water sources." (MPCA 2014). Funding for implementation is also available through other nonpoint source programs and the 319 funding mechanism.

EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:
Section 5 of the TMDL states that the lake and stream segments will be monitored using a nested watershed design with aggregation of watersheds from coarse to fine scale. MPCA also will monitor trends at specific waterbodies: Turtle Creek, and the Cedar River, through its Watershed Pollutant Load Monitoring Program. Specialized monitoring will occur at eight sites by local staff and the State, and will occur on the Cedar River, Dobbins Creek, and Rose Creek, as well as other tributaries. Biological monitoring will occur at Roberts Creek and Woodbury Creek. Other recommendations for the future are included in this Section of the TMDL and state that since TSS is a significant stressor in this watershed, surveys should continue to include transportation factors, linkage to stream geomorphology, modeling, and terrain evaluation, as well as rates and locations of erosion.

EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
Section 6 of the TMDL includes an overview of the implementation strategy for sediment, bacteria, and phosphorus reduction and reflects many entities working together. The point sources would primarily be complying with their permit limits to maintain water quality. The nonpoint sources would be reviewing implementation options on an agroecoregion basis with a focus on the best methods to reduce contaminants based on the soil type and topography. The four ecoregions in the study area are alluvium and outwash, level plains, rolling moraine, and undulating plains. The Best Management Practices (BMPs) and focus for each ecoregion are:

- Alluvium and outwash – use nutrient management practices associated with animal agriculture;

- Level plains – control soil erosion by water and sediment delivery using conservation tillage and grassed filter strips; fertilizer management using soil tests;
- Rolling moraine – control sediment and phosphorus using crop residue, replace tile intakes, use buffer strips, and have grass easements, inject manure, use soil testing to determine fertilizer; and,
- Undulating plains – use conservation tillage, grass easements, animal and manure management such as exclusion of livestock from streams and manure management as above, and rotationally grazed pastures, and encouraging vegetation growth.

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:
The TMDL was public noticed from March 4, 2019 to April 3, 2019. Copies of the draft TMDL were made available upon request and on the Internet web site: https://www.pca.state.mn.us/water/total-maximum-daily-load-tmdl-projects and appendices at https://www.pca.state.mn.us/sites/default/files/wq-iw7-46f.pdf.

The City of Austin provided comments to the MPCA during the public comment period. The concerns and responses were that:

- anti-degradation will be addressed, and provides that the permittee will submit information for prevention, treatment or loading offsets;
- a request for information on streamlining the process for expanding dischargers was provided;
- MPCA clarified why certain assessment units were a focus compared with other segments that were also impaired. Those reasons included prioritization because of convergence of

tributaries, the segment's ongoing monitoring, and the effects or influence of the City of Austin's discharge on the segment;

- MPCA provided details that the Cedar River is impaired for segment -515 due to nitrate-nitrogen, TP, low DO, and TSS, as well as the other segments impaired for TP and low DO. The Cedar River is not listed as impaired based on the River Eutrophication Standard (RES) because the response variables (chlorophyll-a, DO and DO variability) were at acceptable levels, though the identified causes (TP, etc.) had elevated values.
- Both point and nonpoint sources are addressed in the One Water One Plan approach. There are seasonal complexities of both point and nonpoint source contributions. MPCA recognizes that upstream nonpoint sources are a concern, but the effluent limits on point sources are important as well, especially under low flow conditions.

The comments were adequately addressed by MPCA and are included with the final TMDL submittal. MPCA also adequately addressed US EPA comments.

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

12. Submittal Letter

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

Comment:
The EPA received the final Cedar River Watershed TMDL on May 29, 2019, accompanied by a submittal letter dated May 28, 2019. In the submittal letter, MPCA stated that the submission includes the final TMDL for Cedar River addressing TSS, bacteria (*E. coli*) and lake eutrophication (total phosphorus) impairments.

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

13. Conclusion

After a full and complete review, EPA finds that the TSS, *E. coli*, and phosphorus TMDLs for the Cedar River Watershed satisfy all of the elements of approvable TMDLs.
This approval is for 10 TSS and 14 *E. coli* TMDLs (in rivers and streams), and one phosphorus TMDL (in the lake) impairing aquatic life and recreational use.

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

Table 17: Total Suspended solids loading capacities and allocations (AUID: 07080201-501)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	311.95	128.56	50.80	18.65	10.26
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1.89	1.89	1.89	1.89	1.89
Austin City MS4	6.18	2.52	0.97	0.33	0.16
Construction and Industrial Stormwater	0.14	0.057	0.022	0.0074	0.0037
Load Allocation	272.57	111.23	42.84	14.56	7.17
Margin of Safety	31.20	12.86	5.08	1.87	1.03
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1%	1%	4%	10%	19%
Austin City MS4	2.0%	2.0%	1.9%	1.8%	1.6%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.04%
Load Allocation	87%	87%	84%	78%	70%
Margin of Safety	10%	10%	10%	10%	10%

Table 19: Total suspended solids loading capacities and allocations (AUID: 0708020[illegible])

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	129.79	36.17	17.15	7.00	2.72
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.46	0.46	0.46	0.46	0.46
Austin City MS4	0.10	0.03	0.01	0.005	0.002
Construction and Industrial Stormwater	0.06	0.016	0.007	0.0029	0.0010
Load Allocation	116.20	32.05	14.95	5.83	1.99
Margin of Safety	12.98	3.62	1.71	0.70	0.27
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	1%	3%	7%	17%
Austin City MS4	0.1%	0.1%	0.1%	0.1%	0.1%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.04%
Load Allocation	90%	89%	87%	83%	73%
Margin of Safety	10%	10%	10%	10%	10%

Table 21: Total suspended solids loading capacities and allocations (AUID_07080201-515).

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	233.22	96.11	37.98	13.94	7.67
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1.79	1.79	1.79	1.79	1.79
Austin City MS4	5.81	2.37	0.90	0.30	0.14
Construction and Industrial Stormwater	0.10	0.042	0.016	0.0054	0.0026
Load Allocation	202.20	82.30	31.47	10.46	4.97
Margin of Safety	23.32	9.61	3.80	1.39	0.77
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1%	2%	5%	13%	23%
Austin City MS4	2.5%	2.5%	2.4%	2.2%	1.9%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.03%
Load Allocation	87%	86%	83%	75%	65%
Margin of Safety	10%	10%	10%	10%	10%

Table 22: Total suspended solids loading capacities and allocations (AUID: 07080201-535)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	6.43	2.25	1.13	0.41	0.14
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Austin City MS4	0.00	0.00	0.00	0.00	0.00
Construction and Industrial Stormwater	0.003	0.001	0.001	0.0002	0.0001
Load Allocation	5.79	2.03	1.02	0.37	0.13
Margin of Safety	0.64	0.23	0.11	0.04	0.01
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Austin City MS4	0.0%	0.0%	0.0%	0.0%	0.0%
Construction and Industrial Stormwater	0.05%	0.05%	0.05%	0.05%	0.05%
Load Allocation	90%	90%	90%	90%	90%
Margin of Safety	10%	10%	10%	10%	10%

Table 24: Total suspended solids loading capacities and allocations (AUID: 07080201-503)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	84.53	23.56	11.17	4.56	1.77
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.15	0.15	0.15	0.15	0.15
Austin City MS4	0.00	0.00	0.00	0.00	0.00
Construction and Industrial Stormwater	0.04	0.011	0.005	0.0020	0.0007
Load Allocation	75.89	21.05	9.90	3.95	1.45
Margin of Safety	8.45	2.36	1.12	0.46	0.18
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	1%	1%	3%	8%
Austin City MS4	0.0%	0.0%	0.0%	0.0%	0.0%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.04%
Load Allocation	90%	89%	89%	87%	82%
Margin of Safety	10%	10%	10%	10%	10%

Table 26. Total suspended solids loading capacities and allocations (AUID: 07080201-522)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	46.64	16.34	8.20	3.00	1.05
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.11	0.11	0.11	0.11	0.11
Austin City MS4	0.00	0.00	0.00	0.00	0.00
Construction and Industrial Stormwater	0.02	0.007	0.004	0.0013	0.0004
Load Allocation	41.85	14.59	7.27	2.59	0.84
Margin of Safety	4.66	1.63	0.82	0.30	0.11
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	1%	1%	4%	10%
Austin City MS4	0.0%	0.0%	0.0%	0.0%	0.0%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.04%
Load Allocation	90%	89%	89%	86%	80%
Margin of Safety	10%	10%	10%	10%	10%

Table 27. Total suspended solids loading capacities and allocations (AUID: 07080201-553)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	3.59	1.26	0.63	0.23	0.08
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Austin City MS4	0.00	0.00	0.00	0.00	0.00
Construction and Industrial Stormwater	0.002	0.001	0.0003	0.0001	0.00004
Load Allocation	3.23	1.13	0.57	0.21	0.07
Margin of Safety	0.36	0.13	0.06	0.02	0.01
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Austin City MS4	0.0%	0.0%	0.0%	0.0%	0.0%
Construction and Industrial Stormwater	0.05%	0.05%	0.05%	0.05%	0.05%
Load Allocation	90%	90%	90%	90%	90%
Margin of Safety	10%	10%	10%	10%	10%

Table 28. Total suspended solids loading capacities and allocations (AUID: 07080201-555)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	25.78	9.03	4.53	1.66	0.58
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Austin City MS4	0.79	0.28	0.14	0.05	0.02
Construction and Industrial Stormwater	0.01	0.004	0.002	0.0007	0.0003
Load Allocation	22.40	7.85	3.94	1.44	0.50
Margin of Safety	2.58	0.90	0.45	0.17	0.06
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Austin City MS4	3.1%	3.1%	3.1%	3.1%	3.1%
Construction and Industrial Stormwater	0.05%	0.05%	0.05%	0.05%	0.05%
Load Allocation	87%	87%	87%	87%	87%
Margin of Safety	10%	10%	10%	10%	10%

Table 29: Total suspended solids loading capacities and allocations (AUID: 07080201-537)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	26.40	9.25	4.64	1.70	0.59
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Austin City MS4	1.33	0.47	0.23	0.09	0.03
Construction and Industrial Stormwater	0.01	0.004	0.002	0.0008	0.0003
Load Allocation	22.42	7.86	3.94	1.44	0.50
Margin of Safety	2.64	0.92	0.46	0.17	0.06
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Austin City MS4	5.0%	5.0%	5.0%	5.0%	5.0%
Construction and Industrial Stormwater	0.05%	0.05%	0.05%	0.05%	0.05%
Load Allocation	85%	85%	85%	85%	85%
Margin of Safety	10%	10%	10%	10%	10%

Table 31: Total suspended solids loading capacities and allocations (AUID: 07080201-547)

	Flow Zone				
	High	Moist	Mid	Dry	Low
	Tons/day				
TOTAL DAILY LOADING CAPACITY	94.36	34.45	18.64	7.26	2.60
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.09	0.09	0.09	0.09	0.09
Austin City MS4	1.89	0.69	0.37	0.14	0.05
Construction and Industrial Stormwater	0.04	0.015	0.008	0.0032	0.0011
Load Allocation	82.90	30.21	16.30	6.30	2.20
Margin of Safety	9.44	3.45	1.86	0.73	0.26
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	1%	3%
Austin City MS4	2.0%	2.0%	2.0%	2.0%	1.9%
Construction and Industrial Stormwater	0.04%	0.04%	0.04%	0.04%	0.04%
Load Allocation	88%	88%	87%	87%	85%
Margin of Safety	10%	10%	10%	10%	10%

Bacteria Allocations

Table 33: Bacteria loading capacities and allocations (AUID: 07080201-516)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	5916.93	2438.25	963.54	353.75	194.52
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	58.25	58.25	58.25	58.25	58.25
Communities Subject to MS4 NPDES Requirements	108.29	43.92	16.63	5.35	2.40
Load Allocation	5158.70	2092.26	792.30	254.78	114.42
Margin of Safety	591.69	243.82	96.35	35.37	19.45
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1%	2%	6%	16%	30%
Communities Subject to MS4 NPDES Requirements	1.8%	1.8%	1.7%	1.5%	1.2%
Load Allocation	87%	86%	82%	72%	59%
Margin of Safety	10%	10%	10%	10%	10%

Table 35. Bacteria loading capacities and allocations (AUID: 07080201-503)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	1486.53	414.27	196.40	80.18	31.17
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	4.95	4.95	4.95	4.95	4.95
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	1332.93	367.90	171.81	67.21	23.11
Margin of Safety	148.65	41.43	19.64	8.02	3.12
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.3%	1.2%	2.5%	6.2%	15.9%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	89.7%	88.8%	87.5%	83.8%	74.1%
Margin of Safety	10.0%	10.0%	10.0%	10.0%	10.0%

Table 37. Bacteria loading capacities and allocations (AUID: 07080201-522)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	820.10	287.37	144.26	52.78	18.47
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	2.69	2.69	2.69	2.69	2.69
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	735.41	255.95	127.15	44.81	13.94
Margin of Safety	82.01	28.74	14.43	5.28	1.85
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	1%	2%	5%	15%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	90%	89%	88%	85%	75%
Margin of Safety	10%	10%	10%	10%	10%

Table 38. Bacteria loading capacities and allocations (AUID: 07080201-532)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	63.13	22.12	11.10	4.06	1.42
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	56.81	19.91	9.99	3.66	1.28
Margin of Safety	6.31	2.21	1.11	0.41	0.14
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	90%	90%	90%	90%	90%
Margin of Safety	10%	10%	10%	10%	10%

Table 39: Bacteria loading capacities and allocations (AUID: 07080201-535)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	453.31	158.84	79.74	29.17	10.21
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	13.88	4.86	2.44	0.89	0.31
Load Allocation	394.10	138.09	69.32	25.36	8.87
Margin of Safety	45.33	15.88	7.97	2.92	1.02
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	3.1%	3.1%	3.1%	3.1%	3.1%
Load Allocation	87%	87%	87%	87%	87%
Margin of Safety	10%	10%	10%	10%	10%

Table 40: Bacteria loading capacities and allocations (AUID: 07080201-537)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	464.19	162.65	81.65	29.87	10.45
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	23.34	8.18	4.11	1.50	0.53
Load Allocation	394.43	138.21	69.38	25.38	8.88
Margin of Safety	46.42	16.27	8.17	2.99	1.05
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	5.0%	5.0%	5.0%	5.0%	5.0%
Load Allocation	85%	85%	85%	85%	85%
Margin of Safety	10%	10%	10%	10%	10%

Table 42: Bacteria loading capacities and allocations (AUID: 07080201-540)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	1659.32	605.88	327.73	127.72	45.72
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	2.27	2.27	2.27	2.27	2.27
Communities Subject to MS4 NPDES Requirements	33.20	12.09	6.52	2.51	0.87
Load Allocation	1457.92	530.93	286.17	110.17	38.01
Margin of Safety	165.93	60.59	32.77	12.77	4.57
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	1%	2%	5%
Communities Subject to MS4 NPDES Requirements	2.0%	2.0%	2.0%	2.0%	1.9%
Load Allocation	88%	88%	87%	86%	83%
Margin of Safety	10%	10%	10%	10%	10%

Table 43: Bacteria loading capacities and allocations (AUID: 07080201-539)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	385.22	134.98	67.76	24.79	8.67
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	7.63	2.67	1.34	0.49	0.17
Load Allocation	339.07	118.81	59.64	21.82	7.64
Margin of Safety	38.52	13.50	6.78	2.48	0.87
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	2.0%	2.0%	2.0%	2.0%	2.0%
Load Allocation	88%	88%	88%	88%	88%
Margin of Safety	10%	10%	10%	10%	10%

Table 44: Bacteria loading capacities and allocations (AUID: 07080201-526)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	507.57	177.85	89.28	32.66	11.43
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	456.81	160.07	80.35	29.40	10.29
Margin of Safety	50.76	17.79	8.93	3.27	1.14
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	90%	90%	90%	90%	90%
Margin of Safety	10%	10%	10%	10%	10%

Table 46: Bacteria loading capacities and allocations (AUID: 07080201-517)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	458.44	160.64	80.64	29.50	10.32
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	7.53	7.53	7.53	7.53	7.53
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	405.07	137.04	65.04	19.02	1.76
Margin of Safety	45.84	16.06	8.06	2.95	1.03
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	2%	5%	9%	26%	73%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	88%	85%	81%	64%	17%
Margin of Safety	10%	10%	10%	10%	10%

Table 48: Bacteria loading capacities and allocations (AUID: 07080201-518)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	577.84	202.48	101.64	37.19	13.01
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1.33	1.33	1.33	1.33	1.33
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	518.73	180.90	90.15	32.14	10.38
Margin of Safety	57.78	20.25	10.16	3.72	1.30
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	1%	1%	4%	10%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	90%	89%	89%	86%	80%
Margin of Safety	10%	10%	10%	10%	10%

Table 50: Bacteria loading capacities and allocations (AUID: 07080201-514)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	2464.80	1015.69	401.38	147.36	81.03
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	53.29	53.29	53.29	53.29	53.29
Communities Subject to MS4 NPDES Requirements	58.47	23.25	8.32	2.14	0.53
Load Allocation	2106.55	837.58	299.63	77.19	19.10
Margin of Safety	246.48	101.57	40.14	14.74	8.10
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	2.2%	5.2%	13.3%	36.2%	65.8%
Communities Subject to MS4 NPDES Requirements	2.4%	2.3%	2.1%	1.5%	0.7%
Load Allocation	85.5%	82.5%	74.7%	52.4%	23.6%
Margin of Safety	10.0%	10.0%	10.0%	10.0%	10.0%

Table 51: Bacteria loading capacities and allocations (AUID: 07080201-510)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	142.75	50.02	25.11	9.19	3.21
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0.00	0.00	0.00	0.00	0.00
Communities Subject to MS4 NPDES Requirements	9.84	3.45	1.73	0.63	0.22
Load Allocation	118.64	41.57	20.87	7.63	2.67
Margin of Safety	14.27	5.00	2.51	0.92	0.32
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
Communities Subject to MS4 NPDES Requirements	6.9%	6.9%	6.9%	6.9%	6.9%
Load Allocation	83%	83%	83%	83%	83%
Margin of Safety	10%	10%	10%	10%	10%

Table 53: Bacteria loading capacities and allocations (AUID: 07080201-504)

	Flow Zone				
	Very High	High	Mid	Low	Very Low
	Billion Organisms/day				
TOTAL DAILY LOADING CAPACITY	472.74	165.65	83.16	30.42	10.65
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	6.94	6.94	6.94	6.94	6.94
Communities Subject to MS4 NPDES Requirements	0.00	0.00	0.00	0.00	0.00
Load Allocation	418.52	142.14	67.90	20.44	2.64
Margin of Safety	47.27	16.56	8.32	3.04	1.06
	Percent of total daily loading capacity				
TOTAL DAILY LOADING CAPACITY	100%	100%	100%	100%	100%
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	1%	4%	8%	23%	65%
Communities Subject to MS4 NPDES Requirements	0.0%	0.0%	0.0%	0.0%	0.0%
Load Allocation	89%	86%	82%	67%	25%
Margin of Safety	10%	10%	10%	10%	10%

Table 57: Geneva Lake Total Phosphorus Loading Capacity and Allocations

Allocation	Seasonal TP, lbs/day
TMDL	45.2
Margin of Safety	4.52
Atmospheric Load	2.30
Construction and Industrial Stormwater	0.0192
Loading Allocation (internal and external)	38.4