



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7

11201 Renner Boulevard
Lenexa, Kansas 66219

05 AUG 2015

Dr. Susan Mosier
Interim Secretary
Kansas Department of Health and Environment
1000 S.W. Jackson, Suite 540
Topeka, Kansas 66612-1368

Dear Dr. Mosier:

RE: Approval of TMDL document for Neosho River and lower Cottonwood River.

This letter responds to the submission from the Kansas Department of Health and Environment, originally received by the U.S. Environmental Protection Agency, Region 7, on September 26, 2014, for a Total Maximum Daily Load document which contained TMDLs for total phosphorus. The Neosho and Cottonwood River and their tributaries were identified on the 2014 Kansas Section 303(d) list as impaired. This submission fulfills the Clean Water Act statutory requirement to develop TMDLs for impairments listed on a state's § 303(d) list. The specific impairments (water body segments and causes) are:

<u>Water Body Name</u>	<u>WBID</u>	<u>Cause</u>
Neosho River	KS-NE-01-273_26	Total Phosphorus
Badger Creek	KS-NE-01-273_45	Total Phosphorus
Cottonwood River	KS-NE-01-274_1	Total Phosphorus
Dry Creek	KS-NE-01-274_42	Total Phosphorus
Phenis Creek	KS-NE-01-274_30	Total Phosphorus
Jacob Creek	KS-NE-01-274_28	Total Phosphorus
Beaver Creek	KS-NE-01-274_29	Total Phosphorus
Moon Creek	KS-NE-01-274_31	Total Phosphorus

The EPA has completed its review of the TMDL document with supporting documentation and information. By this letter, the EPA approves the submitted TMDLs. Enclosed with this letter is the Region 7 TMDL Decision Document which summarizes the rationale for the EPA's approval of the TMDL document. The EPA believes the separate elements of the TMDLs described in the enclosed document adequately address the causes of concern, taking into consideration seasonal variation and a margin of safety.

Although the EPA does not approve the monitoring or implementation plans submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDLs and determine if future revisions are necessary or appropriate to meet applicable water quality standards. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in the TMDL document.

Therefore, the implementation plan in this TMDL document provides information regarding implementation efforts to achieve the loading reductions identified.

The EPA is currently in consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service regarding this TMDL document. While we are approving the TMDLs at the present time, we may decide that changes to the TMDL document are warranted based upon the results of the consultation when it is completed.

The EPA appreciates the thoughtful effort that the KDHE has put into the TMDL document. We will continue to cooperate with and assist, as appropriate, in future efforts by the KDHE to develop TMDLs.

Sincerely,



Karen A. Flournoy
Director
Water, Wetlands and Pesticides Division

Enclosure

cc: Mr. John Mitchell, Director, Division of Environment, KDHE
Mr. Tom Stiles, Chief, Watershed Planning, Monitoring and Assessment Section, KDHE



EPA Region 7 TMDL Review

TMDL ID: KS-NE-01-273_26

State: KS

Document Name: NEOSHO RIVER/COTTONWOOD RIVER DOC

Basin(s): ARKANSAS RIVER BASIN, NEOSHO BASIN

HUC(s): 11070201, 11070203

Water body(ies): BADGER CR, BEAVER CR, COTTONWOOD R, DRY CR, JACOB CR, JACOB CREEK, MOON CR, MOON CREEK, NEOSHO R, NEOSHO RIVER, PHENIS CR, PHENIS CREEK

Tributary(ies): BADGER CREEK, BEAVER CREEK (29), DRY CREEK (42)

Cause(s): BIOLOGICAL INTEGRITY, TOTAL PHOSPHORUS

Submittal Date: 9/26/2014

Approved: Yes

Submittal Letter and Total Maximum Daily Load Revisions

The state submittal letter indicates final TMDL(s) for specific pollutant(s) and water(s) were adopted by the state, and submitted to the EPA for approval under Section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by the EPA, date of receipt of any revisions and the date of original approval if submittal is a revised TMDL document.

The Kansas Department of Health and Environment submitted the TMDL document to the U.S. Environmental Protection Agency on September 26, 2014. In response to the EPA comments, the KDHE submitted revised TMDL documents in emails dated March 18, and May 28, 2015.

Water Quality Standards Attainment

The targeted pollutant is validated and identified through assessment and data. The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. The TMDL(s) and associated allocations are set at levels adequate to result in attainment of applicable water quality standards [40 CFR § 130.7(c)(1)]. A statement that the WQS will be attained is made.

The KDHE monitoring stations SC273 on the Neosho River and SC274 on the Cottonwood River were sampled bimonthly or quarterly during the years of record from 1990-2013. Based on the total phosphorus data from the stream monitoring stations, the expected aquatic life, contact recreation and domestic water supply uses are impaired in the Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Moon Creek (31), Beaver Creek (29) and Jacob Creek (28).

Long term flow conditions for the Neosho River at SC273 were estimated based on the drainage area ratios between SC273 and USGS gages 07182250 on the Cottonwood River near Plymouth and 07179730 on the Neosho River near Americus. Long term flow conditions for the Cottonwood River at SC274 were estimated based on the drainage area ratios between SC274 and U.S. Geological Survey gage 07182250 on the Cottonwood River near Plymouth. Long term flow conditions for the sampling stations and the USGS gages were based on a period of record from 1990-2013 and are displayed in Table 1 of the TMDL document. Long term flow conditions for the tributaries in the TMDL watershed were derived from the USGS Scientific Investigations Report 2004-5033 and are displayed in Table 2 of the TMDL document. The long term flow estimates at SC273 and SC274 were used to calculate flow duration curves and ranges of percent flow exceedances within which samples were taken, and average and median TP concentrations were calculated.

SC273 Neosho River TP average and median concentrations (milligrams per liter) relative to the percent of flow exceedance

Percentage of Flow Exceedance	TP Avg (mg/L)	TP Median (mg/L)
0-9	0.649	0.577
10-24	0.417	0.329
25-74	0.289	0.245
75-89	0.595	0.609
90-100	0.847	0.671
All Samples	0.438	0.330

SC274 Cottonwood River TP average and median concentrations relative to the percent of flow exceedance

Percentage of Flow Exceedance	TP Avg (mg/L)	TP Median (mg/L)
0-9	0.707	0.683
10-24	0.416	0.309
25-74	0.349	0.284
75-89	0.766	0.820
90-100	1.273	1.241
All Samples	0.545	0.396

The TMDL document establishes two phases or milestones relevant to TP to eventually achieve the ultimate endpoint of attaining water quality standards. The first milestone, which applies to all segments within the TMDL watershed, will be a reduction of the median TP concentration at SC273 and SC274 to 0.164 mg/L, based on the median of the average TP values of sampling stations within Ecoregion 28 and the Neosho Basin. The second milestone will be targeted once the first milestone is reached. The second milestone will be a reduction of the TP median at SC273 and SC274 to 0.121 mg/L, reaching a median equal to that of the best 50 percent of the stations within the Ecoregion 28 and Neosho basin stations. This additionally will result in the second milestone being achieved at the upstream stations SC275 and SC580, since achievement of this milestone will require additional nonpoint source reductions upstream of the TMDL watershed. Table 12 of the TMDL document (as copied below) details the reduction of the current TP median concentrations to reach these milestones in the Neosho River at SC273 and in the Cottonwood River at SC274.

TP concentration reductions necessary to meet TMDL endpoints

Station	Current TP Median (mg/L)	Phase I TMDL (mg/L)	Phase I Concentration Reduction (percent)	Phase II TMDL (mg/L)	Phase II Concentration Reduction (percent)
SC273	0.330	0.164	50.3	0.121	63.3
SC274	0.396	0.164	58.6	0.121	69.4

Using the load duration method, the Phase I TP loading capacities for the Neosho River and lower Cottonwood River, at their 50 percent flow exceedances, for example are 310.36 pounds per day and 227.95 lb/day, respectively. The Phase II TP loading capacity in the Neosho River and lower Cottonwood River, also at their 50 percent flow exceedances, are 228.99 lb/day and 168.19 lb/day, respectively.

The ultimate endpoint of the TMDL document is to achieve the Kansas WQS by eliminating any of the impacts to aquatic life, contact recreation and domestic water supply associated with excessive phosphorus and objectionable amounts of algae as described in the narrative criteria pertaining to nutrients. There are no existing numeric phosphorus criteria currently in Kansas.

The Aquatic Life Use Support Index and sestonic chlorophyll *a* concentrations will serve to establish whether or not the biological community of the Neosho River and lower Cottonwood River reflects recovery, renewed diversity and minimal disruption from the impacts described in the narrative criteria of nutrients on aquatic life, recreation and domestic water supply. Sestonic chlorophyll *a* concentration provides an indication of planktonic algae floating in the water column of the stream. The KDHE has sampled sestonic chlorophyll at SC274 since 2003. The average chlorophyll *a* concentration at SC274 is 22.5 micrograms per liter and the median concentration is 17.8 µg/L. The ALUS Index score consists of five categorizations of biotic conditions:

1. Macroinvertebrate Biotic Index: A statistical measure that evaluates the effects of nutrients and oxygen demanding substances on macroinvertebrates based on the relative abundance of certain indicator taxa (orders and families).
2. Ephemeroptera, Plecoptera and Trichoptera abundance as a percentage of the total abundance of macroinvertebrates.
3. Kansas Biotic Index for Nutrients: Mathematically equivalent to the MBI, however, the tolerance values are species specific and restricted to aquatic insect orders.
4. EPT Percent of Count: The percentage of organisms in a sample consisting of individuals belonging to the EPT orders.
5. Shannon's Evenness: A measure of diversity that describes how evenly distributed the numbers of individuals are among the taxa in a sample.

Each of the above has a maximum score of 4, and a minimum of 0. High ALUS Index scores are indicative of high quality biological communities. Kansas protocol is to delineate the boundaries between full and partial aquatic life support and between partial support and non-support as ALUS Index scores of 14 and 6, respectively.

The numeric endpoints established in the TMDL document indicating attainment of WQS in the Neosho and lower Cottonwood tributaries are summarized as follows:

- 1) An ALUS Index score greater than or equal to 14; and
- 2) A sestonic chlorophyll *a* concentration less than 5 µg/L at SC273 and SC274.

An additional long-term endpoint is established downstream in John Redmond Lake, which is a summer, recreation season chlorophyll *a* average concentration of 10 µg/L or less.

The endpoints have to be attained and maintained over three consecutive years to constitute full support of the designated uses of the lower Cottonwood River at SC274 and the Neosho River at SC273. The lower

Cottonwood and Neosho River segments will be evaluated for delisting under Section 303(d), based on the monitoring data over the period 2015-2023. Therefore, the decision for delisting will come about in the preparation of the 2024-303(d) list. Should modifications be made to the applicable water quality criteria during the ten-year implementation period, the desired endpoints of the TMDL document, the implementation activities and consideration for delisting may be adjusted accordingly.

The EPA concurs that meeting the endpoints established in the TMDL document will result in attainment of all applicable WQS in the Neosho River, lower Cottonwood River and their tributaries.

Designated Use(s), Applicable Water Quality Standard(s) and Numeric Target(s)

The submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria, and a numeric target. If the TMDL(s) is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Special Aquatic Life use: Neosho River (26), Cottonwood River (1) and Jacob Creek (28).

Expected Aquatic Life use: Badger Creek (45), Dry Creek (42), Phenis Creek (30), Moon Creek (31) and Beaver Creek (29).

Primary Contact Recreation B use: Neosho River (26).

Primary Contact Recreation C use: Cottonwood River (1) and Badger Creek (45).

Secondary Contact Recreation b use: Dry Creek (42), Phenis Creek (30) Moon Creek (31) Beaver Creek (29) and Jacob Creek (28).

Drinking Water Supply use: Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Beaver Creek (29) and Jacob Creek (28).

Food Procurement use: Neosho River (26), Badger Creek (45), Cottonwood River (1) and Beaver Creek (29).

Groundwater Recharge use: Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Moon Creek (31), Beaver Creek (29) and Jacob Creek (28).

Industrial use: Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Beaver Creek (29) and Jacob Creek (28)

Irrigation use: Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Beaver Creek (29) and Jacob Creek (28).

Livestock use: Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenis Creek (30), Moon Creek (31) and Jacob Creek (28).

Impaired designated uses of the above segments are expected aquatic life, contact recreation and drinking water supply.

The state of Kansas does not have numeric criteria for total phosphorus, but instead has narrative criteria for nutrients. The TMDL document states the Kansas water quality standards as follows:

Nutrients – Narrative: The introduction of plant nutrients into surface waters designated for domestic water supply use shall be controlled to prevent interference with the production of drinking water (K.A.R. 28-16-28e(d)(3)(D)).

The introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement or aquatic biota or the production of undesirable quantities or kinds of aquatic life (K.A.R. 28-16-28e(d)(2)(A)).

The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation (K.A.R. 28-16-28e(d)(7)(A)).

Based on the total phosphorus data at stream monitoring stations SC273 and SC274 the expected aquatic life, contact recreation and domestic water supply uses are impaired in the Neosho River (26), Badger Creek (45), Cottonwood River (1), Dry Creek (42), Phenix Creek (30), Moon Creek (31), Beaver Creek (29) and Jacob Creek (28).

The ultimate goal of the TMDL document is to attain Kansas WQS by eliminating the impairment of the designated uses - aquatic life, recreation and domestic water supply - associated with excessive phosphorus and objectionable amounts of algae as described in the narrative criteria pertaining to nutrients. All other designated uses are considered and protected through the TP targets established in the TMDL document.

The TMDL document is established in phases and stages to assist in the progressive reduction of TP loadings and ambient instream TP and sestonic chlorophyll *a* concentrations with periodic assessment of the biological endpoints on the lower reaches of the stream. Once the concentrations at Station SC637 approach the Phase I target of a median TP concentration of 0.164 milligrams per liter, and a sestonic chlorophyll *a* concentration of less than 5 micrograms per liter, an intensive assessment of macroinvertebrate diversity will be made to determine Aquatic Life Use Support Index scores (greater than or equal to 14) and compliance with the narrative nutrient criteria.

Pollutant(s) of Concern

A statement that the relationship is either directly related to a numeric water quality standard, or established using surrogates and translations to a narrative WQS is included. An explanation and analytical basis for expressing the TMDL(s) through surrogate measures, or by translating a narrative water quality standard to a numeric target is provided (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae). For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and a margin of safety that do not exceed the loading capacity. If the submittal is a revised TMDL document, there are refined relationships linking the load to water quality standard attainment. If there is an increase in the TMDL(s), there is a refined relationship specified to validate that increase (either load allocation or wasteload allocation). This section will compare and validate the change in targeted load between the versions.

A link has been established between the numeric total phosphorus target in the TMDL document and narrative criteria for nutrients in Kansas water quality standards. The current EPA suggested benchmarks for stream TP in the Great Plains Grass and Shrublands Ecoregion is 0.023 milligrams TP per liter over the 10-state aggregate of Level IV Ecoregions. The EPA reference condition for Ecoregion IV streams in subecoregion 28 (Flint Hills) for the 25th percentile of data is 0.060 mg/L of TP. The contributing area of the TMDL watershed lies entirely within the Flint Hills Ecoregion. Comparable analysis of data that is restricted to Kansas monitoring stations in the Flint Hills Ecoregion indicates the lower quartile TP value from the station medians is also 0.060 mg/L, equaling the EPA suggested benchmark. If the ecoregion value is narrowed down further to only the Neosho Basin, the 25th percentile of medians is slightly higher at 0.085 mg/L. The median concentration of the means for the stations within ecoregion 28 and the Neosho Basin is 0.164 mg/L, and is established as the Phase I target. The TMDL document was established in phases and stages to assist in the progressive reduction of TP loadings and ambient concentrations with periodic assessment of the biological endpoints on the lower reaches of the stream.

The narrative criteria of the Kansas water quality standards are based on impacts to the prevailing biological community. Once the concentrations at Station SC274 and SC273 approach the Phase I target of a median TP concentration of 0.164 mg/L, an intensive assessment of macroinvertebrate diversity will be made to determine compliance with the narrative nutrient criteria. The sestonic chlorophyll concentrations and the Aquatic Life Use Support Index will serve to establish whether or not the biological community of the lower Cottonwood and Neosho River reflects recovery, renewed diversity and minimal disruption by the impacts described in the narrative criteria for nutrients on aquatic life, recreation and domestic water supply.

Excessive primary productivity may also be indicated by extreme swings in dissolved oxygen or pH as the chemical reactions of photosynthesis and respiration alter the ambient levels of oxygen or acid-base balance of a stream. Higher pH values tend to occur during periods of high algal photosynthesis. Levels of pH exceeded the upper criterion of 8.5 at SC273 in four samples, whereas the criterion was exceeded in two samples at SC274. The average pH at SC274 and SC273 is 7.93 and 7.97, respectively, which are within the range of the pH criterion (6.5 to 8.5) in Kansas WQS. Figures 18 and 19 of the TMDL document illustrate the relationship between stream pH and the TP concentration at these two stations.

Presuming one or more of the biological endpoints are not met at the end of Phase I, Phase II will commence. The target Phase II TP levels are comparable to the median concentration of 0.121 mg/l calculated at the Ecoregion 28 Neosho River Basin stations. Emporia wastewater will undergo enhanced nutrient removal and the management of riparian activities will be extended to urban storm water contributing areas and along tributaries adjacent to cropland throughout the TMDL watershed and upstream watershed. As nonpoint source pollution control practices are implemented, TP concentrations will be reduced to meet the Phase II milestone at the unimpaired upstream station of SC275. This will result in achievement of the TMDL for all segments associated with the TP impairment. A second intensive biological assessment will be made once phosphorus levels approach the Phase II target of 0.121 mg/L of TP.

The TMDL document effectively links the success of the TP TMDLs to improvement in the biological conditions in the Neosho and lower Cottonwood Rivers, thereby meeting the WQS and restoring full support of the designated uses of the rivers.

Source Analysis

Important assumptions made in developing the TMDL document, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. The submittal demonstrates all significant sources have been considered. If this is a revised TMDL document any new sources or removed sources will be specified and explained.

In the absence of a national pollutant discharge elimination system permit, the discharges associated with sources were applied to the load allocation, as opposed to the wasteload allocation for purposes of this TMDL document. The decision to allocate these sources to the LA does not reflect any determination by the EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing these TMDL(s) with some sources treated as LAs, the EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the allocated pollutant in this TMDL document are found to be, or become, NPDES-regulated discharges, their loads must be considered as part of the calculated sum of the WLAs in this TMDL document. Any WLA in addition to that allocated here is not available.

There are 12 National Pollutant Discharge Elimination System-permitted facilities located within the TMDL watershed. The permitted facilities are categorized as follows: one "non-overflowing" lagoon that is prohibited from discharging, seven industrial facilities, two commercial facilities, one municipal facility and one Municipal Separate Storm Sewer System permit. The permitted facilities are detailed in Table 13 of the TMDL document (copied below). All of the facilities are located in the lower Cottonwood watershed above SC274, with the exception of the Westar Energy Emporia Center which is above SC273 in the watershed.

The city of Emporia is the only municipal wastewater treatment plant in the watershed. Its NPDES permit requires weekly composite sampling for total phosphorus and daily flow monitoring of its effluent. The permit states that the permittee will operate the treatment facility to maximize the level of nutrient removal with the goal of achieving TP < 1.0 milligrams per liter as an annual average in the effluent. The TP concentration average for the city of Emporia from 2008-2013 has been 5.94 mg/L, with an average flow of 2.11 million gallons per day over this same period. Annual averages are detailed in Figure 21 of the TMDL document.

NPDES permitted facilities in the watershed

Permit #	NPDES #	Facility	Type/Comment	Design Flow (MGD)	Receiving Stream	Permit Expires
C-NE24-0003	KS0095729	GREEN ACRES MOBILE HOME PARK	Mechanical, Activated Slud	0.0516	Cottonwood R via Moon Cr via Unnamed Trib	10/31/2018
I-NE24-P002	KS0000817	TYSON FRESH MEATS -EMPORIA MAIN PLT	Mechanical, 8-cell lagoon	0.65 with 2.8 potential	Cottonwood R via Unnamed Trib	12/31/2018
I-NE24-P006	KS0099244	EMPORIA PWS WATER TREATMENT PLANT	3-cell Lagoon	0.381 to lagoon	Cottonwood R	12/16/2016
I-NE24-C006	KS0094412	EMPORIA INDUSTRIAL PARK III POND	Mechanical, Waste STBL Po	2.0 to cooling lake	Cottonwood R via Unnamed Trib	9/30/2013
M-NE24-SN01	KSR044005	EMPORIA, CITY OF	Mun Stormwater General P	0.0000	MS4	1/31/2019
M-NE24-I001	KS0046728	EMPORIA, CITY OF	Mechanical, Activated Slud	4.6000	Cottonwood R	4/30/2018
I-NE24-P008	KS0099368	WESTAR ENERGY - EMPORIA ENERGY CTR	Process Water, Waste STBL	0.163 to pond	Neosho R via Badger Cr via Coon Cr via Unnamed	1/31/2013
I-NE24-PR01	KSG110163	PENNY'S CONCRETE, INC. - EMPORIA	Concrete Plant, Settling Basin		Cottonwood R	9/30/2017
I-NE24-PR02	KSG110169	BUILDERS CHOICE CONCRETE - EMPORIA	Concrete Plant, Settling Basin		Cottonwood R via Unnamed Trib	9/30/2017
C-NE24-0001	KS0115584	COUNTRY MOBILE HOME PARK	3-cell Lagoon	0.0048	Cottonwood R via Dry Cr via unnamed Trib	3/31/2018
I-NE24-B001	KS0098264	BPE MANUFACTURING	Lagoon, Cooling Water	0.001 avg	Cottonwood R via dry drainage	12/31/2018
C-NE24-N004	KSJ000552	EMPORIA RV PARK WWTF	Non-Overflowing			4/30/2014

* Highlighted design flows are average flows noted in the industrial permits

The Green Acres Mobile Home Park currently monitors TP once monthly. The current TP concentration average in its effluent is 4.75 mg/L. The other commercial facility permit, Country Mobile Home Park, does not require TP monitoring. There are only a couple of discharging events recorded for the Country Mobile Home Park facility. The Emporia RV Park commercial facility has a non-overflowing permit and is not contributing to the total phosphorus impairment in the watershed since it does not discharge.

The two concrete plants typically do not discharge. The Builders Choice Concrete facility has reported two discharging events and the Penny's concrete facility has not reported any discharge over the reporting period since 2008.

The industrial permit for the Emporia Public Water Supply drinking water treatment plant has an estimated flow of 0.381 MGD to the lagoon. This permit is for the discharge of the overflow from the wastewater lagoon system, derived from process water. There is no nutrient monitoring associated with this permit as this facility poses no potential for TP loading to the watershed.

The Emporia Industrial Park Pond permit has an average flow of 2.0 MGD to the pond. The water discharged is municipal potable water utilized for non-contact cooling. There is no nutrient monitoring associated with this permit as this facility poses no potential for TP loading to the watershed.

The BPE Manufacturing facility discharges non-contact cooling water in rates averaging 1000 to 1500 gallons per day. It additionally discharges about 100 gallons per day associated with domestic waste from the facility. Domestic wastewater is routed to a one-cell lagoon. This facility is required to perform monitoring for TP annually. Based on its monitoring results of TP effluent data, there were only two detections out of seven samples. The TP concentration average in the effluent is approximately 0.06 mg/L. Data from this facility confirms there is minimal potential of TP loading to the watershed associated with the facility's discharge.

The Westar Emporia Energy Center discharges process water into an on-site pond. Monitoring for TP is not required in the permit for this facility and this facility has no potential to contribute TP loading to the watershed.

The city of Emporia's MS4 permit was re-issued in February of 2014. The MS4 permit follows a general permit format, requiring six minimum controls to be implemented throughout the permitted areas. The new permit will require the implementation of best management practices to address nutrients and sediment during the new permit cycle, along with subsequent high flow monitoring of the Cottonwood and Neosho Rivers to evaluate performance.

The Tyson Fresh Meats facility is a beef processing plant that has historically operated as a complex slaughterhouse. The daily average discharge for the current beef processing operation is 0.65 MGD according to its permit, but based on their discharge data this facility is not regularly discharging at the present time and has not reported any discharge since 2012. When the facility previously operated as a complex slaughterhouse the average wastewater discharge was 2.8 MGD. Full scale operations have not occurred at this facility since 2007. Based on the monitoring results of the effluent data, the current TP average in the effluent during beef processing is 4.04 mg/L. Historic data associated with the complex slaughterhouse operations indicates the average TP concentration in the effluent was approximately 25 mg/L. Significant operational changes must occur to reduce the TP concentrations associated with the effluent of the complex slaughterhouse operations if these operations were to be reinstated. Since this facility remains permitted to discharge, there is potential for this facility to contribute to the TP impairment in the watershed.

Livestock and Waste Management Systems:

There are six certified or permitted concentrated animal feeding operations within the TMDL watershed, none of which are large enough to require a federal permit. All of these livestock facilities have waste management systems designed to minimize runoff entering their operation and detain runoff emanating from their facilities. These facilities are designed to retain a 25-year, 24-hour rainfall/runoff event as well as an anticipated two weeks of normal wastewater from their operations. Typically, this rainfall event coincides with streamflow that occurs less than 1-5 percent of the time. It is unlikely TP loading would be attributable to properly operating permitted facilities, though extensive loading may occur if any of these facilities were in violation and discharged. The Table below details the facilities within the TMDL watershed.

Registered or Permitted Animal Feeding Operations in the Watershed

KS Permit #	Animal Total	Permit Type	Animal Type	WLA
A-NELY-B008	999	Renewal	Beef	0
1028	950	Registration	Beef	0
N-NELY-6921	500	Application	Swine	0
A-NELY-BA04	250	Certification	Beef	0
A-NELY-T003	0	Renewal	Truckwash	0
A-NELY-T003	700	Permit	Beef	0

Although the total potential number of animals is approximately 3,399 head in the watershed, the actual number of animals at the feedlot operations is typically less than the allowable permitted number.

According to the United States Department of Agriculture’s National Agricultural Statistics Service Kansas Farm Facts 2012 report, there were 61,000 and 38,000 head of cattle (including calves) in Lyon and Chase counties respectively and 3,800 head of hogs reported in Lyon County (hogs not reported for Chase County). The 2007 Census of Agriculture reported there were 2,004 goats and 1,215 horses in Lyon County and 824 horses in Chase County.

Any CAFO that does not obtain an NPDES permit must operate as a no discharge facility. Any discharge from an unpermitted CAFO is a violation of Section 301 of the Clean Water Act. It is the EPA’s position that all CAFOs should obtain an NPDES permit because it provides clarity of compliance requirements, authorization to discharge when the discharges are the result of large precipitation events (e.g., in excess of 25-year and 24-hour frequency/duration) or are from a man-made conveyance.

Permitted CAFOs identified in this TMDL document are part of the assigned wasteload allocation. The AFOs and unpermitted CAFOs are considered under the load allocation because we do not have enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL document does not reflect a determination by the EPA that such facility does not meet the definition of a CAFO nor that the

facility does not need to obtain a permit. To the contrary, a CAFO that discharges or proposes to discharge has a duty to obtain a permit. If it is determined that any such operation is a CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in this TMDL document as approved.

On-Site Waste Systems: Households outside of Emporia are presumably utilizing on-site septic systems. Based on the population of Emporia relative to the watershed population, there are an estimated 6,304 people being served by on-site waste systems in the watershed. The Spreadsheet Tool for Estimating Pollutant Load was used to identify the number of septic systems within the HUC12s within the watershed. According to STEPL, there are approximately 432 septic systems within the watershed with an anticipated failure rate of 0.93 percent. Since 80 percent of the population within the watershed reside within Emporia and are served by wastewater treatment facilities, failing on-site septic systems do not likely contribute to the TP impairment within the watershed.

Population Density: According to the 2010 Census Block information, the watershed has approximately 31,220 people, with a population density of 153.6 people/square mile. There are approximately 24,916 people residing within Emporia. Population changes from the 2000 to 2010 census show that the population of Emporia has declined by 1,844 people, accounting for a population decline of 6.9 percent over the 10-year period.

Land Use: Land use within the watershed is dominated by grassland, 67.0 percent according to the 2001 National Land Cover Data set. Cropland and developed areas comprise about 18.6 percent and 9.8 percent of the watershed respectively. The land use percentages and acres within the watershed are in Table 15 of the TMDL document. Runoff from the cropland and developed areas could contribute significant sources of TP loading. The majority of the nonpoint source nutrient runoff is associated with cropland areas throughout the watershed that are in close proximity to the stream corridors.

Landuse Acres and Percentages in the TMDL Watershed

Land Use	Acres	Percent
Grassland	82720	67.0
Cropland	23019	18.6
Developed	10338	8.4
Forest	4307	3.5
Wetlands	1961	1.6
Open Water	1111	0.9

The TMDL watershed has a mean soil permeability value of 0.35 inches/hour, ranging from 0.01 to 2.24 inches/hour. According to a U.S. Geological Survey report, the threshold soil permeability values are set at 3.43 inches/hour for very high, 2.86 inches/hour for high, 2.29 inches/hour for moderate, 1.71 inches/hour for low, 1.14 inches/hour for very low and 0.57 inches/hour for extremely low soil-permeability. As a result of low soil permeability, higher overland runoff occurs from the watershed during rainfall events, potentially picking-up and delivering sediment and nutrients to the Neosho and lower Cottonwood Rivers.

Background phosphorus is present over the landscape, in the soil profile as well as in terrestrial and aquatic biota. Wildlife can contribute phosphorus loadings, particularly if they congregate to a density that exceeds the assimilative capacity of the land or water.

There are three primary mechanisms in place dictating phosphorus concentrations in the lower reaches of the Cottonwood River and on the Neosho River below the confluence with the Cottonwood River. The first factor is the effect of Emporia's wastewater on the downstream hydrology and nutrient content. The second influence is nonpoint sources in proximity to the Cottonwood and Neosho Rivers and their tributaries, both within the watershed under this TMDL document and upstream nonpoint contributions. The final influence is wet weather sources that dominate loading during runoff events, which includes the wet weather impacts of urban storm water

from Emporia and runoff from nonpoint sources in the aftermath of rainfall from areas upstream and within the watershed.

There is a strong relationship between TP and total suspended solids concentrations when point source contributions are minimized and nonpoint source loading dominates. This relationship indicates phosphorus is linked to sediment because of the propensity of those solids to adsorb phosphorus. As seen in Figure 14 of the TMDL document, there is a strong relationship (R-squared value = 0.905) between TP and TSS concentrations at SC275 on the Cottonwood River above Emporia, which indicates that point sources are not influencing TP concentrations above SC275. Conversely, Figure 15 of the TMDL document details the lack of a relationship between TP and TSS concentrations at SC274 on the Cottonwood River below Emporia, which is attributed to significant point source loading from Emporia's wastewater treatment plant. Point source influence is indicated when high phosphorus concentrations are independent of the sediment or TSS concentrations, which occurs when the point source discharge has a greater impact on water quality as stream flows decrease.

All known sources have been considered.

Allocation - Loading Capacity

The submittal identifies appropriate loading capacities, wasteload allocations for point sources and load allocations for nonpoint sources. If no point sources are present, the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a revised TMDL document the change in loading capacity will be documented in this section. All TMDLs must give a daily number. Establishing TMDL "daily" loads consistent with the U.S. Court of Appeals for the D.C. circuit decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015, (April 25, 2006).

The loading capacity is calculated as LC = sum of wasteload allocation + sum of load allocation + margin of safety. Daily loads are computed by multiplying the Phase I and Phase II target total phosphorus concentrations, 0.164 milligrams per liter and 0.121 mg/L, respectively by flow exceedances along the flow duration curve and using a unit conversion factor. The established TMDL capacities (load duration curves) for all flow exceedances relative to observed loads at stations SC274 (Cottonwood River) and SC273 (Neosho River) are detailed in Figures 23 and 24 of the TMDL document. The LC and allocations at selected flow exceedances are in Tables 18 and 19 of the TMDL document (copied below).

Loading Capacities and Allocations (pounds per day) under Phase I for Neosho River at SC273 and Cottonwood River at SC274

Phase I at SC273, Neosho River

Percent Flow Exceedance	Flow (cfs) *	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)	MS4* Allocation (lb/day)
90	72.19	63.93	38.15	25.78	
75	128.07	113.42	78.21	35.21	
50	350.45	310.36	78.21	225.26	6.89
25	1035.06	916.65	78.21	813.34	25.10
10	3188.79	2823.99	78.21	2669.53	76.25

* cfs = cubic feet per second

* MS4 = Municipal Separate Storm Sewer System

Phase I at SC274, Cottonwood River

Percent Flow Exceedance	Flow (cfs)	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)	MS4 Allocation (lb/day)
90	43.08	38.15	38.15		
75	94.78	83.93	78.21	5.72	
50	257.40	227.95	78.21	142.85	6.89
25	704.36	623.78	78.21	520.47	25.10
10	1960.14	1735.9	78.21	1581.44	76.25

Loading Capacities and Allocations (lb/day) under Phase II

Neosho River at SC273

Percent Flow Exceedance	Flow (cfs)	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)	MS4 Allocation (lb/day)
90	72.19	47.17	28.15	19.02	
75	128.07	83.68	34.35	49.33	
50	350.45	228.99	28.15	188.48	6.16
25	1035.06	676.31	34.35	622.79	19.59
10	3188.79	2083.55	28.15	1991.87	57.33

Cottonwood River at SC274

Percent Flow Exceedance	Flow (cfs)	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)	MS4 Allocation (lb/day)
90	43.08	28.15	28.15		
75	94.78	61.93	34.35	27.58	
50	257.40	168.19	34.35	127.68	6.16
25	704.36	460.23	34.35	406.29	19.59
10	1960.14	1280.76	34.35	1189.08	57.33

Wasteload Allocation Comment

The submittal lists individual wasteload allocations for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to a water quality standard excursion, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLA. Any such exceptions must be explained to a

satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a revised TMDL document, any differences between the original TMDL(s) WLA and the revised WLA will be documented in this section.

The wasteload allocations are associated with the wastewater treatment facilities for the city of Emporia, Tyson Fresh Meats, Green Acres Mobile Home Park, Country Mobile Home Park and BPE Manufacturing. There is an additional WLA reserve being set aside in the watershed as well to accommodate possible operational changes associated with the Tyson Fresh Meats facility. The total WLA for the TMDL watershed is 78.21 pounds per day.

The WLA for these facilities are detailed in Tables 17a and 17b of the TMDL document (and copied below). The WLA for the Green Acres Mobile Home Park and the city of Emporia have been established based on their design flow and a discharge TP concentration of 1.5 milligram per liter. The WLA for Tyson Fresh Meats has been set based on the average flow in the permit (0.65 million gallons per day) for the most recent plant operations relating to the processing of cut beef. The WLA for the BPE manufacturing is based on the average discharge flow (0.001 MGD) and the current TP concentrations in the effluent. The WLA for the Country Mobile Home Park is based on the design flow (0.0048 MGD) with a discharge concentration of 2.0 mg/l, an effluent TP concentration seen from Kansas lagoon systems. It is not anticipated that wasteloads associated with the BPE Manufacturing and the Country Mobile Home Park will require any load reductions. The WLA reserve is based on the Tyson Fresh Meats facility permit and is based on the average flows (2.8 MGD) if this facility is open for complex slaughterhouse operations with a discharge TP concentration of 0.5 mg/l utilizing enhanced nutrient reduction technologies.

Use of wastewater for irrigation and efficient operation of the treatment processes at Emporia will assist lowering phosphorus loading and concentrations seen at SC274 and SC273. Prior to initiating Phase II and enhanced nutrient removal at the city of Emporia, an evaluation should be initiated to consider the growth in current wasteloads among the facilities and the probability of discharge from Tyson Fresh Meats. In addition, consideration of assimilation rates of wastewater phosphorus, wasteload trading opportunities among cities, opportunities to further irrigate with wastewater and actual efficiency in phosphorus removal by the mechanical and lagoon systems should be evaluated, along with resulting downstream TP concentrations at SC274 and SC273.

Phase I Wasteload Allocations for the TMDL watershed

Facility	Phase I TP Discharge Concentration (mg/L)	Daily TP WLA (lb/day)	Annual TP WLA (pounds per year)
GREEN ACRES MOBILE HOME PARK	1.50	0.65	236.16
TYSON FRESH MEATS -EMPORIA MAIN PLT	1.50	8.15	2972.93
EMPORIA, CITY OF	1.50	57.64	21038.97
COUNTRY MOBILE HOME PARK	2.00	0.08	29.20
BPE MANUFACTURING	0.06	0.00	0.37
Reserve	0.50	11.70	4268.68
Total WLA		78.21	28,546.29

Phase II would commence if biological information indicates the impacts identified in the narrative criteria for nutrients are still occurring after Phase I is complete. Should the Phase II milestone become the new goal, the WLA for Emporia will be reduced to reflect a typical annual average effluent concentration of 0.5 mg/l from enhanced nutrient removal. In addition, urban best management practices would be installed to reduce loads delivered to the Cottonwood River by storm water generated within the jurisdictional limits of Emporia under the purview of its Municipal Separate Storm Sewer System permit.

Phase II Wasteload Allocations for the TMDL watershed

Facility	Phase I TP Discharge Concentration (mg/L)	Daily TP WLA (lb/day)	Annual TP WLA (lb/yr)
GREEN ACRES MOBILE HOME PARK	1.50	0.65	236.16
TYSON FRESH MEATS -EMPORIA MAIN PLT	0.50	2.71	989.15
EMPORIA, CITY OF	0.50	19.22	7015.30
COUNTRY MOBILE HOME PARK	2.00	0.08	29.20
BPE MANUFACTURING	0.06	0.00	0.37
Reserve	0.50	11.70	4268.68
Total WLA		34.35	12,538.85

Actual WLA attributed to ambient concentrations seen downstream under normal conditions are anticipated to be much less than the allocations of Tables 17a and 17b because of adsorption to sediments and absorption by biota. Tables 18 and 19 detail the TMDLs at SC274 on the Cottonwood River and at SC273 on the Neosho River. Under the low flow conditions, wasteloads will be largely reduced through efficient treatment, transit losses along the channel and alternative disposal such as irrigation, so that they match up with the overall loading capacity. Instream wasteloads at the low flow condition assimilate, but still account for the majority of the load. It is conservatively assumed that the entire wasteload from all facilities reach SC273 when the LC is greater than the WLA set in this TMDL document at SC274, since the entire WLA originates above SC274.

Municipal Separate Storm Sewer System: The WLA for the MS4 storm water permit associated with the city of Emporia is provided by proportioning the remaining LC, after accounting for the NPDES WLA, between MS4 and nonpoint source loads. This was done by assuming load contributions would arise from the developed areas within the HUC12 (110702030405) of the MS4 permitted area for the city of Emporia. Thus, the MS4 WLA is based on the proportion of developed land in the Emporia HUC12, which accounts for 4.6 percent of the area. The MS4 allocation is therefore 4.6 percent of the TMDL and only applies to flows at or above median flow conditions at SC274.

Load Allocation Comment

All nonpoint source loads, natural background and potential for future growth are included. If no nonpoint sources are identified, the load allocation must be given as zero [40 CFR § 130.2(g)]. If this is a revised TMDL document, any differences between the original TMDL(s) LA and the revised LA will be documented in this section.

The load allocation for nonpoint sources is the remaining loading capacity after assimilated wasteloads for NPDES wastewater and Municipal Separate Storm Sewer System storm water have been accounted for. Nonpoint sources are assumed to be very minimal or null at times during low flow and drier conditions when the city of

Emporia's effluent is the primary influence on water quality within the lower Cottonwood River. The load allocation grows proportionately as normal conditions occur. The allocation and contributing areas increase as wet weather ensues. As shown in Tables 18 and 19 of the TMDL document (copied above), the LA for the Cottonwood River for example under Phase I at the 25 percent flow exceedance is 520.47 pounds per day.

Margin of Safety

The submittal describes explicit and/or implicit margins of safety for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a revised TMDL document, any differences in the MOS will be documented in this section.

The margin of safety provides some hedge against the uncertainty in phosphorus loading into the watershed, predominantly from the point source dischargers in the watershed. This TMDL document uses an implicit MOS, relying on conservative assumption to be assured that future wasteload allocations will not cause further excursion from the nutrient criteria. First, design flows are used for the the municipal wastewater discharge facility to set WLAs, although demographic trends indicate Emporia is likely to decline in population. Additionally, biological endpoints are used to assess the narrative criteria and have to be maintained for three consecutive years before attainment of water quality standards can be claimed. Finally, because there is often a synergistic effect of phosphorus and nitrogen on instream biological activity, concurrent efforts by Emporia to reduce nitrogen content of their wastewater should complement the effect of phosphorus load reduction in improving the biological condition of the watershed.

Seasonal Variation and Critical Conditions

The submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of the WQS. If this is a revised TMDL document, any differences in conditions will be documented in this section.

Seasonal variability has been accounted for in this TMDL document. A three season approach was utilized to include the Spring season consisting of the months of April, May and June; the Summer-Fall season consisting of the months of July, August, September and October; and the Winter season that includes January, February, March, November and December.

The overall total phosphorus concentration average at SC274 on the Cottonwood River is 0.545 milligrams per liter, with a median concentration of 0.396 mg/L. Seasonal TP averages range from a low of 0.436 mg/L in the Spring season to a high of 0.611 mg/L in the Summer-Fall season. Seasonal median concentrations at SC274 are similar between the three seasons, with median concentrations ranging from a low of 0.365 in the Spring to 0.467 mg/L in the Summer-Fall season, to a high of 0.476 mg/L in the Winter.

The overall TP concentration average at SC273 on the Neosho River is 0.438 mg/L. Seasonal TP averages range from a low of 0.381 mg/L in the Spring, to 0.456 mg/L in the Summer-Fall season, and to 0.460 mg/L in the Winter season. Seasonal median concentrations at SC273 are also similar between the three seasons with median concentrations ranging from a low of 0.317 mg/L in the Spring, to 0.342 mg/L in the Summer-Fall, and to a high of 0.365 mg/L in the Winter. Seasonal TP concentrations are further detailed in Figure 6 of the TMDL document. Tables 3 and 4 further detail the seasonal concentrations respective to the flow condition at SC274 and SC273.

The TMDL document's load duration curve method represents flow under all conditions. Because the wasteload allocations, load allocations and TMDLs are applicable at all flow conditions, they are also applicable and protective over all seasons. The advantage of the load duration curve method is that all flow conditions are considered and the constraints associated with using a single-flow critical condition are avoided. Seasonal variation is accounted for in the TMDL document since the endpoint accounts for all flow conditions throughout the year.

Public Participation

The submittal describes required public notice and public comment opportunities, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

Public Notice: An active Internet website is established at http://www.kdheks.gov/tmdl/planning_mgmt.htm to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Neosho Basin.

Public Hearing: A public Hearing on this TMDL document was held on August 28, 2014 in Emporia to receive public comments. No comments were received.

Basin Advisory Committee: The Neosho River Basin Advisory Committee met to discuss the TMDLs in the basin on March 6, 2014 in Marion.

Monitoring Plan for TMDL(s) Under a Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards, and a schedule for considering revisions to the TMDL(s) (where a phased approach is used) [40 CFR § 130.7]. If this is a revised TMDL document, monitoring to support the revision will be documented in this section. Although the EPA does not approve the monitoring plan submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDLs and determine if future revisions are necessary or appropriate to meet applicable water quality standards.

Future stream sampling will continue to occur quarterly at sampling stations SC274 and SC273. The monitoring will include continuation of sestonic chlorophyll sampling at SC274. Monitoring of tributary levels of total phosphorus during runoff events will help direct abatement efforts toward major nonpoint sources. Monitoring of TP below the Emporia outfall in the Cottonwood River will help assess improvements in their nutrient removal processes. Monitoring of TP should be a condition of the Municipal Separate Storm Sewer System permits within the watershed. Monitoring and data will include chlorophyll *a* concentrations in John Redmond Lake.

Commencing in 2017, macroinvertebrate sampling will occur at accessible locations on the Cottonwood and Neosho Rivers within the watershed. The streams will be evaluated for possible delisting in 2024 after Phase I implementation. If the biological endpoints are achieved over 2019-2023, the conditions described by the narrative nutrient criteria will be viewed as attained and the Neosho River and lower Cottonwood River will be moved to Category 2 on the 2024-303(d) list. If they are not, Phase II of the TMDL document begins in 2028.

Once the water quality standards are attained, the adjusted ambient phosphorus concentrations on the Cottonwood and Neosho Rivers will be the basis for establishing numeric phosphorus criteria through the triennial WQS process to protect the restored biological and chemical integrity of the rivers.

Reasonable Assurance

Reasonable assurance only applies when less stringent wasteload allocation are assigned based on the assumption that nonpoint source reductions in the load allocation will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads. States are not required under Section 303(d) of the Clean Water Act to develop TMDL implementation plans and the EPA does not approve or disapprove them. However, this TMDL document provides information regarding how point and nonpoint sources can or should be controlled to ensure implementation efforts achieve the loading reductions identified in this TMDL document. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in this TMDL document. Therefore, the discussion of reduction efforts relating to point and nonpoint sources can be found in the implementation section of the TMDL document, and are briefly described below.

The states have the authority to issue and enforce state operating permits. Inclusion of effluent limits into a state operating permit and requiring that effluent and instream monitoring be reported to the state should provide reasonable assurance that instream water quality standards will be met. Section 301(b)(1)(C) requires that point source permits have effluent limits as stringent as necessary to meet WQS. However, for wasteload allocations to serve that purpose, they must themselves be stringent enough so that (in conjunction with the water body's other loadings) they meet WQS. This generally occurs when the TMDL(s)' combined nonpoint source load allocations and point source WLAs do not exceed the WQS-based loading capacity and there is reasonable assurance that the TMDL(s)' allocations can be achieved. Discussion of reduction efforts relating to nonpoint sources can be found in the implementation section of the TMDL document.

The following authorities may be used to direct activities in the watershed to reduce pollution:

1. K.S.A. 65-164 and 165 empowers the Secretary of the KDHE to regulate the discharge of sewage into the waters of the state.
2. K.S.A. 65-171d empowers the Secretary of the KDHE to prevent water pollution and to protect the beneficial uses of the waters of the state through required treatment of sewage and established water quality standards and to require permits by persons having a potential to discharge pollutants into the

waters of the state.

3. K.S.A. 2002 Supp. 82a-2001 identifies the classes of recreation use and defines impairment for streams.
4. K.A.R. 28-16-69 through 71 implements water quality protection by the KDHE through the establishment and administration of critical water quality management areas on a watershed basis.
5. K.S.A. 2-1915 empowers the Kansas Department of Agriculture, Division of Conservation to develop programs to assist the protection, conservation and management of soil and water resources in the state, including riparian areas.
6. K.S.A. 75-5657 empowers the Kansas Department of Agriculture, Division of Conservation to provide financial assistance for local project work plans developed to control nonpoint source pollution.
7. K.S.A. 82a-901, et. seq. empowers the Kansas Water Office to develop a state water plan directing the protection and maintenance of surface water quality for the waters of the state.
8. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*, including selected Watershed Restoration and Protection Strategies.
9. The *Kansas Water Plan* and the Neosho Basin Plan provide the guidance to state agencies to coordinate programs intent on protecting water quality and to target those programs to geographic areas of the state for high priority in implementation.

National Pollutant Discharge Elimination System and State Permits:

- a. Monitor influent into and effluent from the discharging permitted wastewater treatment facilities, continue to encourage wastewater reuse and irrigation disposal and ensure compliance and proper operation to control phosphorous levels in wastewater discharges.
- b. Establish applicable permit limits and conditions after 2018.
- c. Inspect permitted livestock facilities to ensure compliance.
- d. New livestock permitted facilities will be inspected for integrity of applied pollution prevention technologies.
- e. New registered livestock facilities with less than 300 animal units will apply pollution prevention technologies.
- f. Manure management plans will be implemented, to include proper land application rates and practices that will prevent runoff of applied manure.
- g. Reduce runoff in Emporia through storm water management program and Municipal Separate Storm Sewer System permit.
- h. Establish total phosphorus concentration effluent goal of 1.5 milligrams per liter for the city of Emporia and TP permit limits for the city of Emporia in accordance with the wasteload allocation.
- i. Establish nutrient reduction practices among urban homeowners to manage application on lawns and gardens, through the Emporia stormwater management program.
- j. Interact with the Watershed Restoration and Protection Strategy on opportunities for trading and offsets of loads between Emporia and agricultural producers within the watershed.

Funding: The State Water Plan annually generates \$16-18 million and is the primary funding mechanism for implementing water quality protection and pollution reduction activities in the state through the Kansas Water Plan. The state water planning process, overseen by the Kansas Water Office, coordinates and directs programs and funding toward watershed and water resources of highest priority. Typically, the state allocates at least 50 percent of the fund to programs supporting water quality protection. This watershed and its TMDL are located within a High Priority WRAPS area and should receive support for pollution abatement practices that lower the loading of sediment and nutrients.

Effectiveness: Use of biological nutrient removal technology has been well established to reduce nutrient levels in wastewater, including phosphorus. Additionally, nutrient control has been proven effective through conservation tillage, contour farming and use of grass waterways and buffer strips. In addition, the proper implementation of comprehensive livestock waste management plans has proven effective at reducing nutrient runoff associated with livestock facilities.

Presuming one or more of the biological endpoints are not met at the end of Phase I, additional reductions in loads and phosphorus concentrations will be accomplished through the Phase II enhanced implementation of controls on point and nonpoint sources. The desired target TP levels are comparable to the median concentrations

seen at the Ecoregion 28 Neosho River Basin stations. Emporia wastewater will undergo enhanced nutrient removal and the management of riparian activities will be extended to urban storm water contributing areas and along tributaries adjacent to cropland throughout the TMDL watershed and upstream watershed. As nonpoint practices are implemented, TP concentrations will be reduced to meet the Phase II milestone at the unimpaired upstream station of SC275.

