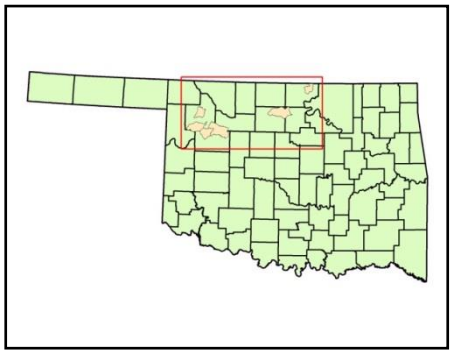
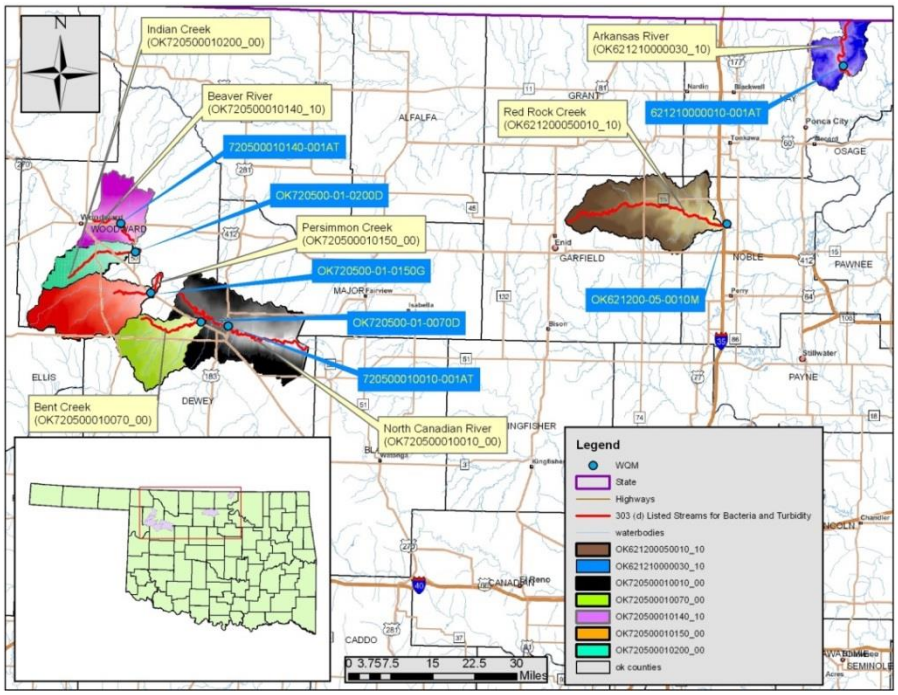


208 FACTSHEET FOR BACTERIAL AND TURBIDITY TMDLs in the ARKANSAS RIVER AND NORTH CANADIAN RIVER STUDY AREA



Watershed:

The Arkansas River and North Canadian River TMDL Study Area is located in the northwestern portion of Oklahoma in the Black Bear-Red Rock (USGS HUC 11060006), Kaw Lake (USGS HUC 11060001), and Middle North Canadian (USGS HUC 11100301) watersheds. The Study Area covers portions of Dewey, Ellis, Garfield, Grant, Kay, Major, Noble, and Woodward counties.

Beneficial Uses in the Arkansas River and North Canadian River Study Area:

According to the Oklahoma Water Quality Standards, the designated beneficial uses for the waterbodies in the Arkansas River and North 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), and Public & Private Water Supply (PPWS). The designated beneficial uses addressed in the Arkansas River and North Canadian River TMDL Study Area were WWAC and PBCR. The Table 1 is the assessment from Oklahoma's 2012 Integrated Report on whether or not these waterbodies met their beneficial uses.

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

Waterbody Identification	Waterbody Name	AES	AG	WWAC	FISH	PBCR	PPWS
OK621200050010_10	Red Rock Creek	F	N	N	X	N	
OK621210000030_10	Arkansas River	I	N	N	I	N	I
OK720500010010_00	North Canadian River	F	F	F	N	N	F
OK720500010070_00	Bent Creek	F	N	F	X	N	I
OK720500010140_10	Beaver River	F	F	F	F	N	
OK720500010150_00	Persimmon Creek	I	F	F	X	N	I
OK720500010200_00	Indian Creek	I	F	F	X	N	I

F – Fully supporting that designated use; N – Not supporting that use; I – Insufficient information; X – Not assessed

Impaired Waterbodies in this Study Area:

Waterbodies that were indicated as impaired for bacteria or turbidity on Oklahoma's 2012 303(d) list, are designated with an "**x**" in the half of Table 2 with a dark blue header:

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

WBID	Waterbody Name	Waterbody impairments from the 2012 303(d) List			TMDLs needed after sampling results analyzed		
		Enterococci	*E. coli*	Turbidity	Enterococci	*E. coli*	Turbidity
OK621200050010_10	Red Rock Creek	X			X		
OK621210000030_10	Arkansas River	X		X	X		X
OK720500010010_00	North Canadian River	X			X		
OK720500010070_00	Bent Creek	X	X		X	X	
OK720500010140_10	Beaver River	X			X		
OK720500010150_00	Persimmon Creek	X	X		X	X	X
OK720500010200_00	Indian Creek	X	X		X	X	

Bacterial water quality monitoring results from 2001 – 2012 (160 samples) and turbidity water quality monitoring results from 2001 – 2013 (205 samples) were examined to verify if these waterbodies were still impaired. 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 still be impaired for bacteria or turbidity. TMDLs were developed for these waterbodies. 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 2012 303(d) list as being impaired. That was the case with Persimmon Creek (OK720500010150_00) which was found to be impaired for turbidity. As a result, a TMDL for turbidity for Persimmon Creek was developed.

Possible Sources of Impairments:

Point sources - The point sources examined in the Arkansas River and North Canadian River Study Area were:

- **OPDES-regulated municipal and industrial wastewater treatment facilities (WWTF)** – There is one municipal (Woodward WWTF) and one industrial (Western Farmers Electric Cooperative-Mooreland plant) OPDES-permitted facility that discharge wastewater into the Beaver River (OK720500010140_10) watershed.
- **OPDES regulated stormwater discharges**:
  - Municipal Separate Storm Sewer Systems (MS4s) - There aren't any in the Study Area.
  - Industrial Sites – The City of Miami's airport is the only facility with a Multi-Sector General Permit (MSGP) in the Study Area.
    - Rock, Sand, and Gravel Quarries – Wastewater generated at quarries is regulated under DEQ General Permit OKG950000. There are three quarries in the Study Area (listed in Table 3-5 and shown in Figure 3-2 of the TMDL report).
  - Construction Sites - There was one DEQ-permitted construction site during the time period that water samples were taken in the Study Area.
- **Sanitary Sewer Overflows (SSO)**: In the Study Area between 1989 and 2001, 77 SSO occurrences were reported with amounts ranging from a minimal amount to over 38 million gallons.
- **No-Discharge Facilities** – In the Study Area, there are eight (five municipal and three industrial facilities) no-discharge facilities. 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.
- **NPDES-regulated Animal Feeding Operations (AFOs)** –The Oklahoma Department of Agriculture, Food and Forestry (ODAFF) has been approved by EPA to issue NPDES permits in Oklahoma under what ODAFF calls the Agriculture Pollutant Discharge Elimination System (AgPDES). There are six Swine Feeding Operations (SFOs) with 38,564 swine in the Study Area. SFOs must follow SFO rules and develop a Swine Waste Management Plan to prevent swine waste from being discharged into surface or groundwater.

Nonpoint sources - The nonpoint sources examined in the Arkansas River and North Canadian River Study Area were:

- Wildlife – There are about 3,250 deer in the Study Area. They are thought to be a minor contributor of bacteria.
- Farm animals – There are an estimated 74,510 head of cattle in the Study Area. They are considered to be a major contributor of fecal coliform in the Study Area.
- Pets – There are an estimated 3,876 dogs and 4,370 cats in the Study Area. They are considered to be a minor contributor of bacteria in the Study Area.
- Failing Septic Systems – There are 241 failing septic systems in the Study Area which are considered to be a minor contributor of bacteria.

For details about each of these sources and their impact on the impairment of waterbodies in the Study Area, consult the full Arkansas River & North Canadian River Bacterial and Turbidity TMDL report at the following DEQ webpage: http://www.deq.state.ok.us/WQDnew/tmdl/index.html.

TMDLs:

The TMDLs were calculated using load duration curves. Afterwards, 12 TMDLs (Table 3) and 1 WLA (Table 4) were developed for the 7 streams in the Arkansas River and North Canadian River Study Area. Table 3 shows 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 its designated beneficial uses:

Table 3: Percent Reduction Goal Needed for Waterbody to Meet Water Quality Standards

WBID	Waterbody Name	These impairments must be reduced by the following amounts in order to meet water quality standards.		
		E. coli	Enterococci	Turbidity
OK621200050010_10	**Red Rock Creek**		**94.7%**	
OK621210000030_10	**Arkansas River**		**93.3%**	**92.4%**
OK720500010010_00	**North Canadian River**		**42.5%**	
OK720500010070_00	**Bent Creek**	**59.8%**	**93.0%**	
OK720500010140_10	**Beaver River**		**48.0%**	
OK720500010150_00	**Persimmon Creek**	**62.5%**	**94.2%**	**1.3%**
OK720500010200_00	**Indian Creek**	**48.5%**	**85.3%**	

Table 4: Bacterial WLA

Waterbody ID	Stream Name	Facility Name	NPDES Permit No.	Disinfection?	Design Flow (mg/d)	Wasteload Allocation ($x10^8$ cfu/day)
						ENT
OK720500010140_00	Beaver River	**Woodward WWTF**	OK0034509	Yes	4.0*	5.0

EPA Approval Date: 09/11/2014
Record Last Updated: 09/26/2014