208 Factsheet regarding Bacteria and Turbidity TMDLs for Neosho and Verdigris Basins Area

Watershed: This Total Maximum Daily Load (TMDL) Study Area is located in the northeastern part of Oklahoma. The waterbodies and their watersheds addressed in this report are in Osage and Ottawa counties.

Beneficial Uses in This Watershed: According to Oklahoma's 2022 Integrated Report, the designated beneficial uses for Oklahoma streams in the Neosho and Verdigris Basins Area are Aesthetics (AES), Agriculture (AG), Fish & Wildlife Propagation - Warm Water Aquatic Community Subcategory (WWAC), Fish Consumption, Primary Body Contact Recreation (PBCR), Public & Private Water Supply (PPWS), and Sensitive Water Supply (SWS).

Designated Beneficial Uses for Waterbodies in the Study Area

Waterbody ID	Waterbody Name	AES	AG	WWAC	FISH	PBCR	PPWS	SWS
OK121300040280_00	Hominy Creek	F	N	N	X	N	I	X
OK121400030170_00	Buck Creek	I	F	I	X	N	I	
OK121600040150_00	Elm Creek	F	N	N	X	F		

F – Fully supporting | **N** – Not supporting | **I** – Insufficient | **X** – Not assessed | Source: **DEQ 2022 Integrated Report**

Bacterial water quality monitoring results from 2007 – 2022 (62 samples) and turbidity water quality monitoring results from 2018 – 2023 (71 after high flow samples were excluded) were collected for the waterbodies in the Study Area. For this study, the water quality data generated by all these samples were analyzed to find out that two waterbodies were impaired for bacteria in the Study Area thus necessitating a TMDL. The water quality data examined to make these determinations can be found in Appendix A of the "2024 Bacterial and Turbidity TMDLs for Oklahoma Streams in the Neosho and Verdigris Basins Area".

Assessed Impairments and Actual Impairments in the Study Area

WBID	Waterbody Name	Category 5 Impairments from the 2022 303(d) List			TMDLs needed after sampling results analyzed		
		Ent.	*E. coli*	Turbidity	Ent.	*E. coli*	Turbidity
OK121300040280_00	Hominy Creek		X	X			
OK121400030170_00	Buck Creek	X			X		
OK121600040150_00	Elm Creek					X	

Based on an assessment of water quality monitoring data for the 2024 Integrated Report (IR), one *E. coli* impairment and one turbidity impairment on Hominy Creek (OK121300040280_00) are recommended for delisting, and one *E. coli* impairment on Elm Creek (OK121600040150_00) will be listed on the 2024 303(d) list.

Possible Sources of Impairments:

Point Source:

- **Oklahoma Pollutant Discharge Elimination System (OPDES) - regulated municipal and industrial wastewater treatment facilities:** There are no municipal or industrial OPDES-permited facilities in the TMDL watersheds.

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

    - **Municipal Separate Storm Sewer Systems (MS4s):** 0.2% of the Elm Creek (OK121600040150_00) watershed area is part of the City of Miami's Phase II MS4 (OKR040032). Therefore, the City of Miami's Phase II MS4 will not be included in the MS4 wasteload allocation for Elm Creek's watershed but considered part of the load allocation for the bacterial TMDL calculation.

- **No-Discharge Facilities**: There are no no-discharge facilities in the TMDL watersheds.

- **Sanitary Sewer Overflows (SSO)**: There are no municipal or industrial OPDES-permitted facilities in the TMDL watersheds, and therefore has no sanitary sewer overflow occurences to report.

- **NPDES regulated Animal Feeding Operations (AFOs):** Based on data provided by ODAFF in September of 2023, there are no concentrated animal feeding operations (CAFOs), swine feeding operations (SFOs), or poultry feeding operations (PFOs) in the TMDL watersheds.

Nonpoint Sources:

- **Wildlife** – It must be noted that no data are available in Oklahoma to estimate wildlife populations other than deer. For the two watersheds impaired for bacteria, this comes to about 977 deer. This is an average deer per acre rate ranging from 0.016 [Buck Creek (OK121400030170_00)] to 0.023 [Elm Creek (OK121600040150_00)]. At this minimal concentration, wildlife is considered to be a minor contributor of bacteria in those impaired watersheds.

- **Farm Animals** – In the two bacterially-impaired watersheds, cattle (an estimated 6,039 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 2017 USDA county agricultural census data.

- **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. In 2020, the average number of pets per household was 1.46 dogs and 1.78 cats [American Veterinary Medical Association (2022)]. Based on these averages, it is estimated that there are about 744 dogs and 529 cats in the two bacterially impaired watersheds in the TMDL watersheds.

- **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 50 failing septic systems in the two bacterially-impaired watersheds.

TMDL Calculation:

The TMDL, wasteload allocations (WLA), load allocations (LA), and margin of safety (MOS) will vary with flow condition, and are calculated at every 5th flow interval percentile. The below tables summarize the TMDL, WLA, LA and MOS loadings at the 50% flow percentile.

Summaries of Bacterial TMDLs

Waterbody Name and ID	Pollutant	TMDL (colonies/day)	WLA $_{WWTF}$ (colonies/day)	WLA $_{MS4}$ (colonies/day)	WLA $_{Growth}$ (colonies/day)	LA (colonies/day)	MOS (colonies/day)
Buck Creek OK121400030170_00	ENT	5.04E+09	0.00E+00	0.00E+00	5.04E+08	4.53E+09	5.04E+08
Elm Creek OK121600040150_00	EC	2.84E+09	0.00E+00	0.00E+00	2.84E+08	2.27E+09	2.84E+08

The table below indicates the amount that each pollutant will need to be reduced [Percent Reduction Goal (PRG)] in order for an impaired waterbody to meet water quality standards and its designated beneficial uses:

PRG Needed for Waterbody to Meet Water Quality Standards

Waterbody Name and ID	These impairments must be reduced by the following amounts in order to meet water quality standards.	
	E. coli	Enterococci
Buck Creek OK121400030170_00		74.7%
Elm Creek OK121600040150_00	16.8%	

The TMDL Report for the Neosho and Verdigris Basins' be found on the following DEQ webpage: https://www.deq.ok.gov/water-quality-division/watershed-planning/tmdl/.

EPA Approval Date: Pending
Record Last Updated: 01/30/2025