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PUBLIC NOTICE[1]

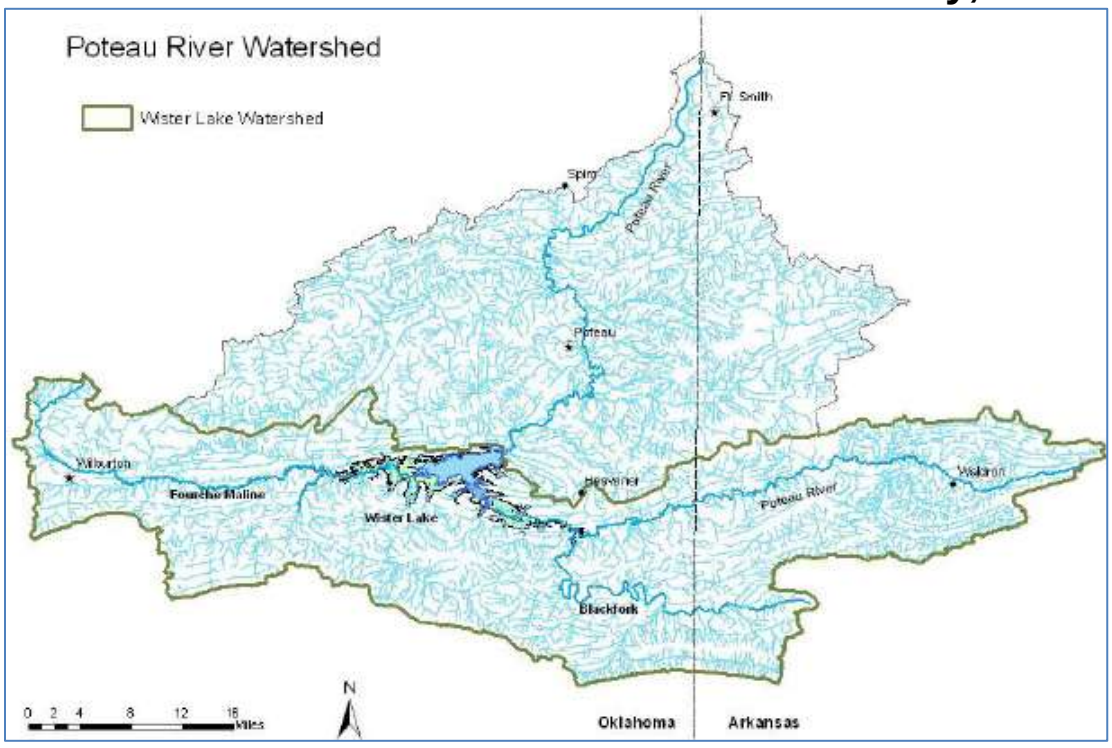
November 22, 2024

Availability of Draft Total Phosphorus (TP), Chlorophyll-a and Turbidity TMDLs for Lake Wister

Proposed Modification to Incorporate Lake Wister Total Phosphorous (TP), Chlorophyll-a and Turbidity TMDLs into Oklahoma's Water Quality Management Plan

Request for Public Comments

Public Comment Period Ends on Monday, January 6, 2025



The Oklahoma Department of Environmental Quality (DEQ) is seeking comments on a draft Total Maximum Daily Load (TMDL) report entitled, "Lake Wister Water Quality Modeling in Support of Nutrient and Sediment TMDL Development". This report describes the reductions in total phosphorus (TP) and total suspended solids (TSS) needed to achieve compliance with water quality standards (WQS) for chlorophyll-a and turbidity in Wister Lake. This TMDL report is based on the 2020 Integrated Report and 303(d) list.

DEQ is also proposing to incorporate these TMDLs into Oklahoma's Water Quality Management Plan (208 Plan). The "**208 Factsheet regarding TP, Chlorophyll-a and Turbidity TMDLs in Lake Wister**" is attached. The full TMDL report can be found on-line at: https://www.deq.ok.gov/water-quality-division/watershed-planning/tmdl/.

[1] As a convenience, this DEQ public notice includes links to third-party sites. DEQ's inclusion of a linked site does NOT constitute an endorsement, recommendation, or favoring of the contents. Please be aware that we do not control or guarantee the accuracy, relevance, timeliness, or completeness of this outside information. Further, the inclusion of third-party sites is not intended to reflect their importance, nor is it intended to endorse any views expressed by the author or organization of the reference. The purpose of providing these links is to ensure that the recipient or reader of this notice has additional useful information and references to assess this TMDL report.

Background

The Federal Clean Water Act requires states to develop Water Quality Standards (WQS)[2] which provide goals and pollution control targets for improving water quality where the standards are not met. The waterbodies where standards are not met are considered to be "impaired." Impaired waterbodies are listed on what is known as the 303(d) list, which refers to Section 303(d) of the Clean Water Act. The plan to improve water quality for impaired waterbodies is accomplished by establishing limits known as Total Maximum Daily Loads (TMDLs) for each pollutant not meeting the standards. TMDLs set levels for pollutants that allow waterbodies to achieve their WQS for beneficial uses. Lake Wister is a 25.4 km^2 (6,259-acre) flood control, water supply, and recreation reservoir located in LeFlore County in eastern Oklahoma. Wister Dam, constructed by the US Army Corps of Engineers in 1949, impounds the Poteau River and its tributary, Fourche Maline Creek. Lake Wister is the source of drinking water and water for commercial and industrial uses for most of LeFlore County and portions of adjacent counties. The Poteau Valley Improvement Authority (PVIA) treats from Lake Wister and distributes it to sixteen cities and rural water districts in the region. Designated uses of the lake are public and private water supply, agriculture, primary body contact recreation, fish and wildlife propagation, Fish Consumption, and aesthetics. The beneficial uses are all described in in the Oklahoma Water Quality Standards (OWQS) [Title 252, Chapter 730]. All waterbodies and their designated beneficial uses can be found in Appendix A of the OWQS. The assessment on whether the waterbodies are meeting their designated beneficial uses along with the current 303(d) list of impaired waterbodies is in a document entitled the "Integrated Report". States are required to develop these Integrated Reports every two years. The assessment of all Oklahoma waterbodies for their beneficial uses can be found in Appendix B (Comprehensive Waterbody Assessment) of Oklahoma's Integrated Report.

Beneficial Uses

The designated beneficial uses for Wister Lake (WBID: OK220100020020_00):

- Aesthetics (AES)
- Agriculture (AG)
- Fish & Wildlife Propagation
    - Warm Water Aquatic Community Subcategory (WWAC)
- Fish Consumption (FISH)
- Primary Body Contact Recreation (PBCR)
- Public & Private Water Supply (PPWS)

Table 1 is an assessment from Oklahoma's 2020 Integrated Report (IR) on whether or not the waterbodies in the Study Area met their designated beneficial uses.

Table 1: Assessed Beneficial Uses for Waterbodies in the Study Area

Waterbody Identification	Waterbody Name	AES	AG	WWAC	FISH	PBCR	PPWS
OK220100020020_00	Wister Lake	N	F	N	N	F	N

F – Fully supporting that designated use; **N – Not supporting that use**; **I – Insufficient information**; **X – Not assessed**

[2] Oklahoma's Water Quality Standards and Implementation of Oklahoma's Water Quality Standards can be found at the Oklahoma Department of Environmental Quality (DEQ) website

Impairments

Based on an assessment of water quality monitoring data for the 2020 IR, Oklahoma DEQ has determined that Wister Lake (OK220100020020_00) is not supporting its designated uses of Public and Private Water Supply, Fish and Wildlife Propagation, Fish Consumption, and Aesthetics. Causes of impairment include excess chlorophyll-a, turbidity, mercury, and phosphorus. This report describes the current water quality conditions in Lake Wister and a modeling application to derive load reduction estimates and inform the development of TMDLs for Total Phosphorus (TP) and Total Suspended Solids (TSS). This report does not address lake impairments due to excessive mercury. High levels of turbidity and chlorophyll-a can have deleterious effects on raw water quality, such as taste and odor complaints and treatment costs of drinking water.

- **Chlorophyll-a**: OAC 252:730-5-10(7) stipulates the long-term average concentration of chlorophyll-a at a depth of 0.5 meters below the surface shall not exceed 0.010 mg/L in Wister Lake. Wherever, such criterion is exceeded, numerical phosphorus or nitrogen criteria or both may be promulgated.
- **Turbidity:** When more than 10% of turbidity samples in a lake are greater than 25 NTU based on long-term record of most recent 10years, the WWAC beneficial use will be considered not attained. Turbidity is a measure of water clarity and is caused by suspended particles in the water column. Turbidity, however, cannot be expressed as a mass load. Total suspended solids (TSS) are therefore modeled and evaluated as a surrogate for turbidity using a site-specific relationship derived from TSS and turbidity measurements.

TMDL Study

A TMDL is a plan of action to reduce pollutant loads so that impaired waterbodies will be able to meet their beneficial uses. TMDLs calculate the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will be able to meet water quality standards for that particular pollutant. The TMDL report uses scientific data collection, analysis, and water quality modeling to determine the sources and amounts of pollutants entering the waterbodies. Then the TMDL allocates loads to point sources (these are known as waste load allocation or WLA) and nonpoint sources (NPS) which are given a load allocation or LA.

The National Pollutant Discharge Elimination System (NPDES) program regulates point source discharges. The NPDES Program in Oklahoma, in accordance with an agreement between DEQ and EPA, is implemented via the Oklahoma Pollutant Discharge Elimination System (OPDES) Act [Title 252, Chapter 606 (https://www.deq.ok.gov/wp-content/uploads/deqmainresources/606.pdf)]. A point source is described as a "discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters." These are usually, but not always, discharges from a pipe. TMDLs must provide WLAs for all NPDES regulated point sources. Nonpoint sources (NPS) are ones, like agricultural runoff, that cannot be identified as entering a waterbody at a single location.

An important part of TMDL analysis is the identification of all sources of pollutants (both point and nonpoint) in the watershed. Once identified, all contributing sources of the pollutants are allocated a portion of the allowable load. This usually requires a reduction in the amount of pollution the source is discharging in order to help the waterbody no longer be impaired. Natural background sources, seasonal variations, and a margin of safety (usually at least 10%) are all taken into account in the allocations. The TMDL equation is as follows:

TMDL = WLA (waste load allocations from point sources) + LA (from nonpoint sources) + MOS (Margin of safety)

Watershed

Lake Wister is located in the Arkansas Valley Level III Ecoregion (US EPA 2013). The Poteau River rises on the slopes of the Ouachita Mountains in western Arkansas, east of the city of Waldron. It runs west to Lake Wister where it turns north and flows to its confluence with the Arkansas River at Fort Smith, Arkansas. The second major tributary of the lake, Fourche Maline Creek, rises on the slopes of the San Bois Mountains north of Wilburton, Oklahoma. The Fourche Maline likewise descends quickly to a lower gradient and flows east to Lake

Wister. Wister Dam was constructed on the Poteau River just downstream from where the Fourche and Poteau River converged. Wister Lake is located approximately mid-way in the Poteau River watershed and receives water from a watershed of approximately 2572 km^2 (993 sq. miles).

Wister Lake

Wister Lake (OK220100020020_00) is listed as 7,333 acres in the 2020 IR, but the most bathymetric survey of the lake found the size to be 6,259 acres. It is located in LeFlore County in eastern Oklahoma. At its conservation pool elevation of 145.7 m (478 ft.), Lake Wister has an average depth of 2.4 m (8 ft.) resulting in the storage of approximately 62.3 x 10^6 m^3 water (50,529 acre-feet). Its primary function is flood control, and the surface of the lake can increase by almost four times resulting in a potential storage of 473 x 10^6 m^3 water (383,302 acre-ft.).

Point Source Discharges:

- **OPDES regulated municipal and industrial wastewater treatment facilities:** There are 7 facilities in the Study Area (two in Arkansas and five in Oklahoma). Five wastewater dischargers are located in the Poteau River arm of the Lake Wister drainage (two in Arkansas and three in Oklahoma) and two are located in the Fourche-Maline Creek watershed area (Figure 1-5).
- **OPDES regulated stormwater discharges:** DEQ regulates stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s), industrial sites, and construction sites. However, DEQ's stormwater program does not include the discharges from Indian Country lands, discharges related to oil & gas extraction, or discharges associated with agricultural purposes. For details about DEQ's Stormwater Program, go to https://www.deq.ok.gov/stormwater-permitting/. There are no MS4s in the Wister Lake watershed and all other stormwater discharges (multi-sector general permit and construction permit) are included in Load Allocation (LA).

Nonpoint Sources of Discharges in the Study Area:

Nonpoint sources include those sources that cannot be identified as entering the waterbody at a specific location. Nonpoint sources of pollutants are typically separated into urban and rural categories. Surface storm runoff is an important source of loading in urban or residential settings with many roads and other paved, impervious areas. In rural settings, the important sources are animal manures and soil erosion. There were some numbers of poultry houses and animal farms in the Wister Lake watershed. Most of the chicken litter created by broiler production is applied to pasture for cattle production (Table 1-2) and a portion of applied litter runs off the land and into streams and the lake. Phosphorus that does not run off remains in the soli, bound to soil particles and then moves with the soil when it is eroded.

TMDL Calculations:

The TMDL to meet WQS was based on 5 years simulation (2011 – 2015) with the use of the Estuarine, Lake, and Coastal Ocean Model (ELCOM) in conjunction with the Computational Aquatic Ecosystem Dynamic Model (CAEDYM) developed by the Centre for Water Research at the University of Western Australia. Due to limited data, the regression models were used to generate the continuous data set for the boundary conditions in the ELCOM-CAEDYM (Table 2-3). The five model years were divided into three calibration years (2011, 2013, and 2015) and two validation years (2012 and 2014). Model performance statistics for both the calibration and validation years were evaluated based on the criteria in Table 2-5. For chl-a, the model performed well at predicting the average concentrations, but relatively weak at predicting extreme conditions. For TSS, the model performed best at predicting TSS concentrations in 2013 and 2014 where there were relatively frequent rainfall events that were not particularly large relative to other years (2011, 2012, and 2015).

Recommendations:

TP and TSS TMDLs were established with the model simulations to achieve the long-term chl-a concentration less than 10 µg/L and turbidity violations (>25 NTU) less than 10% of observations.

Table 2 TMDLs and Target Loads

Parameter	Average Load for the Simulation Period (kg/yr)	Reduced Annual Load (kg/yr)	10% MOS (kg/yr)	Target Annual Load (kg/yr)	Target Daily Load (kg/day)
TP	221.787	48,793 (78% reduction)	4,879	43,914	120
TSS	142,560,053	41,342,415 (71% reduction)	4,134,242	37,208,174	101,940

All major point source dischargers (Heavener Utility Authority, Wilburton Public Works Authority, the City of Waldron (AR), and Tyson Processing Plant in Waldron, AR) should have a discharge permit limit of 1 mg/L TP. Current TSS permit limits represent about 0.3% of TSS TMDL, so no reduction in the permit limits has been recommended. A 10% MOS is applied for the load allocations.

Table 3 Load Allocations

Parameter	TMDL (kg/day)	WLA	LA	MOS
TP	133.7	12.7	107.6	13.4
TSS	113,266.9	321.8	101,618.4	11,326.7

Providing comments

- DEQ invites your comments. The comment period will be open for 45 days. The TMDL report is a draft document and is subject to change based on comments received during the public participation process.
- You may also request a public meeting in writing. If there is a significant degree of interest, DEQ will schedule a public meeting.
- All official comments for the record must be submitted either in writing or by e-mail before the end of the comment period. DEQ will prepare a responsiveness summary addressing all comments received. After evaluating comments received and making any necessary changes, the TMDL report will be submitted to EPA for final approval. The final results of the TMDL will be incorporated into Oklahoma's Water Quality Management Plan.

Please submit your comments in writing to: Soojung Lim, Water Quality Division, Oklahoma Department of Environmental Quality, P.O. Box 1677, Oklahoma City, OK 73101-1677; (405) 702-8192; E-mail: Water.Comments@deq.ok.gov

Comments must be received by 4:30 pm on Monday, January 6, 2025

Obtaining copies: You may view the full Wister Lake TMDL Report by going to the DEQ website at: https://www.deq.ok.gov/water-quality-division/watershed-planning/tmdl/ or by picking up copies at the DEQ main office, Water Quality Division, 707 North Robinson, Oklahoma City from 8:30 am – 5:00 pm. A document copying fee may apply.

You are receiving this notice because you are either on DEQ's list to receive all public notices, or you requested notices about your watershed. In addition to proposed TMDL reports, DEQ's Watershed Planning & Stormwater Permitting Section sends out public notices about proposed wasteload allocations (208s), proposed changes to the CPP or Integrated Report, 404 projects, 401 Certification requests, and stormwater permits.

If you would like to receive any or all of these public notices via e-mail, please send your e-mail address to Water.Comments@deq.ok.gov. Also, please let us know if you want to receive notices for the entire State or just for your watershed.

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