FECAL COLIFORM BACTERIA TOTAL MAXIMUM DAILY LOAD EVALUATION FOR PONCA CREEK, GREGORY AND TRIPP COUNTIES, SOUTH DAKOTA

South Dakota Department of
Environment and Natural Resources

Protecting South Dakota's Tomorrow ... Today

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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Total Maximum Daily Load Summary Table

Ponca Creek Total Maximum Daily Load

Entity ID:	SD-MI-R-PONCA-01
Location:	HUC Code: 10150001
Size of Watershed:	240,000 acres
Water body Type:	River/Stream
303(d) Listing Parameter:	Fecal Coliform Bacteria
Initial Listing date:	2006 IR
TMDL Priority Ranking:	1
Listed Stream Miles:	79 miles from Highway 183 to the Nebraska Border
Designated Use of Concern:	Limited Contact Recreation
Analytical Approach:	Load Duration Curve Framework
Target:	Meet applicable water quality standards 74:51:01:55
Indicators:	Fecal Coliform Bacteria Counts
Threshold Value:	< 1000 colonies/100 ml geometric mean concentration with maximum single sample concentrations of <2000 colonies/100 ml
High Flow Zone LA:	1.78×10^{13} Colonies/ Day
High Flow Zone WLA:	Colome = 3.30×10^{10} Colonies/ Day
	Gregory = 4.51×10^{11} Colonies/ Day
High Flow Zone MOS:	1.99×10^{12} Colonies/ Day
High Flow Zone TMDL:	2.03×10^{13} Colonies/ Day

1.0 Introduction

The intent of this document is to clearly identify the components of the TMDL submittal to support adequate public participation and facilitate the United States Environmental Protection Agency (EPA) review and approval. The TMDL was developed in accordance with Section 303(d) of the federal Clean Water Act and guidance developed by EPA. This TMDL document addresses the fecal coliform bacteria impairment of Ponca Creek from Highway 183 to the Nebraska Border, SD-MI-R-Ponca-01.

1.1 Watershed Characteristics

The entire Ponca Creek watershed drains 520,000 acres in South Dakota and Nebraska and discharges to Lewis and Clark Lake near Verdel, Nebraska. The 303(d) listed segment that this TMDL addresses drains approximately 240,000 acres of Gregory and Tripp Counties in south central South Dakota (Figure 1).

The communities of Burke, Colome, Dallas, Gregory and Herrick all reside within the listed segments drainage. The population of the watershed is approximately 2,900 with nearly half residing in and around the community of Gregory.

The watershed climate is characterized by hot summers with temperatures occasionally reaching 100^{o}F or greater and cold winters with temperatures dipping down below 0^{o}F. Annual precipitation averages around 22 inches with 75% of it falling during the growing season, April through September. The average annual snowfall total is 50 inches.

The dominant soil associations located in the Ponca Creek drainage include the Reliance, Ree, Anselmo-Holt-Tassel, Meadin-Jansen, and Labu-Sansarc. The Ree and Reliance associations are dominated by cropland. Corn, small grain, grain sorghum, and alfalfa are the main cultivated crops. Anselmo-Holt-Tassel associations are dominated by rangelands with 85% of these soils supporting native vegetation. About 95% of Meadin-Jansen soils and Labu-Sansarc associations support native vegetation and are used for grazing (USDA, 1984).

Land use in the watershed is predominately agricultural in nature. Major land use categories are 78% native rangelands, 8% row crops, 6% developed (this includes road right of ways), 3% small grains, 2% hay ground, 1% forested, and 1% water and wetlands.

Ponca Creek was assessed as an individual portion of the larger Lewis and Clark Watershed Assessment, which looked at individual streams such as Ponca Creek as well as the entire drainage basin and the cumulative effects of the individual waterbodies on Lewis and Clark Lake.

Segment SD-MI-R-PONCA-01 was listed for total suspended sediment (TSS) and fecal coliform in the 2006 Integrated Report (SDDENR, 2006). This TMDL will address the fecal coliform listing. Any other listings will be evaluated in separate TMDL document(s).

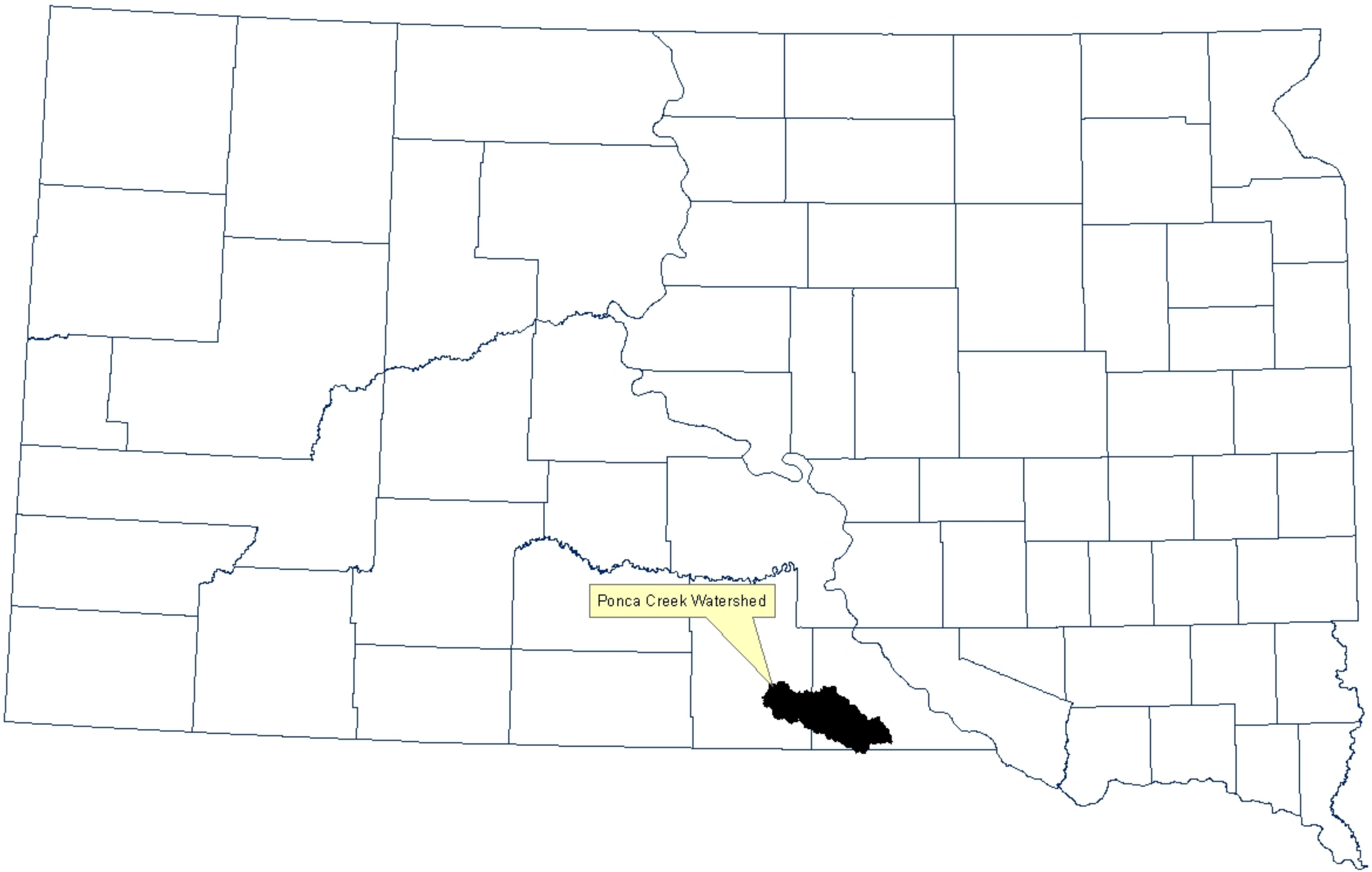

Figure 1. **Ponca Creek Watershed location in South Dakot**a

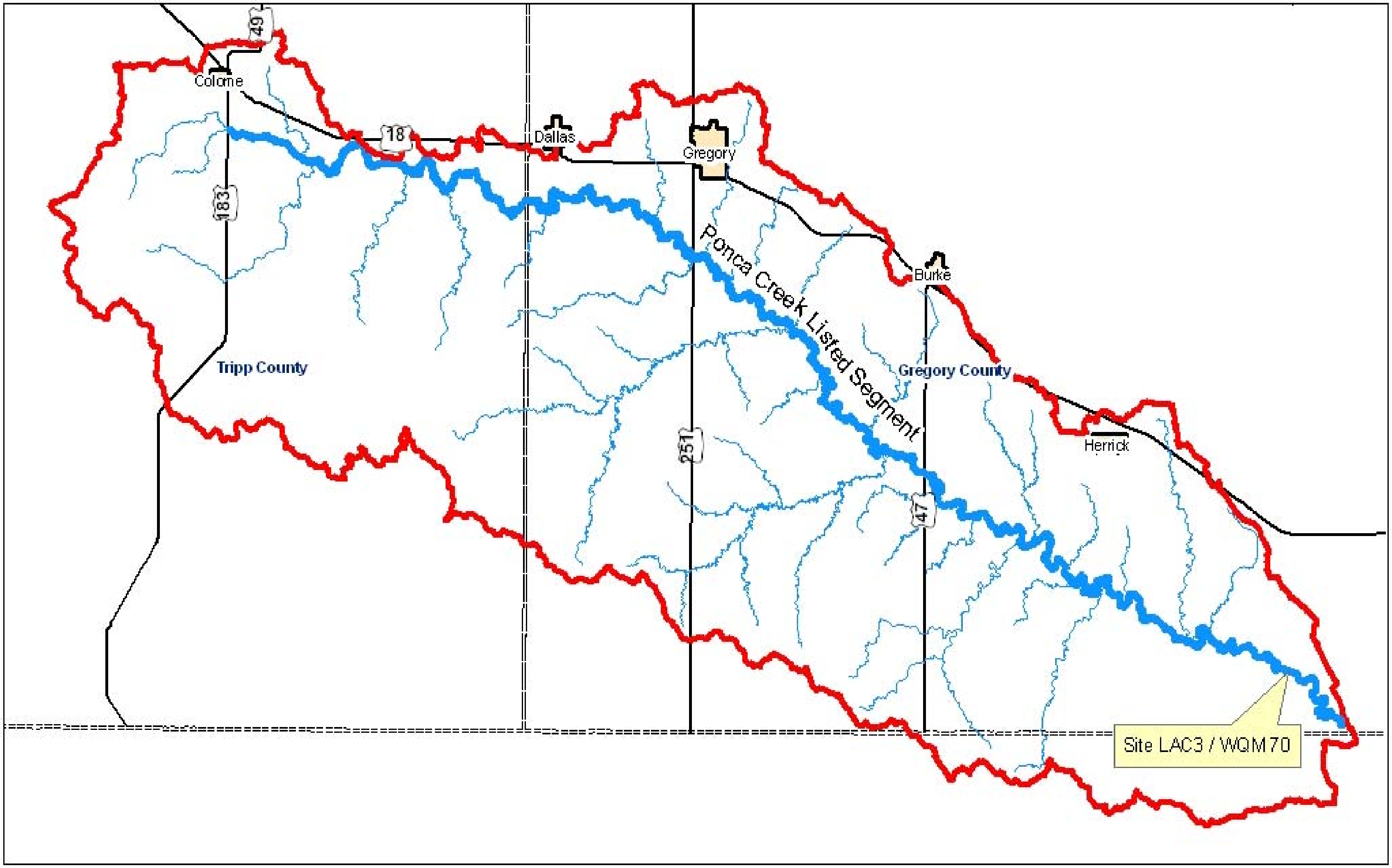

Figure 2. Ponca Creek Watershed

2.0 Water Quality Standards

Each waterbody within South Dakota is assigned beneficial uses. All waters (both lakes and streams) are designated the use of fish and wildlife propagation, recreation and stock watering. All streams are assigned the use of irrigation. Additional uses may be assigned by the state based on a beneficial use analysis of each waterbody. Water quality standards have been defined in South Dakota state statutes in support of these uses. These standards consist of suites of numeric criteria that provide physical and chemical benchmarks from which management decisions can be developed.

Chronic standards, including geometric means and 30-day averages, are applied to a calendar month. While not explicitly described within the states water quality standards, this is the method used in the states Integrated Water Quality Report (IR) as well as in permit development.

Additional "narrative" standards that may apply can be found in the "Administrative rules of South Dakota: Articles 74:51:01:05; 06; 08; and 09". These contain language that generally prohibits the presence of materials causing pollutants to form, visible pollutants, and nuisance aquatic life.

Ponca Creek from Highway 183 downstream to the Nebraska border has been assigned the beneficial uses of: warmwater semi-permanent fish life propagation, irrigation waters, limited contact recreation, and fish and wildlife propagation, recreation, and stock watering. Table 1 lists the criteria that must be met to support the specified beneficial uses. When multiple criteria exist for a particular parameter, the most stringent criterion is used.

The numeric TMDL target established for Ponca Creek is 1000 cfu/100 ml, which is based on the chronic standard for fecal coliform. The fecal coliform criteria for the limited contact recreation beneficial use requires that 1) no sample exceeds 2000 cfu/100 ml and 2) during a 30-day period, the geometric mean of a minimum of 5 samples collected during separate 24-hour periods must not exceed 1000 cfu/100 ml. These criteria are applicable from May 1 through September 30.

The listed segment of Ponca Creek ends at the Nebraska border. Since Nebraska does not have a water quality standard that applies to fecal coliform bacteria, the development of this TMDL only took into consideration South Dakota's Water Quality Standards. From the Nebraska border, it is approximately 25 stream miles to a segment that is classified as a recreational waterbody. Nebraska water quality standards for recreational use are based on *E. coli*. This segment of Ponca Creek in South Dakota should not affect the beneficial uses of the regulated segment of Ponca Creek in Nebraska.

Table 1. State Water Quality Standards for Ponca Creek.

Parameters	Criteria	Unit of Measure	Beneficial Use Requiring this Standard
Total ammonia nitrogen as N	Equal to or less than the result from Equation 3 in Appendix A of Surface Water Quality Standards	mg/L 30 average March 1 to October 31	Warmwater Semipermanent Fish Propagation
	Equal to or less than the result from Equation 4 in Appendix A of Surface Water Quality Standards	mg/L 30 average November 1 to February 29	
	Equal to or less than the result from Equation c in Appendix A of Surface Water Quality Standards	mg/L Daily Maximum	
Dissolved Oxygen	≥4.0	mg/L	Warmwater Semipermanent Fish Propagation
Total Suspended Solids	≤90 (mean) ≤158 (single sample)	mg/L	Warmwater Semipermanent Fish Propagation
Temperature	≤32	°C	Warmwater Semipermanent Fish Propagation
Fecal Coliform Bacteria (May 1- Sept 30)	≤1000 (geometric mean) ≤2000 (single sample)	count/100 mL	Limited Contact Recreation
Escherichia coli Bacteria (May 1- Sept 30)	≤630 (geometric mean) ≤1178 (single sample)	count/100 mL	Limited Contact Recreation
Alkalinity ($CaCO_3$)	≤750 (mean) ≤1,313 (single sample)	mg/L	Wildlife Propagation and Stock Watering
Conductivity	≤2,500 (mean) ≤4,375 (single sample)	µmhos/cm @ 25° C	Irrigation Waters
Nitrogen, nitrate as N	≤50 (mean) ≤88 (single sample)	mg/L	Wildlife Propagation and Stock Watering
pH (standard units)	≥6.5 to ≤9.0	units	Warmwater Semipermanent Fish Propagation
Solids, total dissolved	≤2,500 (mean) ≤4,375 (single sample)	mg/L	Wildlife Propagation and Stock Watering
Total Petroleum Hydrocarbon Oil and Grease	≤10 ≤10	mg/L	Wildlife Propagation and Stock Watering
Sodium Adsorption Ratio	<10	ratio	Irrigation Waters

3.0 Significant Sources

3.1 Point Sources

There are two permitted facilities in the watershed which must be included in the Waste Load Allocation (WLA) of this TMDL.

The cities of Colome and Gregory wastewater treatment are comprised of retention pond systems that may periodically require a portion of the final pond to be discharged. Table 2 includes the basic system information and permit numbers for each of the facilities within the basin.

Table 2. Permitted Facilities within the Ponca Creek Drainage

Permit Number	Facility Name	System comments	Pond 1 (acres)	Pond 2 (acres)	Pond 3 (acres)
SD0023230	Colome	Pond system	2.0	2.0	
SD0022179	Gregory	Pond system	25	12.3	17.4

Table 3 includes the information used by SDDENR to calculate a maximum allowable discharge from each of these facilities. The WLA calculation was based on the effluent limits included in each city's surface water discharge permit, multiplied by the expected flow rate from each facility. The normal operation of these systems would typically result in only a portion of the calculated daily amounts actually being discharged. It is important to note that all discharges are required to meet the chronic water quality threshold for Ponca Creek.

Table 3. Waste Load Allocation for Facilities in the Ponca Creek Drainage

Facility Name	Flow (cfs) used in WLA	30-day Geometric Mean Fecal Coliform Bacteria (cfu/100ml) permit limit	Fecal Coliform WLA (cfu/day)
Colome	1.35	1000	3.30×10^{10}
Gregory	18.43	1000	4.51×10^{11}

Including the WLA in the load duration curve required several factors be taken into account. The maximum waste load for all systems in aggregate is 4.84×10^{11} cfu/day. Associated with this load is also a flow of 19.78 cfs. A flow of 19.78 cfs is met or exceeded in Ponca Creek 40% of the time. Arbitrarily adding this load to the entire flow regime would be a misrepresentation of how the system(s) function, essentially suggesting a continuous discharge.

3.2 Nonpoint Sources

Nonpoint sources of fecal coliform bacteria in Ponca Creek come primarily from agricultural sources. Data from the 2009 National Agricultural Statistic Survey (NASS) and from the 2002 South Dakota Game Fish and Parks county wildlife assessment were utilized for livestock and wildlife densities, respectively. Animal density information was used to estimate relative source contributions of bacteria loads.

3.2.1 Agriculture

Manure from livestock is a potential source of fecal coliform to the stream. Livestock in the basin are predominantly beef cattle and hogs. Livestock can contribute fecal coliform bacteria directly to the stream by defecating while wading in the stream. They also can contribute by defecating while grazing on rangelands that get washed off during precipitation events. Table 4 allocates the sources for bacteria production in the watershed into three primary categories. The summary is based on several assumptions. Feedlot numbers were calculated as the sum of all dairy, hog, and the NASS estimate of beef in feeding areas. All remaining livestock were assumed to be on grass.

Table 4. Fecal Source Allocation for Ponca Creek

Source	Percentage
Feedlots	9.1%
Livestock on Grass	90.5%
Wildlife	0.4%

The main source of fecal coliform bacteria is likely livestock, directly utilizing the stream or from livestock grazing on upland areas. Evidence of this is available in the load duration curve located in Figure 4 which indicates that elevated counts occur throughout different flow regimes.

3.2.2 Human

Two point sources are located in the Ponca Creek watershed, Colome and Gregory. These systems account for about 1700 of the approximately 2900 people in the watershed. Septic systems are assumed to be the primary human source for the rest of the population in the watershed. Human fecal production may be estimated at 1.95E+9 (Yagow et al. 2001). When included as a total load in the table, the remaining population produced fecals accounting for less than 0.1% of all fecal coliforms produced in the watershed. These bacteria should all be delivered to a septic system, which if functioning correctly would result in no fecal coliforms entering the creek.

3.2.3 Natural background/wildlife

Wildlife within the watershed is a natural background source of fecal coliform bacteria. Wildlife population density estimates were obtained from the South Dakota Department of Game, Fish, and Parks.

Table 5. Ponca Creek Nonpoint Sources

Species	#/sq mile	#/acre	FC/Animal/Day	Fecal Coliform	Percent
Dairy cow	1.70	2.7E-03	4.46E+10	1.19E+08	2.2%
Beef	78.32	1.2E-01	3.90E+10	4.77E+09	90.3%
Bison[1]	1.81	2.8E-03	4.46E+10	1.26E+08	2.4%
Hog	7.15	1.1E-02	1.08E+10	1.21E+08	2.3%
Sheep	0.69	1.1E-03	1.96E+10	2.11E+07	0.4%
Horse	1.20	1.9E-03	5.15E+10	9.65E+07	1.9%
All Wildlife	Sum of all Wildlife			2.92E+07	0.4%
Turkey (Wild)[2]	8.87	1.4E-02	1.10E+08	1.36E+06	
Sharptail grouse and prairie chicken[3]	9.20	1.4E-02	1.40E+08	3.31E+06	
Deer[4]	5.72	8.9E-03	3.47E+08	3.28E+06	
Beaver[4]	2.37	3.7E-03	2.00E+05	5.12E+02	
Raccoon[4]	2.03	3.2E-03	2.50E+08	1.26E+06	
Coyote/Fox[5]	1.99	3.1E-03	1.75E+09	7.60E+06	
Muskrat[2]	1.94	3.0E-03	2.50E+07	8.25E+04	
Opossum[6]	1.16	1.8E-03	2.50E+08	4.23E+05	
Mink[6]	1.36	2.1E-03	2.50E+08	5.33E+05	
Skunk[6]	2.13	3.3E-03	2.50E+08	9.44E+05	
Badger[6]	1.07	1.7E-03	2.50E+08	4.79E+05	
Jackrabbit[6]	2.23	3.5E-03	2.50E+08	1.36E+06	
Cottontail[6]	8.96	1.4E-02	2.50E+08	5.29E+06	
Squirrel[6]	6.49	1.0E-02	2.50E+08	3.26E+06	
1 FC/Animal/Day copied from Dairy Cow to provide a more conservative estimate of background affects of wildlife					
2 USEPA 2001					
3 FC/Animal/Day copied from Chicken (USEPA 2001) to provide an estimate of background affects of wildlife					
4 Bacteria Indicator Tool Worksheet					
5 Best Professional Judgment based off of Dogs					
6 FC/Animal/Day copied from Raccoon to provide a more conservative estimate of background affects of wildlife					

4.0 Technical Analysis

4.1 Data Collection Method

Data on Ponca Creek were collected during the Lewis and Clark Watershed Assessment from one sampling point located two miles upstream of the Nebraska border, this site was identified as site LEWCLARLAC3 (LAC3). The data collected during the assessment was used to supplement existing data from SD DENR ambient water quality monitoring site 460670 (WQM 70) which was co-located at site LAC3. Flow data for Ponca Creek was retrieved from the United States Geological Survey (USGS) at two stations. The gauge data from Verdel (06453600) served as the long term surrogate for data collected at the Anoka station (06453500) which was in operation from 1950 until 1994.

Unless otherwise noted, analysis was completed with modeling programs according to the most recent version of the Water Quality Modeling in South Dakota document (SDDENR, 2009).

4.2 Flow Analysis

Water quantity data were collected during the project and supplemented with USGS data from station 06453500 located on Ponca Creek near Anoka, Nebraska and station 06453600 located at the mouth of Ponca Creek near Verdel Nebraska. The gauge at Anoka was the preferred gauge for the monitoring location. Its location only a few miles downstream with a nearly identical drainage area make it ideal. Maintenance of this site ended in 1994, creating a critical data gap during the years for which water chemistry data was available. To remedy this, the gauge at Anoka was modeled against the gauge at Verdel (still in operation) with the AQUARIUS empirical modeling tool. When correctly stratified, the model was able to reproduce flows at the Anoka site with over 90% accuracy. This high rate of accuracy was acceptable for the development of the TMDL. The model was used to generate synthetic flows for the Anoka site from its termination in 1994 through 2009.

The final flow data set provided nearly 60 years of water quantity data (Figure 3). This relatively robust data set provided the basis for a load duration curve that accurately represents the Ponca Creek flow frequencies. Water quality data from the Lewis and Clark Project as well as SDDENR ambient water quality monitoring were utilized in the development of this TMDL. Sites LAC3 and 460670 were both located at the same point on the creek.

South Dakota has recently adopted *Escherichia coli* criteria for the protection of the limited contact and immersion recreation uses. However, Ponca Creek does not require an *E. coli* TMDL because the parameter is not currently listed as a cause of impairment to this stream. Because the two indicators are closely related, the fecal coliform bacteria TMDL and associated implementation strategy described in this document are expected to address both the fecal coliform bacteria and possible future *E. coli* impairments. If a TMDL must be established for *E. coli* in the future, a separate TMDL document will be developed for this parameter.

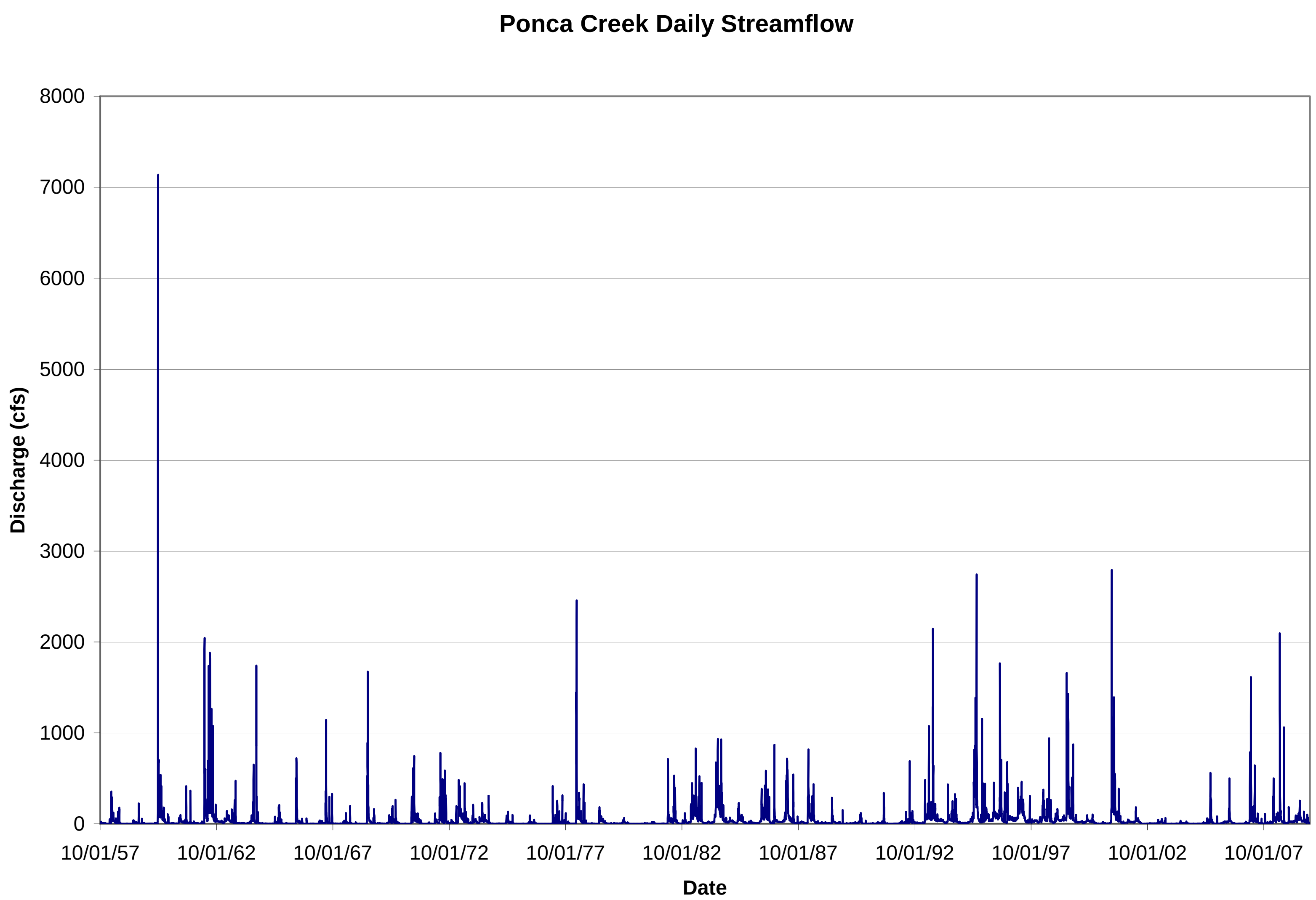

Figure 3. Ponca Creek Daily Streamflow

4.3 Sample Data

Sample data from the existing WQM project as well as the assessment project were utilized to evaluate the stream. A total of 26 samples were available for analysis. Comparing flow and concentration resulted in a very weak relationship that was inadequate for use in predicting daily loads. Ten of the 26 samples were above the chronic standard while nine of those exceeded the acute standard.

Table 6. Ponca Creek Fecal Coliform Bacteria Sample Data (Highlighted samples are in excess of the chronic standard and bolded samples are in excess of the acute standard.)

Date	Station	Fecal Coliform Bacteria (cfu/100 ml)	Flow	Flow Zone
05/25/1976	460670	510	22.0	2
06/24/1976	**460670**	**7300**	**3.0**	**4**
05/19/1977	460670	100	3.9	4
06/23/1977	460670	420	53.0	2
07/21/1977	**460670**	**2000**	**0.3**	**5**
08/18/1977	460670	170	4.3	4
05/20/2003	LEWCLARLAC3	80	12.5	3
05/29/2003	LEWCLARLAC3	420	12.6	3
06/05/2003	LEWCLARLAC3	610	7.1	4
06/10/2003	LEWCLARLAC3	1000	9.5	3
06/18/2003	LEWCLARLAC3	480	20.7	2
06/25/2003	**LEWCLARLAC3**	**4000**	**35.9**	**2**
07/01/2003	LEWCLARLAC3	300	7.4	4
07/15/2003	**460670**	**140000**	**0.6**	**5**
07/17/2003	**LEWCLARLAC3**	**3000**	**0.2**	**5**
07/23/2003	**LEWCLARLAC3**	**46000**	**0.1**	**5**
07/30/2003	**LEWCLARLAC3**	**41000**	**0.1**	**5**
06/09/2004	LEWCLARLAC3	780	2.1	4
05/12/2005	**LEWCLARLAC3**	**9900**	**13.0**	**3**
06/15/2005	**LEWCLARLAC3**	**3200**	**320.0**	**1**
07/07/2005	LEWCLARLAC3	360	17.0	3
07/12/2005	460670	380	9.6	3
07/18/2007	460670	350	4.6	4
07/23/2008	460670	180	11.0	3
05/12/2009	460670	120	29.0	2
08/13/2009	460670	410	32.0	2

The waste load allocations were not included in the load duration curve to prevent the misconception that they provided a continuous discharge. They were included in the daily loads for each of the flow zones and are included as a part of the final TMDL calculations.

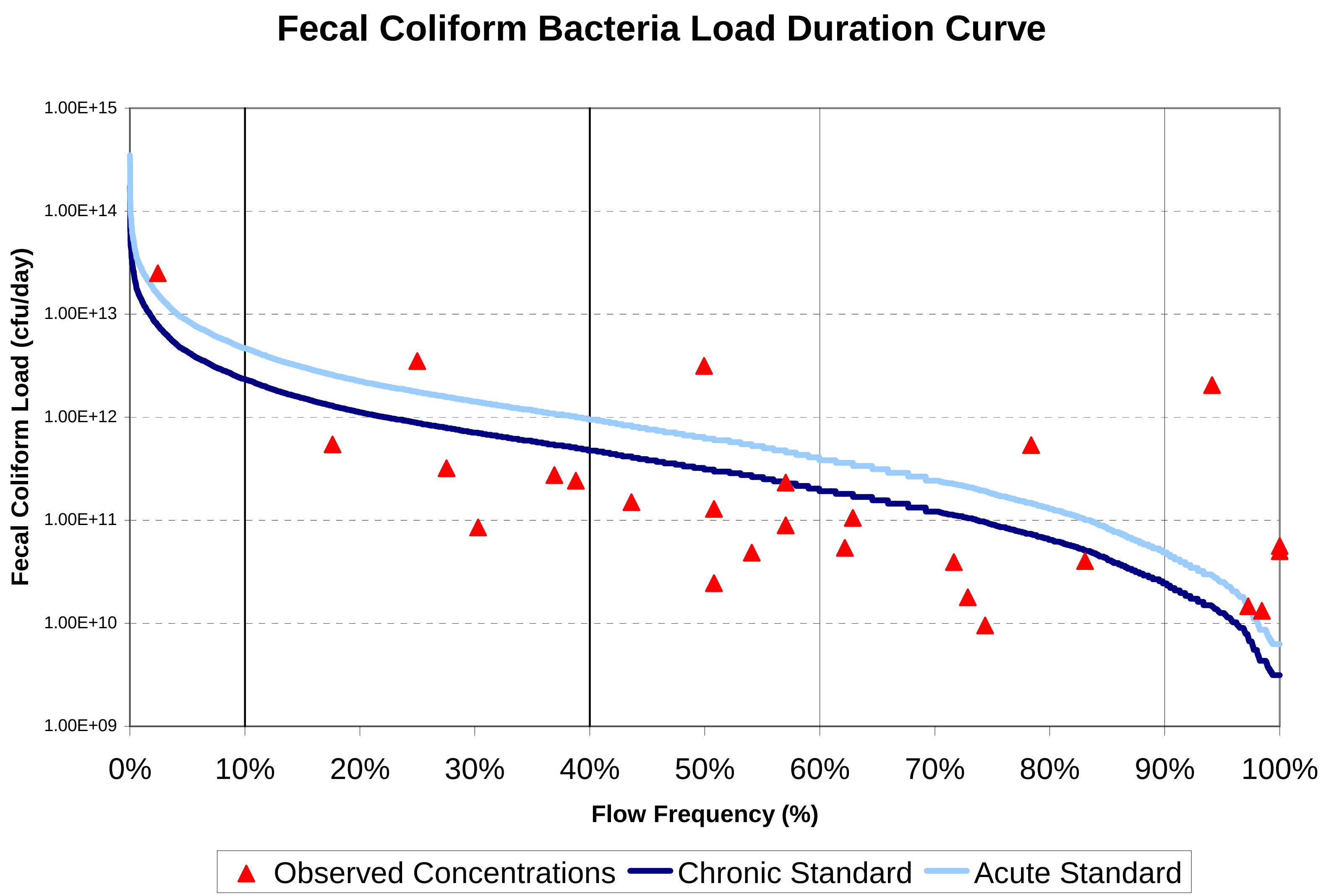

Figure 4. Fecal Coliform Load Duration Curve

5.0 TMDL and Allocations

5.0.1 High Flows (<10% exceedence)

The high flow zone is composed of the highest 10% of flows that occurred in Ponca Creek. The 10th percentile equates to a flow of 96 cfs and is the division between the top two flow zones as defined in the EPA load duration curve guidance. This flow is considerably less than the channel forming flow or $Q_{1.5,}$ which is approximately 295 cfs. The annual return event for Ponca Creek may be calculated at slightly less than 100 cfs, making this an appropriate breaking point in the TMDL curve.

There was only one sample, 3200 cfu/100 ml, representing this zone which was above both the acute and chronic standard. We used it to calculate the current load from which reductions were calculated.

Table 7 depicts an example of a TMDL for a flow of 830 cfs within the high flow zone regime. 830 cfs is the 95th percentile flow in this zone and is an example of the acceptable load at this particular flow. Higher and lower flows within this zone may acceptably carry higher or lower loads as long as the concentration does not exceed the state standard.

The concentration of 2000 cfu/100ml represents the acute standard and may make an appropriate goal for this flow zone because flows in excess of 96 cfs typically only last for short periods of time (peak runoff events). Analysis of the flow frequency within this flow regime indicates that flows of this magnitude persist for a full week less than 5% of the time.

While the 2000 cfu/100ml goal may have made an acceptable goal, the chronic threshold of 1000 cfu/100ml was chosen for the TMDL. Chronic violations are not likely in this flow zone, but by using the 1000 cfu/100ml threshold assurance is provided that the water quality standard will not be exceeded.

Table 7. High Flow Total Maximum Daily Load

	Flow Zone (expressed as CFU/Day)	
	High Flows	
	>96 cfs	
LA	**1.78E+13**	*Remaining load after deducting WLA and MOS from TMDL*
WLA Colome	**3.30E+10**	*Based on a flow of 1.35 cfs and a concentration of 1000 cfu/100 ml*
WLA Gregory	**4.51E+11**	*Based on a flow of 18.43 cfs and a concentration of 1000 cfu/100 ml*
MOS	**1.99E+12**	
TMDL @ 1000 cfu/100 ml	**2.03E+13**	*Standard multiplied by 95th % flow for zone*
Current Load	**2.38E+13**	*95th Percentile of observed fecal coliform bacteria load for each zone*
Load Reduction	**19%**	*Reduction required to reduce the current load to the load at the standard*

5.0.2 Moist Conditions (10% to 40% exceedence)

Moist condition flows are characterized by above average moisture conditions in the watershed. Flows in this regime are generated by precipitation and snowmelt events. The upper bound of this flow regime is approximately the annual return event while the lower end is approximately 19 cfs.

Table 8 depicts an example of a TMDL for a flow of 83 cfs within the moist condition regime. 83 cfs is the 95th percentile flow in this zone and is an example of the acceptable load at this particular flow. Higher and lower flows within this zone may acceptably carry higher or lower loads as long as the concentration does not exceed the state standard.

One of the six samples (17%) collected within this flow zone was above both the chronic threshold of 1000 cfu/100ml and the acute threshold of 2000 cfu/100 ml. Flows within this zone may be expected to persist for several weeks on a regular basis. As a result of insufficient data to accurately assess the chronic standard, reductions will be based on the chronic threshold of 1000 cfu/100 ml. By utilizing 1000 cfu/100ml as the reduction target for a single sample maximum, it insures that both the chronic and acute standards are fully supported. The 95th percentile of this flow regime was calculated to 389 cfu/100ml, well within the water quality standards, suggesting full support within this flow regime.

Table 8. Moist Conditons Total Maximum Daily Load

	Flow Zone (expressed as CFU/Day)	
	Moist Conditions	
	19-96 cfs	
LA	**1.13E+12**	*Remaining load after deducting WLA and MOS from TMDL*
WLA Colome	**3.30E+10**	*Based on a flow of 1.35 cfs and a concentration of 1000 cfu/100 ml*
WLA Gregory	**4.51E+11**	*Based on a flow of 18.43 cfs and a concentration of 1000 cfu/100 ml*
MOS	**4.01E+11**	
TMDL @ 1000 cfu/100 ml	**2.02E+12**	*Standard multiplied by 95th % flow for zone*
Current Load	**7.89E+11**	*95th Percentile of observed fecal coliform bacteria load for each zone*
Load Reduction	**0%**	*Reduction required to reduce the current load to the load at the standard*

5.0.3 Midrange Flows (40% to 60% exceedence)

The midrange flows extend from approximately 19 cfs down to 8 cfs. Of the seven samples collected from this flow regime, one (14%) exceeded the acute standard and two (29%) exceeded the chronic standard. The 95th percentile of this flow regime was calculated to 1121 cfu/100 ml, slightly over the chronic standard. A load reduction of 11% will be needed to fully support designated beneficial uses to the chronic water quality standard.

Table 9 depicts an example of a TMDL for a flow of 18.9 cfs within the midrange flow zone regime. 18.9 cfs is the 95th percentile flow in this zone and is an example of the acceptable load at this particular flow. Higher and lower flows within this zone may acceptably carry higher or lower loads as long as the concentration does not exceed the state standard.

From this point in the flow regime the WLA has been adjusted. Since the flow is below the combined capability of the treatment systems, the full allocation was given to the Colome system (1.35 cfs) and the remaining flow was divided between the Gregory system (8.80 cfs) and the LA (8.80 cfs). This is an example of conditions that may occur.

Table 9. Midrange Flow Total Maximum Daily Load

	Flow Zone (expressed as CFU/Day)	
	Midrange Flows	
	8-19 cfs	
LA	**9.69E+10**	*Remaining load after deducting WLA and MOS from TMDL*
WLA Colome	**3.30E+10**	*Based on a flow of 1.35 cfs and a concentration of 1000 cfu/100 ml*
WLA Gregory	**2.15E+11**	*Based on a flow of 8.8 cfs and a concentration of 1000 cfu/100 ml*
MOS	**1.18E+11**	
TMDL @ 1000 cfu/100 ml	**4.63E+11**	*Standard multiplied by 95th % flow for zone*
Current Load	**5.18E+11**	*95th Percentile of observed fecal coliform bacteria load for each zone*
Load Reduction	**11%**	*Reduction required to reduce the current load to the load at the standard*

5.0.4 Dry Conditions (60% to 90% exceedence)

The dry condition flows extend from approximately 8 cfs down to 1 cfs. One of the six samples (17%) collected within this flow zone were above both the chronic threshold of 1000 cfu/100ml and the acute threshold of 2000 cfu/100 ml. The 95th percentile of this flow regime was calculated to 606 cfu/100 ml, well within the water quality standards, suggesting full support within this flow regime.

Table 10 depicts an example of a TMDL for a flow of 7.4 cfs within the dry condition regime. 7.4 cfs is the 95th percentile flow in this zone and is an example of the acceptable load at this particular flow. Higher and lower flows within this zone may acceptably carry higher or lower loads as long as the concentration does not exceed the state standard.

Table 10. Dry Conditions Total Maximum Daily Load

	Flow Zone (expressed as CFU/Day)	
	Dry Conditions	
	1-8 cfs	
LA	**7.50E+09**	*Remaining load after deducting WLA and MOS from TMDL*
WLA Colome	**3.30E+10**	*Based on a flow of 1.35 cfs and a concentration of 1000 cfu/100 ml*
WLA Gregory	**7.35E+10**	*Based on a flow of 3.01cfs and a concentration of 1000 cfu/100 ml*
MOS	**6.60E+10**	
TMDL @ 1000 cfu/100 ml	**1.80E+11**	*Standard multiplied by 95th % flow for zone*
Current Load	**1.09E+11**	*95th Percentile of observed fecal coliform bacteria load for each zone*
Load Reduction	**0%**	*Reduction required to reduce the current load to the load at the standard*

5.0.5 Low Flows (90% to 100% exceedence)

The low flows extend from approximately 1 cfs down to no flow. All five samples in this regime exceed both the chronic and acute standards. The 95th percentile of this flow regime was calculated to 18904 cfu/100 ml. Sources of bacteria in this flow zone can be expected to be in direct contact with the stream. This flow regime contained three of the highest fecal coliform concentrations recorded during the study. Grazing livestock in direct contact with the steam is probably the main source of fecal coliform bacteria in this flow zone. Reducing direct access to the stream from livestock during this low flow zone should reduce the amount of fecal coliform bacteria in Ponca Creek.

Table 11 depicts an example of a TMDL for a flow of 0.9 cfs within the low flow zone regime. 0.9 cfs is the 95th percentile flow in this zone and is an example of the acceptable load at this particular flow. Higher and lower flows within this zone may acceptably carry higher or lower loads as long as the concentration does not exceed the state standard.

Since the flow is well below the combined capability of the treatment systems, the flow was divided evenly between the WLAs and the LA. This is an example of conditions that may occur.

Table 11. Low Flow Total Maximum Daily Load

	Flow Zone (expressed as CFU/Day)	
	Low Flows	
	0-1 cfs	
LA	**4.26E+09**	*Remaining load after deducting WLA and MOS from TMDL*
WLA Colome	**4.16E+09**	*Based on a flow of 0.17 cfs and a concentration of 1000 cfu/100 ml*
WLA Gregory	**4.16E+09**	*Based on a flow of 0.17 cfs and a concentration of 1000 cfu/100 ml*
MOS	**9.43E+09**	*Medium flow LC - Low flow LC*
TMDL @ 1000 cfu/100 ml	**2.20E+10**	*Standard multiplied by 95th % flow for zone*
Current Load	**4.16E+11**	*95th Percentile of observed fecal coliform bacteria load for each zone*
Load Reduction	**95%**	*Reduction required to reduce the current load to the load at the standard*

5.1 Load Allocations (LAs)

Approximately 91% of the landuse in the watershed is agricultural. The majority of the TMDL load has been allocated to these nonpoint source loads in the following load allocations. A 15% reduction in fecal coliform bacteria from anthropogenic sources (livestock) is required in the high flow zone to fully attain the current water quality standards. This concentration is the same as the chronic standard, however this reduction is based on reducing a single sample. An 11% reduction in fecal coliform bacteria is required in the midrange flow zone to fully attain current water quality standards. A 95% reduction in fecal coliform bacteria is required in the low flow zone to fully attain current water quality standards. The remaining flow regimes do not require reductions to maintain support of the standards. Reducing the highest samples below the chronic standard provides assurance that both acute and chronic standards will be met.

5.2 Wasteload Allocations (WLAs)

There are two point sources of pollutants in this watershed. The Cities of Colome and Gregory wastewater treatment are comprised of retention pond systems that may periodically require a portion of the final pond to be discharged. The wasteload allocations were set equal to the discharge of the final pond in the system.

Operation of these systems is conducted in a manner so that discharges are short in duration (several days to a couple weeks) one or two times per year. They do not provide a continuous discharge to the stream and account for less than 1% of the annual water load. Each WLA was included in the flow zone as a part of the daily load.

6.0 Margin of Safety (MOS) and Seasonality

6.1 Margin of Safety

An explicit MOS identified using a duration curve framework is basically unallocated assimilative capacity intended to account for uncertainty (e.g., loads from tributary streams, effectiveness of controls, etc). An explicit MOS was calculated as the difference between the loading capacity at the mid-point of each of the flow zones and the loading capacity at the minimum flow in each zone. A substantial MOS is provided using this method, because the loading capacity is typically much less at the minimum flow of a zone as compared to the mid-point. Because the allocations are a direct function of flow, accounting for potential flow variability is an appropriate way to address the MOS.

6.2 Seasonality

The impairments to Ponca Creek are most severe during summer. During this time period the creek is most likely to experience higher temperatures (encouraging livestock use of the stream) and peak recreational use of the waters.

7.0 Public Participation

STATE AGENCIES
South Dakota Department of Environment and Natural Resources (SD DENR) was the primary state agency involved in completion of this assessment. SD DENR provided technical support and equipment throughout the course of the project.

FEDERAL AGENCIES
Environmental Protection Agency (EPA) provided the primary source of funds for the completion of the assessment on Lewis and Clark Lake.

Natural Resource Conservation Service (NRCS) provided technical assistance, particularly in the collection of soils data for the AnnAGNPS portion of the report.

The Farm Service Agency provided a great deal of information that was utilized in the completion of the AnnAGNPS modeling portion of the assessment.

LOCAL GOVERNMENT, INDUSTRY, ENVIRONMENTAL, AND OTHER GROUPS, AND PUBLIC AT LARGE
The project was presented at many meetings during the assessment period. With Randall Resource, Conservation, and Development Associated, Inc, (RC&D) as the leading sponsor, the project was not limited by state boundaries. The project had many partners from both South Dakota as well as Nebraska: Many of the organizations listed below saw several updated presentations as the project progressed. In addition to the many meetings that were attended, a website was also developed and maintained throughout the project.

South Dakota Conservation Districts: Aurora, Bennett, Bon Homme, Charles Mix, Clearfield-Keya Paha, Douglas, Gregory, Hutchinson, Todd, Yankton

Nebraska Natural Resource Districts:
Lewis and Clark, Lower Niobrara, Middle Niobrara, Upper Elkhorn

Government: National Park Service, Nebraska DEQ, NRCS, SD DENR, SD Department of Agriculture, SD GF&P, USACOE, USGS

Organizations: Bon Homme - Yankton Rural Water, Cedar-Knox Rural Water, Cities of Yankton and Springfield, Knox Co. Commission, Lewis and Clark SD-NE Preservation Association, Rosebud Cattlemen's Association, Spring/Bull Creek Watershed District, So. Central Water Development District, Village of Niobrara, Yankton and Rosebud Sioux Tribes

R.C.&D's
Badlands, Lower James, Northeast Nebraska, North Central Nebraska, South Central SD

Industry: Natural Resource Solutions, Brookings, South Dakota

8.0 Monitoring Strategy

The Department may adjust the load and/or wasteload allocations in this TMDL to account for new information or circumstances that are developed or come to light during the implementation of the TMDL and a review of the new information or circumstances indicate that such adjustments are appropriate. Adjustment of the load and waste load allocation will only be made following an opportunity for public participation. New information generated during TMDL implementation may include, among other things, monitoring data, BMP effectiveness information and land use information. The Department will propose adjustments only in the event that any adjusted LA or WLA will not result in a change to the loading capacity; the adjusted TMDL, including its WLAs and LAs, will be set at a level necessary to implement the applicable water quality standards; and any adjusted WLA will be supported by a demonstration that load allocations are practicable. The Department will notify EPA of any adjustments to this TMDL within 30 days of their adoption.

9.0 Restoration Strategy

An implementation project began in 2006 for the greater Lewis and Clark watershed and will encompass the Ponca Creek watershed and address the TMDL for this waterbody.

10.0 Literature Cited

Huxoll, Cory. 2002. South Dakota Game Fish and Parks; South Dakota Game Report No. 2003-11; 2002 Annual Report County Wildlife Assessments with a summary of the 1991-2002 Assessments.

SDDENR (South Dakota Department of Environment and Natural Resources). 2006. The 2006 South Dakota Integrated Report for Surface Water Quality Assessment Pierre, SD.

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SDDENR (South Dakota Department of Environment and Natural Resources). 2009. Water Quality Modeling in South Dakota, May, 2009 Revision; Pierre, SD.

USDA (United States Department of Agriculture). 1984. Soil Survey of Gregory County, South Dakota.

USEPA. 2001. Protocol for Developing Pathogen TMDLs. EPA 841-R-00-002. Office of Water (4503F0, United States Environmental Protection Agency, Washington D.C. 132 pp.

Yagow, G., Dillaha, T., Mostaghimi, S., Brannan, K., Heatwole, C., and Wolfe, M.L. 2001. *TMDL modeling of fecal coliform bacteria with* HSPF. ASAE meeting paper No.01-2006. St. Joseph, Mich.

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Ref: 8EPR-EP

AUG 02 2010

Steven M. Pirner
Secretary
South Dakota Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Re: TMDL Approvals
Ponca Creek; Fecal Coliform; SD-MI-R-PONCA_01

Dear Mr. Pirner:

We have completed our review of the total maximum daily loads (TMDLs) as submitted by your office for the waterbodies listed in the enclosure to this letter. In accordance with the Clean Water Act (33 U.S.C. 1251 *et. seq.*), we approve all aspects of the TMDLs as developed for the water quality limited waterbodies as described in Section 303(d)(1). Based on our review, we feel the separate elements of the TMDLs listed in the enclosed table adequately address the pollutants of concern as given in the table, taking into consideration seasonal variation and a margin of safety.

Thank you for submitting these TMDLs for our review and approval. If you have any questions, the most knowledgeable person on my staff is Vern Berry and he may be reached at 303-312-6234.

Sincerely,

Carol L. Campbell
Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation

Enclosures

ENCLOSURE 1: APPROVED TMDLs

Fecal Coliform Bacteria Total Maximum Daily Load Evaluation for Ponca Creek, Gregory and Tripp Counties, South Dakota (SD DENR, April 2010)

Submitted: 7/6/2010

1	Pollutant TMDLs completed.
1	Causes addressed from the 2008 303(d) list.
0	Determinations that no pollutant TMDL needed.

Segment: Ponca Creek - from Highway 183 to the Nebraska Border

303(d) ID: SD-MI-R-PONCA_01

Parameter/Pollutant (303(d) list cause): FECAL COLIFORM - 259

Water Quality Targets: < = 1000 cfu/100 mL 30-day geometric mean; < = 2000 cfu/100mL single sample maximum

Allocation*	Value	Units	Permits
TMDL	2.20E+10	CFU/DAY	
WLA	4.16E+09	CFU/DAY	SD0023230
WLA	4.16E+09	CFU/DAY	SD0022179
LA	4.26E+03	CFU/DAY	
MOS	9.43E+09	CFU/DAY	

Notes: The loads shown represent the loads during the low flow regime as defined by the load duration curve for Ponca Creek (see Figure 4 of the TMDL). The low flows are when the largest differences occur between the existing load and the target load, therefore the greatest load reduction is needed to meet the water quality standards.

* LA = Load Allocation, WLA = Wasteload Allocation, MOS = Margin of Safety, TMDL = sum(WLAs) + sum(LAs) + MOS

ENCLOSURE 2

EPA REGION VIII TMDL REVIEW

TMDL Document Info:

Document Name:	**Fecal Coliform Bacteria Total Maximum Daily Load Evaluation for Ponca Creek, Gregory and Tripp Counties, South Dakota**
Submitted by:	**Rich Hanson, SD DENR**
Date Received:	**July 6, 2010**
Review Date:	**July 28, 2010**
Reviewer:	**Vern Berry, EPA**
Rough Draft / Public Notice / Final?	**Final**
Notes:	

Reviewers Final Recommendation(s) to EPA Administrator (used for final review only):

☒ Approve
☐ Partial Approval
☐ Disapprove
☐ Insufficient Information

Approval Notes to Administrator:

This document provides a standard format for EPA Region 8 to provide comments to state TMDL programs on TMDL documents submitted to EPA for either formal or informal review. All TMDL documents are evaluated against the minimum submission requirements and TMDL elements identified in the following 8 sections:

1. Problem Description
   1.1. TMDL Document Submittal Letter
   1.2. Identification of the Waterbody, Impairments, and Study Boundaries
   1.3. Water Quality Standards
2. Water Quality Target
3. Pollutant Source Analysis
4. TMDL Technical Analysis
   4.1. Data Set Description
   4.2. Waste Load Allocations (WLA)
   4.3. Load Allocations (LA)
   4.4. Margin of Safety (MOS)
   4.5. Seasonality and variations in assimilative capacity
5. Public Participation
6. Monitoring Strategy
7. Restoration Strategy
8. Daily Loading Expression

Under Section 303(d) of the Clean Water Act, waterbodies that are not attaining one or more water quality standard (WQS) are considered "impaired." When the cause of the impairment is determined to be a pollutant, a TMDL analysis is required to assess the appropriate maximum allowable pollutant loading rate.

A TMDL document consists of a technical analysis conducted to: (1) assess the maximum pollutant loading rate that a waterbody is able to assimilate while maintaining water quality standards; and (2) allocate that assimilative capacity among the known sources of that pollutant. A well written TMDL document will describe a path forward that may be used by those who implement the TMDL recommendations to attain and maintain WQS.

Each of the following eight sections describes the factors that EPA Region 8 staff considers when reviewing TMDL documents. Also included in each section is a list of EPA's minimum submission requirements relative to that section, a brief summary of the EPA reviewer's findings, and the reviewer's comments and/or suggestions. Use of the verb "must" in the minimum submission requirements denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable.

This review template is intended to ensure compliance with the Clean Water Act and that the reviewed documents are technically sound and the conclusions are technically defensible.

1. Problem Description

A TMDL document needs to provide a clear explanation of the problem it is intended to address. Included in that description should be a definitive portrayal of the physical boundaries to which the TMDL applies, as well as a clear description of the impairments that the TMDL intends to address and the associated pollutant(s) causing those impairments. While the existence of one or more impairment and stressor may be known, it is important that a comprehensive evaluation of the water quality be conducted prior to development of the TMDL to ensure that all water quality problems and associated stressors are identified. Typically, this step is conducted prior to the 303(d) listing of a waterbody through the monitoring and assessment program. The designated uses and water quality criteria for the waterbody should be examined against available data to provide an evaluation of the water quality relative to all applicable water quality standards. If, as part of this exercise, additional WQS problems are discovered and additional stressor pollutants are identified, consideration should be given to concurrently evaluating TMDLs for those additional pollutants. If it is determined that insufficient data is available to make such an evaluation, this should be noted in the TMDL document.

1.1 TMDL Document Submittal Letter

When a TMDL document is submitted to EPA requesting formal comments or a final review and approval, the submittal package should include a letter identifying the document being submitted and the purpose of the submission.

Minimum Submission Requirements.

☒ A TMDL submittal letter should be included with each TMDL document submitted to EPA requesting a formal review.

☒ The submittal letter should specify whether the TMDL document is being submitted for initial review and comments, public review and comments, or final review and approval.

☒ Each TMDL document submitted to EPA for final review and approval should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter should contain such identifying information as the name and location of the waterbody and the pollutant(s) of concern, which matches similar identifying information in the TMDL document for which a review is being requested.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Ponca Creek fecal coliform TMDL was submitted to EPA for review and approval via an email from Cheryl Saunders, SD DENR on July 6, 2010. The email included the final TMDL document and a letter requesting final review and approval.

COMMENTS: None

1.2 Identification of the Waterbody, Impairments, and Study Boundaries

The TMDL document should provide an unambiguous description of the waterbody to which the TMDL is intended to apply and the impairments the TMDL is intended to address. The document should also clearly delineate the physical boundaries of the waterbody and the geographical extent of the watershed area studied. Any additional information needed to tie the TMDL document back to a current 303(d) listing should also be included.

Minimum Submission Requirements:

☒ The TMDL document should clearly identify the pollutant and waterbody segment(s) for which the TMDL is being established. If the TMDL document is submitted to fulfill a TMDL development requirement for a waterbody on the state's current EPA approved 303(d) list, the TMDL document submittal should clearly identify the waterbody and associated impairment(s) as they appear on the State's/Tribe's current EPA approved 303(d) list, including a full waterbody description, assessment unit/waterbody ID, and the priority ranking of the waterbody. This information is necessary to ensure that the administrative record and the national TMDL tracking database properly link the TMDL document to the 303(d) listed waterbody and impairment(s).

☒ One or more maps should be included in the TMDL document showing the general location of the waterbody and, to the maximum extent practical, any other features necessary and/or relevant to the understanding of the TMDL analysis, including but not limited to: watershed boundaries, locations of major pollutant sources, major tributaries included in the analysis, location of sampling points, location of discharge gauges, land use patterns, and the location of nearby waterbodies used to provide surrogate information or reference conditions. Clear and concise descriptions of all key features and their relationship to the waterbody and water quality data should be provided for all key and/or relevant features not represented on the map.

☐ If information is available, the waterbody segment to which the TMDL applies should be identified/geo-referenced using the National Hydrography Dataset (NHD). If the boundaries of the TMDL do not correspond to the Waterbody ID(s) (WBID), Entity_ID information or reach code (RCH_Code) information should be provided. If NHD data is not available for the waterbody, an alternative geographical referencing system that unambiguously identifies the physical boundaries to which the TMDL applies may be substituted.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: Ponca Creek is a stream located in Gregory and Tripp Counties, South Dakota and is a tributary of the Missouri River in the Ponca sub-basin (HUC 10150001). The Creek has a total drainage area of approximately 520,000 acres in south central South Dakota. The 303(d) listed segment of Ponca Creek includes 79 miles of the Creek from Highway 183 to the South Dakota – Nebraska border (SD-MI-R-PONCA_01). It is listed as high priority for TMDL development.

The designated uses for Ponca Creek include warmwater semi permanent fish life propagation waters, limited-contract recreation waters, fish and wildlife propagation, recreation, and stock watering. The segment was listed on the 2008 303(d) list for total suspended solids (TSS) which is impairing the warmwater fish life propagation uses, and for fecal coliform which is impairing the recreational use. The TSS impairment was addressed in a separate TMDL document.

COMMENTS: None.

1.3 Water Quality Standards

TMDL documents should provide a complete description of the water quality standards for the waterbodies addressed, including a listing of the designated uses and an indication of whether the uses are being met, not being met, or not assessed. If a designated use was not assessed as part of the TMDL analysis (or not otherwise recently assessed), the documents should provide a reason for the lack of assessment (e.g., sufficient data was not available at this time to assess whether or not this designated use was being met).

Water quality criteria (WQC) are established as a component of water quality standard at levels considered necessary to protect the designated uses assigned to that waterbody. WQC identify quantifiable targets and/or qualitative water quality goals which, if attained and maintained, are intended to ensure that the designated uses for the waterbody are protected. TMDLs result in maintaining and attaining water quality standards by determining the appropriate maximum pollutant loading rate to meet water quality criteria, either directly, or through a surrogate measurable target. The TMDL document should include a description of all applicable water quality criteria for the impaired designated uses and address whether or not the criteria are being attained, not attained, or not evaluated as part of the analysis. If the criteria were not evaluated as part of the analysis, a reason should be cited (e.g., insufficient data were available to determine if this water quality criterion is being attained).

Minimum Submission Requirements:

☒ The TMDL must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the anti-degradation policy. (40 C.F.R. §130.7(c)(1)).

☒ The purpose of a TMDL analysis is to determine the assimilative capacity of the waterbody that corresponds to the existing water quality standards for that waterbody, and to allocate that assimilative capacity between the significant sources. Therefore, <u>all TMDL documents must be written to meet the existing water quality standards</u> for that waterbody (CWA §303(d)(1)(C)).

Note: In some circumstances, the load reductions determined to be necessary by the TMDL analysis may prove to be infeasible and may possibly indicate that the existing water quality standards and/or assessment methodologies may be erroneous. However, the TMDL must still be determined based on existing water quality standards. Adjustments to water quality standards and/or assessment methodologies may be evaluated separately, from the TMDL.

☒ The TMDL document should describe the relationship between the pollutant of concern and the water quality standard the pollutant load is intended to meet. This information is necessary for EPA to evaluate whether or not attainment of the prescribed pollutant loadings will result in attainment of the water quality standard in question.

☒ If a standard includes multiple criteria for the pollutant of concern, the document should demonstrate that the TMDL value will result in attainment of all related criteria for the pollutant. For example, both acute and chronic values (if present in the WQS) should be addressed in the document, including consideration of magnitude, frequency and duration requirements.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Ponca Creek segment addressed by this TMDL is impaired based on fecal coliform concentrations for limited contact recreation. South Dakota has applicable numeric standards for fecal coliform that may be applied to this Creek segment. The fecal coliform numeric standards being implemented in this TMDL are: a single sample maximum value of ≤ 2000 cfu/100 mL, and a 30-day geometric mean of ≤ 1000 cfu/100 mL. Discussion of additional applicable water quality standards for Ponca Creek can be found on pages 7 and 8 of the TMDL.

South Dakota has recently adopted *Escherichia coli* criteria for the protection of the limited contact and immersion recreation uses. However, Ponca Creek does not require an *E. coli* TMDL because the parameter is not currently listed as a cause of impairment to this stream. Because the two indicators are closely related, the fecal coliform bacteria TMDL and associated implementation strategy described in this document are expected to address both the fecal coliform bacteria and possible future *E. coli* impairments. If a TMDL must be established for *E. coli* in the future, a separate TMDL document will be developed for this parameter.

COMMENTS: None.

2. Water Quality Targets

TMDL analyses establish numeric targets that are used to determine whether water quality standards are being achieved. Quantified water quality targets or endpoints should be provided to evaluate each listed pollutant/water body combination addressed by the TMDL, and should represent achievement of applicable water quality standards and support of associated beneficial uses. For pollutants with numeric water quality standards, the numeric criteria are generally used as the water quality target. For pollutants with narrative standards, the narrative standard should be translated into a measurable value. At a minimum, one target is required for each pollutant/water body combination. It is generally desirable, however, to include several targets that represent achievement of the standard and support of beneficial uses (e.g., for a sediment impairment issue it may be appropriate to include a variety of targets representing water column sediment such as TSS, embeddeness, stream morphology, up-slope conditions and a measure of biota).

Minimum Submission Requirements:

☒ The TMDL should identify a numeric water quality target(s) for each waterbody pollutant combination. The TMDL target is a quantitative value used to measure whether or not the applicable water quality standard is attained.

Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. Occasionally, the pollutant of concern is different from the parameter that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as a numerical dissolved oxygen criterion). In such cases, the TMDL should explain the linkage between the pollutant(s) of concern, and express the quantitative relationship between the TMDL target and pollutant of concern. In all cases, TMDL targets must represent the attainment of current water quality standards.

☐ When a numeric TMDL target is established to ensure the attainment of a narrative water quality criterion, the numeric target, the methodology used to determine the numeric target, and the link between the pollutant of concern and the narrative water quality criterion should all be described in the TMDL document. Any additional information supporting the numeric target and linkage should also be included in the document.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The water quality target for this TMDL is based on the numeric water quality standards for fecal coliform to achieve the limited contact recreation beneficial use for Ponca Creek. The target for the Ponca Creek segment included in the TMDL document is the fecal coliform standard expressed as the 30-day geometric mean of 1000 CFU/100 mL during the recreation season from May 1 to September 30. While the standard is intended to be expressed as the 30-day geometric mean, the target was used to compare to values from single grab samples. This ensures that the reductions necessary to achieve the target will be protective of both the acute (single sample value) and chronic (geometric mean of 5 samples) standard.

COMMENTS: None.

3. Pollutant Source Analysis

A TMDL analysis is conducted when a pollutant load is known or suspected to be exceeding the loading capacity of the waterbody. Logically then, a TMDL analysis should consider all sources of the pollutant of concern in some manner. The detail provided in the source assessment step drives the rigor of the pollutant load allocation. In other words, it is only possible to specifically allocate quantifiable loads or load reductions to each significant source (or source category) when the relative load contribution from each source has been estimated. Therefore, the pollutant load from each significant source (or source category) should be identified and quantified to the maximum practical extent. This may be accomplished using site-specific monitoring data, modeling, or application of other assessment techniques. If insufficient time or resources are available to accomplish this step, a phased/adaptive management approach may be appropriate. The approach should be clearly defined in the document.

Minimum Submission Requirements:

☒ The TMDL should include an identification of all potentially significant point and nonpoint sources of the pollutant of concern, including the geographical location of the source(s) and the quantity of the loading, e.g., lbs/per day. This information is necessary for EPA to evaluate the WLA, LA and MOS components of the TMDL.

☒ The level of detail provided in the source assessment should be commensurate with the nature of the watershed and the nature of the pollutant being studied. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of both the natural background loads and the nonpoint source loads.

☒ Natural background loads should not be assumed to be the difference between the sum of known and quantified anthropogenic sources and the existing *in situ* loads (e.g. measured in stream) unless it can be demonstrated that all significant anthropogenic sources of the pollutant of concern have been identified, characterized, and properly quantified.

☒ The sampling data relied upon to discover, characterize, and quantify the pollutant sources should be included in the document (e.g. a data appendix) along with a description of how the data were analyzed to characterize and quantify the pollutant sources. A discussion of the known deficiencies and/or gaps in the data set and their potential implications should also be included.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The TMDL document identifies the land use in the watershed as predominately agricultural consisting of cropland (8%) and grazing or pasture land (78%), small grains and hay (5%) with the remaining 9% of the watershed composed of water, wetlands, roads, housing and forested lands.

Nonpoint sources of fecal coliform bacteria in Ponca Creek come primarily from agricultural sources. Data from the 2009 National Agricultural Statistic Survey (NASS) and from the 2002 South Dakota Game Fish and Parks county wildlife assessment were utilized for livestock and wildlife densities, respectively. Animal density information was used to estimate relative source contributions of bacteria loads.

Manure from livestock is a potential source of fecal coliform to the stream. Livestock in the basin are predominantly beef cattle and hogs. Livestock can contribute fecal coliform bacteria directly to the stream by defecating while wading in the stream. They also can contribute by defecating while grazing on rangelands that get washed off during precipitation events. Table 4 allocates the sources for bacteria production in the watershed into three primary categories. The summary is based on several assumptions. Feedlot numbers were calculated as the sum of all dairy, hog, and the NASS estimate of beef in feeding areas. All remaining livestock were assumed to be on grass. The main source of fecal coliform bacteria is likely livestock, directly utilizing the stream or from livestock grazing on upland areas. Evidence of this is available in the load duration curve located in Figure 4 which indicates that elevated counts occur throughout different flow regimes.

Table 4. Fecal Source Allocation for Ponca Creek

Source	Percentage
Feedlots	9.1%
Livestock on Grass	90.5%
Wildlife	0.4%

There are two small communities within the watershed that have permitted waste water treatment facilities. These are the cities of Colome and Gregory.

Table 3, excerpted from the TMDL document, includes the information used by SDDENR to calculate a maximum allowable discharge from each of these facilities. The calculations were based on the assumption that in some instance a complete discharge from the facility may be necessary; however the normal operation of these systems would typically result in only a small fraction of the calculated amounts actually being discharged. Flows used in the waste load allocation were determined by the individual facilities peak discharge capability. It is important to note that all discharges are required to meet state water quality standards.

Table 3. Waste Load Allocation for Facilities in the Ponca Creek Drainage

Facility Name	Flow (cfs) used in WLA	30-day Geometric Mean Fecal Coliform Bacteria (cfu/100ml) permit limit	Fecal Coliform WLA (cfu/day)
Colome	1.35	1000	3.30×10^{10}
Gregory	18.43	1000	4.51×10^{11}

Including the WLA in the load duration curve required several factors be taken into account. The maximum waste load for all systems in aggregate is 4.84E+11 cfu/day. Associated with this load is also a flow of 19.78 cfs. A flow of 19.78 cfs is met or exceeded in Ponca Creek 40 percent of the time. Arbitrarily adding this load to the entire flow regime would be a misrepresentation of how the system(s) function, essentially suggesting a continuous discharge.

COMMENTS: None.

4. TMDL Technical Analysis

TMDL determinations should be supported by a robust data set and an appropriate level of technical analysis. This applies to **all** of the components of a TMDL document. It is vitally important that the technical basis for **all** conclusions be articulated in a manner that is easily understandable and readily apparent to the reader.

A TMDL analysis determines the maximum pollutant loading rate that may be allowed to a waterbody without violating water quality standards. The TMDL analysis should demonstrate an understanding of the relationship between the rate of pollutant loading into the waterbody and the resultant water quality impacts. This stressor → response relationship between the pollutant and impairment and between the selected targets, sources, TMDLs, and load allocations needs to be clearly articulated and supported by an appropriate level of technical analysis. Every effort should be made to be as detailed as possible, and to base all conclusions on the best available scientific principles.

The pollutant loading allocation is at the heart of the TMDL analysis. TMDLs apportion responsibility for taking actions by allocating the available assimilative capacity among the various point, nonpoint, and natural pollutant sources. Allocations may be expressed in a variety of ways, such as by individual discharger, by tributary watershed, by source or land use category, by land parcel, or other appropriate scale or division of responsibility.

The pollutant loading allocation that will result in achievement of the water quality target is expressed in the form of the standard TMDL equation:

$$TMDL = \sum LAs + \sum WLAs + MOS$$

Where:

TMDL	=	Total Pollutant Loading Capacity of the waterbody
LAs	=	Pollutant Load Allocations
WLAs	=	Pollutant Wasteload Allocations
MOS	=	The portion of the Load Capacity allocated to the Margin of safety.

Minimum Submission Requirements:

☒ A TMDL must identify the loading capacity of a waterbody for the applicable pollutant, taking into consideration temporal variations in that capacity. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

☒ The total loading capacity of the waterbody should be clearly demonstrated to equate back to the pollutant load allocations through a balanced TMDL equation. In instances where numerous LA, WLA and seasonal TMDL capacities make expression in the form of an equation cumbersome, a table may be substituted as long as it is clear that the total TMDL capacity equates to the sum of the allocations.

☒ The TMDL document should describe the methodology and technical analysis used to establish and quantify the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

☒ It is necessary for EPA staff to be aware of any assumptions used in the technical analysis to understand and evaluate the methodology used to derive the TMDL value and associated loading allocations. Therefore, the TMDL document should contain a description of any important assumptions (including the basis for those assumptions) made in developing the TMDL, including but not limited to:

(1) the spatial extent of the watershed in which the impaired waterbody is located and the spatial extent of the TMDL technical analysis;
(2) the distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) a presentation of relevant information affecting the characterization of the pollutant of concern and its allocation to sources such as population characteristics, wildlife resources, industrial activities etc…;
(4) present and future growth trends, if taken into consideration in determining the TMDL and preparing the TMDL document (e.g., the TMDL could include the design capacity of an existing or planned wastewater treatment facility);

(5) an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

☒ The TMDL document should contain documentation supporting the TMDL analysis, including an inventory of the data set used, a description of the methodology used to analyze the data, a discussion of strengths and weaknesses in the analytical process, and the results from any water quality modeling used. This information is necessary for EPA to review the loading capacity determination, and the associated load, wasteload, and margin of safety allocations.

☒ TMDLs must take critical conditions (e.g., steam flow, loading, and water quality parameters, seasonality, etc…) into account as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable critical conditions and describe the approach used to determine both point and nonpoint source loadings under such critical conditions. In particular, the document should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

☐ Where both nonpoint sources and NPDES permitted point sources are included in the TMDL loading allocation, and attainment of the TMDL target depends on reductions in the nonpoint source loads, the TMDL document must include a demonstration that nonpoint source loading reductions needed to implement the load allocations are actually practicable [40 CFR 130.2(i) and 122.44(d)].

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The technical analysis should describe the cause and effect relationship between the identified pollutant sources, the numeric targets, and achievement of water quality standards. It should also include a description of the analytical processes used, results from water quality modeling, assumptions and other pertinent information. The technical analysis for the Ponca Creek TMDL describes how the fecal coliform loads were derived in order to meet the applicable water quality standards for the 303(d) impaired stream segment.

Data on Ponca Creek was collected during the Lewis and Clark Watershed Assessment. Fecal coliform data was collected at a sampling station located on Ponca Creek two miles upstream of the Nebraska border. Flow data for Ponca Creek was retrieved from the United States Geological Survey (USGS) at two stations. The gauge data from Verdel (06453600) served as the long term surrogate for data collected at the Anoka station (06453500) which was in operation from 1950 until 1994.

The TMDL loads and loading capacities were derived using the load duration curve (LDC) approach. The LDC was divided into 5 distinct flow regimes – high flow (≥ 96 cfs), moist flow (between 96 cfs and 19 cfs), midrange flow (between 19 cfs and 8 cfs), dry flow (between 8 cfs and 1 cfs), and low flow (< 1 cfs). The result is a flow-variable TMDL target across the flow regime shown in Figure 4 of the TMDL document. The LDC is a dynamic expression of the allowable load for any given daily flow. Loading capacities were derived from this approach at the midpoint of each flow regime: high flow = 2.03E+13 CFU/day; moist flow = 2.02E+12 CFU/day; midrange flow = 4.63E+11 CFU/day; dry flow = 1.80E+11 CFU/day; and low flow = 2.20E+10 CFU/day.

COMMENTS: None.

4.1 Data Set Description

TMDL documents should include a thorough description and summary of all available water quality data that are relevant to the water quality assessment and TMDL analysis. An inventory of the data used for the TMDL analysis should be provided to document, for the record, the data used in decision making. This also provides the reader with the opportunity to independently review the data. The TMDL analysis should make use of all readily available data for the waterbody under analysis unless the TMDL writer determines that the data are not relevant or appropriate. For relevant data that were known but rejected, an explanation of why the data were not utilized should be provided (e.g., samples exceeded holding times, data collected prior to a specific date were not considered timely, etc...).

Minimum Submission Requirements:

☒ TMDL documents should include a thorough description and summary of all available water quality data that are relevant to the water quality assessment and TMDL analysis such that the water quality impairments are clearly defined and linked to the impaired beneficial uses and appropriate water quality criteria.

☒ The TMDL document submitted should be accompanied by the data set utilized during the TMDL analysis. If possible, it is preferred that the data set be provided in an electronic format and referenced in the document. If electronic submission of the data is not possible, the data set may be included as an appendix to the document.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Ponca Creek TMDL data description and summary are included mostly in the Technical Analysis section of the document. Data on Ponca Creek was collected during the Lewis and Clark Watershed Assessment from one sampling point located two miles upstream of the Nebraska border. The data collected during the assessment was used to supplement existing data from SD DENR ambient water quality monitoring site 460670 which was co-located at site LAC3. A total of 26 samples were available for analysis. Comparing flow and concentration resulted in a very weak relationship that was inadequate to for use in predicting daily loads. Ten of the 26 samples were above the chronic threshold while nine of these exceeded the acute standard.

Flow data for Ponca Creek was collected during the project and supplemented with USGS data from station 06453500 located on Ponca Creek near Anoka, Nebraska and station 06453600 located at the mouth of Ponca Creek near Verdel Nebraska. The gauge at Anoka was the preferred gauge for the monitoring location. Maintenance of this site ended in 1994, creating a critical data gap during the years for which water chemistry data was available. Therefore, the gauge at Anoka was modeled against the gauge at Verdel (still in operation) with the AQUARIUS empirical modeling tool. The AQUARIUS model was able to reproduce flows at the Anoka site with over 90% accuracy. The model was used to generate synthetic flows for the Anoka site from its termination in 1994 through 2009. The final flow data set provided nearly 60 years of water quantity data. This relatively robust dataset provided the basis for a load duration curve that accurately represents the Ponca Creek flow frequencies.

COMMENTS: None.

4.2 Waste Load Allocations (WLA):

Waste Load Allocations represent point source pollutant loads to the waterbody. Point source loads are typically better understood and more easily monitored and quantified than nonpoint source loads. Whenever practical, each point source should be given a separate waste load allocation. All NPDES permitted dischargers that discharge the pollutant under analysis directly to the waterbody should be identified and given separate waste load allocations. The finalized WLAs are required to be incorporated into future NPDES permit renewals.

Minimum Submission Requirements:

☒ EPA regulations require that a TMDL include WLAs for all significant and/or NPDES permitted point sources of the pollutant. TMDLs must identify the portion of the loading capacity allocated to individual existing and/or future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit. If no allocations are to be made to point sources, then the TMDL should include a value of zero for the WLA.

☒ All NPDES permitted dischargers given WLA as part of the TMDL should be identified in the TMDL, including the specific NPDES permit numbers, their geographical locations, and their associated waste load allocations.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: There are two point sources of pollutants in this watershed. In flow zones where the stream flows exceeded the designed discharge capacity of the facility, the wasteload allocation was set equal to the discharge of the final pond in the system. The expected flow rate from each facility was then multiplied by the permit limit or the chronic fecal coliform threshold to derive the WLA. See Tables 7 - 11 in the TMDL document for the WLA values for each facility and flow zone.

COMMENTS: None.

4.3 Load Allocations (LA):

Load allocations include the nonpoint source, natural, and background loads. These types of loads are typically more difficult to quantify than point source loads, and may include a significant degree of uncertainty. Often it is necessary to group these loads into larger categories and estimate the loading rates based on limited monitoring data and/or modeling results. The background load represents a composite of all upstream pollutant loads into the waterbody. In addition to the upstream nonpoint and upstream natural load, the background load often includes upstream point source loads that are not given specific waste load allocations in this particular TMDL analysis. In instances where nonpoint source loading rates are particularly difficult to quantify, a performance-based allocation approach, in which a detailed monitoring plan and adaptive management strategy are employed for the application of BMPs, may be appropriate.

Minimum Submission Requirements:

☒ EPA regulations require that TMDL expressions include LAs which identify the portion of the loading capacity attributed to nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Load allocations may be included for both existing and future nonpoint source loads. Where possible, load allocations should be described separately for natural background and nonpoint sources.

☒ Load allocations assigned to natural background loads should not be assumed to be the difference between the sum of known and quantified anthropogenic sources and the existing *in situ* loads (e.g., measured in stream) unless it can be demonstrated that all significant anthropogenic sources of the pollutant of concern have been identified and given proper load or waste load allocations.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Watershed Characteristics section of the TMDL explains that the landuse in the watershed is 91 percent agricultural. Therefore the majority of the loading capacity has been allocated to the nonpoint sources in the form of load allocations. Tables 7 - 11 include the load allocations at each of the flow regimes – 1.78E+13 CFU/day at high flows; 1.13E+12 CFU/day during moist flows; 9.69E+10 CFU/day at midrange flows; 7.50E+09 CFU/day during dry conditions; and 4.26E+09 CFU/day at low flows.

COMMENTS: None.

4.4 Margin of Safety (MOS):

Natural systems are inherently complex. Any mathematical relationship used to quantify the stressor → response relationship between pollutant loading rates and the resultant water quality impacts, no matter how rigorous, will include some level of uncertainty and error. To compensate for this uncertainty and ensure water quality standards will be attained, a margin of safety is required as a component of each TMDL. The MOS may take the form of a explicit load allocation (e.g., 10 lbs/day), or may be implicitly built into the TMDL analysis through the use of conservative assumptions and values for the various factors that determine the TMDL pollutant load → water quality effect relationship. Whether explicit or implicit, the MOS should be supported by an appropriate level of discussion that addresses the level of uncertainty in the various components of the TMDL technical analysis, the assumptions used in that analysis, and the relative effect of those assumptions on the final TMDL. The discussion should demonstrate that the MOS used is sufficient to ensure that the water quality standards would be attained if the TMDL pollutant loading rates are met. In cases where there is substantial uncertainty regarding the linkage between the proposed allocations and achievement of water quality standards, it may be necessary to employ a phased or adaptive management approach (e.g., establish a monitoring plan to determine if the proposed allocations are, in fact, leading to the desired water quality improvements).

Minimum Submission Requirements:

☒ TMDLs must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit (i.e., incorporated into the TMDL through conservative assumptions in the analysis) or explicit (i.e., expressed in the TMDL as loadings set aside for the MOS).

- ☐ <u>If the MOS is implicit</u>, the conservative assumptions in the analysis that account for the MOS should be identified and described. The document should discuss why the assumptions are considered conservative and the effect of the assumption on the final TMDL value determined.
- ☒ <u>If the MOS is explicit</u>, the loading set aside for the MOS should be identified. The document should discuss how the explicit MOS chosen is related to the uncertainty and/or potential error in the linkage analysis between the WQS, the TMDL target, and the TMDL loading rate.
- ☐ <u>If</u>, rather than an explicit or implicit MOS, the <u>TMDL relies upon a phased approach</u> to deal with large and/or unquantifiable uncertainties in the linkage analysis, the document should include a description of the planned phases for the TMDL as well as a monitoring plan and adaptive management strategy.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Ponca Creek TMDL includes an explicit MOS derived by calculating the difference between the loading capacity at the mid-point of each of the five flow zones and the loading capacity at the minimum flow in each zone. The explicit MOS values are included in Tables 7 - 11 of the TMDL.

COMMENTS: None.

4.5 Seasonality and variations in assimilative capacity:

The TMDL relationship is a factor of both the loading rate of the pollutant to the waterbody and the amount of pollutant the waterbody can assimilate and still attain water quality standards. Water quality standards often vary based on seasonal considerations. Therefore, it is appropriate that the TMDL analysis consider seasonal variations, such as critical flow periods (high flow, low flow), when establishing TMDLs, targets, and allocations.

Minimum Submission Requirements:

☒ The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variability as a factor. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: By using the load duration curve approach to develop the TMDL allocations seasonal variability in fecal coliform loads are taken into account. Highest steam flows typically occur during late spring, and the lowest stream flows occur during the winter months.

COMMENTS: None.

5. Public Participation

EPA regulations require that the establishment of TMDLs be conducted in a process open to the public, and that the public be afforded an opportunity to participate. To meaningfully participate in the TMDL process it is necessary that stakeholders, including members of the general public, be able to understand the problem and the proposed solution. TMDL documents should include language that explains the issues to the general public in understandable terms, as well as provides additional detailed technical information for the scientific community. Notifications or solicitations for comments regarding the TMDL should be made available to the general public, widely circulated, and clearly identify the product as a TMDL and the fact that it will be submitted to EPA for review. When the final TMDL is submitted to EPA for approval, a copy of the comments received by the state and the state responses to those comments should be included with the document.

Minimum Submission Requirements:
☒ The TMDL must include a description of the public participation process used during the development of the TMDL (40 C.F.R. §130.7(c)(1)(ii)).

☒ TMDLs submitted to EPA for review and approval should include a summary of significant comments and the State's/Tribe's responses to those comments.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The State's submittal includes a summary of the public participation process that has occurred which describes the ways the public has been given an opportunity to be involved in the TMDL development process so far. In particular, the State encouraged participation through public meetings in the watershed, and a website was developed and maintained throughout the project. The TMDL was available for a 30-day public notice period prior to finalization.

COMMENTS: None.

6. Monitoring Strategy

TMDLs may have significant uncertainty associated with the selection of appropriate numeric targets and estimates of source loadings and assimilative capacity. In these cases, a phased TMDL approach may be necessary. For Phased TMDLs, it is EPA's expectation that a monitoring plan will be included as a component of the TMDL document to articulate the means by which the TMDL will be evaluated in the field, and to provide for future supplemental data that will address any uncertainties that may exist when the document is prepared.

Minimum Submission Requirements:

☒ When a TMDL involves both NPDES permitted point source(s) and nonpoint source(s) allocations, and attainment of the TMDL target depends on reductions in the nonpoint source loads, the TMDL document should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring.

☒ Under certain circumstances, a phased TMDL approach may be utilized when limited existing data are relied upon to develop a TMDL, and the State believes that the use of additional data or data based on better analytical techniques would likely increase the accuracy of the TMDL load calculation and merit development of a second phase TMDL. EPA recommends that a phased TMDL document or its implementation plan include a monitoring plan and a scheduled timeframe for revision of the TMDL. These elements would not be an intrinsic part of the TMDL and would not be approved by EPA, but may be necessary to support a rationale for approving the TMDL. http://www.epa.gov/owow/tmdl/tmdl_clarification_letter.pdf

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: Ponca Creek should continue to be monitored as part of the Lewis and Clark Implementation Project. Post-implementation monitoring will be necessary to assure the TMDL has been reached and maintenance of the beneficial use occurs.

COMMENTS: None.

7. Restoration Strategy

The overall purpose of the TMDL analysis is to determine what actions are necessary to ensure that the pollutant load in a waterbody does not result in water quality impairment. Adding additional detail regarding the proposed approach for the restoration of water quality <u>is not</u> currently a regulatory requirement, but is considered a value added component of a TMDL document. During the TMDL analytical process, information is often gained that may serve to point restoration efforts in the right direction and help ensure that resources are spent in the most efficient manner possible. For example, watershed models used to analyze the linkage between the pollutant loading rates and resultant water quality impacts might also be used to conduct "what if" scenarios to help direct BMP installations to locations that provide the greatest pollutant reductions. Once a TMDL has been written and approved, it is often the responsibility of other water quality programs to see that it is implemented. The level of quality and detail provided in the restoration strategy will greatly influence the future success in achieving the needed pollutant load reductions.

Minimum Submission Requirements:

☒ EPA is not required to and does not approve TMDL implementation plans. However, in cases where a WLA is dependent upon the achievement of a LA, "reasonable assurance" is required to demonstrate the necessary LA called for in the document is practicable). A discussion of the BMPs (or other load reduction measures) that are to be relied upon to achieve the LA(s), and programs and funding sources that will be relied upon to implement the load reductions called for in the document, may be included in the implementation/restoration section of the TMDL document to support a demonstration of "reasonable assurance".

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Implementation Plan section of the TMDL document says that an implementation plan has already been developed for all of the subwatersheds that drain to Lewis and Clark Lake. Since there are no significant point sources in the Ponca Creek watershed there is no need to include a discussion of reasonable assurance in this TMDL document.

COMMENTS: None.

8. Daily Loading Expression

The goal of a TMDL analysis is to determine what actions are necessary to attain and maintain WQS. The appropriate averaging period that corresponds to this goal will vary depending on the pollutant and the nature of the waterbody under analysis. When selecting an appropriate averaging period for a TMDL analysis, primary concern should be given to the nature of the pollutant in question and the achievement of the underlying WQS. However, recent federal appeals court decisions have pointed out that the title TMDL implies a "daily" loading rate. While the most appropriate averaging period to be used for developing a TMDL analysis may vary according to the pollutant, a daily loading rate can provide a more practical indication of whether or not the overall needed load reductions are being achieved. When limited monitoring resources are available, a daily loading target that takes into account the natural variability of the system can serve as a useful indicator for whether or not the overall load reductions are likely to be met. Therefore, a daily expression of the required pollutant loading rate is a required element in all TMDLs, in addition to any other load averaging periods that may have been used to conduct the TMDL analysis. The level of effort spent to develop the daily load indicator should be based on the overall utility it can provide as an indicator for the total load reductions needed.

Minimum Submission Requirements:

☒ The document should include an expression of the TMDL in terms of a daily load. However, the TMDL may also be expressed in temporal terms other than daily (e.g., an annual or monthly load). If the document expresses the TMDL in additional "non-daily" terms the document should explain why it is appropriate or advantageous to express the TMDL in the additional unit of measurement chosen.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

SUMMARY: The Ponca Creek fecal coliform TMDL includes daily loads expressed as cfu/day. The daily TMDL loads are included in TMDL and Allocations section of the TMDL document.

COMMENTS: None.