2024 Addendum to the South Dakota Mercury TMDL

Scott Lake

1.0 Introduction

The South Dakota Department of Agriculture and Natural Resources (SDDENR) adopted the Statewide Mercury Total Maximum Daily Load (TMDL) in 2016. The Statewide Mercury TMDL currently has 79 Assessment Units (AUs) covered under its most recent addition. While 70 AUs originate from the original Mercury TMDL, the remaining nine AU's come from addendums such as this one. Those addended waterbodies include Sheriff Dam, Clubhouse Lake, James River (segment 8), Stockade, Sheridan, Potts, Stink, Durkee, and East Lemmon Lake. The SDDANR currently seeks coverage for an additional waterbody to be covered under the original Statewide Mercury TMDL in accordance with Section 303(d) of the Clean Water Act (CWA). With the previous TMDL, two previous addenda, and this current addition, 80 AUs are to be covered under the Statewide Mercury TMDL. This addendum does not modify any aspect of the Statewide Mercury TMDL and the allocations and TMDL remain as presented in the original Statewide Mercury TMDL (in kilograms per year [Kg/yr]).

Annual Statewide Mercury TMDL Calculation

TMDL (595.32 Kg/yr) = WLA (4.84 Kg/yr) + LA (590.48 Kg/yr) + MOS (implicit)

Refer to Section 10.0 of the original TMDL for more information on how the SDDANR calculated the annual and daily load (3.21 Kilograms per day [Kg/day]). This addendum includes information specific to a single AU in South Dakota that was identified as impaired on the 2024 section of the 303(d) list within the Integrated Report. Figure 1 shows the location of the waterbody. Table 2 identifies the AU in addition to the acreage of the waterbody. Fish tissue samples collected from this AU exhibited methylmercury concentrations exceeding the 0.3 milligrams per Kilogram (mg/Kg) human health criteria identified in the Administrative Rules of South Dakota (ARSD) Chapter 74:51:01 Appendix B. Please note that any reference to "mercury in fish or mercury in fish tissue" in this addendum refers to the organic form of mercury known as methylmercury.

For a waterbody to be determined as impaired for mercury in fish tissue for lakes and streams within South Dakota, a minimum of 10 fish tissue samples are required for assessment. At least three fish tissue samples per species is required. There is no minimum number of sampling events, and all data within 10 years of the most recent Integrated Report (IR) will be used. The

composite mean result of each fish species will be compared to Water Quality Criteria (WQC). If any species mean composite result exceeds the WQC, or if a fish consumption advisory has been advised it will be considered non-supporting.

Refer to the original, approved TMDL document for details related to the overall methods and assumptions used in establishing the South Dakota Statewide Mercury TMDL. For coverage under the Statewide Mercury TMDL, a waterbody must meet the following conditions in Table 1.

Table 1. Displays the assumptions necessary for a waterbody to be placed within the South Dakota Mercury TMDL

#	Description	Report Section
1.	It falls entirely within state jurisdiction.	2.0 Jurisdiction
2.	If jurisdiction is shared, it may only apply to those portions of the water under South Dakota jurisdiction.	2.0 Jurisdiction
3.	The standard-length fish (SLF) tissue methylmercury concentration from the water does not exceed 0.878 mg/Kg.	3.0 Comparable Existing Conditions
4.	There are no potential impacts from current or historic gold mining processes.	4.1 Mining
5.	If it is a river or stream, National Pollutant Discharge Elimination System (NPDES) discharges do not exceed permitted limits.	4.3 NPDES Permitted Sources
6.	The Total Maximum Daily Load (TMDL) will meet the water quality in the proposed water.	3.0 Comparable Existing Conditions 6.0 Water Quality Standards
7.	The original TMDL assumptions (e.g., source contributions, loading capacity, etc.) are still valid.	3.0 Comparable Existing Conditions 4.0 Source Assessment - Point Sources 5.0 Source Assessment - Nonpoint Sources 6.0 Water Quality Standards

The third condition expresses a fish flesh methylmercury cap of 0.878 mg/Kg. This was the maximum concentration observed from a SLF within Bitter Lake in the original TMDL (2016). As a direct result, any waterbody with a SLF fish flesh concentration exceeding this benchmark is void from coverage under the Statewide Mercury TMDL and will need to be addressed under a waterbody specific TMDL report.

This addendum demonstrates that the AU shown in Table 2 satisfies each of the conditions described above, and in doing so, falls under the coverage of the original South Dakota Mercury TMDL.

Table.2 Proposed waterbodies to be added to the South Dakota Mercury TMDL

Assessment Unit ID	Common Name	Acres/Miles in EPA ADP
SD-BS-L-SCOTT_01	Scott Lake	80.27

2.0 Jurisdiction

Scott Lake is within the jurisdiction of the State of South Dakota. Figure 1 shows locations of Tribal Lands and Reservations with respect to the waterbody listed in this addendum. The jurisdictional location of Scott Lake allows the state of South Dakota to manage it for the benefit of the public. It also provides the necessary authority needed for restoring it to full attainment of all the lake's designated beneficial uses.

Scott Lake Location

(For State Jurisdiction Regarding Hg Impaired Waterbodies)

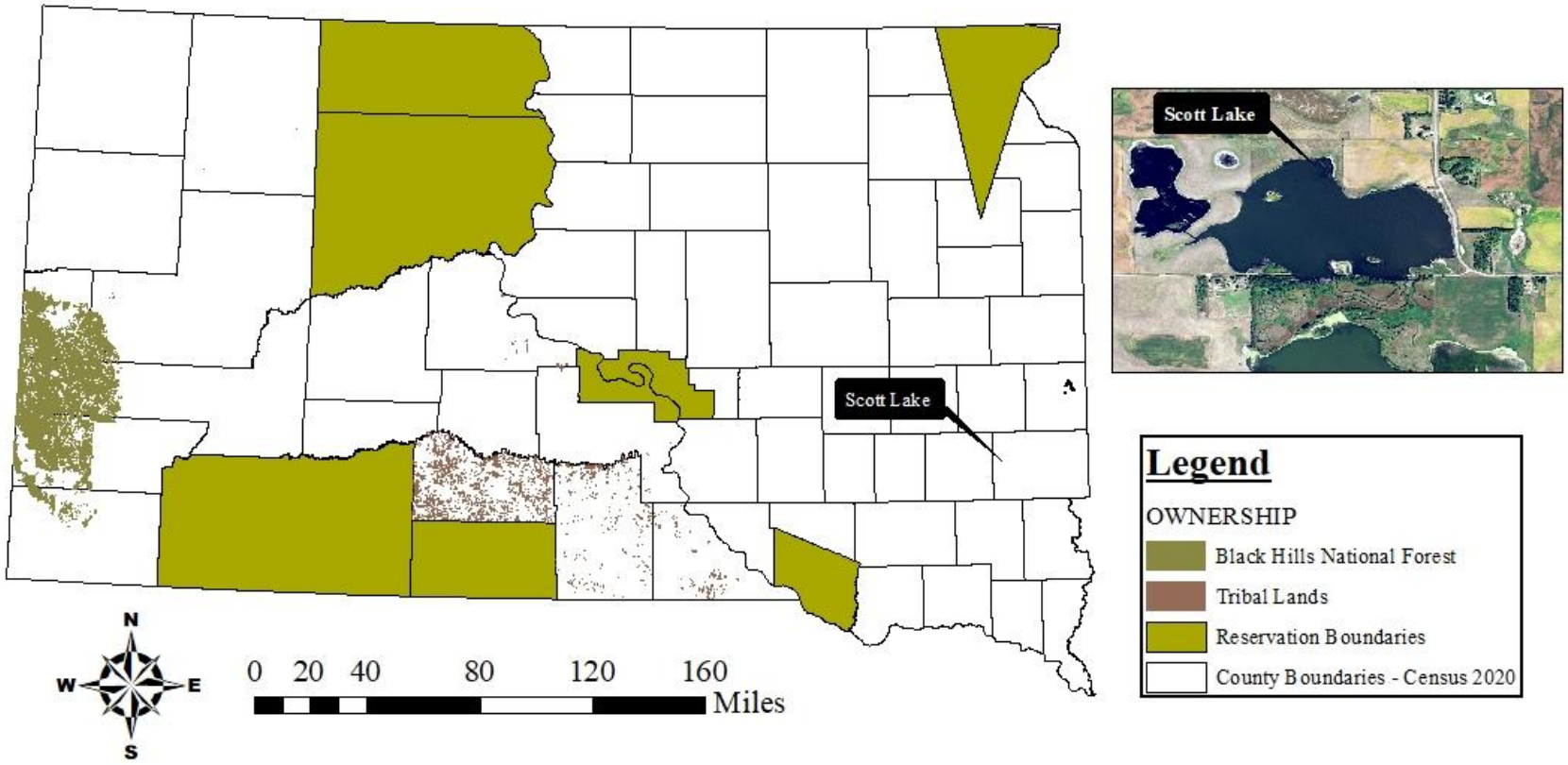


Figure 1. Location of Scott Lake in relation to Tribal Lands and Reservations in South Dakota

3.0 Comparable Existing Conditions

To determine the applicability of the South Dakota Mercury TMDL for additional waterbodies, a review of existing conditions must be completed. This review discusses fisheries, loadings analysis, and potential sources, both point and nonpoint that were similarly discussed as part of the original TMDL.

3.1 Fishery

Scott Lake is an 80.27-acre lake situated in Minnehaha County, South Dakota. It is considered a high-priority waterbody due to mercury impairment and has a maximum depth of 11 feet. To determine reductions for waterbodies within the state of South Dakota, the methylmercury concentration in a standard-length fish was used as the benchmark (or standard) to which all waterbodies can be compared. The most commonly targeted species for anglers in South Dakota are Walleye (*Sander vitreus*) and the standard length was determined to be 15.1 inches or approximately 384 millimeters. For more information on how these assumptions were generated, reference the original Statewide Mercury TMDL.

Figures 2 and 3 detail the distribution of mercury concentrations in fish species sampled from Scott Lake, further supported by Appendix A, which catalogues individual methylmercury data for these fish. A fish of standard length (15.1 inches) from Scott Lake adhering to the methylmercury criteria limit of 0.878 mg/kg aligns with the requirements set forth in the third and sixth conditions of the Statewide TMDL. While Scott Lake's fish demonstrate methylmercury levels below the 0.878 mg/Kg criteria, it's important to note that the average concentration still surpasses the specific water quality criterion of 0.3 mg/kg for Scott Lake. This suggests that while the lake's current status does not fully meet all local water quality criteria, it is compliant with statewide mercury reduction goals. Implying that although there is an exceedance of Scott Lake's specific water quality criteria, the overall strategies from the original TMDL and reduction measures are effective in moving towards water quality standard attainment.

Moving from a general overview to a focused analysis, we now turn our attention specifically to Walleye in Scott Lake. Figure 2 focuses on mercury concentrations in standard length fish (SLF) from the lake, marked by a red dashed line. This illustration shows that while these levels surpass the EPA's 0.3 mg/kg criterion, they remain under the 0.878 mg/kg SLF threshold set for other waterbodies, thus meeting the third specified condition.

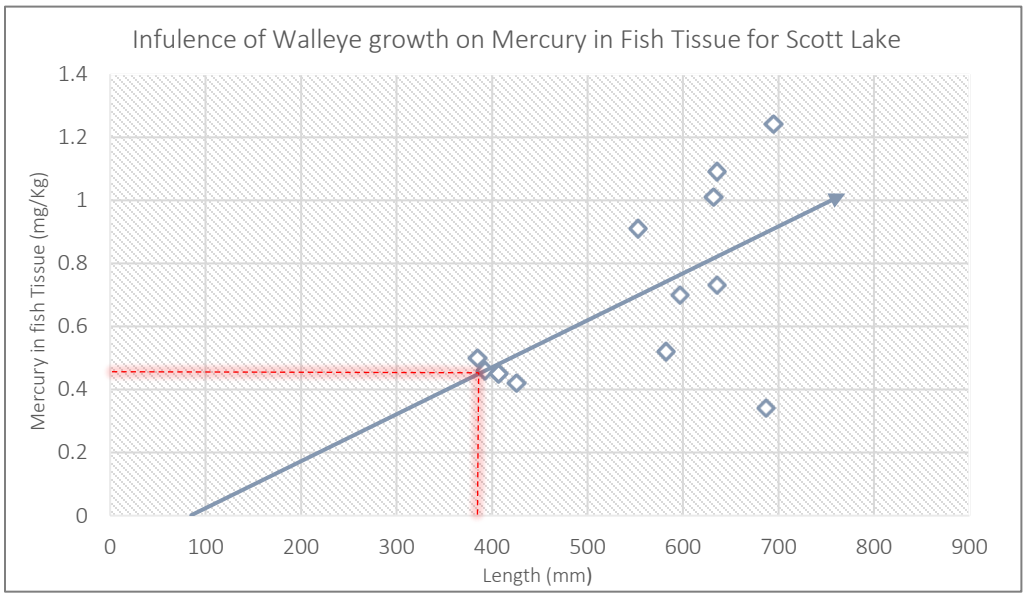
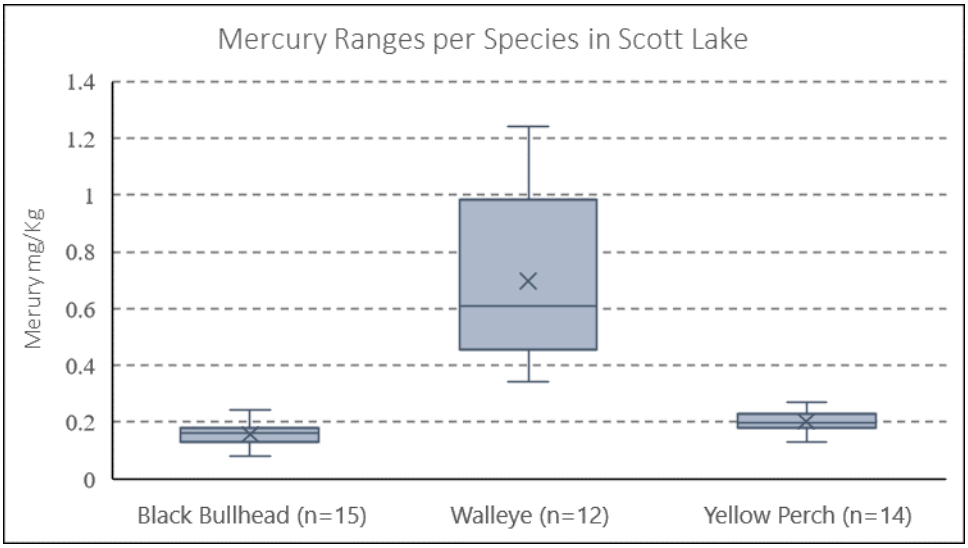


Figure 2. Scott Lake Mercury (mg/Kg) Concentrations vs Length (mm).
A linear regression line has been drawn showing the approximate trend of mercury in Walleye as fish grow. Red dashed lines intersect the regression line to represent how much mercury a SLF from Scott Lake would be expected to possess.

The mercury results from two other Scott Lake species differ significantly from Walleye (Figure 3). Both Black Bullhead and Yellow Perch sit below the 0.3 mg/Kg mercury impairment criteria. Black Bullheads are opportunistic feeders with a diet consisting of macroinvertebrates and other food sources that are at or near the base of the food chain (Leunda, et al., 2008) leading to a lower bioaccumulation rate. While it is true that Yellow Perch are piscivorous as adults, the Yellow Perch in South Dakota prey on other food items as well. A South Dakota food habits study on Yellow Perch demonstrated that the fast growth of Yellow Perch was attributed to a diet consisting of aquatic insects including chironomids, amphipods, and corixids (Lott, et al., 2011). These aquatic insects and crustaceans are lower in the food chain then bait fish and don't bioaccumulate mercury as quickly. This could be one reason why Yellow Perch in Scott Lake do not have a larger range of mercury within fish flesh.



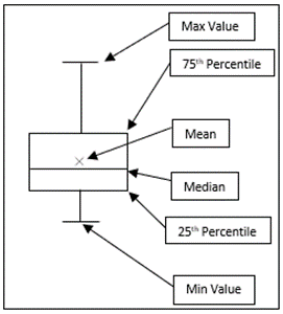


Figure 3. Mercury concentrations per species in Scott Lake

4.0 Source Assessment – Point Sources

Point sources of water pollution are grouped as follows: Mining, Municipal Separate Storm Sewer Systems (MS4s), National Pollutant Discharge Elimination System (NPDES) permitted facilities. Although the mercury in fish tissue impairments regarding the waterbodies listed in this addendum are not related to any specific point sources, a transparent assessment of these sources will demonstrate that the waterbody is meeting the necessary conditions for acceptance under the Statewide TMDL.

4.1 Mining

Mercury mining and the use of mercury for the extraction of gold are potential point sources of inorganic mercury. Although mercury mining ceased in the United States in 1992 and mercury amalgamation for the extraction of gold has been replaced by cyanide leaching (Wentz et al., 2014), deposits from these processes remain a localized concern in portions of the country. South Dakota has no record of mercury mining occurring within Minnehaha County, SD and is of no concern for this waterbody in terms of point source pollution. This helps satisfy the fourth condition discussed earlier in the document.

4.2 Municipal Storm Water Sewer Systems (MS4s)

The requirements of MS4 permits are to control anthropogenic loads in stormwater discharges. MS4's are considered a point source under the Clean Water Act and are typically included as a part of the point source waste load allocation (WLA) within the TMDL calculation. Factoring out atmospheric deposition, which is accounted for separately in the TMDL source assessment, and illicit discharges, which are already regulated, there should be no anthropogenic sources of mercury. Thus, the only source of mercury in MS4 loads is atmospheric deposition. The MS4 permit areas are included in the measured and modeled deposition results and are located in Table 24 (page 76) of the original TMDL. The MS4 permits included in the original TMDL, and their acreages are listed below in Table 3. The MS4s listed below have no impact on Scott Lake but are included here to ensure that these potential sources have been considered.

Table 3. MS4 permits, phase, and acreages in South Dakota (2016)

MS4	Permit	Phase	Area (acres)	Km²	Estimation Description
City of Sioux Falls	SDS0001	I	48429	196	Provided by permittee
City of Vermillion	SDR41A001	II	2410	10	The permittee provided the area within city limits, which is covered by the MS4
City of Pierre	SDR41A002	II	8340	34	Provided by permittee
City of Brookings	SDR41A003	II	7450	30	The area within Brookings, minus the SDSU campus, was provided by the permittee
Pennington County	SDR41A004	II	27320	111	Provided by permittee using GIS mapping
City of Mitchell	SDR41A005	II	7256	29	The area within Mitchell, minus Lake Mitchell, was provided by the permittee
City of Sturgis	SDR41A006	II	3100	13	The permittee provided the area within city limits, which is covered by the MS4
City of Rapid City	SDR41A007	II	35200	142	Provided by permittee
City of Aberdeen	SDR41A008	II	8960	36	Provided by permittee
SD DOT	SDR41A009	II	0	0	Already included
City of Watertown	SDR41A010	II	16596	67	Provided by permittee
City of North Sioux City	SDR41A011	II	1693	7	Provided by permittee
City of Huron	SDR41A012	II	6400	26	Provided by permittee
City of Yankton	SDR41A013	II	5278	21	Provided by permittee
City of Spearfish	SDR41A014	II	10250	41	Provided by permittee
Meade County	SDR41A015	II	3670	15	Provided by permittee

4.3 NPDES Permitted Sources

SD Administrative Rule 74:51:01:27 states point source effluents discharge directly into lake systems are mandated to achieve Water Quality Standards (WQS) at the immediate point of discharge, thereby precluding the establishment of a mixing zone. The foundational Total Maximum Daily Load (TMDL) analysis assumes the regulation of such point sources via National Pollutant Discharge Elimination System (NPDES) permit stipulations mitigate localized exceedances of mercury WQS in lake environments. Within the Hydrologic Unit Code (HUC) 12 delineation for Scott Lake, identified specifically as the Beaver Lake Watershed with HUC designation 101702031101, there are 15 NPDES permitted facilities. These sites are shown in Table 4.

It is important to note that any facilities that have reasonable potential to cause impairments of any kind are required to have a NPDES permit. In 2015, when the original Statewide Mercury TDML was developed, there were 247 NPDES facilities noted, and thus a total discharge was calculated using these facilities. The total discharge was then used to calculate the total point source load of mercury for the state of South Dakota. This indicates that the waste load for any permitted facility prior to 2015 has already been accounted for separately in the Statewide Mercury TMDL and won't be reintroduced as a

potential new load here unless permit exceedances are noted. For more information on how these calculations were generated visit Section 4.0 of the original Statewide Mercury TMDL.

Included within the Beaver Lake Watershed are two facilities classified as Publicly Owned Treatment Works (POTWs). The wastewater facility under Hartford's jurisdiction permit (SD0021750) was observed from 2010 to 2023, showing a minimum 30-day average effluent discharge of 0.63 Million Gallons per Day (MGD), peaking at 4.24 MGD, with an average discharge of 2.03 MGD. Noteworthy is that this facility has experienced nine informal violations over the last decade, all related to ammonia and nitrogen levels, with no infractions involving mercury. Significantly, the discharge from this facility enters Skunk Creek, following a drainage path that does not merge with Scott Lake. Furthermore, this facility was previously accounted for in the Statewide Mercury TMDL and therefor any additional load would not be applicable.

Progressing forward, we examine the NPDES permit (SD0024015-SDG824015) for the wastewater facility in Humboldt, SD. Notably, although Beaver Lake is situated downstream, it lacks a direct hydrological connection to Scott Lake. This key separation, along with the facility's status as a no-discharge permit, rules out its potential as a mercury pollution source. Therefore, it is exempt from receiving a WLA.

An additional nine facilities with stormwater permits (SDR10XXX) are related to general construction activities. Similar to the preceding permits, they cannot impact Scott Lake's water quality due to their lack of hydrological connection to the lake. This fundamental absence of a direct or indirect water pathway is the most critical factor in ensuring they do not contribute to pollution in Scott Lake. While these permits do allow for stormwater discharges during construction, they come with stringent restrictions against releasing substances that could degrade WQS. Consequently, these facilities were not issued a WLA for mercury. Moreover, their compliance record is exemplary, with no reported violations that would suggest a risk to water quality.

Building on the examination of stormwater permit holders, the focus shifts to the remaining group of facilities under the (SDR00XXXX) permit classification, which are engaged in general industrial stormwater activities. The defining safeguard for Scott Lake’s water quality in relation to these entities, again, lies in the absence of any hydrologic connection. This ensures that despite their potential for discharges during industrial operations, similar to the previous permit holders, they cannot adversely affect the waterbody. This comprehensive analysis of NPDES-permitted entities within the watershed underscores the lack of a quantifiable WLA contribution from point source mercury pollution within Scott Lake.

Table 4. Facilities with a NPDES permit within the HUC 12 Beaver Lake Watershed

Facility	City	State	Permit ID	Violations
E 6TH ST & MUNDT AVE RECONSTRUCTION - HARTFORD SD	HARTFORD	SD	SDR10K611	
GET N GO - WESTERN AVE	HARTFORD	SD	SDR10K665	
HARTFORD, CITY OF	HARTFORD	SD	SDR000215343	
HARTFORD, CITY OF	HARTFORD	SD	SD0021750	9 informal actions

5.0 Source Assessment – Nonpoint Sources

HUMBOLDT, CITY OF	HUMBOLDT	SD	SD0024015 - SDG824015	
IRON HORSE SALVAGE	HARTFORD	SD	SDR000218545	
MAPLE PASS APARTMENTS & TOWNHOMES	HARTFORD	SD	SDR10K737	
MCWC SERVICE AREA 6 - 12" PIPELINE	HUMBOLDT	SD	SDR10P51R	
PCN 05T2 & 0965	HARTFORD	SD	SDR10P50A	
PCN 05T3	HARTFORD	SD	SDR10P238	
PUBLIC SAFETY TRAINING CAMPUS	SIOUX FALLS	SD	SDR10K438	
RONDEAU RECYCLING	HARTFORD	SD	SDR000219535	
SOUTH MAIN ADDITION TO CITY OF HARTFORD	SIOUX FALLS	SD	SDR10B309	
TWO GUYS & A GARAGE AUTO REPAIR	HARTFORD	SD	SDR000220061	
WESTERN MEADOWS ADDITION HARTFORD	HARTFORD	SD	SDR10C962	

Nonpoint source mercury pollution in South Dakota consists of >99% of the mercury found in the state's waterbodies. The process is understood to be directly related to atmospheric sources. The data used for the load analysis in the original TMDL was obtained from a wet and dry mercury deposition study conducted by Dr. Stone at the South Dakota School of Mines and Technology (SDSM&T) in addition to existing data within the Mercury Deposition Network. It was determined in the original Statewide Mercury TMDL that the reductions would ultimately come from nonpoint sources.

The original Statewide Mercury TMDL highlights that up to 30% of mercury emissions are natural and unmodifiable. To meet Water Quality Standards (WQS), a 79% reduction in anthropogenic mercury sources is necessary. Within the anthropogenic fraction, it is estimated that 4.5% of the nonpoint source load originates from South Dakota, primarily due to emissions from Otter Tail Power Company and Wharf Resources Inc. These facilities, detailed in Section 4.3 of the original TMDL, are significant contributors to mercury deposition in the state. However, they are subject to regulation and must adhere to the South Dakota Administrative Rules 74:36:06:01, ensuring they operate within established environmental guidelines.

6.0 Water Quality Standards

All waters (both lakes and streams) are assigned the beneficial use of fish and wildlife propagation, recreation, and stock watering. All streams are assigned the beneficial use of irrigation. The state assigns additional uses based on a beneficial use analysis of each waterbody. Each beneficial use has a set of WQC to protect those uses. The Administrative Rules of South Dakota (ARSD) contains the WQC in Chapter 74:51. South Dakota WQC specifically address mercury concentrations in the water column designed to protect human health and aquatic health. The more restrictive mercury concentrations were established for human health. Table 5 shows the beneficial use classifications in South Dakota and the

numeric criteria assigned to those uses. All criteria are reported in the total recoverable mercury or total methylmercury (for fish tissue) fraction.

Table 5. Beneficial Uses for Human and Aquatic Life Criteria

Use Classification	Use Description	Human Health		Aquatic Life	
		Water Column Hg	Fish Tissue CH3Hg+	Acute (CMC) Hg	Chronic (CCC) Hg
		µg/L	mg/Kg	µg/L	µg/L
(1)	Domestic water supply waters	0.050			
(2)	Coldwater permanent fish life propagation waters	0.051	0.3	1.4	0.77
(3)	Coldwater marginal fish life propagation waters	0.051	0.3	1.4	0.77
(4)	Warmwater permanent fish life propagation waters	0.051	0.3	1.4	0.77
(5)	Warmwater semipermanent fish life propagation waters	0.051	0.3	1.4	0.77
(6)	Warmwater marginal fish life propagation waters	0.051	0.3	1.4	0.77
(7)	Immersion recreation waters				
(8)	Limited contact recreation waters				
(9)	Fish and wildlife propagation, recreation, and stock watering waters	0.051	0.3	1.4	0.77
(10)	Irrigation waters				
(11)	Commerce and industry waters				

Additional water quality regulations which apply to mercury impairments include the biological integrity of waters. Elevated mercury levels may impair biological integrity, such as reduced reproductive success of Walleye (Selch, 2008). ARSD Section 74:51:01:12 states that all waters of the state must be free from substances, whether attributable to human-induced point source discharges or nonpoint source activities, in concentrations or combinations which will adversely impact the structure and function of indigenous or intentionally introduced aquatic communities. Additionally, ARSD Section 74:51:01:55 also states that toxic pollutants (including mercury) may not exist at levels that are or may become injurious to public health, safety, or welfare. Protection of these narrative criteria is best accomplished by meeting the most stringent numeric water column criteria 0.050 µg/L of total mercury.

As a part of the 2014 triennial review, SDDANR proposed the Water Management Board adopt WQC, including a fish flesh methylmercury (MeHg) standard of 0.3 mg/Kg. This concentration is the EPA recommended human health criterion applicable to beneficial uses 2, 3, 4, 5, 6, and 9. The waterbodies included in this addendum and their beneficial uses are shown in Table 6.

Table 6. Beneficial Uses for Scott Lake

Common Name	County	Beneficial Uses
Scott Lake	Minnehaha	6,7,8,9

The original TMDL identified a target of 0.3 mg/Kg based on the approved EPA human health criterion (and approved by the State of SD). This fish flesh concentration standard and target required a linkage to protect the existing mercury water column standards. This linkage was accomplished by applying a Bioaccumulation Factor (BAF) discussed in Section 2.0 of the original TMDL. Bioaccumulation refers to the uptake and retention of a chemical by an aquatic organism from all surrounding media, including water, sediment, and the food it consumes. The TMDL used a BAF to verify that the target and the human health criterion of 0.3 mg/Kg would translate back to total mercury levels in the water column below the most stringent South Dakota WQC (0.050 µg/L). For more detail on these calculations, please refer to Section 2.0 in the original TMDL.

The original TMDL used 0.669 mg/Kg (the existing condition) as the value from which to calculate reductions. These numbers were based on the SLF calculation process outlined in Section 3.0 of the original Mercury TMDL. The reduction factor (RF) was based on this existing condition and the fish tissue criteria of 0.3 mg/Kg. WE38 in the following equation refers to a SLF Walleye of 15 inches long. Reducing the methylmercury in fish flesh in Scott Lake by 55.2% will meet all appropriate WQS.

$$RF = (WE38 - 0.3)/WE38$$
$$55.2\% = (0.669-0.3)/0.669$$

7.0 Conclusion

This addendum has provided detailed information specific to Scott Lake and has conducted a thorough comparison with the original Statewide Mercury TMDL. This review encompassed an analysis of fish tissue, as well as an examination of the jurisdictional area, point sources, and nonpoint sources. The findings from this review demonstrate that Scott Lake satisfies the criteria for inclusion under the original TMDL.

No potential local sources of mercury were discovered for Scott Lake. SD Administrative Rule 74:51:01:27 states that point sources discharging directly into lakes must meet WQS at the point of discharge and are not allowed a mixing zone. This addendum, and the original TMDL, assumes that point sources are being controlled under this regulation through NPDES permit requirements and are not causing localized WQS exceedances of mercury. Additionally, because of the rural nature of Scott Lake, municipal stormwater discharges (MS4) are of no concern. The original statewide TMDL used the regional modeling system for aerosols and deposition model. This model demonstrated >99% of the mercury deposited into South Dakota's waterbodies is from atmospheric deposition sources.

Fish flesh analysis of the Walleye collected from Scott Lake exceeded the 0.3 mg/Kg level indicating a reduction in atmospheric mercury is necessary in order to reach full attainment. The average concentration from the Walleye tissue available for analysis was 0.70 mg/Kg of mercury with a 15-inch SLF exhibiting 0.446 mg/Kg. Since Walleye was also used to calculate a SLF concentration in the original Statewide Mercury TMDL a direct comparison to Scott Lake can be made. The SLF concentration from Scott Lake (0.446 mg/Kg) is significantly lower than the 0.669 mg/Kg of mercury calculated in the original TMDL. This demonstrates a 0.223 mg/Kg margin of safety if the 55.2% reductions from the original TMDL are met.

The lake listed in this addendum is within the state's jurisdiction, and no additional loading analysis (point or non-point) was needed to calculate reductions. The original Mercury TMDL (2016) includes additional margin of safety factors on pages 73-74, which further support the justification for full attainment. The fish flesh levels of mercury in Scott Lake present a value exceeding the EPA health standard and South Dakota WQC of 0.3 mg/Kg. Assuming the necessary atmospheric reductions occur, Scott Lake will fall below the threshold designation and will achieve full attainment.

8.0 Public Participation

A 30-day public comment period was issued for the draft TMDL Addendum. A public notice letter was published in the following local newspapers:_____. The draft TMDL addendum document and ability to comment was made available on DANRs One-Stop Public Notice Page: https://danr.sd.gov/public/default.aspx. The public comment period began _____and ended _____. No public comments were received during the 30-day comment period.

Works Cited

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Appendix A:

Individual Fish Collected from Scott Lake within the Index Period

Site	Sample Year	Species	Length (mm)	Mercury (ppm)
Scott Lake	2019	Black Bullhead	214	0.2
Scott Lake	2019	Black Bullhead	205	0.17
Scott Lake	2019	Black Bullhead	187	0.16
Scott Lake	2019	Black Bullhead	212	0.15
Scott Lake	2019	Black Bullhead	186	0.12
Scott Lake	2019	Black Bullhead	193	0.16
Scott Lake	2019	Black Bullhead	203	0.14
Scott Lake	2019	Black Bullhead	245	0.08
Scott Lake	2019	Black Bullhead	239	0.24
Scott Lake	2019	Black Bullhead	217	0.18
Scott Lake	2019	Black Bullhead	213	0.11
Scott Lake	2019	Black Bullhead	201	0.14
Scott Lake	2019	Black Bullhead	233	0.13
Scott Lake	2019	Black Bullhead	202	0.17
Scott Lake	2019	Black Bullhead	222	0.2
Scott Lake	2019	Walleye	636	1.09
Scott Lake	2019	Walleye	636	0.73
Scott Lake	2019	Walleye	687	0.34
Scott Lake	2019	Walleye	695	1.24
Scott Lake	2019	Walleye	393	0.46
Scott Lake	2019	Walleye	582	0.52
Scott Lake	2019	Walleye	407	0.45
Scott Lake	2019	Walleye	426	0.42
Scott Lake	2019	Walleye	385	0.5
Scott Lake	2019	Walleye	553	0.91
Scott Lake	2019	Walleye	632	1.01
Scott Lake	2019	Walleye	597	0.7
Scott Lake	2019	Yellow Perch	220	0.18
Scott Lake	2019	Yellow Perch	280	0.22
Scott Lake	2019	Yellow Perch	273	0.27
Scott Lake	2019	Yellow Perch	183	0.18
Scott Lake	2019	Yellow Perch	258	0.18
Scott Lake	2019	Yellow Perch	200	0.2
Scott Lake	2019	Yellow Perch	246	0.18
Scott Lake	2019	Yellow Perch	169	0.13
Scott Lake	2019	Yellow Perch	255	0.22
Scott Lake	2019	Yellow Perch	243	0.2
Scott Lake	2019	Yellow Perch	192	0.19

Site	Sample Year	Species	Length (mm)	Mercury (ppm)
Scott Lake	2019	Yellow Perch	194	0.16
Scott Lake	2019	Yellow Perch	243	0.26
Scott Lake	2019	Yellow Perch	246	0.25

Appendix B: Approval Letter

REGION 8
DENVER, CO 80202

June 12, 2024

Ref: 8WD-CWS

SENT VIA EMAIL

Hunter Roberts, Secretary
South Dakota Department of Agriculture & Natural Resources
Hunter.Roberts@state.sd.us

Re: Approval of 2024 Addendum to the South Dakota Mercury TMDL – Scott Lake

Dear Secretary Roberts:

The U.S. Environmental Protection Agency (EPA) has completed review of the 2024 addendum to the South Dakota Mercury total maximum daily load (TMDL) for Scott Lake submitted by your office on May 22, 2024. In accordance with the Clean Water Act (33 U.S.C. §1251 *et. seq.*) and the EPA's implementing regulations at 40 C.F.R. Part 130, the EPA hereby approves South Dakota's TMDL for Scott Lake. The EPA has determined that the separate elements of the TMDL listed in the enclosure adequately address the pollutant of concern, are designed to attain and maintain applicable water quality standards, consider seasonal variation and includes a margin of safety. The EPA's rationale for this action is contained in the enclosure.

We appreciate the South Dakota Department of Agriculture & Natural Resources efforts to complete this TMDL. If you have any questions, please contact Amy King on my staff at (303) 312-6708.

Sincerely,

STEPHANIE DEJONG

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Date: 2024.06.13 06:37:06 -06'00'

Stephanie DeJong, Manager
Clean Water Branch

Enclosure: EPA TMDL Decision Rationale – 2024 Addendum to the South Dakota Mercury TMDL

cc: Paul Lorenzen, Watershed Protection Program Administrator, South Dakota DANR
Alan Wittmuss, TMDL Team Leader, South Dakota DANR

Appendix C: Decision Rational

EPA TOTAL MAXIMUM DAILY LOAD (TMDL) DECISION RATIONALE

TMDL: 2022 Addendum to the South Dakota Mercury TMDL – Scott Lake

ATTAINS TMDL ID: R8-SD-2024-02

LOCATION: Minnehaha County, South Dakota

IMPAIRMENTS/POLLUTANTS: The TMDL submittal addresses one lake that is impaired due to high concentrations of mercury in fish tissue. Designated uses that are not being attained include warmwater marginal fish life propagation and fish and wildlife propagation, recreation, and stock watering.

Waterbody/Pollutant Addressed in this TMDL Action

Assessment Unit ID	Waterbody Description	Pollutants Addressed
SD-BS-L-SCOTT_01	Scott Lake	Mercury in fish tissue

BACKGROUND: The South Dakota Department of Agriculture and Natural Resources (DANR) submitted to the EPA the final 2024 Addendum to the South Dakota Mercury TMDL (Addendum) for Scott Lake with a letter requesting review and approval dated May 22, 2024. The EPA previously reviewed and provided staff comments on draft versions of the report but did not submit comments during the subsequent public comment period (April 16, 2024 to May 21, 2024). The Addendum addresses one new assessment unit not approved as part of the original South Dakota Mercury TMDL on March 1, 2016 (also referred to as the Statewide Mercury TMDL).

The submittal included:

- Letter requesting the EPA's review and approval of the TMDL
- Final TMDL report

APPROVAL RECOMMENDATIONS: Based on the review presented below, the reviewer recommends approval of the final 2024 Addendum to the South Dakota Mercury TMDL, which includes Scott Lake. All the required elements of an approvable TMDL have been met.

TMDL Approval Summary	
Number of TMDLs Approved:	1
Number of Causes Addressed by TMDLs:	1

REVIEWER: Amy King, EPA

The following review summary explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) of the CWA, and the EPA's implementing

regulations in 40 C.F.R. Part 130.

EPA REVIEW OF THE 2024 ADDENDUM TO THE SOUTH DAKOTA MERCURY TMDL – SCOTT LAKE

This TMDL review document includes the EPA's guidelines that summarize the currently effective statutory and regulatory requirements relating to TMDLs (CWA Section 303(d) and 40 C.F.R. Part 130). These TMDL review guidelines are not themselves regulations. Any differences between these guidelines and the EPA's regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the information generally necessary for the EPA to determine if a TMDL submittal fulfills the legal requirements for approval. The sections in regular type reflect the EPA's analysis of the state's compliance with these requirements. 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.

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

The TMDL submittal must clearly identify (40 C.F.R. §130.7(c)(1)):

- *the waterbody as it appears on the State's/Tribe's 303(d) list;*
- *the pollutant for which the TMDL is being established; and*
- *the priority ranking of the waterbody.*

The TMDL submittal must include (40 C.F.R. §130.7(c)(1); 40 C.F.R. §130.2):

- *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);*
- *facility names and NPDES permit numbers for point sources within the watershed; and*
- *a description of the natural background sources, and the magnitude and location of the sources, where it is possible to separate natural background from nonpoint sources.*

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:

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

Elevated concentrations of mercury in fish tissue in Scott Lake have caused the fish and wildlife propagation, recreation, and stock watering waters and warmwater marginal fish life propagation waters designated uses to not be fully supported. Scott Lake is identified as impaired because

methylmercury concentrations in fish tissue exceeded the 0.3 milligram per kilogram (mg/kg) human health criteria (Sections 1.0 and 6.0).

There are seven conditions that waterbodies must meet to obtain coverage under the Statewide Mercury TMDL (SD DANR, 2016). The seven conditions, or applicability criteria, are used to confirm that the assumptions and calculations of original TMDL are still valid and demonstrate that Scott Lake is within South Dakota's jurisdiction, exhibits comparable conditions to the original waters, and is expected to meet water quality standards when the Statewide Mercury TMDL and targets are met. DANR demonstrated in the Addendum that Scott Lake is appropriate for coverage under the Statewide Mercury TMDL.

The location of the lake is shown in Figure 1 of the Addendum, which indicates no jurisdictional concerns (meeting applicability criteria one and two). Scott Lake (SD-BS-L-SCOTT_01) is an 80.27 acre lake in Minnehaha County, South Dakota located just north of the city of Hartford. It was assigned a high priority for TMDL development (i.e., 1) in South Dakota's 2024 303(d) list (SD DANR, 2024) after being first listed in 2020 (Section 3.1). Three fish species were sampled from the lake, including walleye which is a top predator. Of the twelve walleye collected in 2019, all exceeded the numeric target for methylmercury of 0.3 mg/kg. The average methylmercury concentration was 0.70 mg/kg (Figure 3 and Section 7.0). Because walleye data are available, a concentration can be estimated for the standard length fish (SLF; defined in the Statewide Mercury TMDL as 384 millimeters) using the regression line in Figure 2. This can be directly compared with the Statewide Mercury TMDL. The estimated Scott Lake concentration of 0.446 mg/kg methylmercury is below the 0.878 mg/kg maximum SLF fish tissue concentration from the Statewide Mercury TMDL, demonstrating that conditions in Scott Lake are comparable to the rest of the state. This ensures that the original TMDL and load reduction factor will be sufficient to meet water quality standards in Scott Lake, meeting applicability criteria three and six.

The Addendum evaluated sources to Scott Lake (Sections 4 and 5) and built upon the pollutant source analysis from the Statewide Mercury TMDL. As described in the original TMDL, DANR investigated nonpoint sources of mercury by monitoring and modeling atmospheric deposition rates. This information was used to understand geographical and seasonal patterns of mercury deposition and derive annual loading rates. Monitoring results can be found in Appendix B of the Statewide Mercury TMDL and REMSAD model results are summarized in Figures 21-22 and Table 21 (SD DANR, 2016). Modeling runs were conducted by the EPA and provided to DANR for TMDL analysis. The results indicated that the largest (93%) source of mercury either originates from outside the modeling domain (continental U.S. plus parts of Canada and Mexico) or originates within the modeling domain but is transported outside to become part of the global pool. In-state emission sources were shown to account for only 0.12% of South Dakota's total atmospheric mercury deposition. DANR assumed that 30% of the total atmospheric mercury deposition is non-anthropogenic in origin and represents natural background conditions, which is consistent with other statewide mercury TMDLs and scientific literature (SD DANR, 2016). DANR summarizes the nonpoint sources in Section 5.0.

The statewide analysis of point sources conducted in Section 4 of the original Statewide Mercury TMDL found that permitted point sources account for 0.36% of the total existing statewide load and 0.81% of the total allowable load. The Addendum reviews the potential contribution from abandoned mines and

point sources near Scott Lake. As noted in the Addendum, Scott Lake is not influenced by current or historic mining (Section 4.1; meeting acceptance criterion four).

DANR also evaluated potential mercury loading from municipal separate storm sewer systems (MS4s) and other National Pollutant Discharge Elimination System (NPDES) permits (Sections 4.2 and 4.3, respectively). The MS4s in the state (Table 3) have no impact on Scott Lake and are therefore not a potential source of mercury. In the Statewide Mercury TMDL, DANR assumed that permitted point sources are not causing localized mercury impairments to lakes because state permitting requirements (ARSD 74:51:01:27) mandate that water quality standards be met at the point of discharge (i.e., no mixing zone allowed) if the point source discharges to a lake (SD DANR, 2016) (meeting acceptance criterion five, since Scott Lake is not a river or stream). Several permitted facilities are located in the Scott Lake watershed; however, none of them are hydrologically connected sources to the lake and do not receive wasteload allocations (WLAs).

DANR's conclusion that mining activities, MS4s, and NPDES permitted sources are not causing localized mercury impairments is supported by the fish tissue comparison completed in Section 3.1. Fish tissue mercury concentrations in Scott Lake are similar to the statewide dataset used in the original TMDL, thereby suggesting similar sources of mercury for all waters (meeting acceptance criterion seven).

Assessment: The EPA concludes that DANR adequately identified the impaired waterbody, the pollutant of concern, the priority ranking, the identification, location and magnitude of the pollutant sources, and the important assumptions and information used to develop the TMDL.

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)); and*
- *a numeric water quality target for each TMDL. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal (40 C.F.R. §130.2(i)).*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations.

Water quality standards applicable to the impaired lake are described in Section 6.0 with citations to relevant South Dakota regulations. Section 2.0 of the original Statewide Mercury TMDL also contains a full discussion of water quality standards including beneficial uses and criteria in South Dakota (ARSD 74:51) (SD DANR, 2016). Designated uses associated with Scott Lake are presented in Table 6. Table 5 identifies the numeric criteria associated with each of these uses. The Addendum clearly links Scott Lake's designated uses to numeric and narrative mercury criteria.

In 2016, the EPA approved DANR's request to recognize 0.3 mg/kg total methylmercury in fish tissue as a water quality criterion for Clean Water Act purposes assigned to designated use categories 2, 3, 4, 5, 6, and 9. South Dakota also retained existing numeric criteria for mercury as measured in the water column for human health and aquatic life designated use categories. To ensure that the fish tissue criterion is protective of all uses and water column criteria, DANR conducted a bioaccumulation factor (BAF) analysis, as discussed in Section 2.0 of the Statewide Mercury TMDL. This analysis confirmed that the human health criterion of 0.3 mg/kg translates to total mercury levels in the water column below the most stringent South Dakota WQC (0.050 micrograms per liter [μg/L]). Establishing the TMDL to meet the methylmercury criterion will result in the protection all other mercury related criteria and uses (SD DANR, 2016).

The Statewide Mercury TMDL and Addendum directly use South Dakota's numeric criterion of 0.3 mg/kg total methylmercury in fish tissue as the TMDL target (Section 6.0). This assumes steady-state conditions and relies on the principle of proportionality to determine the load reduction factors needed to meet the fish tissue TMDL target, which EPA recognizes as a reasonable assumption. As explained in Section 3.3 of the Statewide Mercury TMDL, DANR expects that, according to the principle of proportionality, a reduction in mercury emissions will result in a proportional reduction in deposition, mercury loading to waterways, and fish tissue methylmercury concentrations (SD DANR, 2016). Following this logic, DANR calculated that existing fish tissue methylmercury concentrations statewide require a 55.2 percent reduction to meet the 0.3 mg/kg criterion and then applied that same reduction factor to the existing total source load to derive the TMDL (Section 6.0).

The Statewide Mercury TMDL and Addendum are consistent with South Dakota antidegradation policies because they provide recommendations and establish pollutant limits at water quality levels necessary to meet criteria and fully support existing beneficial uses, including more stringent downstream uses.

Assessment: The EPA concludes that DANR adequately described the applicable water quality standards and numeric water quality target for this TMDL.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

The TMDL submittal must include the loading capacity for each waterbody and pollutant of concern. 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 TMDL submittal must:

- *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;*
- *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; and*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation (40 C.F.R. §130.2).

The full water quality dataset should be made available as an appendix to the TMDL or as a separate electronic file. Other datasets used (e.g., land use, flow), if not included within the TMDL submittal, should be referenced by source and year. The TMDL analysis should make use of all readily available data for the waterbody unless the TMDL writer determines that the data are not relevant or appropriate.

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). Most TMDLs should be expressed as daily loads (USEPA. 2006a). If the TMDL is expressed in terms other than a daily load (e.g., annual load), the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen.

The TMDL submittal must describe the critical conditions and related physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions (e.g., stream flow, temperature, loads) in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality

The Addendum relies largely on the technical analysis completed and documented in the original Statewide Mercury TMDL. DANR developed the loading capacity at a statewide scale; however, the TMDL is still written to meet water quality standards in individual waters. DANR demonstrated this by relating the loading capacity back to numeric water quality criteria that apply statewide (i.e., there are no unique, basin-specific mercury criteria). Conservative decisions made throughout the process result in a statewide TMDL that may be more protective than necessary to meet water quality standards in some waters. The TMDL loading capacity is equal to the sum of the allocations and can be simplified as: Implicit MOS (0 kilograms per year [kg/yr]) + WLA (4.84 kg/yr) + LA (590.48 kg/yr) = TMDL (595.32 kg/yr). This balanced TMDL equation, additional source category breakouts, and derivation steps are included in Section 10.0 of the original Statewide Mercury TMDL, along with a calculation of daily loads for the TMDL (3.21 kilograms per day [kg/day]) (SD DANR, 2016).

The Addendum demonstrates that all seven conditions outlined in the Statewide Mercury TMDL's revision process are met for Scott Lake, which is appropriate for coverage under the Statewide Mercury TMDL (Sections 1.0 through 6.0; specific sections are identified in Table 1). The seven conditions, or applicability criteria, are used to confirm that the assumptions and calculations of original TMDL are valid and demonstrate that the new assessment unit is within South Dakota's jurisdiction, exhibits comparable conditions to the original waters, and is expected to meet water quality standards when the Statewide Mercury TMDL and targets are met. The majority of the Addendum is devoted to comparing mercury concentrations of fish tissue collected from Scott Lake to the conclusions in the Statewide Mercury TMDL.

Appendix A of the Addendum provides all fish tissue measurements for Scott Lake. These data are summarized in Figure 3 to assess bioaccumulation and compare tissue concentrations by species. The average existing concentration for walleye (the top predator) exceeded the numeric target, while black

bullhead and yellow perch are below the target. Figure 2 evaluates walleye data compared to fish length.

The Statewide Mercury TMDL accounted for variability in mercury concentrations from fish of different age and length by using the SLF concept. DANR defined the SLF as a 384 mm walleye and the maximum methylmercury concentration for the SLF was 0.878 mg/kg (SD DANR, 2016). This sets a concentration limit for Scott Lake. Any waterbody with a fish flesh concentration exceeding this benchmark is void from coverage under the Statewide Mercury TMDL and will need to be addressed under a waterbody specific TMDL.

The SLF for walleye in Scott Lake was 0.446 mg/kg, which is below the existing condition of 0.669 mg/kg calculated in the original TMDL, verifying that conditions in Scott Lake are similar to the statewide dataset. The Addendum documents that applying a 55.2 percent reduction results in fish tissue levels below the target (Sections 6.0 and 7.0). This condition ensures that the original TMDL and load reduction factor will be sufficient to meet water quality standards in Scott Lake.

The Statewide Mercury TMDL included a discussion on critical conditions and seasonality (Section 9.0 of SD DANR, 2016) and considered wet deposition during periods of rainfall. Other factors that influence mercury methylation and bioaccumulation in the food chain are wetland areas, Secchi depth, and variation in lake levels since wetting and drying impacts the methylation process. The TMDL was initially calculated as an annual load to account for year-round deposition and seasonal characteristics of the lakes and drainages (SD DANR, 2016).

Assessment: The EPA concludes that the loading capacity was calculated using an acceptable approach, used a water quality target consistent with water quality criteria, and has been appropriately set at a level necessary to attain and maintain the applicable water quality standards. The pollutant loads have been expressed as daily limits. The critical conditions were described and factored into the calculations and were based on a reasonable approach to establish the relationship between the target and pollutant sources.

4. Load Allocation

The TMDL submittal must include load allocations (LAs). EPA regulations define LAs as the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution and to natural background sources. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, separate LAs should be provided for natural background and for nonpoint sources.

In the rare instance that a TMDL concludes that there are no nonpoint sources or natural background for a pollutant, the load allocation must be expressed as zero and the TMDL should include a discussion of the

Section 5.0 of the Addendum summarizes the nonpoint sources associated with mercury loading. In the Statewide Mercury TMDL, DANR identified and quantified sources of nonpoint source pollution

through in-state atmospheric deposition monitoring and the REMSAD computer model. Using this information, DANR estimated the state receives 1,326.3 kg of mercury per year from atmospheric nonpoint sources of pollution statewide (see Section 5.1.2 and Section 10.0 of the Statewide Mercury TMDL; SD DANR, 2016). After attributing 30% of this load to natural background, the remaining human-derived nonpoint source load requires a 79% reduction to meet the atmospheric deposition LA (590.48 kg/yr) and the final TMDL loading capacity (595.32 kg/yr). All reductions in the TMDL are applied to this aggregated statewide LA representing anthropogenic loading from atmospheric deposition and reductions are expected through the implementation of international (Minamata Convention) and national (Mercury Air Toxics Standards Rule) controls on mercury emissions, and unrelated operational adjustments to existing facilities in South Dakota (SD DANR, 2016).

Assessment: The EPA concludes that the LAs provided in the TMDL are reasonable and will result in attainment of the water quality standards.

5. Wasteload Allocations

The TMDL submittal must include wasteload allocations (WLAs). EPA regulations define WLAs as the portion of a receiving water's loading capacity that is allocated to existing and future point sources (40 C.F.R. §130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and natural background will result in attainment of the applicable water quality standards, and all point sources have no measurable contribution.

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. In some cases, WLAs may cover more than one discharger (e.g., if the source is contained within a

DANR expanded upon the point source analysis conducted in Section 4 of the original Statewide Mercury TMDL, which calculated the allowable stormwater and non-stormwater WLAs (SD DANR, 2016). Section 4.0 provides a more detailed review of the potential contribution from mines, MS4s, and other NPDES point sources associated with Scott Lake. This review confirmed that point sources are not causing localized mercury impairments; therefore, the WLAs derived in the original Statewide Mercury TMDL are appropriate.

DANR evaluated potential mining sources and found that Scott Lake is outside the sphere of influence from historical or present-day mining practices associated with the Black Hills region. Mining does not pose any concern as a mercury source. In the original Statewide Mercury TMDL, DANR characterized the existing NPDES-regulated MS4 load based on the percentage of the South Dakota's land surface falling within MS4 boundaries relative to the atmospheric mercury deposition for the entire state.
DANR estimated an aggregate allocation for all MS4s in the state, as identified in Table 17 of the original Statewide Mercury TMDL, without applying a reduction factor (SD DANR, 2016). The Addendum listed the MS4s in the Statewide Mercury TMDL and confirmed that these permitted areas

have no impact on Scott Lake (Table 3); therefore, MS4 areas do not pose a concern as a mercury source.

DANR characterized the existing non-stormwater, NPDES-permitted, point sources in the original Statewide Mercury TMDL and established an aggregate WLA that caps the statewide load at existing conditions (see Sections 4.3 and 6.0 of the original Statewide Mercury TMDL; SD DANR, 2016). Appendix E of the original Statewide Mercury TMDL lists all the non-stormwater NPDES-permitted facilities in South Dakota included within the aggregate WLA along with permit numbers and geographical locations (SD DANR, 2016). The Addendum identifies fifteen permitted facilities located in the Scott Creek watershed (hydrologic unit code [HUC] 101702031101) (Table 4). Neither of the two publicly owned treatment works (POTWs) have a hydrologic connection to Scott Lake and are therefore not potential sources of mercury pollution. Similarly, the nine construction stormwater permits and four general industrial storm water permits do not drain to Scott Lake and are not sources of mercury. Therefore, no additional facilities need to be considered as part of the WLA in the original TMDL (Section 4.3).

The EPA recognizes that aggregated WLAs are reasonable for this TMDL. Although the total contribution from permitted point sources appears to be very small, the EPA expects that while implementing the statewide WLAs, DANR will ensure that permitted point source discharges do not have a reasonable potential to cause or contribute to an exceedance of water quality standards.

Assessment: The EPA concludes that the WLAs provided in the TMDL are reasonable, will result in the attainment of the water quality standards and will not cause localized impairments. The TMDL accounts for all point sources contributing loads to impaired segments, upstream segments, and tributaries in the watershed.

6. Margin of Safety

*The TMDL submittal must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load allocations, wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). The MOS may be **implicit** or **explicit**.* *If the MOS is **implicit**, the conservative assumptions in the analysis that account for the MOS must be*

As described in Section 8.0 of the original Statewide Mercury TMDL (SD DANR, 2016), the TMDL incorporated an implicit margin of safety by following conservative approaches at numerous steps during TMDL development such as:

- Resampling waters with elevated fish tissue methylmercury concentrations more frequently than other waters. This results in a statewide fish tissue dataset that is biased towards egregiously impaired waters and a load reduction factor that is potentially greater than necessary for many waters. The Addendum notes that fish tissue concentrations below, the methylmercury criterion is expected for Scott Lake once the loading reduction factor is met.

DANR considers the difference between the criterion and projected tissue concentrations to be an added margin of safety.

- Selecting the 90th percentile SLF tissue concentration to represent existing conditions. This also overestimates the loading reductions needed for many waters.
- Focusing target attainment within a top predator species (walleye or a surrogate species) where methylmercury concentrations and bioaccumulation rates are highest. This protects humans consuming other fish species.
- Comparing fish tissue analyzed for total mercury concentration directly to the methylmercury TMDL target for listing decisions and TMDL calculations. This affords a level of protection because measurements of total mercury include other forms of mercury in addition to methylmercury.
- Setting allocations without accounting for reductions in sulfur emissions realized under the Clean Air Act which is expected to affect sulfate-reducing bacteria and lower methylation rates.

Assessment: The EPA concludes that the TMDL incorporates an adequate implicit margin of safety.

7. Seasonal Variation

The TMDL submittal must be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

The Addendum relies on the critical conditions and seasonal variation discussion contained in Section 9.0 of the original Statewide Mercury TMDL (SD DANR, 2016). DANR supported a monitoring network of atmospheric mercury deposition stations across the state for multiple years to explore temporal and geospatial differences in mercury deposition. Results indicated a positive relationship between deposition and precipitation, but overall DANR determined that deposition rates were sufficiently uniform to establish a single TMDL representative of the entire state. Sediment cores from ten lakes were also reviewed for insight into mercury loading trends, but results indicated that mercury concentrations in upper lakebed sediments were highly variable and no conclusions were drawn from the sediment cores. In addition to a daily load, the loading capacity was expressed as an annual load which incorporates seasonal variation of flow and weather. Lastly, DANR also stated that the use of a fish tissue TMDL target, representing the bioaccumulation of mercury throughout a fish's lifespan, inherently captures the variability of multiple seasons and critical conditions (SD DANR, 2016).

Assessment: The EPA concludes that seasonal variations were adequately described and considered to ensure the TMDL allocations will be protective of the applicable water quality standards throughout any given year.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by both point and nonpoint sources, EPA guidance (USEPA. 1991) and court decisions say that the TMDL must 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 the applicable water quality standards (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

EPA guidance (USEPA. 1997) 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

DANR's framework restoration strategy is outlined in the original Statewide Mercury TMDL (Section 11.0 of SD DANR, 2016). The loading analysis showed that nonpoint sources account for over 99% of the mercury loading to state waterbodies; therefore, the TMDL requires all reductions to occur through the load allocations. The amount of mercury be attributed to point sources (WLA) is small enough that reductions in any form or amount would not yield a measurable effect on fish tissue samples. Section 5.0 of the Statewide Mercury TMDL discusses various sources of mercury, noting an order of magnitude difference between in-state sources and atmospheric sources (SD DANR, 2016).

There are limited reductions that can be achieved in the state and South Dakota has ranked low in mercury emissions. Various federal mandates are expected to achieve the majority of the necessary load reductions. The Statewide Mercury TMDL stresses the importance of national and international regulatory controls on mercury emissions such as the U.S. Mercury Air Toxics Standards Rule and the United Nations Minamata Convention Agreement. This TMDL will largely be implemented through control of atmospheric sources; however, to address remaining smaller sources, DANR identifies implementation opportunities and evaluation programs for point sources (including dental offices, publicly owned treatment works, and MS4s) and solid waste (Section 11.0 of SD DANR, 2016).

Assessment: The EPA considered the reasonable assurances contained in the TMDL submittal and concludes that they are adequate to meet the load reductions. Nonpoint source load reductions are expected to occur through the implementation of best management practices ongoing and planned to begin in the future. Point sources with NPDES permits require that treatment is consistent with assumptions and requirements of WLAs for the discharges in the TMDL.

9. Monitoring Plan

The TMDL submittal should include a monitoring plan for all:

- *Phased TMDLs; and*
- *TMDLs with both WLA(s) and LA(s) where reasonable assurances are provided.*

Under certain circumstances, a phased TMDL should be developed when there is significant uncertainty associated with the selection of appropriate numeric targets, estimates of source loadings, assimilative capacity, allocations or when limited existing data are relied upon to develop a TMDL. EPA guidance (USEPA. 2006b) recommends that a phased TMDL submittal, or a separate document (e.g., implementation plan), include a monitoring plan, an explanation of how the supplemental data will be used to address any uncertainties that may exist when the phased TMDL is prepared and a scheduled timeframe for revision of the

For TMDLs that need to provide reasonable assurances, the monitoring plan should describe the additional data to be collected to determine if the load reductions included in the TMDL are occurring and leading to attainment of water quality standards.

EPA guidance (USEPA. 1991) recommends post-implementation monitoring for all TMDLs to determine the success of the implementation efforts. Monitoring plans are not a required part of the TMDL and are not

The Addendum relies on the framework monitoring strategy outlined in Section 12.0 of the original Statewide Mercury TMDL. DANR identified three monitoring categories. These future sampling efforts will address data gaps and evaluate progress towards meeting the TMDL target. The three categories of mercury monitoring are atmospheric deposition, fish tissue, and water column (SD DANR, 2016). EPA expects DANR to ensure permitted point source discharges do not have a reasonable potential to cause or contribute to an exceedance of water quality standards and stresses that collecting effluent data with sufficiently low detection limits is essential for making these determinations.

Assessment: Monitoring plans are not a required element of the EPA's TMDL review and decision-making process. The EPA is taking no action on the monitoring strategy included in the TMDL submittal.

10. Implementation

EPA policy (USEPA. 1997) 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. The 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.

EPA encourages States/Tribes to include restoration recommendations (e.g., framework) in all TMDLs for stakeholder and public use to guide future implementation planning. This could include identification of a range of potential management measures and practices that might be feasible for addressing the main loading sources in the watershed (see USEPA. 2008b, Chapter 10). Implementation plans are not a required part of the

DANR's framework restoration strategy is outlined in the original Statewide Mercury TMDL (Section 11.0 of SD DANR, 2016). Because the loading analysis showed that nonpoint sources, largely outside of South Dakota, account for over 99% of the mercury loading to state waterbodies, the TMDL requires all reductions to occur through the LA and stresses the importance of national and international regulatory controls on mercury emissions such as the U.S. Mercury Air Toxics Standards Rule and the United Nations Minamata Convention Agreement. DANR also highlighted recent emission reductions observed at two South Dakota coal power plants (Ben French and SDSU) and in-state efforts to recycle mercury-containing solid waste products and avoid releases of mercury from these products into the

environment. Pretreatment programs implemented by the larger publicly owned treatment plants also evaluate for mercury in the wastewater entering their system.

Assessment: Although not a required element of the TMDL approval, DANR discussed how information derived from the TMDL analysis process can be used to support implementation of the TMDL. The EPA is taking no action on the implementation portion of the TMDL submittal.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. §25.3 and §130.7(c)(1)(ii)).

The final TMDL submittal must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments (40 C.F.R. §25.3 and §25.8).

Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate

The submittal explains the public engagement process DANR followed during development of the Addendum (Section 8.0). A draft TMDL report was released for public comment from April 16, 2024 to May 21, 2024. The opportunity for public review and comment was posted on DANR's website and announced in four local newspapers: Sioux Falls Argus Leader, Minnehaha Messenger, Madison Daily Leader, Parker New Era. No public comments were submitted.

Assessment: The EPA has reviewed DANR's public participation process and concludes that DANR involved the public during the development of the TMDL and provided adequate opportunities for the public to comment on the draft report.

12. Submittal Letter

The final TMDL submittal must 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 (40

C.F.R. §130.7(d)(1)). The final submittal letter should contain such identifying information as the waterbody

A transmittal letter with the appropriate information was included with the final TMDL report submission from DANR, dated May 22, 2024 and signed by Alan Wittmuss, Environmental Scientist Manager – TMDL Team Leader, Watershed Protection Program.

Assessment: The EPA concludes that the state's submittal package clearly and unambiguously requested EPA to act on the TMDL in accordance with the Clean Water Act and the submittal contained all necessary supporting information.

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