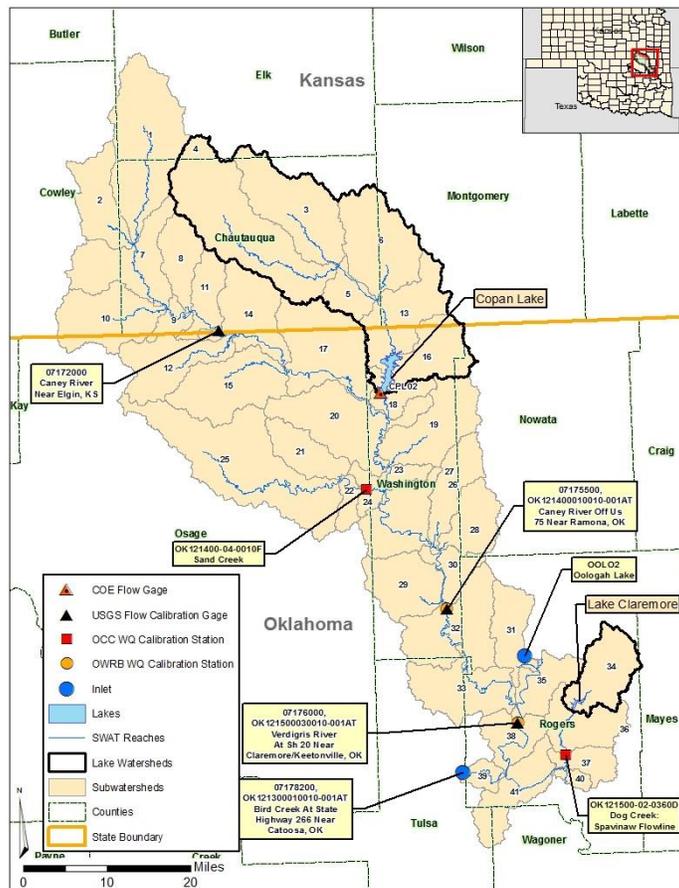


208 FACTSHEET REGARDING CHLOROPHYLL-*a* TMDLs in the COPAN LAKE and LAKE CLAREMORE WATERSHEDS

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
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

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>.

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