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OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

PUBLIC NOTICE

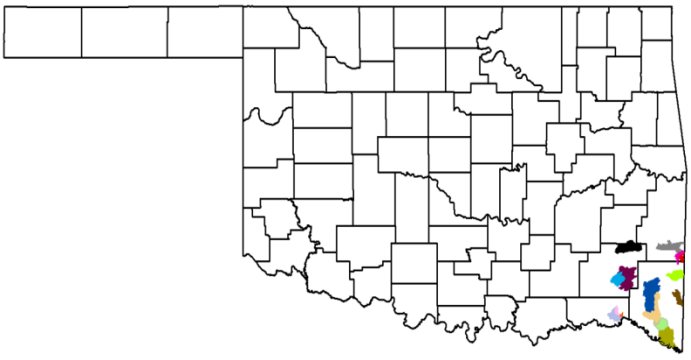
February 3, 2014

Availability of Draft Bacterial and Turbidity TMDLs for the Lower Red River - Little River Basin

Proposed Modification to Incorporate Lower Red River - Little River Bacterial and Turbidity TMDLs into Oklahoma's Water Quality Management Plan

Request for Public Comments

Public Comment Period Ends on Friday, March 21, 2014



The Oklahoma Department of Environmental Quality (DEQ) is seeking comments on a draft Total Maximum Daily Load (TMDL) report describing reductions of bacteria and turbidity needed to improve water quality in the Lower Red River - Little River Basin Study Area. This Study Area is in the southeastern portion of Oklahoma in the Kiamichi (USGS HUC 11140105), Pecan-Waterhole (USGS HUC 11140106), Upper Little (USGS HUC 11140107), Mountain Fork (USGS HUC 11140108), and Lower Little (USGS HUC 11140109) watersheds. The Study Area covers portions of Choctaw, Latimer, LeFlore, McCurtain and Pushmataha 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 Lower Red River - Little River Basin Study Area**" is attached. The full Lower Red River - Little River bacterial and turbidity TMDL report can be found on-line at: http://www.deq.state.ok.us/WQDnew/tmdl/index.html.

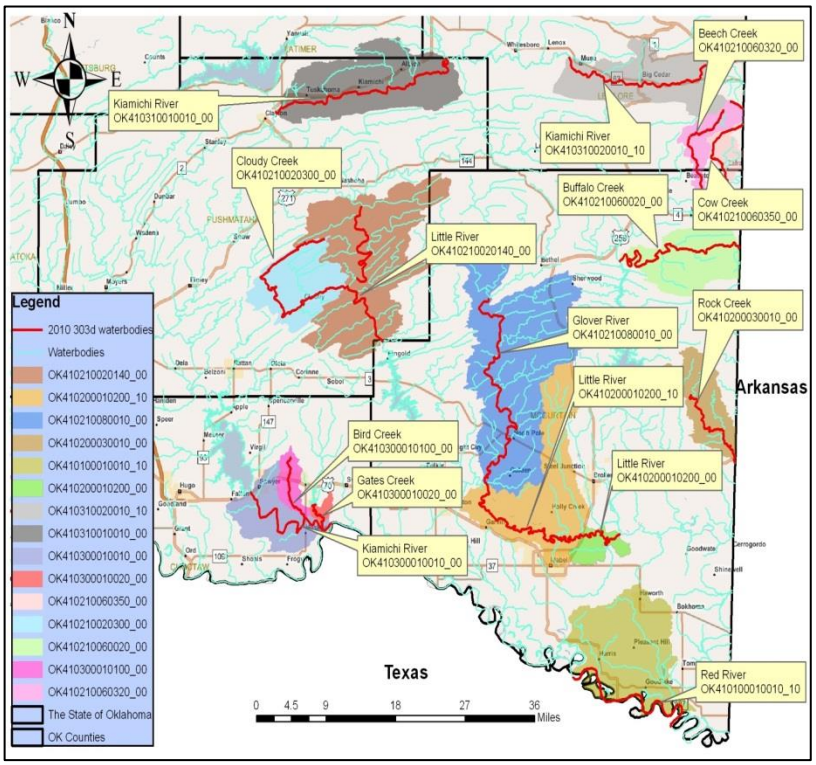
Background: The Federal Clean Water Act requires states to develop Water Quality Standards (WQS)[1] which provide goals and pollution control targets to improve water quality where the standards are not met. The waterbodies where standards are not met are considered to be "impaired." Impaired waterbodies 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

1 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:
http://www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/watersciencesseminar/SmolenWQImplementation.pdf

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.

Beneficial Uses: The designated beneficial uses for the waterbodies in the Lower Red River - Little River Basin Study Area are Aesthetics (AES), Agriculture (AG), Fish & Wildlife Propagation-Warm Water Aquatic Community Subcategory (WWAC), Fish & Wildlife Propagation-Cool Water Aquatic Community Subcategory (CWAC), Fish Consumption (FISH), Primary Body Contact Recreation (PBCR), and Public & Private Water Supply (PPWS).

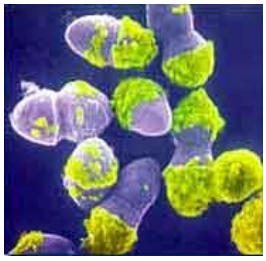
The following table is the assessment from Oklahoma's 2010 Integrated Report on whether or not these waterbodies met their designated beneficial uses. The assessment of all Oklahoma waterbodies for their beneficial uses can be found in Appendix B (Comprehensive Waterbody Assessment) of Oklahoma's Integrated Report. The designated beneficial uses addressed in the Lower Red River – Little River Basin Study Area were PBCR, WWAC, and CWAC.



Waterbody Identification	Waterbody Name	AES	AG	WWAC	CWAC	FISH	PBCR	PPWS
OK410100010010_10	Red River	I	F	N		N	F	I
OK410200010200_00	Little River	I	F		N	I	F	F
OK410200010200_10	Little River	I	F		N	F	F	F
OK410200030010_00	Rock Creek	F	F		N	X	I	X
OK410210020140_00	Little River	F	F		N	N	N	F
OK410210020300_00	Cloudy Creek	F	F		N	X	I	X
OK410210060020_00	Buffalo Creek	F	F		N	X	I	X
OK410210060320_00	Beech Creek	F	F		N	X	I	X
OK410210060350_00	Cow Creek	F	F		N	X	I	X
OK410210080010_00	Glover River	F	F		N	N	F	F
OK410300010010_00	Kiamichi River	I	F	N		N	N	N
OK410300010020_00	Gates Creek	I	F		N	X	I	X
OK410300010100_00	Bird Creek	F	F	N		X	I	I
OK410310010010_00	Kiamichi River	I	F	N		N	N	F
OK410310020010_10	Kiamichi River	N	F	N		F	N	F

(F = Fully supporting that designated use; N = Not supporting that use; I = Insufficient information; X= Not assessed)

Impairments



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

- **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-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. Enterococci impairs 6,964 miles of streams in Oklahoma, and *E. coli* impairs 4,136 miles of streams.[2]

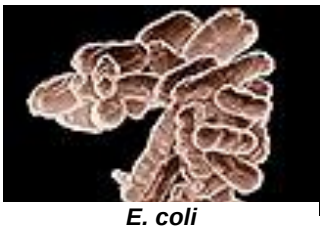
- **Turbidity:** The other beneficial uses evaluated in this study were the WWAC and CWAC subcategories of Fish and Wildlife Propagation. The WWAC and CWAC subcategories evaluate whether the water quality and habitat are adequate to support a climax (fully-developed) fish community. Turbidity is one of the impairments that keeps waterbodies from attaining their WWAC and CWAC beneficial uses. Turbidity is a measure of the cloudiness of water and is one of the threats to the fish community. It is mostly caused by suspended particles such as sediment, clay, silt, plankton, or microscopic organisms. Other factors such as true color, dissolved solids etc. may also affect turbidity. The suspended particles are generally referred to as Total Suspended Solids (TSS). Because turbidity cannot be expressed as a mass load, TSS is used as a surrogate for turbidity in this TMDL.

Photo courtesy of USDA NRCS

Turbidity/TSS can affect fish by causing gill abrasion or fin rot. It can also impact aquatic biota by reducing habitat through the blanketing of fish spawning and feeding areas. In addition, it can eliminate sensitive food organisms or reduce sunlight penetration to aquatic plants, thereby impairing photosynthesis. Turbidity/TSS may add to the mechanical wear of water supply pumps and distribution systems, thus increasing water treatment costs. In addition, turbidity/TSS can provide a mechanism for the transport of pesticides or other toxic compounds. Thus, reductions in turbidity/TSS will improve water quality. Turbidity was found to be the cause of impairment for 2,775 miles of streams in Oklahoma.[3]

TMDL Study: The TMDL study evaluated 15 waterbodies in the Lower Red River – Little River Basin Study Area that DEQ designated as impaired in the 2010 Integrated Report 303(d) list for nonsupport of the PBCR, WWAC, and/or CWAC 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

The WQS for turbidity is listed under the *Protection of Fish and Wildlife Propagation* beneficial use (OAC785:45-5-12(f)(7)). Turbidity, from other than natural sources, cannot exceed 10 NTUs (nepholometric turbidity units) for streams with a CWAC beneficial use and cannot exceed 50 NTUs in streams with a WWAC

2 Table 6 of DEQ's draft 2012 Oklahoma Integrated Report.

3 Table 6 of the draft 2012 Oklahoma Integrated Report.

beneficial use in 10% or more of the samples.[4] This criterion applies only to seasonal base flow conditions. Turbidity levels are expected to be elevated during, and for several days after, a storm event. If a waterbody is impaired by a pollutant so that it is unable to meet its designated beneficial use, then the impairment is listed on the 303(d) list in the Integrated Report. Impaired waterbodies in this Study Area are shown in the green-shaded area of the following table. An "**x**" indicates if the impairment on the 303(d) list of the Integrated Report is for Enterococci, *E. coli*, or turbidity.

Water quality monitoring is conducted to see whether or not the waterbodies are 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). Between 2001 – 2008, 246 bacterial samples were collected for the waterbodies in the Study Area. Between 1998 – 2012, 455 turbidity samples were collected 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 or turbidity thus necessitating a TMDL. The water quality data examined to make these determinations can be found in Appendix A of the "**2014 Bacterial and Turbidity TMDL Report for the Lower Red River - Little River Basin Study Area**".

The results of the data analyses are also summarized in the following table. An "**x**" in the tan-shaded area indicates that the sampling data showed that the waterbody was found to be impaired for bacteria or turbidity so a TMDL was developed. The "**x**" in red represents a waterbody that was found to be impaired when the water quality data was analyzed but that the waterbody had not been on the 2010 303(d) list as being impaired. That was the case with Little River (OK410200010200_00) which was found to be impaired for Enterococci when it was sampled. As a result, a TMDL for Enterococci for Little River was developed. For Little River (OK410210020140_00), a TMDL was already developed for Enterococci in 2007. The hyperlink is the TMDL report at the DEQ webpage ("*Bacterial TMDL in the Little River Area*").

WBID	Waterbody Name	Waterbody Impairments from the 2010 303(d) List			TMDLs needed after sampling results analyzed		
		Enterococci	*E. coli*	Turbidity	Enterococci	*E. coli*	Turbidity
OK410100010010_10	Red River			X			X
OK410200010200_00	Little River			X	X		X
OK410200010200_10	Little River			X			X
OK410200030010_00	Rock Creek			X			X
OK410210020140_00	Little River	X[5]		X	Done 2007		X
OK410210020300_00	Cloudy Creek			X			X
OK410210060020_00	Buffalo Creek			X			X
OK410210060320_00	Beech Creek			X			X
OK410210060350_00	Cow Creek			X			X
OK410210080010_00	Glover River			X			X
OK410300010010_00	Kiamichi River	X			X		
OK410300010020_00	Gates Creek			X			X
OK410300010100_00	Bird Creek			X			X
OK410310010010_00	Kiamichi River	X			X		
OK410310020010_10	Kiamichi River	X			X		

4 OAC 785:46-15-4(b)(2): http://www.owrb.ok.gov/util/rules/pdf_rul/Chap46.pdf

5 A TMDL was already developed for this impairment in 2007.

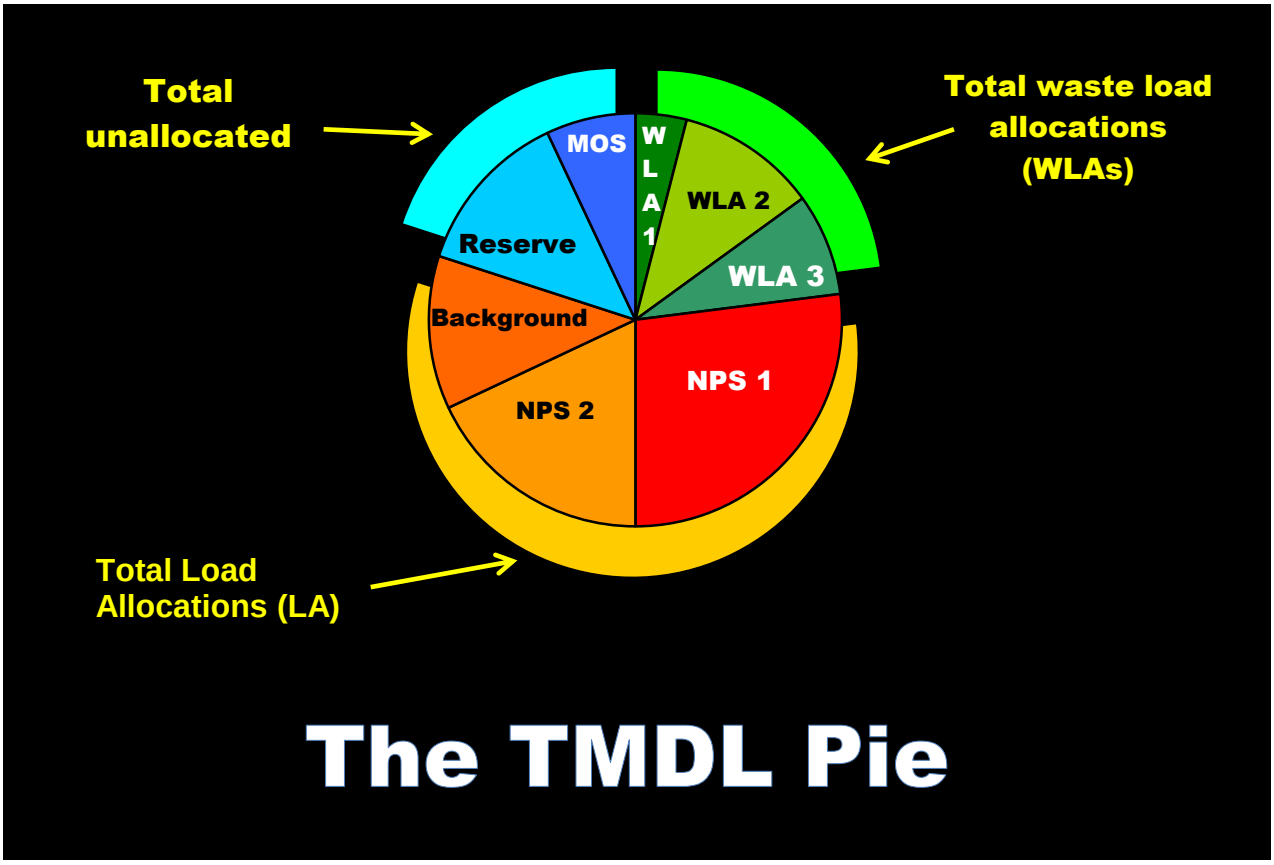
TMDLs: A TMDL is a plan of action to reduce pollutant loads so that impaired waterbodies will be able to meet their beneficial uses. TMDLs calculate the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will be able to meet water quality standards for that particular pollutant. The TMDL report uses scientific data collection, analysis, and water quality modeling to determine the sources and amounts of 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.

DEQ file photo of a point source discharge

The National Pollutant Discharge Elimination System (NPDES) program regulates point source discharges. 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)



Point Source Discharges in the Lower Red River – Little River Basin Study Area:

- **NPDES regulated municipal and industrial wastewater treatment facilities (WWTF):** There aren't any municipal wastewater facilities discharging into the Lower Red River - Little River Basin Study Area. But there are two industrial NPDES-permitted facilities in the Study Area. Western Farmers Electric Cooperative-Hugo plant discharges into the Bird Creek (OK410300010100_00) watershed, and Tyson Foods, Inc. - Broken Bow discharges into the Little River (OK410200010200_00) watershed. Because Tyson Foods is discharging into a waterbody that requires a TMDL for Enterococci, Tyson will receive a WLA for bacteria. Because Tyson is not considered a potential source of turbidity, they will keep the TSS limits in their current permit. Western Farmers Electric Cooperative will receive a WLA for TSS since they discharge into the Bird Creek watershed , and Bird Creek is impaired for turbidity.

- **NPDES 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/

  - **NPDES regulated stormwater discharges through Municipal Separate Storm Sewer Systems (MS4s):** Polluted stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it is often discharged untreated into local waterbodies. To prevent harmful pollutants from being washed or dumped into an MS4, cities and towns must obtain an MS4 Permit and develop a stormwater management program. However, there aren't any MS4s in the Lower Red River – Little River Basin Study Area.

  - **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 find out which industries are covered, refer to Table 1-2 beginning on Page 3 of the MSGP (OKR05). 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 two facilities in the Lower Red River – Little River Basin Study Area with a MSGP.[6]

  - **Construction Sites (OKR10):** A Construction General Permit is required for any stormwater discharges associated with construction activities that result in land disturbance of equal to or greater than one (1) acre, or less than one (1) acre if they are part of a larger common plan of development or sale that totals at least one (1) acre. The permit also authorizes any stormwater discharges from support activities (e.g. concrete or asphalt batch plants, equipment staging yards, material storage

6 Meridian Aggregates Co (OKR050878) in the Little River (OK410200010200_10) watershed, and Tyson Foods (OKR050522) in the Little River (OK410200010200_00) watershed.

areas, excavated material disposal areas, and borrow areas) that are directly related to a construction site that is required to have permit coverage, and is not a commercial operation serving unrelated different sites.

An authorization to discharge from DEQ must be received prior to beginning any construction activities with stormwater discharges. In order to receive this authorization, 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 the OKR10 permit. During the time period when water samples were taken, there were three OKR10 permits for construction projects in the Lower Red River – Little River Basin Study Area.[7]

- **Rock, Sand, and Gravel Quarries:** Operators of rock, sand, and gravel quarries in Oklahoma are regulated with a general permit issued by DEQ (OKG950000). The general permit does not allow discharge of wastewater to turbidity-impaired waters on Oklahoma's 303(d) list. This is the case if a TMDL has not been performed or the result of the TMDL indicates that discharge limits more stringent than 45 mg/l for TSS are required. There aren't any rock, sand, or gravel quarries in the Study Area.

- **NPDES regulated Concentrated Animal Feeding Operations (CAFOs):** 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.

  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 Act is 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 25-year, 24–hour rainfall event, CAFOs are considered "no discharge" facilities. If not managed properly, CAFOs have the potential to cause serious impacts on water quality.[8] Potential problems for CAFOs include possible animal waste discharges to State waterbodies and failure to properly operate wastewater lagoons. CAFOs are not considered a source of TSS loading.

  According to ODAFF, there are 44 PFOs with 3,046,700 birds located in McCurtain County in the Lower Red River – Little River Basin Study Area. One of these PFOs is operated by Pilgrims Pride with a total of 25,100 chickens. All the rest are Tyson Foods facilities. Regulated CAFOs operate under NPDES permits issued and overseen by ODAFF. But 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.

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7 ODOT JP #18849(04) (OKR107548) in the Kiamichi River (OK410300010010_00) watershed, ODOT JP #18851(04) (OKR106906) in the Bird Creek (OK410300010100_00) watershed, and The Woodlands (OKR107418) in the Little River (OK410200010200_10) watershed.

8 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.

- **Sanitary Sewer Overflows (SSO) and No-Discharge Facilities**: 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 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.

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 lead to citizen complaints.[9] All SSOs falling into these two categories are addressed through DEQ's formal enforcement process. However, the Lower Red River – Little River Basin Study Area did not have any SSO occurrences.

For the purposes of these TMDLs, it is assumed that no-discharge facilities (such as towns with total retention lagoons) do not contribute to bacteria or TSS getting 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. But in the Lower Red River – Little River Basin Study Area, there aren't any no-discharge facilities.

- **Section 404 Permits**: Because discharge of dredged or fill material in waters can be a significant source of impairments such as turbidity/TSS, Section 404 of the Clean Water Act (CWA) requires a permit from the U.S. Army Corps of Engineers (USACE) before discharging those materials into waters of the United States, including wetlands. Activities regulated under this program include - but are not limited to - fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. However, certain farming and forestry activities are exempt. Both USACE and EPA can take enforcement actions for violations of Section 404. Under Section 401 of the CWA, DEQ reviews and certifies that Oklahoma Water Quality Standards are protected.

Nonpoint Sources:

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[10] is an important source of loading in urban or residential settings with many roads and other paved, impervious areas. In rural settings[11], 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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9 For environmental complaints, go to: http://www.deq.state.ok.us/ECLSnew/Complaints/onlncmpl.htm

10 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 (http://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.

11 The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (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: http://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 bacteria 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.

  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 bacteria 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 county data, the population of deer can be roughly estimated. By using this estimate and the percentage of the watershed area within each county, a wild deer population can be calculated for each watershed. For the Lower Red River – Little River Basin Study Area, this comes to about 3,430 deer. This is an average deer per acre rate ranging from 0.0027 [Buffalo Creek (OK410210060020_00)] to 0.0080 [Gates Creek (OK410300010020_00)]. At this minimal concentration, wildlife is considered to be a minor contributor of bacteria in the watersheds.

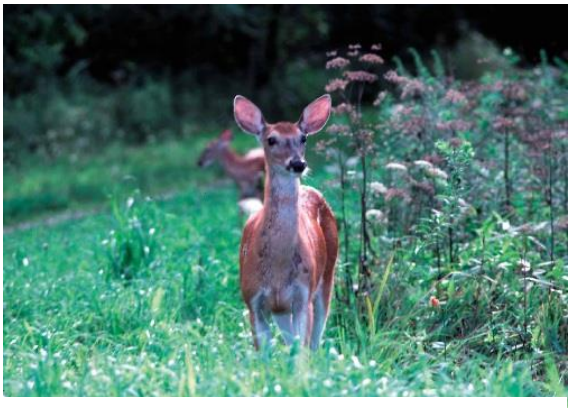


Photo courtesy of USDA NRCS

- **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, for the purpose of these TMDLs, land application of commercially raised farm animal manure is considered a potential source of bacteria loading to watersheds in the Lower Red River - Little River Basin Study Area. 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 bacteria loading to 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 runoff.

  - **Direct access to waterbodies by livestock:** Livestock standing in or crossing streams can provide a direct concentrated source of fecal bacteria in the streams. In the Lower Red River – Little River Basin Study Area, cattle (an estimated 44,634 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 2007 U.S. Department of Agriculture (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 3-6).

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

Photo courtesy of USDA NCRS

- **Failing Septic Systems** – If a septic system is not working properly, then raw sewage - a concentrated source of bacteria - can go directly into streams. Bacteria 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 436 failing septic systems in the Lower Red River - Little River Basin Study Area. Refer to the full TMDL report (Section 3.3.3) on how these numbers were calculated.

- **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 3,712 dogs and 4,185 cats in the Lower Red River - Little River Basin Study Area.

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 Lower Red River - Little River Basin Study Area, most of the bacteria appears to come from nonpoint sources. Of the four watersheds in the Study Area that required bacterial TMDLs, three are segments of the Kiamichi River which have no continuous, permitted point sources of bacteria and no AFOs such as PFOs. The Enterococci impairment for these segments of the Kiamichi River almost certainly comes from nonpoint sources. The 4th watershed that is bacterially impaired with Enterococci is the Little River (OK410200010200_00) watershed which has 1 continuous point source discharger [Tyson Foods, Inc. - Broken Bow (OK0000795)] and 8 PFOs with 622,000 broilers which could contribute bacteria. Though a possible source of bacteria in the Little River (OK410200010200_00) watershed, the Tyson Foods - Broken Bow wastewater treatment facility has a bacterial limit in their permit. PFOs are not allowed to discharge or allow the runoff of animal waste so they are not considered to be major sources of bacteria as long as they are in compliance with their Nutrient Management Plans and Animal Waste Management Plans as outlined in the ODAFF PFO Rules. Therefore, nonpoint sources are most likely the cause of bacterial impairment in the Little River.

  Though most of the pathogens come from non-point sources, it is not known which sources these are specifically from without additional study. Of the four major nonpoint sources (wildlife, farm animals, failing septic systems, and domesticated dogs & cats), over 99% 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 quite a few of them (12,309 cattle, calves, and cows in the bacterially-impaired watersheds of the Lower Red River – Little River Basin Study Area).
  - They produce a lot of fecal coliform.
  - They graze in fields where rain can result in runoff into nearby waterbodies.
  - Sometimes cattle are allowed to wade in creeks and streams that flow to waterbodies, such as the Little River.

- **Turbidity** - Of the twelve watersheds in the Study Area that require turbidity TMDLs, only one of them - Bird Creek (OK410300010100_00) - has an industrial source of TSS [Western Farmers Electric Cooperative-Hugo plant (OK0035327)]. The other watersheds have some permitted stormwater discharges (MSGP and construction) that could result in some TSS getting into those waterbodies. But this loading should be minimal since these stormwater dischargers must use BMPs to prevent sediment from leaving their site and entering a waterbody. Therefore, nonpoint sources are responsible for most of the TSS impairments in these watersheds.

  However, it is difficult to know the exact cause of TSS impairment in these other 11 watersheds. Cattle grazing in the field can result in sediment from erosion. Sediment loading of streams can also originate

from natural erosion processes, including the weathering of soil, rocks, and uncultivated land; geological abrasion; and other natural phenomena. There is insufficient data available to quantify contributions of TSS from these natural processes. TSS or sediment loading can also occur under non-runoff conditions as a result of anthropogenic activities in riparian corridors which cause erosive conditions. There isn't enough data to know how much of the turbidity in the impaired waterbodies is naturally-occurring and how much is from other sources.

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 Lower Red River - Little River Basin Study Area contains waterbodies that are in violation of Oklahoma WQS with respect to bacteria and/or turbidity. The TMDL calculates the reduction in bacteria and turbidity 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, see Sections 4 & 5 and Appendices B, D, E, & F of the *Bacterial and Turbidity TMDL Report for the Lower Red River - Little River Basin*.

Recommendations:

After re-evaluating both bacterial and turbidity data following Oklahoma's assessment protocol, 16 TMDLs and 2 WLAs were developed for the 15 streams in the Lower Red River - Little River Basin Study Area. The following table 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:

WBID	Waterbody Name	These impairments must be reduced by the following amounts in order to meet water quality standards.	
		Enterococci	Turbidity
OK410100010010_10	Red River		57.8%
OK410200010200_00	Little River	39.9%	73.3%
OK410200010200_10	Little River		65.7%
OK410200030010_00	Rock Creek		51.6%
OK410210020140_00	Little River	TMDL done in 2007	67.3%
OK410210020300_00	Cloudy Creek		46.5%
OK410210060020_00	Buffalo Creek		56.0%
OK410210060320_00	Beech Creek		78.0%
OK410210060350_00	Cow Creek		78.0%
OK410210080010_00	Glover River		64.3%
OK410300010010_00	Kiamichi River	17.0%	
OK410300010020_00	Gates Creek		73.1%
OK410300010100_00	Bird Creek		82.6%
OK410310010010_00	Kiamichi River	45.3%	
OK410310020010_10	Kiamichi River	36.9%	

The TMDLs include these waste load allocations for the point source dischargers:

Waterbody ID & Waterbody Name	NPDES Permit No.	Name	Disinfection	Design Flow (mgd) Maximum 30-day flow ($Q_{e(30)}$)	EC Wasteload Allocation (cfu/day)	ENT Wasteload Allocation (cfu/day)
OK410200010200_00 Little River	OK0000795	**Tyson Foods, Inc.- Broken Bow**	Yes	1.5464	**7.38E+09**	**1.93E+09**

Waterbody ID & Waterbody Name	NPDES Permit No.	Name	Long Term Average Monthly Flow (mgd)	Effluent TSS Target (mg/L)	Wasteload Allocation (lb/day)
OK410300010100_00 Bird Creek	OK0035327	**Western Farmers Electric Cooperative-Hugo plant**	**2.84**	**23.6** (TSS limit lowered from 30 mg/L)	**558.0**

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:

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 written comments to**: Water.Comments@deq.ok.gov

Comments must be received by 4:30 pm on Friday, March 21, 2014

Obtaining copies: You may view the full Lower Red River - Little River Basin bacterial and turbidity TMDL study by going to the DEQ website at: http://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.

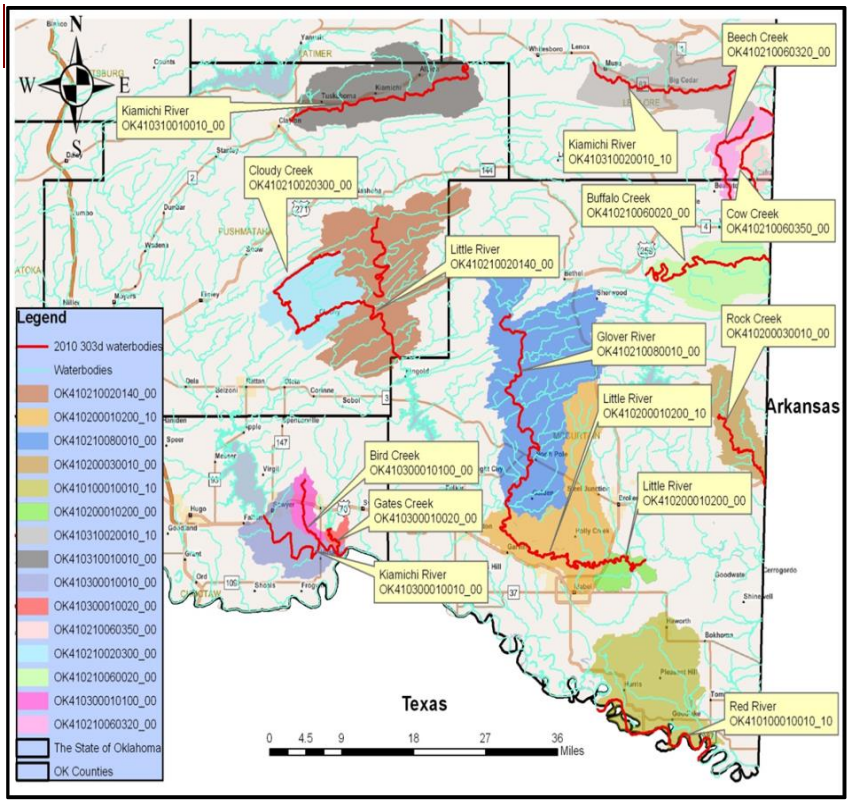
If you would like to receive any or all of these public notices via e-mail, please send your e-mail address to Water.Comments@deq.ok.gov. Also, please let us know if you want to receive notices for the entire State or just for your watershed.

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.

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

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

208 FACTSHEET FOR BACTERIAL AND TURBIDITY TMDLs in the OKLAHOMA LOWER RED RIVER – LITTLE RIVER BASIN STUDY AREA



Background: The TMDL study addressed bacterial and turbidity impairments in 15 waterbodies in southeastern Oklahoma.

Watershed: This TMDL Study Area was located in the Kiamichi (USGS HUC 11140105), Pecan-Waterhole (USGS HUC 11140106), Upper Little (USGS HUC 11140107), Mountain Fork (USGS HUC 11140108), and Lower Little (USGS HUC 11140109) watersheds. The Study Area covered portions of Choctaw, Latimer, LeFlore, McCurtain and Pushmataha Counties.

Beneficial Uses in This Watershed: According to Oklahoma's 2010 Integrated Report, the designated beneficial uses for the waterbodies in the Lower Red River - Little River Basin Study Area were Aesthetics (AES), Agriculture (AG), Fish & Wildlife Propagation-Warm Water Aquatic Community Subcategory (WWAC), Fish & Wildlife Propagation-Cool Water Aquatic Community Subcategory (CWAC), Fish Consumption (FISH), Primary Body Contact Recreation (PBCR), and Public & Private Water Supply (PPWS).

The rivers & creeks impaired with bacteria and turbidity in this Study Area, according to Oklahoma's 2010 303(d) list, are shown in the green-shaded area of the following table with an "**x**" indicating the type of bacteria and/or turbidity for which the Integrated Report said it is impaired.

Between 2001 – 2008, 246 bacterial samples were collected for the waterbodies in the Study Area. Between 1998 – 2012, 455 turbidity samples were collected 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 or turbidity thus necessitating a TMDL. The water quality data examined to make these determinations can be found in Appendix A of the "**2014 Bacterial and Turbidity TMDL Report for the Lower Red River - Little River Basin Study Area**".

The results of the data analyses are also summarized in the following table. An "**x**" in the tan-shaded area indicates that the sampling data showed that the waterbody was found to be impaired for bacteria or turbidity so a TMDL was developed. The "**x**" in red represents a waterbody that was found to be impaired when the water quality data was analyzed but that the waterbody had not been on the 2010 303(d) list as being impaired. That was the case with Little River (OK410200010200_00) which was found to be impaired for Enterococci when it was sampled. As a result, a TMDL for Enterococci for Little River was developed. For Little River (OK410210020140_00), a TMDL was already developed for Enterococci in 2007. The hyperlink will take you to that TMDL report at the DEQ webpage ("*Bacterial TMDL in the Little River Area*").

WBID	Waterbody Name	Waterbody Impairments from the 2010 303(d) List			TMDLs needed after sampling results analyzed		
		Enterococci	E-Coli	Turbidity	Enterococci	E-Coli	Turbidity
OK410100010010_10	Red River			X			X
OK410200010200_00	Little River			X	X		X
OK410200010200_10	Little River			X			X
OK410200030010_00	Rock Creek			X			X
OK410210020140_00	Little River	X		X	Done 2007		X
OK410210020300_00	Cloudy Creek			X			X
OK410210060020_00	Buffalo Creek			X			X
OK410210060320_00	Beech Creek			X			X
OK410210060350_00	Cow Creek			X			X
OK410210080010_00	Glover River			X			X
OK410300010010_00	Kiamichi River	X			X		
OK410300010020_00	Gates Creek			X			X
OK410300010100_00	Bird Creek			X			X
OK410310010010_00	Kiamichi River	X			X		
OK410310020010_10	Kiamichi River	X			X		

Possible Sources of Impairments:

Point sources:

- **NPDES regulated** municipal **and** industrial **wastewater treatment facilities (WWTF):** There aren't any municipal wastewater facilities discharging into the Lower Red River - Little River Basin Study Area. There are two industrial facilities in the Lower Red River - Little River Basin Study Area.: Tyson Foods, Inc. - Broken Bow (OK0000795) and Western Farmers Electric Cooperative-Hugo plant (OK0035327).

- **NPDES regulated stormwater discharges:** DEQ regulates stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s), industrial sites, and construction sites.

  - **NPDES regulated stormwater discharges through Municipal Separate Storm Sewer Systems:** There aren't any Phase I or Phase II (OKR04) MS4s in the Study Area.

  - **Industrial Sites (OKR05):** These two facilities in the Lower Red River – Little River Basin Study Area have a Multi-Sector General Permit (MSGP): Meridian Aggregates Co (OKR050878) in the Little River (OK410200010200_10) watershed and Tyson Foods (OKR050522) in the Little River (OK410200010200_00) watershed.

  - **Construction Sites (OKR10):** There were three OKR10 permits for construction projects in the Lower Red River – Little River Basin Study Area during the time period when water samples were taken. These were ODOT JP #18849(04) (OKR107548) in the Kiamichi River (OK410300010010_00) watershed, ODOT JP #18851(04) (OKR106906) in the Bird Creek (OK410300010100_00) watershed and The Woodlands (OKR107418) in the Little River (OK410200010200_00) watershed.

- **Rock, Sand, and Gravel Quarries:** There aren't any rock, sand, or gravel quarries in the Study Area.

- **NPDES regulated Concentrated Animal Feeding Operations (CAFOs):** There aren't any CAFOs in the Study Area, but there are 44 Poultry Feeding Operations (PFO) with 3,046,700 birds in McCurtain County.

- Sanitary Sewer Overflows **(SSO) and No-Discharge Facilities**: There aren't any no-discharge facilities or SSOs in the Study Area.

Nonpoint sources - The nonpoint sources examined in this Study Area were:

- **Wildlife:** It is difficult to assess the magnitude of bacteria contributions from wildlife species as a general category. Since there is adequate data regarding the number of deer in each county, the number of deer is used to represent wildlife in general. By using the count of deer in each county and the percentage of the watershed area within each county, a wild deer population is calculated for each watershed. There are approximately 3,338 deer in the Lower Red River – Little River Basin Study Area. This is an average deer per acre rate ranging from 0.0027 [Buffalo Creek (OK410210060020_00)] - 0.0080 [Gates Creek (OK410300010020_00)]. At this minimal concentration, wildlife is considered to be a minor contributor of bacteria in the watersheds.

- **Farm Animals:** 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 bacteria loading to waterbodies if washed into streams by runoff.

- Livestock grazing in pastures during which manure containing fecal bacteria could be deposited onto land surfaces which may be washed into waterbodies by runoff.

- Direct access to waterbodies by livestock: In the bacterially-impaired watersheds of the Lower Red River – Little River Basin Study Area, cattle (an estimated 12,309 head) generate the largest amount of fecal coliform and often have direct access to streams and tributaries.

- **Failing Septic Systems:** It is estimated that there are 398 failing septic systems in the Lower Red River - Little River Basin Study Area.

- **Pets:** Based on national averages, it is estimated that there are about 3,094 dogs and 3,488 cats in the Lower Red River - Little River Basin Study Area.

Of the four watersheds in the Study Area that required bacterial TMDLs, three were segments of the Kiamichi River which had no continuous, permitted point sources of bacteria and no animal feeding operations. The Enterococci impairment for these segments of the Kiamichi River almost certainly comes from nonpoint sources. The fourth watershed that was bacterially impaired with Enterococci was the Little River (OK410200010200_00) watershed which has one continuous point source discharger [Tyson Foods, Inc. - Broken Bow (OK0000795)] and two Poultry Feeding Operations (PFOs) with 211,000 broilers which could contribute bacteria. Though those were possibilities, the point source discharger has a bacteria limit in their permit; and PFOs are not allowed to discharge or allow the runoff of animal waste into Oklahoma waterbodies. Therefore, nonpoint sources are thought to be the most likely cause of bacterial impairment in the Little River.

Of the twelve watersheds in the Study Area that required turbidity TMDLs, only one of them - Bird Creek (OK410300010100_00) - had an industrial source that could contribute TSS [Western Farmers Electric Cooperative-Hugo plant (OK0035327)]. The other watersheds had some permitted stormwater discharges (MSGP and construction) that could result in some TSS getting into those waterbodies. But that loading should be minimal since those stormwater dischargers had a TSS limit in their permit and must use BMPs to prevent sediment from leaving their site and entering a waterbody. Therefore, nonpoint sources were thought to be most responsible for the TSS impairments in these watersheds.

In summary, nonpoint sources were determined to be the most likely sources of bacterial and turbidity loading into Study Area waterbodies.

TMDLs:

The TMDLs were calculated using load duration curves. The following table indicates the percentage that the pollutant will need to be reduced [percent reduction goal (PRG)] in order for that waterbody to not be impaired and meet its designated beneficial use:

WBID	Waterbody Name	These impairments must be reduced by the following amounts in order to meet water quality standards.	
		Enterococci	Turbidity
OK410100010010_10	Red River		57.8%
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OK410300010100_00 Bird Creek	OK0035327	**Western Farmers Electric Cooperative- Hugo plant**	**2.84**	**23.6** (TSS limit lowered from 30 mg/L)	**558.0**

The 2014 Lower Red River – Little River Basin Study Area Bacterial and Turbidity 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: 02/03/2014