

## PUBLIC NOTICE

April 29, 2011

- **AVAILABILITY OF DRAFT BACTERIA TMDL FOR THE UPPER CIMARRON AREA**

- **REQUEST FOR PUBLIC COMMENTS**

**Public Comment Period Ends: June 13, 2011**

The Oklahoma Department of Environmental Quality (DEQ) is seeking comments on a draft report describing pathogen reductions needed to improve water quality in the Upper Cimarron River Study Area (USGS HUC 11070107) in the Upper Cimarron-Upper Cimarron Liberal watersheds. The Federal Clean Water Act requires DEQ to develop plans with goals and pollution control targets for improving water quality where minimum standards are not met. This is accomplished by establishing limits known as Total Maximum Daily Loads (TMDLs) for each pollutant exceeding the standards. TMDLs set levels for pollutants that allow waterbodies to achieve their beneficial uses. Beneficial uses include water for drinking, recreation, aesthetics, irrigation, fishing, and swimming. The primary body contact recreation (i.e. swimming) beneficial use of the Upper Cimarron River Study Area was evaluated for excess pathogens. These pathogenic bacteria include fecal coliform, *Escherichia coli* (*E. coli*), and enterococci. These bacteria are found in the intestines of humans and animals and may get into streams as a result of the overflow of domestic sewage or non-point sources of human and animal waste.

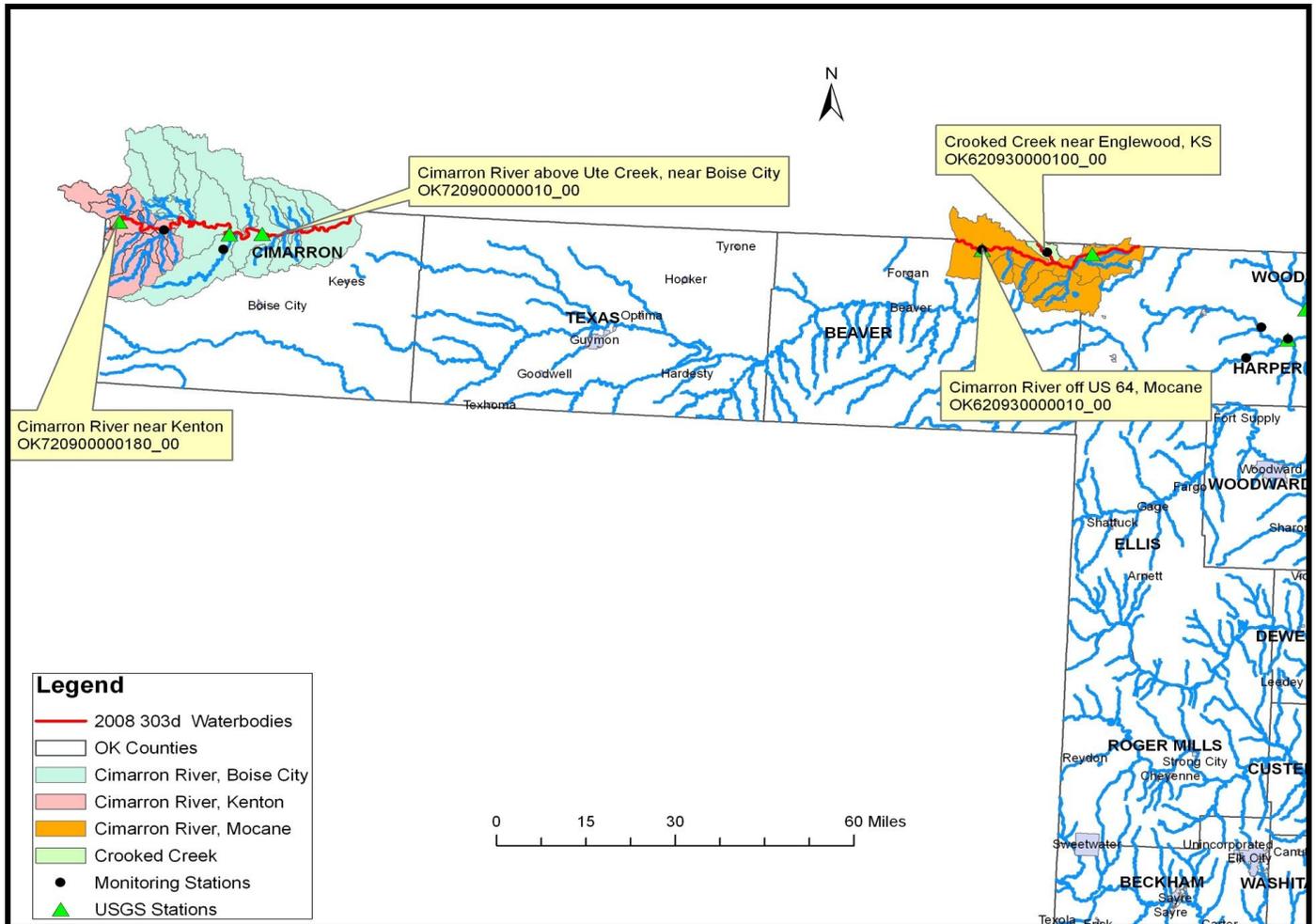
The watersheds in this TMDL are located in Cimarron and Beaver Counties in Northwestern Oklahoma. These watersheds extend into Baca County in Colorado, Union County in New Mexico and Meade County in Kansas. The vast majority of the drainage area for the waterbodies included in this report is located in Cimarron County. The TMDL study in the Upper Cimarron River Study Area focused on three waterbodies that DEQ placed in Category 5 of the 2008 Integrated Report [303(d) list]<sup>1</sup> for nonsupport of primary body contact recreation (PBCR). These three waterbodies are:

- Cimarron River (OK720900000180\_00)
- Cimarron River (OK620930000010\_00)
- Crooked Creek (OK620930000100\_00)



<sup>1</sup> [http://www.deq.state.ok.us/wqdnew/305b\\_303d/2008\\_integrated\\_report\\_app\\_c\\_303d\\_list.pdf](http://www.deq.state.ok.us/wqdnew/305b_303d/2008_integrated_report_app_c_303d_list.pdf)

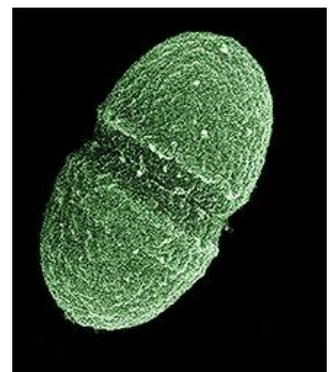
## Watersheds Not Supporting Primary Body Contact Recreation Use within the Study Area



## Study

From 2000 to 2008, data for this study was collected from a variety of sources. This included data from 163 samples from five Water Quality Monitoring (WQM) stations. This data was gathered during the primary contact recreation season (May 1<sup>st</sup> to September 30<sup>th</sup>) to determine if there were violations of water quality standards for bacteria in the Upper Cimarron River Study Area. The criteria to determine if a stream is listed on the 303(d) list can be found in Title 785, Chapter 46 of the Oklahoma Administrative Code.<sup>2</sup> Screening levels for bacteria are listed in the *Assessment of Primary Body Contact Recreation support* (OAC 785:46-15-6(c-e)).

Of the waterbodies sampled, three were found to be in violation of water quality standards for enterococci thus requiring a TMDL. In addition, the Upper Cimarron River near Kenton and off U.S. 64 at Mocane was also impaired with fecal coliform. (See the following table.)



**Enterococci faecalis**  
Photo courtesy of USDA ARS

<sup>2</sup> [http://www.owrb.ok.gov/util/rules/pdf\\_rul/Chap46.pdf](http://www.owrb.ok.gov/util/rules/pdf_rul/Chap46.pdf)

## Waterbodies Requiring TMDLs for Not Supporting Primary Contact Recreation Use

WQM Station	Waterbody ID	Waterbody Name	Indicator Bacteria		
			ENT	<i>E. coli</i>	FC
OK720900-00-0180C OK720900-00-0180G	OK720900000180_00	Cimarron River near Kenton	X		X
OK620930-00-0010G OK620930-00-0010T	OK620930000010_00	Cimarron River off US 64, Mocane	X		X
OK620930-00-0100G	OK620930000100_00	Crooked Creek near Englewood, KS	X		

ENT = enterococci; FC = fecal coliform

### TMDLs

A TMDL document uses scientific data collection and analysis to determine the amount and source of each pollutant entering the system, and allocates pollutant loads to each source at levels that would ultimately restore water quality to meet clean water standards. A TMDL is the amount of each pollutant a waterway can receive and not violate water quality standards. A TMDL takes into account the pollution from all sources.

An important part of TMDL analysis is the identification of individual sources of pollutants in the watershed that affect pathogens and the amount of loading contributed by each source. Under the Clean Water Act, sources are classified as either point or non-point sources. The National Pollutant Discharge Elimination System (NPDES) program<sup>3</sup> 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.



DEQ file photo of a point-source discharge

The pollution in these watersheds comes from non-point source pollution (NPS). Non-point sources are widespread sources that cannot be identified as entering a waterbody at a single location. These include wildlife, various agricultural activities, livestock, domesticated animals, bacteria from land application fields, urban runoff, bacteria from failing septic systems, and bacteria from domestic pets.

### Point Source Discharges

Point source discharges are single, identifiable, and localized, like discharges from a pipe. Point source discharges can be described by three broad subcategories: 1) NPDES regulated municipal and industrial wastewater treatment facilities (WWTF); 2) NPDES regulated industrial and municipal stormwater discharges; and 3) NPDES regulated Concentrated Animal Feeding Operations (CAFOs). A TMDL must provide Waste Load Allocations (WLAs) for all NPDES regulated point sources. Non-point sources are widespread sources that cannot be identified as entering a waterbody at a single location. For the purposes of this TMDL, all sources of pollutant loading not regulated by NPDES permits are considered non-point sources. The TMDL must provide a Load Allocation (LA) for these sources.

<sup>3</sup> EPA NPDES home page: <http://cfpub.epa.gov/npdes/index.cfm>

- **NPDES regulated municipal and industrial wastewater treatment facilities:** There aren't any municipal or industrial point source dischargers in the Upper Cimarron River Study Area.
- **NPDES regulated industrial and municipal storm water discharges:** Stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it is often discharged untreated into local waterbodies. However, there are no MS4s in the Upper Cimarron River 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). Its goal is to help develop, coordinate, and oversee environmental policies and programs aimed at protecting the Oklahoma environment from pollutants associated with agricultural animals and their waste.<sup>4</sup> According to ODAFF, there are no NPDES permitted CAFOs in the Upper Cimarron River Study Area.
- **Sanitary sewer overflows (SSO):** Sanitary sewer overflows (SSO) from wastewater collection systems can be a major source of harmful bacteria in streams. However since there are not any wastewater collection systems in the study area, there aren't any SSOs.

## Non-Point Sources

Non-point 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 runoff is an important source of loading in urban or residential settings with high amounts of paved, impervious areas. In rural settings, the sources of bacteria may include runoff of manure applied to agricultural land, the runoff of animal wastes associated with the erosion of sediments in grazing fields, contributions from wildlife, and failing septic tanks. Some examples include:

- **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.



Photo courtesy of USDA NRCS

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 Upper Cimarron River Study Area, this comes to about 464 deer. This is an average

deer per acre rate of 0.0009. At this minimal concentration, wildlife is considered to be a minor contributor of bacteria in the watersheds.

4 <http://www.oda.state.ok.us/aems.htm>

It must be noted that while no data are available to estimate populations and fecal loading of wildlife 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.

- **Agricultural Animals** - Agricultural livestock grazing in pastures deposit manure containing bacteria onto land surfaces. Detailed information is not 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 Upper Cimarron River Study Area.

Examples of livestock activities that can contribute to bacteria sources 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: 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 Upper Cimarron River Study Area, cattle (an estimated 50,329 head) generate the largest amount of fecal coliform and often have direct access to streams and tributaries. (Refer to the full TMDL report for the estimated number of all agricultural animals as well as their daily fecal coliform production rates.)



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 34 failing septic systems in the Upper Cimarron River Study Area. Refer to the full TMDL report (Section 3.2.3) 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)]. This means there are about 1550 dogs and 2006 cats in the Upper Cimarron River Study Area.



In the entire Upper Cimarron River Study Area, commercially raised farm animals are estimated to be the primary contributors of bacteria to the land surface.

## Conclusions and Recommendations

The Upper Cimarron River Study Area is in violation of Oklahoma Water Quality Standards with respect to pathogens. The TMDL calculations of a reduction in bacteria that would be needed in order for these streams to be in compliance with Oklahoma's WQS were derived using load duration curves. The calculations include present and future sources as well as a margin of safety. These pathogens come from non-point sources though it is not known which sources these are specifically from without additional study. The health effects of pathogens should be a concern for the public who uses these waterways for activities such as swimming, wading, or boating. This is because some waterborne pathogenic bacteria can cause serious human illness or disease.

In order to meet water quality standards for swimming (Primary Body Contact Recreation), the levels of pathogens must be reduced by the following amounts:

### **TMDL Percent Reductions Required to Meet Water Quality Standards for Impaired Waterbodies in the Upper Cimarron River Study Area**

Waterbody ID	Waterbody Name	Percent Reduction Required*		
		FC	ENT	
		Instantaneous	Instantaneous	Geo-mean
OK720900000180_00	Cimarron River near Kenton	<b>28%</b>	88%	<b>56%</b>
OK620930000010_00	Cimarron River off US 64, Mocane	<b>20%</b>	99%	<b>66%</b>
OK620930000100_00	Crooked Creek near Englewood, KS		94%	<b>70%</b>

\* Selection of the appropriate Percent Reduction Goal for each bacteria indicator for each waterbody is denoted by the **bold** text

## Providing comments

The comment period will be open for 45 days. If you have any concerns regarding these proposed limits, 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: [Karen.Miles@deq.ok.gov](mailto:Karen.Miles@deq.ok.gov)

### **Comments must be received by close of business on June 13, 2011**

You may also request a public meeting in writing. If there is a significant degree of interest, the Department of Environmental Quality will schedule a public meeting. After evaluating comments received and making any necessary changes, the modification will be submitted to EPA for final approval. The final results of the TMDL will be incorporated into Oklahoma's Water Quality Management Plan.

## Obtaining copies

You may view the study this TMDL was based on by going to the DEQ website at:  
<http://www.deq.state.ok.us/WQDnew/index.htm>

OR

Pick up copies of the studies at the DEQ office, Water Quality Division, 707 North Robinson, Oklahoma City from 7:30 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 about changes in this watershed or you are located downstream in the watershed where changes have been recommended.

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