

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

PUBLIC NOTICE¹

Revision – Public Comment Ending Period Extended to March 8th, 2016

December 23, 2015

Availability of Draft Bacterial and Turbidity TMDLs for the Canadian River Study Area

**Proposed Modification to Incorporate Canadian River Area Bacterial TMDLs into
Oklahoma's Water Quality Management Plan**

Request for Public Comments

Public Comment Period Ends on **March 8, 2016**



The [Oklahoma Department of Environmental Quality \(DEQ\)](#) is seeking comments on a draft [Total Maximum Daily Load \(TMDL\)](#) report describing reductions of [bacteria](#) needed to improve water quality in the Canadian River Study Area. This Study Area is in the central portion of Oklahoma in the [Little watershed \(USGS HUC 11090203\)](#). The Study Area covers portions of Oklahoma and Cleveland counties.

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

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

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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

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 include water for [drinking](#), recreation, aesthetics, agriculture, fishing, and swimming. The beneficial uses are all described in in the [Oklahoma Water Quality Standards \(OWQS\)](#) [Title 785, Chapter 45]. 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 the waterbodies in the Canadian River Study Area are:

- 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)

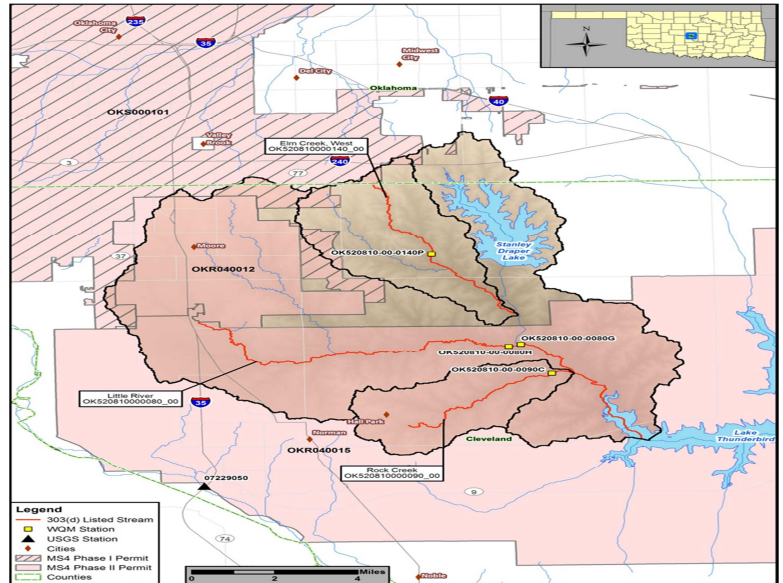


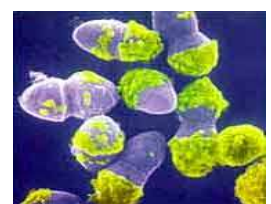
Table 1 is an assessment from Oklahoma's [2014 Integrated Report](#) on whether or not the waterbodies in the Study Area met their designated beneficial uses. The designated beneficial uses addressed in the Canadian River Study Area TMDL Report were PBCR and WWAC:

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

Waterbody ID	Waterbody Name	AES	AG	WWAC	FISH	PBCR	PPWS
OK520810000080_00	Little River	X	F	N	X	N	X
OK520810000090_00	Rock Creek	X	F	I	X	N	X
OK520810000140_00	Elm Creek, West	X	F	F	X	N	X
F – Fully supporting information		N – Not supporting		I – Insufficient		X – Not assessed	
Source: DEQ 2014 Integrated Report							

Impairments

● **Bacteria:** The PBCR beneficial use includes [swimming](#). If the PBCR beneficial use is not met, that means there is too much bacteria in that waterbody. Many types of bacteria are [pathogens](#) which are things that can cause disease in animals or plants. According to the OWQS, bacterial testing is done for [Escherichia coli](#) (E. coli) and [Enterococci](#). These are micro-



Enterococci

Photo courtesy of the U.S. Dept. of Energy's Lawrence Berkeley

organisms found in the intestines of humans and animals that may cause disease. They may be found in fecal matter entering waterbodies from sources such as sewage discharges, leaking septic tanks, or runoff from animal feedlots. Enterococcus impairs 7, 4442 miles of streams in Oklahoma, and *E. coli* impairs 4,006 miles of streams.³

TMDL Study: The TMDL study evaluated three waterbodies in the Canadian River Study Area that DEQ designated as impaired in the [2014 Integrated Report 303\(d\) list](#) for nonsupport of the PBCR or WWAC beneficial uses. 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).

The Oklahoma WQS used to contain three bacterial indicators (fecal coliform, *E. coli* and Enterococci). In keeping with EPA's recommended [Recreational Water Quality Criteria for States](#), the Oklahoma WQS were revised on July 1, 2011 to contain only *E. coli* and Enterococci. No more fecal coliform TMDLs have been developed since then. The WQS for *E. coli* and Enterococci bacteria are listed in the *Assessment of Primary Body Contact Recreation support* [OAC 785:46-15-6(b-c)]. The PBCR season every year is May 1 – September 30.



E. coli
Photo courtesy of [USDA ARS](#)

An "x" indicates that the impaired waterbody is on the 303(d) list for Enterococci or *E. coli*.

Water quality monitoring is conducted to see whether or not the waterbodies are actually impaired. In Oklahoma, water quality monitoring is conducted by several different agencies including the [Oklahoma Conservation Commission](#) (OCC), the [Oklahoma Water Resources Board](#) (OWRB), and the [U.S. Geological Survey](#) (USGS). In 2008, 126 bacterial samples were collected for the waterbodies in the Study Area. For this study, the water quality data generated by all of these samples was analyzed to find out if the waterbodies in the Study Area were impaired for bacteria thus necessitating a TMDL. The water quality data examined to make these determinations can be found in Appendix A of the "**2015 Canadian River Study Area Bacterial TMDL Report**".

The results of the data analyses are also summarized in Table 2. An "x" in the half of the table with the yellow header indicates that sampling data showed the waterbody to be impaired for bacteria or turbidity. TMDLs were developed for these waterbodies.

Table 2: Assessed Impairments and Actual Impairments in the Study Area

WBID	Waterbody Name	Waterbody impairments from the 2014 303(d) List		TMDLs needed after sampling results analyzed	
		Enterococci	<i>E. coli</i>	Enterococci	<i>E. coli</i>
OK520810000080_00	Little River	X	X	X	X
OK520810000090_00	Rock Creek	X	X	X	X
OK520810000140_00	Elm Creek, West	X	X	X	X

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

³ Table 6 of DEQ's of the [2014 Oklahoma Integrated Report](#).

determine the sources and amounts of the 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.

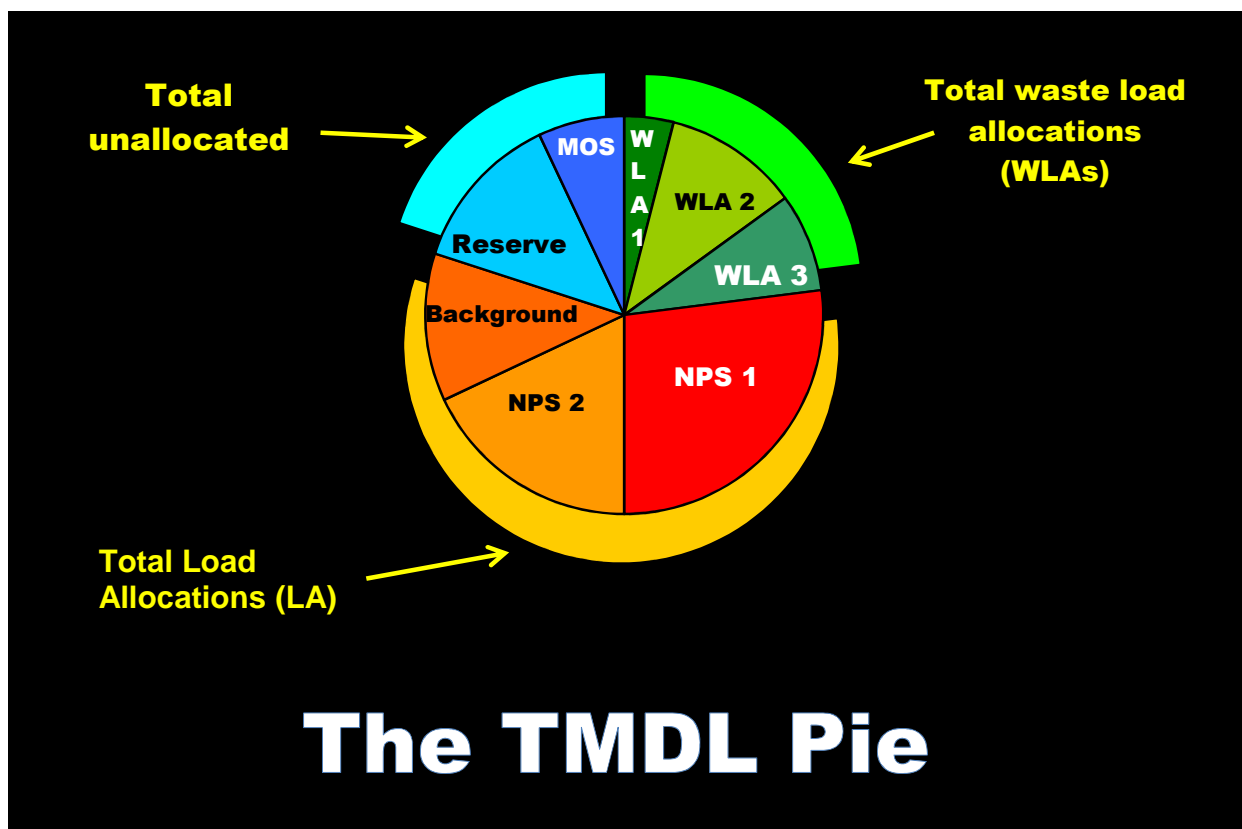
The [National Pollutant Discharge Elimination System \(NPDES\) program](#) regulates point source discharges. The NPDES Program in Oklahoma, in accordance with an agreement between DEQ and EPA, is implemented via the Oklahoma Pollutant Discharge Elimination System (OPDES) Act [Title 252, Chapter 606 (<http://www.deq.state.ok.us/rules/606.pdf>)]. A point source is described as a “discernible, 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.



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:

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



Point Source Discharges in the Canadian River Study Area:

- **OPDES-regulated municipal and industrial wastewater treatment facilities (WWTF):** There are no municipal or industrial OPDES-permitted facilities that discharge wastewater into any of the streams in the Study Area.
- **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 discharges from Indian Country lands, discharges related to oil & gas extraction, or discharges associated with agricultural purposes. Stormwater discharges occur only during or immediately following periods of rainfall and elevated flow conditions when the turbidity criteria do not apply. Because of this and because these facilities are permitted, they are not considered potential contributors to turbidity impairment. For details about DEQ's Stormwater Program, go to <http://www.deq.state.ok.us/WQDnew/stormwater/>
- **OPDES regulated stormwater discharges through Municipal Separate Storm Sewer Systems (MS4s):** Polluted stormwater runoff is commonly transported through MS4s, from which it is often discharged untreated into local waterbodies. Cities and towns in urbanized areas must use Best Management Practices (BMPs) to prevent harmful pollutants from being washed or dumped into local streams and lakes. MS4s outline these BMPs in their stormwater management program. They must also obtain an MS4 Permit from DEQ (OKR04). The Canadian River Study Area has three MS4s.



DEQ file photo of storm drain marker

Table 3: MS4 Facilities in the Study Area

Waterbody Name	Waterbody ID	MS4 Jurisdiction	Permit No.	Type
Little River	OK520810000080_00	City of Norman	OKR040015	Phase II
Little River	OK520810000080_00	City of Moore	OKR040012	Phase II
Little River	OK520810000080_00	Oklahoma City	OKS000101	Phase I
Rock Creek	OK520810000090_00	City of Norman	OKR040015	Phase II
Elm Creek, West	OK520810000140_00	Oklahoma City	OKS000101	Phase I

- **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) authorizes the discharge of stormwater from industrial facilities. The determination of whether or not an industrial facility must obtain stormwater discharge permit coverage is based both on the facility's Standard Industrial Classification (SIC) code and whether or not the facility has the potential to contaminate stormwater. To get an industrial stormwater permit, a Notice of Intent (NOI) must be filed with DEQ and the applicable application and annual permit fees must be paid. Also, a stormwater pollution prevention plan (SWP3) **must** be developed and



implemented according to the requirements of this permit. There are no industrial point sources in the Study Area

● **No-Discharge Facilities:** Certain municipal facilities are classified as no-discharge. These facilities are required to sign an affidavit of no discharge. For the purposes of these TMDLs, it is assumed that no-discharge facilities (such as towns with [total retention lagoons](#)) do not contribute bacteria or TSS into the waterbodies. However, it is possible that the wastewater collection systems associated with these no-discharge facilities could be a source of bacteria, or that discharges from the wastewater plant may occur during large rainfall events that exceed the systems' storage capacities. In Canadian River Study Area, there are seven no-discharge facilities, including three municipal and four industrial facilities. Details about them are in Table 3-2 of the TMDL report.

● **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. Although infrequent, [sanitary sewer overflows \(SSO\)](#) from wastewater collection systems can be a major source of harmful bacteria into streams. Most overflows are caused by



Photo courtesy of the City of Raleigh, NC

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.

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 lead to citizen complaints.⁴ 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 in the Canadian River Study Area between 1989 and 2014, 29 SSO occurrences were reported with amounts ranging from a minimal amount to over 0.5 million gallons. Data about these SSOs are summarized in Table 3-3 of the TMDL report with specific details in Appendix D.

● **NPDES regulated [Animal Feeding Operations \(AFOs\)](#):** 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 \(AgPDES\)](#). PFOs are smaller animal feeding operations so they are not required to get NPDES permits. They are only required to register with ODAFF and follow [PFO rules](#). In the Canadian River Study Area, there weren't any PFOs.

A CAFO is an animal feeding operation that confines and feeds 1,000 or more animal units for 45 days or more in a 12-month period. The [CAFO Rules](#) are designed to protect water quality through the use of Best Management Practices ([BMPs](#)). BMPs include dikes, berms, terraces, ditches or other similar structures used to isolate animal waste from outside surface drainage. Except for a

⁴ For environmental complaints, go to: www.deq.state.ok.us/ECLsnew/Complaints/onlncmpl.htm

25-year, 24-hour rainfall event, CAFOs are considered “no discharge” facilities and are not considered a source of TSS loading. If not managed properly, CAFOs have the potential to cause serious impacts on water quality.⁵ Potential problems for CAFOs include possible animal waste discharges to State waterbodies and failure to properly operate wastewater lagoons. There are no CAFOs in the Canadian River Study Area.

An SFO is a lot or facility where swine kept for at least ninety (90) consecutive days or more in any twelve-month period. A “concentrated swine feeding operation” has a certain number of swine⁶ and either discharges its pollutants into nearby waterbodies through a ditch, flushing system or other constructed device, or the pollutants flow directly into waterbodies that flow through or come into direct contact with swine at the facility. SFOs are required to follow [Oklahoma SFO Rules](#) and develop a [Swine Waste Management Plan](#) to prevent swine waste from being discharged into surface or groundwaters. This Plan includes the use of BMPs to prevent runoff & erosion.⁷ The Swine Waste Management Plan may include, but is not limited to, a Comprehensive Nutrient Management Plan per NRCS guidance or Nutrient Management Plan per EPA guidance. There are no SFOs in the Study Area.



Photo courtesy of [Michigan State University](#).

Nonpoint Sources of Discharges in the Canadian River 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](#)⁸ is an important source of loading in urban or residential settings with many [roads](#) and other [paved, impervious areas](#). In [rural settings](#)⁹, the sources of bacteria may include runoff of manure applied to agricultural land, the runoff of farm animal wastes associated with the erosion of [sediments](#) in grazing fields, contributions from wildlife, and failing septic tanks. Some examples include:

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- ⁵ The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) has a program where operators of Animal Feeding Operations/Confined Animal Feeding Operations (AFO/CAFO) can apply for financial assistance for the storage, treatment, and utilization of animal waste. This is a statewide process to address the water quality impacts of these facilities to the rivers and streams of the State. For more information, go to www.nrcs.usda.gov/wps/portal/nrcs/detail/ok/programs/financial/?cid=nrcs142p2_000482.
 - ⁶ A concentrated swine feeding operation has at least 750 swine that each weighs over 25 kilograms (about 55 pounds), 3,000 weaned swine weighing under 25 kilograms, or 300 swine animal units. A swine animal unit is a unit of measurement for any swine feeding operation calculated by adding the following numbers: The number of swine weighing over twenty-five (25) kilograms, multiplied by four-tenths (0.4), plus the number of weaned swine weighing under twenty-five (25) kilograms multiplied by one-tenth (0.1)
 - ⁷ Swine Animal Waste Management Plan Requirements [Title 35 (ODAFF), Chapter 17 (Water Quality), Subchapter 3 (Swine Feeding Operations)] can be found in 35:17-3-14.
 - ⁸ For information on how to reduce runoff after rainstorms, request the free DVD from EPA entitled “Reduce Runoff: Slow it Down, Spread it Out, Soak it in!” (EPA Publication #84211001) by calling them at 800-490-9198 or by ordering it from their webpage (www.epa.gov/nscep/). 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>.
 - ⁹ The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program from the USDA NRCS that promotes agricultural production and environmental quality. Through EQIP, farmers and ranchers may receive financial and technical assistance to install or implement structural and management conservation practices on eligible agricultural land. To find out what programs are available, go to: www.nrcs.usda.gov/wps/portal/nrcs/detail/ok/programs/financial/?cid=nrcs142p2_000353 or contact your local [NRCS Field Service Center](#).

● **Wildlife** – Disease-causing bacteria can be produced by all warm-blooded animals, including birds. Wildlife is naturally attracted to riparian corridors of streams and rivers. With direct access to the stream channel, wildlife can be a concentrated source of bacterial loading to a waterbody. Bacteria from wildlife are also deposited onto land surfaces, where they may be washed into nearby streams by rainfall runoff. It must be noted that no data are available in Oklahoma to estimate wildlife populations other than deer. A number of bacteria source tracking studies around the nation demonstrate that wild birds and mammals can represent a major source of the fecal bacteria found in streams.



Photo courtesy of [USDA ARS](#)

Currently there are insufficient data available to estimate populations and spatial distribution of wildlife and avian species by watershed. Consequently, it is difficult to assess the magnitude of bacterial contributions from wildlife species as a general category. However, adequate data are available by county to estimate the number of deer by watershed. Using [Oklahoma Department of Wildlife Conservation](#) (ODWC) county data, the population of deer can be roughly estimated. By using this estimate and the percentage of the watershed area within each county, wild deer population can be calculated for each watershed. This comes to about 457 deer in the Canadian River Study Area. The average deer per acre rate is 0.012 for streams in the Study Area. At this minimal concentration, wildlife is considered to be a minor contributor of bacteria in those impaired watersheds.

● **Farm Animals** - Agricultural [livestock grazing](#) in pastures deposit [manure](#) containing bacteria onto land surfaces. Detailed information is not currently available to describe or quantify the relationship between in-stream concentrations of bacteria and land application of manure from commercially raised farm animals. Despite the lack of specific data, land application of commercially raised farm animal manure is considered a potential source of bacterial loading into watersheds in the Canadian River Study Area for the purpose of these TMDLs. Examples of livestock activities that could result in bacteria getting into creeks, streams, and rivers include:

- **Processed manure from livestock operations such as poultry facilities:** This manure is often applied to fields as fertilizer and can contribute to fecal bacterial loading into waterbodies if washed into streams by runoff. In Oklahoma, [poultry waste applicators must be certified](#).

- **Livestock grazing in pastures:** Livestock deposit manure containing fecal bacteria onto land surfaces. These bacteria may be washed into waterbodies by storm runoff.



This cattle crossing keeps the cattle out of the stream except at the time of crossing.

Photo courtesy of [USDA NCRS](#)

- **Direct access to waterbodies by livestock:** Livestock standing in or crossing streams can provide a direct concentrated source of fecal bacteria and TSS into the streams. In the three bacterially-impaired watersheds in the Canadian River Study Area, cattle (an estimated 3,204 head) generate the largest amount of fecal coliform and often have direct access to streams and tributaries. The estimated numbers of livestock by watershed are based on the USDA county agricultural census data. The estimated farm animal populations were derived by using the percentage of the watershed within each county. Refer to the full TMDL report for the estimated number of all agricultural animals (Table 3-5) as well as their daily fecal coliform production rates (Table 3-7).

● **Pets** - Bacteria from the feces of dogs and cats can be a potential source of in-stream bacteria when it is transported to streams by runoff from urban and suburban areas. On average nationally there are 1.7 dogs per household and 2.2 cats per household [American Veterinary Medical Association (2007)]. Based on these national averages, it is estimated that there are about 13,149 dogs and 14,833 cats in the Canadian River Study Area. See Section 3.3.3 of the TMDL report for the estimated bacterial load from dogs and cats. Pets are considered to be a minor contributor of bacteria in those impaired watersheds.



Photo courtesy of K. Miles

● **Failing Septic Systems** – If a septic system is not working properly, then raw sewage - a concentrated source of bacteria - can go directly into streams. Bacterial loading from failing septic systems can be transported to streams in a variety of ways, including runoff from surface ponding or through groundwater. Bacteria-contaminated groundwater can also enter creeks through springs and seeps. It is estimated that there are 198 failing septic systems in the Canadian River Study Area. Refer to the full TMDL report (Section 3.3.4) on how these numbers were calculated and the estimated bacterial load from failing septic systems.

Summary of Possible Sources of Impairment:

● **Bacteria** - The health effects of bacteria should be a concern for the public who use these waterbodies for activities such as swimming, wading, or boating because some waterborne bacteria can cause serious human illness or disease. In the Canadian River Study Area, most of the bacteria appear to come from nonpoint sources. In the Little River (OK520810000080_00) and Rock Creek (OK520810000090_00) watersheds, there are seven no-discharge facilities. But since these facilities are not allowed to discharge or, they are not considered to be major sources of the bacteria in the Canadian River watershed. Therefore, the various nonpoint sources are considered to be the major source of bacterial loading in each watershed that requires a TMDL.

Though most of the pathogens come from nonpoint sources, the specific sources from which the bacteria come cannot be determined without additional study. Of the four major nonpoint sources (wildlife, farm animals, failing septic systems, and domesticated dogs & cats), most of the fecal coliform load estimates from nonpoint sources to land surfaces appears to come from farm animals. Cattle, in particular, are thought to contribute the most to bacterial nonpoint source pollution because:

- There are an estimated 3,204 in the Study Area.
- Cattle waste contains a significant amount of fecal coliform.
- Cattle graze in fields where rain can result in stormwater runoff into nearby waterbodies.
- Cattle are often allowed to wade in creeks and streams that flow to waterbodies.

Table 3-12 of the TMDL report is an estimated percentage of fecal coliform load estimates from the four major nonpoint source categories that can contribute to the elevated bacterial concentrations found in the impaired waterbodies in the Study Area.

TMDL Calculations:

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. The Canadian River Study Area contains waterbodies that are in violation of Oklahoma Water Quality Standards with respect to bacteria. The TMDL calculates the reduction in bacteria that would be needed in order for these streams to be in compliance with Oklahoma's WQS. This was done using [load duration curves](#). The calculations include present and future sources as well as a margin of

safety. For more information on how the TMDLs were developed, read Sections 4 & 5 and Appendix B of the TMDL report.

Recommendations:

After re-evaluating both bacterial and turbidity data following Oklahoma's assessment protocol, 6 TMDLs were developed for the three streams in the Canadian River Study Area. Table 4 indicates the amount that each pollutant will need to be reduced [Percent Reduction Goal (PRG)] in order for that waterbody to meet water quality standards and thus its designated beneficial uses:

Table 4: Percent Reduction Goal Needed for Waterbody to Meet Water Quality Standards

Waterbody ID	Waterbody Name	These impairments must be reduced by the following amounts in order to meet water quality standards.	
		<i>E. coli</i>	Enterococci
OK520810000080_00	Little River	61%	93%
OK520810000090_00	Rock Creek	65%	95%
OK520810000140_00	Elm Creek, West	61%	93%

Permitted stormwater discharges are considered point sources. Bacteria WLAs for OPDES-permitted stormwater for three MS4 permits are specified in Table 5. The WLA_{MS4} was derived from the percentage of the watershed of each waterbody within the area covered by the MS4 permit

Table 5: Summary of Bacterial Wasteload Allocations at Median Flow for MS4s

Waterbody ID & Name	Permit No.	MS4 Jurisdiction	Type	Acreage and Percentage of Subwatershed	<i>E. coli</i> WLA (cfu/day)	Enterococcus WLA (cfu/day)
OK520810000080_00 Little River	OKR040015	City of Norman	Phase II	27,434 (48.39%)	2.07E+10	5.43E+09
	OKR040012	City of Moore	Phase II	13,084 (23.08%)	9.89E+09	2.59E+09
	OKS000101	Oklahoma City	Phase I	3,049 (5.38%)	2.30E+09	6.04E+08
OK520810000090_00 Rock Creek	OKR040015	City of Norman	Phase II	7,521 (100%)	4.27E+09	1.12E+09
OK520810000140_00 Elm Creek, West	OKS000101	Oklahoma City	Phase I	1,241 (10.93%)	7.04E+08	1.84E+08

Table 6 summarizes the TMDL, WLA, LA and MOS loadings at the median flow for streams in the Canadian River Study Area.

Table 6: Summaries of Bacterial TMDLs at Median Flow

Stream Name	Waterbody ID	Pollutant	TMDL (cfu/day)	WLA _{WWTF} (cfu/day)	WLA _{MS4} (cfu/day)	LA (cfu/day)	MOS (cfu/day)
Little River	OK520810000080_00	ENT	1.25E+10	0	8.62E+09	2.60E+09	1.25E+09

		<i>E.coli</i>	4.76E+10	0	3.29E+10	9.92E+09	4.76E+09
Rock Creek	OK52081000090_00	ENT	1.24E+09	0	1.12E+09	0	1.24E+08
		<i>E.coli</i>	4.74E+09	0	4.27E+09	0	4.74E+08
Elm Creek, West	OK520810000140_00	ENT	1.87E+09	0	1.84E+08	1.50E+09	1.87E+08
		<i>E.coli</i>	7.15E+09	0	7.04E+08	5.73E+09	7.15E+08

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: David Akakpo, Water Quality Division, Oklahoma Department of Environmental Quality, P.O. Box 1677, Oklahoma City, OK 73101-1677; (405) 702-8197; E-mail: Water.Comments@deq.ok.gov

Comments must be received by 4:30 pm on Tuesday, March 8, 2016

Obtaining copies: You may view the full TMDL Report by picking up copies at the DEQ main office, Water Quality Division, 707 North Robinson, Oklahoma City from 8:30 am – 4:30 pm. A document copying fee may apply. You may also view the TMDL report by going to the DEQ website at: www.deq.state.ok.us/WQDnew/tmdl/index.html.



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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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