



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 7**

11201 Renner Boulevard  
Lenexa, Kansas 66219

17 JUN 2015

Dr. Susan Mosier  
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 Headwaters at Parkerville

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 River and its 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-01-637_23	Total Phosphorus
Neosho River, West Fork	KS-NE-01-637_28	Total Phosphorus
Haun Creek	KS-NE-01-637_29	Total Phosphorus
Level Creek	KS-NE-01-637_9023	Total Phosphorus
Parkers Creek	KS-NE-01-637_27	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 TMDLs. 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 TMDL 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. 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-01-637\_23

**State:** KS

**Document Name:** NEOSHO RIVER HEADWATER AT PARKERVILLE

**Basin(s):** NEOSHO BASIN

**HUC(s):** 11070201

**Water body(ies):** HAUN CR, LEVEL CR, NEOSHO R, NEOSHO R, W FK, PARKERS CR

**Tributary(ies):** CROOKED CREEK, HAUN CREEK, LEVEL CREEK, NEOSHO RIVER, PARKERS CREEK, WEST FORK NEOSHO RIVER

**Cause(s):** BIOLOGICAL INTEGRITY, PHOSPHORUS, TOTAL

**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 formally submitted the TMDL document to the U.S. Environmental Protection Agency in an email dated September 26, 2014. In response to the EPA comments, the KDHE submitted a final revised TMDL document to EPA in an email dated March 10, 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 rotational monitoring station SC637 on the Neosho River was sampled bimonthly or quarterly by the KDHE in 1992, 1993, 1996, 2000, 2004, 2008 and 2012. The Watershed Restoration and Protection Strategy sampling site SW015, co-located with SC637, was sampled by the KDHE four or five times per year from March through October in years 2011 through 2014. The KDHE also sampled Level Creek at station SPA067 three times in 2006 as part of a probabilistic survey.

Based on the median concentration of total phosphorus at stream monitoring station SC637 the expected aquatic life use is impaired in the Neosho River, Haun Creek, Parkers Creek, West Fork Neosho River and Level Creek; the primary contact recreation use is impaired in the Neosho River, Haun Creek and Parkers Creek; the secondary contact recreation use is impaired in the West Fork Neosho River and Level Creek; and the domestic water supply use is impaired in the Neosho River, Haun Creek, Parkers Creek, West Fork Neosho River and Level Creek. The section 303(d) listings for TP were determined by median concentrations exceeding 0.201 milligrams per liter in accordance with KDHE's listing methodology. The median TP concentration at the Neosho River monitoring station (SC637) from 1992-2014 is 0.259 mg/L.

Stream biological conditions will be assessed using the Aquatic Life Use Support Index (ALUS Index) developed by the KDHE beginning in 2017 at monitoring station SC637. The index was designed to assess the response of macroinvertebrate communities to a wide variety of stressors including various toxics, low dissolved oxygen and sedimentation. Following the EPA Rapid Bioassessment Protocol guidance, data from candidate reference sites and regular targeted network sites were used to standardize the metrics to a dimensionless scale. Metric

scores will be added-up to generate the ALUS index score. The ALUS Index score consists of five categorizations of biotic condition or three levels of aquatic life support:

1. Macroinvertebrate Biotic Index - A measure used to evaluate the effects of nutrients and oxygen demanding pollutants on macroinvertebrate communities. The index provides order and family level tolerance values for several benthic macroinvertebrate classes. The value represents a weighted average tolerance value for the organisms in a sample. The value is weighted by the number of individuals in each taxa.
2. Kansas Biotic Index for Nutrients - Mathematically equivalent to the MBI, however the tolerance values are species specific and restricted to aquatic insect orders.
3. Ephemeroptera, Plecoptera and Trichoptera Index - The number of taxa belonging to the insect orders Ephemeroptera, Trichoptera, and Plecoptera. Most species in these insect orders are considered intolerant of perturbations in water quality and habitat.
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 endpoint for this TMDL document is an ALUS Index score greater than or equal to 14.

The TP concentrations in ecoregion 28 that are associated with an ALUS Index score greater than 14, have a lower 25th percentile TP concentration ranging from 0.045 mg/L to 0.239 mg/L. Biological sampling has not been conducted yet from SC637 on the Neosho River near Parkerville. Future biological sampling will ultimately establish the specific relationship between the ALUS index and TP concentrations within stream segments of the Neosho headwaters watershed.

The TMDL will be implemented in two phases to improve instream water quality and attain Kansas water quality standards. Implementation Phase I and II TMDL endpoints are expressed as TP concentrations, 0.164 mg/L and 0.121 mg/L, respectively. The Phase I TP concentration is equivalent to the median of the average TP values of sampling stations within ecoregion 28 and the Neosho Basin, and the Phase II concentration is equivalent to the best 50 percent of the stations within ecoregion 28 and the Neosho basin.

**TP concentration reductions necessary to meet TMDL endpoints**

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)
0.259	0.164	36.7	0.121	53.3

Long term flow conditions for the Neosho River were estimated based on regression calculations utilizing the U.S. Geological Survey gage 07179300 (2012-2014) on the Neosho River near Parkerville, the USGS gage 06888500 (1990-2014) on Mill Creek near Paxico and the USGS Scientific Investigations Report 2004-5033. Appendix A of the TMDL document details the calculations used to develop long term flows at SC637 and the corresponding flow duration curve. Figure 2 of the TMDL document illustrates the flow duration curve at SC637 over the period of record from 1990-2013. Daily loads (charted along a load duration curve) are computed by multiplying the target TP concentrations, noted above for Phase I and II, by variable stream flows along the flow duration curve and a unit conversion factor. For example, at the 50 percent flow exceedance, the TP loading capacity of the Neosho River is 4.25 pounds per day and 3.14 pounds per day for Phase I and II, respectively.

An additional target is instream sestonic chlorophyll-a concentration of less than 5 micrograms per liter. Sestonic chlorophyll indicates planktonic algae floating in the water column of the streams, and will be monitored by the KDHE at the WRAPS sampling site SW015 beginning in 2016. Once the TP concentrations at Station SC637 approach the Phase I target of a median TP concentration of 0.164 mg/L, and the sestonic chlorophyll-a concentration are less than 5 µg/l, an intensive assessment of macroinvertebrate diversity will be made to determine compliance with the narrative nutrient criteria.

The ultimate goal of the TMDL document is to achieve the Kansas water quality standards by eliminating the impairment to aquatic life, domestic water supply and contact recreation associated with excessive phosphorus and objectionable amounts of algae as described in the narrative criteria pertaining to nutrients. The ALUS Index and sestonic chlorophyll-a concentration endpoints will serve to establish whether or not the biological community of the Neosho River headwaters reflects recovery, renewed diversity and minimal disruption or impacts as described by the narrative nutrient criteria in Kansas WQS.

The EPA agrees that all applicable WQS are considered and will be met through the implementation of the TMDL document.

All endpoints - median TP concentration, sestonic chlorophyll-a concentration and the ALUS Index - must be maintained over three consecutive years to be considered fully supportive of designated uses. The Neosho River at SC637 will be evaluated for delisting of impairment causes based on the monitoring data over the period 2015-2023. Therefore, the decision for delisting will come about in the preparation of the 2024 Integrated Report and 303(d) list. Should modifications be made to the applicable water quality criteria during the ten-year implementation period, consideration for delisting, desired endpoints of this TMDL document and implementation activities may be adjusted accordingly.

**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.*

Expected Aquatic Life use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Primary Contact Recreation C use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28) and the Neosho River (23);

Secondary Contact Recreation b use: Level Creek (9023) and Crooked Creek (35);

Drinking Water Supply use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Food Procurement use: Haun Creek (29), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Groundwater Recharge use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Industrial use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Irrigation use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23);

Livestock Watering use: Haun Creek (29), Parkers Creek (27), West Fork Neosho River (28), Level Creek (9023), Crooked Creek (35) and the Neosho River (23).

Impaired uses of the above segments with the exception of Crooked Creek are Expected Aquatic Life, Contact Recreation and Drinking Water Supply.

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

"Nutrients- Narratives: 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(c) (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 of aquatic biota or the production of undesirable quantities or kinds of aquatic life (K.A.R. 28-16-28e(c)(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. 28-26-28e(c)(7)(A))."

The overall goal of the TMDL document is to achieve the Kansas WQS by eliminating impairment of designated uses - aquatic life, domestic water supply and recreation - associated with excessive phosphorus and objectionable amounts of algae as described in the narrative nutrient criteria.

The TMDL document is established in phases and stages to assist in the progressive reduction of total phosphorus loadings and ambient instream TP and sestonic chlorophyll 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.

All uses are considered and protected by targets established in the TMDL document.

### **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.*

The state of Kansas does not have a numeric criterion for total phosphorus, but instead uses narrative criteria for nutrients. A link has been established between the narrative criteria for nutrients and the numeric total phosphorus targets in the TMDL document. The current EPA suggested benchmark for instream TP in the South-Central Cultivated Great Plains ecoregion is 0.067 milligrams TP per liter over the 10-state aggregate of Level III ecoregions. The TMDL document was established in phases to assist in the progressive reduction of TP loadings and ambient instream concentrations with periodic assessment of biological endpoints. The Phase I TP concentration is equivalent to the median of the average TP values of sampling stations within ecoregion 28 and the Neosho Basin. Once the concentrations at Station SC637 approach the Phase I target median TP concentration of 0.164 mg/L, and a sestonic chlorophyll-a concentration of less than 5 µg/l, an intensive assessment of macroinvertebrate diversity using the Aquatic Life Use Support Index will be made to determine compliance with narrative nutrient criteria.

The narrative nutrient criteria of Kansas water quality standards are based on impacts to the prevailing biological community. Excessive production of algae driven by nutrients may also result in extreme fluctuations in dissolved oxygen and pH as the chemical reactions of photosynthesis and respiration alter the ambient levels of oxygen and the acid-base balance of the streams. Figure 10 of the TMDL document illustrates the relationship between pH and TP concentrations at SC637. Higher pH tends to occur during periods of high photosynthesis. However, the pH level only exceeded the criterion of 8.5 at SC637 in one sample, and the average pH value, 7.76 at SC636, was within the acceptable range of the pH numeric criterion for Kansas waters.

Presuming one or more of the biological endpoints are not met at the end of Phase I, Phase II will commence. Additional reductions in loads and phosphorus concentrations will be accomplished through enhanced implementation of controls on nonpoint sources, including additional best management practices for grassland and rangeland. A second intensive biological assessment will be made once phosphorus levels reach the Phase II target median concentration of 0.121 mg/L TP. Achievement of the biological endpoints indicates phosphorus loads are within the loading capacity of the stream, water quality standards are attained and designated uses of the Neosho headwater streams - aquatic life, domestic water supply and recreation - are fully supported.

## 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 is one permitted National Pollutant Discharge Elimination System facility located within the watershed, the White City Wastewater Treatment Plant, which utilizes a three-cell wastewater stabilization lagoon system. This facility currently monitors for total phosphorus concentrations in their effluent on a quarterly basis, however there has not been any discharge since TP monitoring was added to their permit. The permit summary for this facility is detailed in Table 10 of the TMDL document copied below. Since 2008, there have only been 14 months when discharge from this facility was reported. Total phosphorus monitoring has only been a requirement as of the most recent permit issued on April 1, 2013.

### NPDES Permitted Facilities in the Watershed

NPDES #	Facility	Permitted Flow (MGD*)	Receiving Stream	Permit Expires
KS0096873	White City WWTP	0.094	Neosho River via unnamed tributary	3/31/18

\*MGD = million gallons per day

**Livestock and Waste Management Systems:** There are three certified or permitted concentrated animal feeding operations identified within the TMDL document. Of these, one is a large federally permitted facility. All of these livestock facilities have waste management systems designed to minimize runoff entering their operation and to 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 5 percent of the time. It is unlikely TP loading would be attributable to properly operating permitted facilities, although extensive loading may occur if any of these facilities were in violation and discharged. Table below details the livestock waste facilities within the watershed.

### Registered or Permitted Animal Feeding Operations

KS Permit #	NPDES	County	Animal Total	Permit Type	Animal Type
A-NEMR-C001	KS0117218	Morris	15,500	Permit	Beef
A-NEMR-BA01	NA	Morris	400	Certification	Beef
A-NEMR-MA04	NA	Morris	20	Certification	Dairy

Although the total potential number of animals is approximately 15,920 head in the watershed, the actual number of animals at the feedlot operations is typically less than the permitted number.

According to the United States Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) Kansas Farm Facts 2012 report, there were 55,000 head of cattle (including calves) in Morris County. The 2007 Census of Agriculture reported there were 768 horses in Morris 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. 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 the municipalities served by wastewater treatment systems are presumably utilizing on-site septic systems. The Spreadsheet Tool for Estimating Pollutant Load was utilized to identify the number of septic systems within the watershed. According to STEPL, there are approximately 201 septic systems within the watershed with an anticipated failure rate of 0.93 percent. Failing on-site septic systems do not likely contribute to the total phosphorus impairment within the watershed.

**Population Density:** According to the 2010 Census information, the watershed has approximately 953 people, with a population density of 12.7 people/square mile. The cities of White City and Parkerville have populations of 618 and 59 people, respectively. White City had an increase in population from the 2000 census when it reported 518 residents. Parkerville is declining in population as the 2000 census reported 73 residents. Future growth and additional sources of TP within the watershed are assumed to be insignificant.

**Land Use:** Land use within the watershed is dominated by grassland (63.25 percent) according to the 2001 National Land Cover Data set. Cropland and developed areas comprise about 26.02 percent and 4.78 percent of the watershed, respectively. The land use percentages and acres within the watershed are in Table 12 of the TMDL document (copied below) and are further illustrated in the land use map in Figure 11 of the TMDL document. As detailed in Figure 11 of the TMDL document, the location of the cropland within the watershed is in the low lying areas adjacent to the stream corridors. Runoff from the cropland areas could contribute significant sources of TP loading.

**Landuse Acres and Percentages in the TMDL Watershed**

Land Use	Acres	Percent
Grassland	35623.5	63.25
Cropland	14658.9	26.02
Developed	2690.1	4.78
Forest	2491.7	4.42
Wetlands	594.7	1.06
Open Water	264.7	0.47

The entire watershed has a soil permeability less than 1.29 inches/hour. According to a USGS report, the threshold soil permeability values are set at 3.43 inches/hour for very high permeability, 2.86 inches/hour for high permeability, 2.29 inches/hour for moderate permeability, 1.71 inches/hour for low permeability, 1.14 inches/hour for very low permeability, 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 River.

Background: Phosphorus is present over the landscape, in the soil profile as well as in the 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.

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. For example, the TP loading capacity for the Neosho River segment 23 is 4.25 pounds per day and 3.14 lb/day for Phase I and II, respectively, at the 50 percent flow exceedance.

#### Loading Capacities and Allocations (pounds per day) under Phase I for Neosho River Segment 23 as Measured at SC637

Percent Flow Exceedance	Flow (cfs)*	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)
75	0.57	0.50	0.50	0
50	4.8	4.25	1.57	2.68
25	12.86	11.39	1.57	9.82
10	35.55	31.49	1.57	29.92

\* cfs = cubic feet per second

#### Loading Capacities and Allocations (lb/day) under Phase II for Neosho River Segment 23 as Measured at SC637

Percent Flow Exceedance	Flow (cfs)	Load Capacity (lb/day)	WLA (lb/day)	LA (lb/day)
75	0.57	0.37	0.37	0
50	4.8	3.14	1.57	1.57
25	12.86	8.4	1.57	6.83
10	35.55	23.23	1.57	21.66

### **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 allocation is associated with the wastewater treatment facility for White City. The WLA is based on the permitted flow (0.094 million gallons per day) with a discharge concentration of 2.0 milligrams total phosphorus per liter, an effluent TP concentration typical of Kansas lagoon systems. The WLA is 1.57 pounds TP per day at flow exceedances less than 75 percent. During drier conditions, with flow exceedances of 75 percent or more, the wasteload allocation is 0.37 lb-TP/day.

### **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 load capacity after assimilated wasteloads for the National Pollution Discharge Elimination System permitted wastewater has been accounted for. Nonpoint sources are assumed to be very minimal during drier conditions when stream flows are less than median flows. The load allocation grows proportionately as stream flow increases. The loading capacities and allocations in the TMDL document are detailed by Tables 14 and 15 of the TMDL document (as copied above) for Phase I and Phase II. The TMDL allocation is calculated at SC637 on segment 23 of the Neosho River.

### **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 of phosphorus loading in the watershed, predominately from the point source discharger in the watershed. This TMDL document uses an implicit margin of safety, relying on conservative assumption to be assured that future wasteload allocations will not cause further excursion from the nutrient criteria. The city of White City infrequently discharges from their lagoon to the watershed. Additionally, biological endpoints are used to assess the narrative criteria and must be maintained for three consecutive years to be considered fully supportive of designated uses.

### **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 the 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.

Seasonal total phosphorus averages range from a low of 0.227 milligrams per liter in the Winter season to a high of 0.360 mg/L in the Summer-Fall season. Seasonal median concentrations at SC637 are similar between the three seasons, with median concentrations ranging from a low of 0.170 mg/L in the Winter to 0.200 mg/L in the Spring season, to a high of 0.282 mg/L in Winter. Table 2a in the TMDL document and copied below details the seasonal averages and medians along with seasonal averages of these.

**Seasonal TP concentration averages and medians on the Neosho River from the combined data set of SW015 and SC637.**

Season	Spring	Summer/Fall	Winter	Overall
Average (mg/L)	0.255	0.360	0.227	0.281
Median (mg/L)	0.200	0.282	0.170	0.217

Table 2b copied below details the average and median TP concentrations during various flow conditions at SC637. The highest TP concentration average and median relative to flow are during the high flow condition (0-10 percent flow exceedance) at SC637, with a TP average of 0.611 mg/L and a TP median of 0.640 mg/L during this condition. TP concentrations are the lowest during the normal flow condition (11-80 percent), with a TP average of 0.235 mg/L and a TP median of 0.217 mg/L. The TP concentrations during the high flow conditions indicate an increase in nonpoint source loading in the watershed during runoff conditions.

**Summary of TP data collected by the KDHE at sampling station SC637 and SW015**

Percent of Flow Exceedance	TP Average (mg/L)	TP Median (mg/L)
0-10	0.611	0.640
11-80	0.235	0.217
81-99	0.259	0.268
All Data	0.284	0.259

Seasonal TP concentrations based on stream flow conditions are further detailed in Table 3 and Figures 5 and 6 of the TMDL document. The highest TP concentrations are observed during the high flow conditions during the Spring season, followed by the high flow conditions in the Winter and Summer-Fall. The TP concentrations associated with the normal flow condition are highest during the Summer-Fall season and the lowest during the Winter Season. During the low flow condition (81-99 percent flow exceedance), TP concentrations are the highest during the Summer-Fall season and the lowest during the Spring season.

Monthly average and median TP concentrations at SC637 are detailed and compared to the monthly average precipitation in Figure 7 of the TMDL document. Higher TP concentrations occur during the warmer months when precipitation averages are higher. This further indicates that the high TP concentrations are related to nonpoint sources during runoff events associated with prolonged or intense rainfall events.

**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](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 regarding this TMDL document.

Basin Advisory Committee: The Neosho River Basin Advisory Committee met to discuss the TMDLs in the basin on March 6, 2014, in Marion and on September 24, 2014, in Galena.

**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 SC637. The monitoring will include the initiation of sestonic chlorophyll sampling. Monitoring of tributary levels of total phosphorus during runoff events will help direct abatement efforts toward major nonpoint sources.

Commencing in 2017, macroinvertebrate sampling will occur at accessible locations on the Neosho River within the watershed. The streams will be evaluated for possible delisting in 2024 after Phase One of the TMDL is implemented. If the biological endpoints are achieved over 2019-2023, the conditions described by the narrative nutrient criteria will be viewed as attained on the Neosho River at SC637 and will be moved to Category 2 on the 2024-303(d) list. If they are not, Phase Two of this TMDL document begins in 2024.

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 water quality standards 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.

**Funding:** The State Water Plan Fund 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 watersheds and water resources of highest priority. Typically, the state allocates at least 50 percent of the fund to programs supporting water quality protection through the Watershed Restoration and Protection Strategy. This watershed and its TMDLs are located within a high priority WRAPS area and should receive support for pollution abatement practices that lower the loading of sediment and nutrients.

**Desired Implementation Activities:**

- Implement and maintain conservation farming, including conservation tilling, contour farming and no-till farming to reduce runoff and cropland erosion.
- Improve riparian conditions along stream systems by installing grass and/or forest buffer strips along the stream and drainage channels in the watershed.
- Perform extensive soil testing to ensure excess phosphorus is not applied.
- Ensure land applied manure is being properly managed and is not susceptible to runoff by implementing nutrient management plans.
- Install pasture management practices, including proper stock density to reduce soil erosion and storm runoff.
- Ensure livestock feeding sites and pens are away from streams and waterways to increase filtration and waste removal of manure.
- Ensure proper on-site waste system operations in proximity to the main stream segments.
- Ensure that labeled application rates of chemical fertilizers are being followed and implement runoff control measures.
- Renew state and federal permits and inspect permitted facilities for permit compliance.
- The stakeholder leadership team for the Twin Lakes WRAPS will coordinate best management practices to address:
  - Livestock: vegetative filter strips, relocate feeding sites, relocate pasture feeding sites off-stream and alternate watering system.
  - Cropland: grassed waterways, terraces, conservation crop rotations and water retention structures.

**Listed National Pollutant Discharge Elimination System and state permit implementation actions:**

- 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.
- Establish applicable permit limits and conditions after 2018.
- Inspect permitted livestock facilities to ensure compliance.
- New livestock permitted facilities will be inspected for integrity of applied pollution prevention technologies.
- New registered livestock facilities with less than 300 animal units will apply pollution prevention technologies.
- Manure management plans will be implemented, to include proper land application rates and practices that will prevent runoff of applied manure.

Nutrient control in Kansas watersheds 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.

This TMDL document will be incorporated into the Continuing Planning Process, Water Quality Management Plan and the Kansas Water Planning Process. According to the current Continuing Planning Process, the next anticipated revision of the CPP will be in 2015, and it will emphasize implementation of WRAPS activities. At that time, incorporation of this TMDL document will be made into the WRAPS plan. Recommendations for this TMDL document will be considered in the *Kansas Water Plan* implementation decisions under the State Water Planning Process for Fiscal Years 2015-2023.