

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

PUBLIC NOTICE¹

July 25, 2014

Availability of Draft Chlorophyll-*a* TMDLs for Copan Lake and Lake Claremore

Proposed Modification to Incorporate Copan Lake and Lake Claremore
Chlorophyll-*a* TMDLs into Oklahoma's Water Quality Management Plan

Request for Public Comments

Public Comment Period Ends on Monday, September 8, 2014



Copan Lake

(Photo courtesy of Green Country Marketing
Association at TravelOK.com)

The [Oklahoma Department of Environmental Quality \(DEQ\)](#) is seeking comments on a draft [Total Maximum Daily Load \(TMDL\)](#) report entitled, "**Chlorophyll-*a* TMDL Report for Copan Lake and Lake Claremore**". This report describes the reductions in total nitrogen (TN), and total phosphorus (TP) needed to achieve compliance with water quality standards for [chlorophyll-*a*](#) thus improving water quality in the Copan Lake and Lake Claremore watersheds. Elevated levels of chlorophyll-*a* means that too much [algae](#) is growing in the lakes. Too much algae ([eutrophication](#)) means there is a high concentration of nutrients, especially nitrogen and phosphorus, in the [lakes](#). Since there are no specific water quality standards (WQS) for [nitrogen](#) and [phosphorus](#) (also referred to as [nutrients](#)), this TMDL provides a numeric limit on [nutrients](#) needed to reach the chlorophyll-*a* standard.

[Eutrophication](#) can cause surface scum, poor water clarity, and noxious odors. It can affect the taste of drinking water as well as increase the costs of [treating the water](#). Algae in drinking water can also interact with disinfectants ([chlorine](#)) to produce unwanted byproducts ([trihalomethanes](#)), some of which can be carcinogenic.

DEQ is also proposing to incorporate these TMDLs into Oklahoma's Water Quality Management Plan (208 Plan). The "**208 Factsheet Regarding Chlorophyll-*a* TMDLs in the Copan Lake and Lake Claremore Watersheds**" is attached. The full Copan Lake and Lake Claremore TMDL report can be found on-line at: www.deq.state.ok.us/WQDnew/tmdl/index.html.

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](#)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](#).

Beneficial Uses and Impairments

Beneficial uses include water for [drinking](#), recreation, aesthetics, agriculture, fishing, and swimming. The beneficial uses are all described in the [Oklahoma Water Quality Standards](#) [Title 785, Chapter 45]. All waterbodies and their designated beneficial uses are listed in Appendix A of the WQS. According to Appendix A.3 of the WQS, Copan Lake and Lake Claremore are also considered to be Sensitive Water Supply (SWS) lakes [785:45-5-25(c)(4)(A)]. The SWS designation means that conditions are present that make these public and private water supply lakes more susceptible to pollution. As a result, the WQS require that the water quality of SWS lakes must be maintained and [protected](#) [785:45-3-2(c)].

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](#)”. The criteria to determine if a stream is listed on the 303(d) list can be found in [Implementation of Oklahoma’s Water Quality Standards](#) (Title 785, Chapter 46). States are required to develop Integrated Reports every two years.



According to Oklahoma’s 2012 Integrated Report, the [Public and Private Water Supply](#) (e.g. drinking water) beneficial use for Copan Lake and Lake Claremore is impaired for chlorophyll-*a*. The Public and Private Water Supply designated use, as outlined in the WQS, limits the amount of chlorophyll-*a* allowed in SWS lakes to 10.0 µg/L [785:45-5-10(7)]. In addition to being impaired for chlorophyll-*a*, Lake Claremore is impaired for [turbidity](#) so it can’t meet its beneficial use for Fish & Wildlife Propagation-Warm Water Aquatic Community (WWAC) Subcategory. Lake Claremore is also impaired for color so it can’t meet its aesthetic beneficial use. These water quality issues will be addressed in a future study.

TMDLs

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. In accordance with an [agreement between DEQ and the Environmental Protection Agency \(EPA\)](#), the NPDES Program in Oklahoma is implemented via the *Oklahoma Pollutant Discharge Elimination System (OPDES) Act*. OPDES Standards can be found in Title 252, Chapter 606 (<http://www.deq.state.ok.us/rules/606.pdf>). TMDLs must provide WLAs for all NPDES-regulated point sources.

² A PowerPoint presentation on “Implementation of Water Quality Standards” can be found at the [Oklahoma Water Resources Board’s \(OWRB\)](#) website. It can be found at: www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/waterscienceseminar/SmolenWQImplementation.pdf

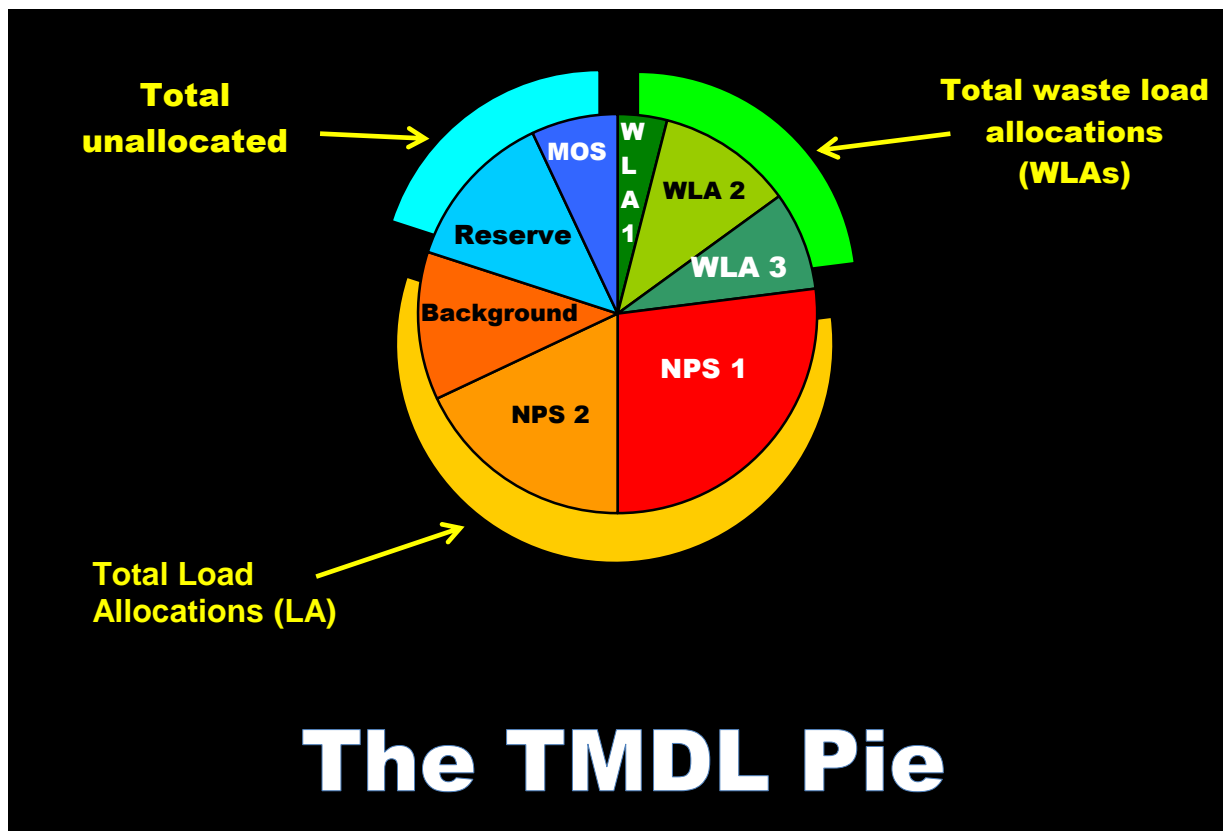
A point source is described as a “discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters.” These are usually, but not always, discharges from a pipe. Nonpoint sources (NPS) are ones, like agricultural runoff, that cannot be identified as entering a waterbody at a single location.



DEQ file photo of a point source discharge

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:

$$\text{TMDL} = \text{WLA} \text{ (waste load allocations from [point sources](#))} + \text{LA} \text{ (from [nonpoint sources](#))} + \text{MOS} \text{ (Margin of safety)}$$



WATERSHED

This TMDL Study Area is in east north central Oklahoma in the [Verdigris River Basin](#). [Copan Lake](#) (OK121400050020_00) is in the [Caney watershed](#) (USGS [HUC](#) 11070106). [Lake Claremore](#) (OK121500040020_00) is in the [Lower Verdigris](#) watershed (USGS HUC 11070105).

- [Copan Lake](#) is a 4,850-acre lake of which 84% is in Kansas and 16% is in [Washington](#) County in Oklahoma. It was first impounded in 1983 by the U.S. Army Corp of Engineers (USACE) and primarily serves as a recreational lake. It is also used for flood control, water supply, water quality, and fish & wildlife. [Little Caney River](#) (aka Caney Creek - 5.52 miles long) is the primary tributary flowing to Copan Lake. Between 2003 and 2012, 49 Copan Lake chlorophyll-a samples averaged 19 µg/L. Between 1999 and 2012 in Copan Lake, TN levels averaged approximately 0.65 mg/L, and TP levels averaged 0.09 mg/L.

- [Lake Claremore](#) is a 470-acre reservoir in [Rogers](#) County and is owned by the City of Claremore for which it serves as a municipal water supply. It also serves as a recreational lake. Lake Claremore was created in 1930 by impounding 16.87-mile [Dog Creek](#) (OK121500040010_00) and 5.9-mile [Little Dog Creek](#) (OK121500040030_00). Between 2003 and 2010, 43 Lake Claremore chlorophyll-a samples averaged 30.4 µg/L. Between 2001 and 2010 in Lake Claremore, TN levels averaged approximately 1.07 mg/L, and TP levels averaged 0.08 mg/L.

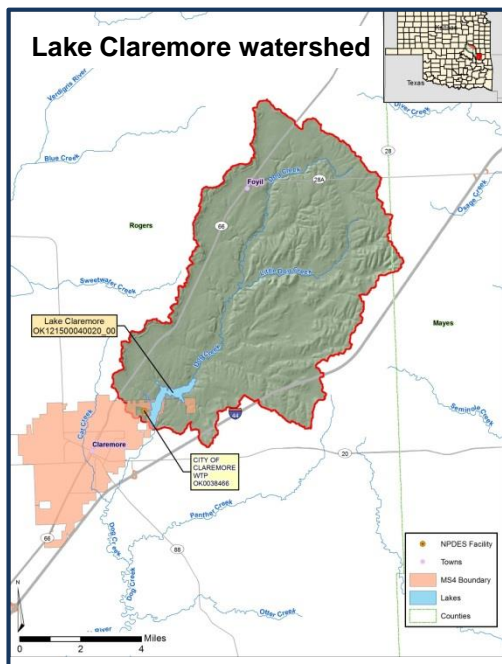
Point Source Discharges in the Copan Lake & Lake Claremore Watersheds

- **OPDES regulated [municipal](#) and [industrial wastewater treatment facilities](#):** There are no OPDES industrial point source dischargers in the Study Area, but there are two continuous municipal point source dischargers. The Copan Public Works Authority is a wastewater plant which is a possible source of nutrient loading. They made a formal request in May 2014 to move their discharge point to the stream segment just below Copan Lake. Once they make this move, there will no longer be a continuous point source discharger in the Copan Lake watershed so they will not require a WLA. The facility in the Lake Claremore watershed is a water treatment plant, which is not a source of nutrients.
- **OPDES regulated [stormwater](#) discharges:** DEQ [regulates stormwater discharges](#) from Municipal Separate Storm Sewer Systems (MS4s), industrial sites, and construction sites. But 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 www.deq.state.ok.us/WQDnew/stormwater/.



MS4s

Polluted stormwater runoff is commonly transported through MS4s, from which it is often discharged untreated into local waterbodies. Phase I of the MS4 program required *medium* and *large* cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. There aren’t any Phase I permittees in the Study Area.



Phase II of the MS4 Program requires regulated [small MS4s](#) to obtain an MS4 Permit from DEQ ([OKR04](#)). Phase II permittees must develop stormwater management programs that are designed to reduce discharges of pollutants to the “maximum extent practicable”. This is done through the implementation of [Best Management Practices \(BMPs\)](#) and must address the following six minimum control measures:

1. [Public Education and Outreach](#)
2. [Public Participation/Involvement](#)
3. [Illicit Discharge Detection and Elimination](#)
4. [Construction Site Runoff Control](#)
5. [Post-Construction Runoff Control](#)
6. [Pollution Prevention/Good Housekeeping](#)

The City of Claremore has a Phase II MS4 permit. But since just 1% of the watershed is within Claremore’s MS4 boundary, permitted stormwater is not considered a significant source of nutrient loading. Therefore, a WLA will not be required for the City of Claremore’s stormwater permit.

☛ Industrial Sites

Stormwater run-off from industrial sites is regulated because stormwater from industrial facilities may come into contact with many different types of pollutants including process wastewater, equipment wash run-off, leaks from storage tanks, oil & gas from vehicles, pesticides & fertilizers, and sediment. [DEQ's Multi-Sector General Permit \(MSGP\)](#) is required from all industrial facilities whose Standard Industrial Classification (SIC) code is listed on Table 1-2 of the MSGP. But facilities with those SIC codes are not sources of nutrients so their stormwater discharge was not considered in this study.

☛ Construction Sites

Stormwater from construction sites is not a source of nutrients so it was not considered in this study.

- **No-Discharge Facilities:** There weren't any of these facilities in the Study Area.

■ Sanitary sewer overflows (SSO)

The sanitary sewer system is the network of underground pipes that carry wastewater from sinks, toilets, showers, bathtubs, and interior floor drains to the wastewater treatment plant where it is cleaned and treated before being discharged into local waterbodies. [Sanitary sewer overflows](#) from wastewater collection systems can be a major source of harmful bacteria and other pollutants into streams. Most overflows are caused by blockage of sewer pipes by grease, tree roots, trash, and other debris that clog sewer lines; by sewer line breaks and leaks; by cross connections with storm sewers; excessive rain; and by inflow and infiltration of groundwater into sanitary sewers.



SSO

Photo courtesy of the
City of Raleigh, NC

SSOs are a common result of the aging wastewater infrastructure around Oklahoma. Oklahoma has been ahead of other states and, in some cases EPA itself, in its handling of SSOs. Due to the widespread nature of the SSO problem, DEQ has focused its limited resources to first target SSOs that result in definitive environmental harm (such as fish kills) or come from citizen complaints. All SSOs falling into these two categories are addressed through DEQ's formal enforcement process. While not all sewer overflows are reported, DEQ has some data. For example between 1999 and 2005 in the Lake Copan watershed, there were reported 14 overflows ranging from 2 – 5 million gallons. A summary of these can be found in Table 3-2 of the TMDL report. Given the low occurrence of reported overflows, the amount of nutrients into Copan Lake from SSOs is considered to be negligible. There aren't any known SSOs in the Lake Claremore watershed.

■ Animal Feeding Operations (AFOs)



Photo courtesy of the [USDA's ARS](#)

The [Agricultural Environmental Management Services \(AEMS\)](#) is a program within the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). Through regulations established by the [Oklahoma Concentrated Animal Feeding Operation \(CAFO\) Act](#), [Swine Feeding Operation \(SFO\) Act](#), and the [Poultry Feeding Operation \(PFO\) Registration Act](#), AEMS helps develop, coordinate, and oversee environmental policies and programs aimed at protecting the Oklahoma environment from pollutants associated with agricultural animals and their waste. ODAFF is the NPDES-permitting authority for CAFOs and SFOs in Oklahoma under what ODAFF calls the [Agriculture Pollutant Discharge Elimination System](#)

(AgPDDES). AEMS works with producers who use [BMPs](#) to ensure that animal waste does not impact the waters of the State. However, there are no AFOs within the Copan Lake or Lake Claremore watersheds.

Nonpoint Sources

Nonpoint sources include those sources that cannot be identified as entering the waterbody at a specific location. Non-point sources of pollutants are typically separated into urban and rural categories. Surface storm runoff³ is an important source of loading in urban or residential settings with high amounts of paved, impervious areas. Many nutrients from nonpoint sources get into waterbodies through polluted runoff.

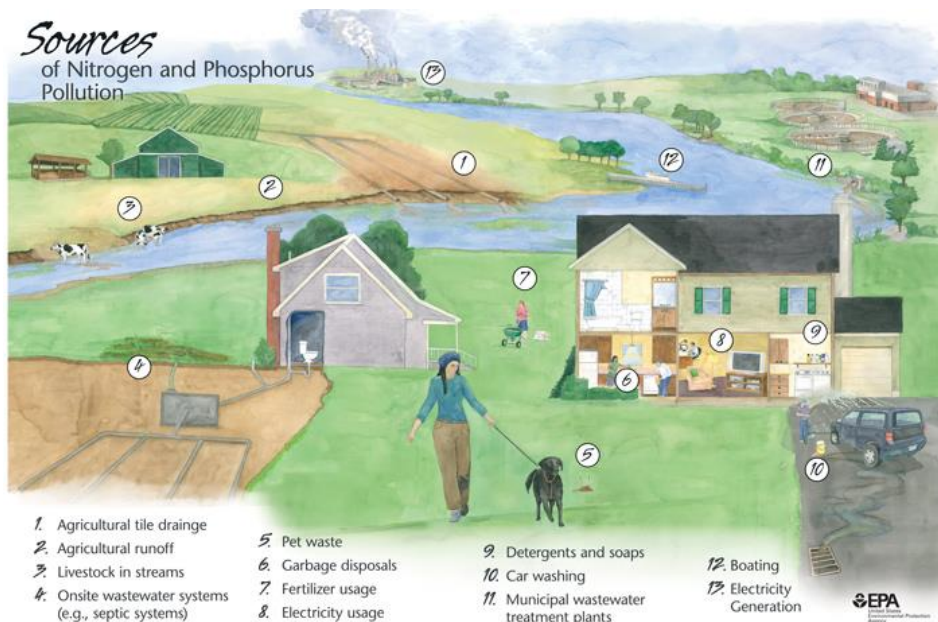


Extra nitrogen in the air can result in excess nitrogen in waterbodies (through acid rain) as well as hurting our ability to breathe and altering plant growth.

Almost all of the nutrient loading into the Copan Lake and Lake Claremore watersheds comes from nonpoint sources. Nutrient sources in rural watersheds originate from soil erosion, agricultural fertilization, residues from mowing and harvesting, leaf litter, and fecal waste deposited in the watershed by livestock. Causes of soil erosion can include natural causes such as flooding and wind, construction activities, vehicular traffic, and agricultural activities. Other sources of nutrient loading in a watershed include atmospheric deposition, failing onsite wastewater disposal (OSWD) systems, and fecal matter deposited in the watershed by wildlife and pets.

Nonpoint sources of nutrients may include:

- Agriculture (e.g., fertilized soils, manure application)
- Urban runoff (e.g., lawns, roads & highways)
- Air [e.g., emissions from vehicles, ammonia (NH₄) emissions from animal waste (contributes nitrogen loadings to land & water⁴), etc.]
- Grazing livestock
- Failing Septic Systems (source of nutrients)
- Domestic pets



³ For information on how to reduce runoff after rainstorms, request the free DVD, "Reduce Runoff: Slow it Down, Spread it Out, Soak it in!" (EPA Publication #84211001) from the National Service Center for Environmental Publications at their webpage (<http://www.epa.gov/nscep/>) or call them at 800-490-9198. The DVD includes the video, "After the Storm" which was co-produced by EPA and The Weather Channel. The "After the Storm" brochure (PDF) can be downloaded at <http://water.epa.gov/action/weatherchannel/index.cfm>.

⁴ National Oceanic and Atmospheric Administration, Air Resources Laboratory: <http://www.arl.noaa.gov/AtmChem.php>

TMDL Models and Calculations

Soil and Water Assessment Tool (SWAT): The purpose of a TMDL is to identify sources of pollutants in a watershed and calculate the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. Given the lack of in-stream water quality data and pollutant source data available to quantify nutrient and sediment loading directly from the tributaries of Copan Lake and Lake Claremore, **SWAT**, which is a basin-scale watershed loading model, was used to develop nonpoint source loading estimates. Major components of SWAT include weather, hydrology, soil temperature and properties, plant growth, nutrients, and land management. These estimates from SWAT were used to quantify the nutrient contributions to each lake from agricultural, forest, and range management activities. For more information, see Section 3.3 and Appendix C of the *Chlorophyll-a TMDL Report for Copan Lake and Lake Claremore*.

BATHTUB: It is necessary to establish a linkage between the external loading of nutrients and the waterbody response in terms of lake water quality conditions, as evaluated by chlorophyll-a concentrations. The water quality linkage analysis was performed using the **BATHTUB** reservoir water quality model. BATHTUB is a USACE model designed to simulate eutrophication in reservoirs and lakes. BATHTUB has been cited as an effective tool for reservoir and lake water quality assessment and management, particularly where data are limited. The model incorporates several empirical equations of nutrient settling and algal growth to predict steady-state water column nutrient and chlorophyll-a concentrations based on waterbody characteristics, hydraulic characteristics, and external nutrient loadings. The BATHTUB models for each lake were run under average existing conditions, and calibrated to measure in-lake water quality conditions (based on 1999-2012 data) using phosphorus, nitrogen, chlorophyll-a and secchi disk calibration factors. For more information about how BATHTUB was used in this study, see Section 4 of the *Chlorophyll-a TMDL Report for Copan Lake and Lake Claremore*.

Recommendations

The following table summarizes the percent reduction goals for nutrient loading established for each lake.

Total Phosphorus and Nitrogen Load Reductions Needed to Meet Chlorophyll-a In-lake Water Quality Targets

Lake	Percent Reduction	Maximum Allowable Load (kg/yr) ^a	
		Total Phosphorus	Total Nitrogen
Copan Lake	50%	237,700	688,350
Lake Claremore	73%	6,048	29,187

^a Loads do not include atmospheric deposition or the point source discharging to Copan Lake.

These maximum allowable loads for both nitrogen and phosphorus include an inherent margin of safety.

TMDLs for Chlorophyll-a Expressed in Kilograms of Total Phosphorus and Nitrogen Per Day

Waterbody Name	Waterbody ID	Nutrient	TMDL	WLA	LA	MOS
Copan Lake	OK121400050020_00	Total Phosphorus	605.1	0	605.1	Implicit
		Total Nitrogen	1826.8	0	1826.8	Implicit
Lake Claremore	OK121500040020_00	Total Phosphorus	19.1	0	19.1	Implicit
		Total Nitrogen	112.6	0	112.6	Implicit

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.



Green driveways and rain gardens are attractive ways of reducing runoff from paved areas.

Please submit your comments in writing to:

**Dr. Karen Miles, 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, September 8, 2014

Obtaining copies: You may view the full Copan Lake and Lake Claremore TMDL study by going to the DEQ website at: www.deq.state.ok.us/WQDnew/tmdl/index.html 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](#).

By receiving PDF public notices via e-mail, you will help save money and the environment by reducing the amount of paper we use to mail them. In addition to helping the environment, you will be able to click on helpful FYI hyperlinks.

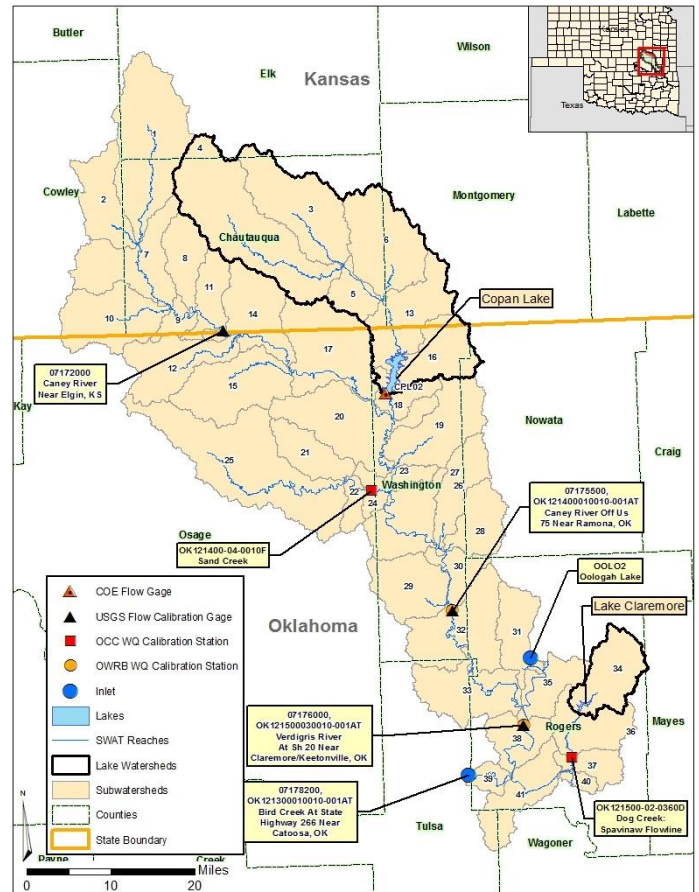


Note to newspapers: This notice is for your information only. **Do not publish in the legal section or as a legal notice.**

208 FACTSHEET REGARDING CHLOROPHYLL-*a* TMDLs in the COPAN LAKE and LAKE CLAREMORE WATERSHEDS

Watershed: This TMDL Study Area is in the east north central Oklahoma in the [Verdigris River Basin](#). [Copan Lake](#) (OK121400050020_00) is in the [Caney watershed](#) (USGS HUC 11070106). [Lake Claremore](#) (OK121500040020_00) is in the [Lower Verdigris watershed](#) (USGS HUC 11070105).

Beneficial Uses and Impairments: This TMDL study was done because the Public and Private Water Supply beneficial use for both of these lakes is impaired because of elevated chlorophyll-*a* levels. Copan Lake and Lake Claremore are Sensitive Water Supply (SWS) lakes [785:45-5-25(c)(4)(A)]. The Public and Private Water Supply designated use limits the amount of chlorophyll-*a* allowed in SWS lakes to 10.0 µg/L [785:45-5-10(7)]. In addition to being impaired for chlorophyll-*a*, Lake Claremore is impaired for turbidity so it can't meet its beneficial use for Fish & Wildlife Propagation-Warm Water Aquatic Community (WWAC) Subcategory. Lake Claremore is also impaired for color so it can't meet its aesthetic beneficial use. These water quality issues will be addressed in a future study.



Possible Sources of Impairments:

Point sources - The point sources examined in the Copan Lake and Lake Claremore watersheds examined in this TMDL study were:

- **OPDES-regulated [municipal](#) and [industrial wastewater treatment facilities \(WWTF\)](#)** – There are no OPDES industrial point source dischargers in the Study Area, but there are two continuous municipal point source dischargers. The Copan Public Works Authority is a wastewater plant which is a possible source of nutrient loading. They made a formal request in May 2014 to move their discharge point to the stream segment just below Copan Lake. Once they make this move, there will no longer be a continuous point source discharger in the Copan Lake watershed so they will not require a WLA. The facility in the Lake Claremore watershed is a water treatment plant, which is not a source of nutrients.
- **[OPDES regulated stormwater discharges](#)** - DEQ [regulates stormwater discharges](#) from Municipal Separate Storm Sewer Systems (MS4s), industrial sites, and construction sites.
 - ☛ **[Municipal Separate Storm Sewer Systems \(MS4s\)](#)** - The City of Claremore has a Phase II MS4 permit. But since just 1% of the watershed is within Claremore's MS4 boundary, permitted stormwater is not considered a significant source of nutrient loading. Therefore, a WLA will not be required for the City of Claremore's stormwater permit. There aren't any MS4s in the Copan Lake watershed.
 - ☛ **[Industrial Sites](#)** – [DEQ's Multi-Sector General Permit \(MSGP\)](#) is required from all industrial facilities whose Standard Industrial Classification (SIC) code is listed on Table 1-2 of the MSGP. But facilities with those SIC codes are not sources of nutrients so their stormwater discharge was not considered in this study.

☛ [Construction Sites](#) - Stormwater from construction sites is not a source of nutrients so it was not considered in this study.

- **No-Discharge Facilities** – There weren't any of these facilities in the Study Area.
- **Sanitary Sewer Overflows (SSO)** - In the Study Area between 1999 and 2005, just 14 SSO occurrences were reported with amounts ranging from 2 – 5 million gallons.
- **Animal Feeding Operations (AFOs)** - The Oklahoma Department of Agriculture, Food and Forestry (ODAFF) has been approved by EPA to issue NPDES permits in Oklahoma under the [Agriculture Pollutant Discharge Elimination System \(AgPDES\)](#). There aren't any AFOs in the Copan Lake or Lake Claremore watersheds.

Since the amount of nutrients from point sources is considered to be negligible, then almost all nutrient loading to the Copan Lake and Lake Claremore watersheds must come from nonpoint sources.

Recommendations:

The TMDL models used in this Study were SWAT (to develop nonpoint source loading estimates) and BATHTUB (which simulates eutrophication in reservoirs and lakes). The following table summarizes the percent reduction goals for nutrient loading established for each lake:

Total Phosphorus and Nitrogen Load Reductions Needed to Meet Chlorophyll-*a* In-lake Water Quality Targets

Lake	Percent Reduction	Maximum Allowable Load (kg/yr) ^a	
		Total Phosphorus	Total Nitrogen
Copan Lake	50%	237,700	688,350
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^a Loads do not include atmospheric deposition or the point source discharging to Copan Lake.

These maximum allowable loads for both nitrogen and phosphorus include an inherent margin of safety:

TMDLs for Chlorophyll-*a* Expressed in Kilograms of Total Phosphorus and Nitrogen Per Day

Waterbody Name	Waterbody ID	Nutrient	TMDL	WLA	LA	MOS
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		Total Nitrogen	112.6	0	112.6	Implicit

The full Copan Lake and Lake Claremore TMDL report can be found on the following DEQ webpage: <http://www.deq.state.ok.us/WQDnew/tmdl/index.html>.

EPA Approval Date: Pending
Record Last Updated: 07/25/2014