LOWER ARKANSAS RIVER BASIN TOTAL MAXIMUM DAILY LOAD

Water Body: **Arkansas River near Arkansas City**
Water Quality Impairment: Nutrients and Oxygen Demand Impact on Aquatic Life

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasins: Middle Arkansas–Slate & Kaw Lake **Counties:** Cowley and Sumner

HUC 8s: 11030013 **HUC 11** (HUC 14s)**: 030** (070, 080, and 090)

11060001 **HUC 11** (HUC 14s)**: 040** (010)

Drainage Area: 99.3 square miles

Main Stem Segments: WQLS: 1, 14, 18 ; starting at the Oklahoma border and ending at the confluence with Slate Creek. **(Figure 1)**

Designated Uses: Special Aquatic Life Support; Primary Contact Recreation; Domestic Water Supply; Food Procurement; Ground Water Recharge; Industrial Water Supply Use; Irrigation Use; Livestock Watering Use for Main Stem Segments

1998 303d Listing: Table 2–Stream Segments Identified by Biological Monitoring

Impaired Use: Special Aquatic Life Support on Main Stem Segments.

Water Quality Standard: Nutrients--Narrative: 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. (KAR 28-16-28e(c)(2)(B)).

2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

Level of Support for Designated Use under 1998 303d: Partially Supporting

Monitoring Sites: Station 218 near Arkansas City

Period of Record Used: 1980 to 1999

Flow Record: Arkansas River at Arkansas City (USGS Station 07146500); 1970 to 1999

Arkansas River near Arkansas City
TMDL Reference Map

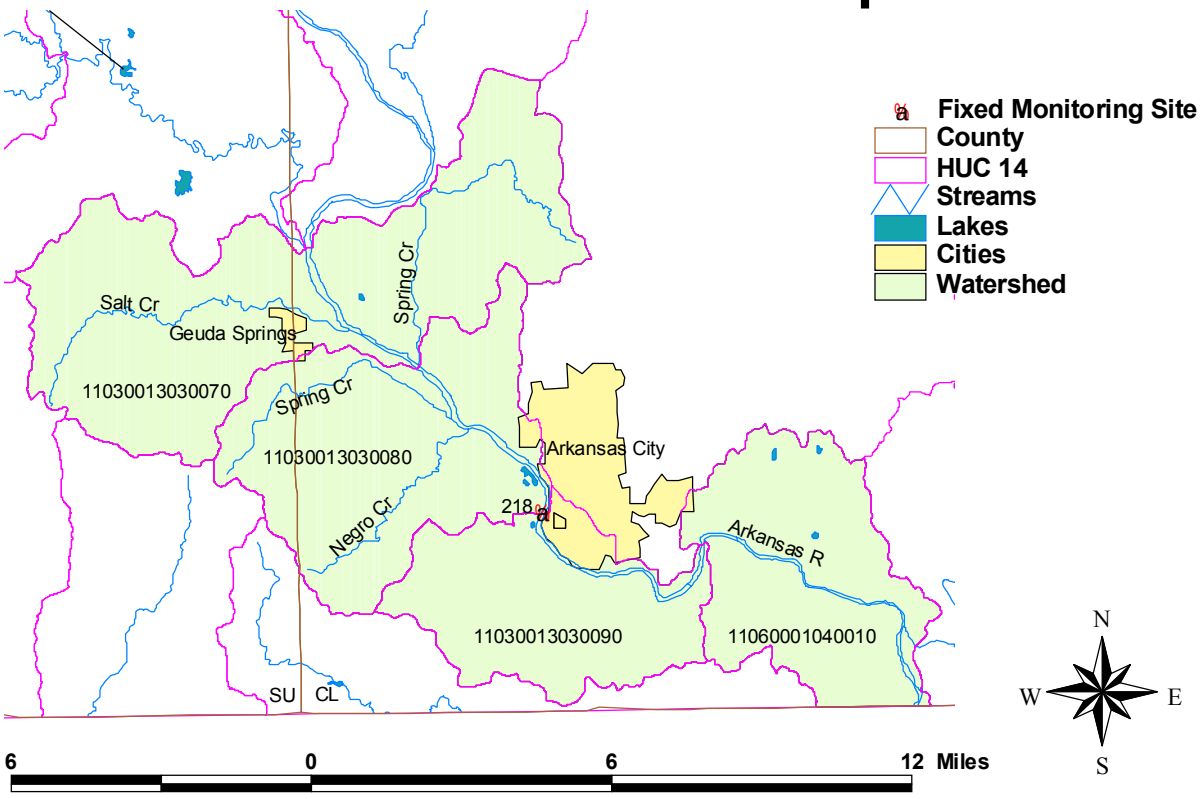

Figure 1

Long Term Flow Conditions: Average Flow = 2160 cfs; Median Flow = 1052 cfs**,**
7Q10 = 170 cfs

Current Conditions:

Parameter	**Historical Average & Range (1980 - 1996 for biological data)**
Macroinvertebrate Biotic Index (MBI)	4.81 (3.96 - 5.56)
% Ephemeroptera, Plecoptera, and Trichoptera (EPT) Taxa	47% (12 - 75 %)
Biochemical Oxygen Demand (BOD)	6.62 mg/L (1.00 - 20.0 mg/L)
Phosphorus	727 ug/L (210 - 2,740 ug/L)
Ammonia	145 ug/L (20 - 1,220 ug/L)
Nitrate	1,368 ug/L (10 - 4,080 ug/L)
TSS	152.7 mg/L (1 mg/L - 1,920 mg/L)

Three main parameters (MBI, %EPT, and BOD) were analyzed to address the nutrient/ oxygen demand impairment. The Macroinvertebrate Biotic Index rates the nutrient and oxygen demanding pollution tolerance of large taxonomic groups (order and family). Higher values indicate greater pollution tolerances. Along with the number of individuals within a rated group, a single index value is computed which characterizes the overall tolerance of the community. The higher the index value the more tolerant the community is of organic pollution exerting oxygen demands in the stream setting. Index values greater than 5.4 are indicative of non-support of the aquatic life use; values between 4.51 and 5.39 are indicative of partial support and values at or below 4.5 indicate full support of the aquatic life use.

The EPT index is the proportion of aquatic taxa present within a stream belonging to pollution intolerant orders; Ephemeroptera, Plecoptera and Trichoptera (mayflies, stoneflies and caddisflies). Higher percentages of total taxa comprising these three groups indicate less pollutant stress and better water quality.

On this stream segment, the average MBI value indicates that aquatic life support is partially impaired (MBI between 4.51 and 5.39). Eighty-five percent of the surveys resulted in MBI values over 4.5; the rest were under 4.5. Average MBI under partial support conditions was 4.92; average MBI under full support conditions was 4.17. When aquatic life is partially impaired, the percentage of EPT taxa ranges from 12 - 68% (44% average). Under full support conditions, the percentage averages 69%. The historical average of BOD (6.62 mg/L) is above normal background levels (3 - 4 mg/L).

Phosphorus, ammonia, and nitrate were graphed against the flow. In all graphs, the nutrient concentration decreased slightly with increased flow, which suggests that phosphorus, ammonia, and nitrate are being diluted during high runoff events. Overall, the average concentration of nutrients in the Arkansas River watershed tends to be exceptionally high (727 ug/L phosphorus, 145 ug/L ammonia, and 1,368 ug/L nitrate).

Comparison of Biological Index Values and Average Nutrient and Sediment Concentrations

Station	MBI	Total P	Nitrate	Ammonia	BOD	TSS
Great Bend	5.45	1.13 mg/l	1.3 mg/l	1.0 mg/l	6.1 mg/l	106 mg/l
Valley Center	4.67	0.80 mg/l	0.95 mg/l	0.16 mg/l	4.6 mg/l	127 mg/l
Derby	5.15	0.82 mg/l	1.89 mg/l	0.73 mg/l	6.6 mg/l	98 mg/l
Ark City	**4.81**	**0.73 mg/l**	**1.37 mg/l**	**0.15 mg/l**	**6.6 mg/l**	**153 mg/l**
Cowskin	4.56	0.33 mg/l	0.65 mg/l	0.085 mg/l	4.7 mg/l	103 mg/l

Desired Endpoint for Arkansas River for 2005 - 2009

The use of biological indices allows assessment of the cumulative impacts of dynamic water quality on aquatic communities present within the stream. As such, these index values serve as a baseline of biological health of the stream. Sampling occurs during open water season (April to November) within the aquatic stage of the life cycle of the macroinvertebrates. The endpoint would be average MBI values of 4.5 or less over 2005-2009.

Achievement of this endpoint would be indicative of full support of the aquatic life use in the stream reach. While the narrative water quality standard pertaining to nutrients is utilized by this TMDL, there is no direct linkage between MBI values and nutrient levels. A number of factors may contribute to the occasional excursion in index values above 4.5. These include flows, adequate habitat, and stream modifications. The link between MBI values and nutrient levels on Arkansas River at Arkansas City remains tentative at this phase of the TMDL.

3. SOURCE INVENTORY AND ASSESSMENT

NPDES: There are two NPDES permitted wastewater dischargers located along the impaired reaches.

MUNICIPALITY	STREAM REACH	SEGMENT	DESIGN FLOW	EXPIRATION DATE
GEUDA SPRINGS MWTP	SALT CR	22	0.014 MGD	2002
ARKANSAS CITY MWTP	ARKANSAS RV	1	2.1 MGD	2002

Population projections indicate moderate decline for Arkansas City (- 9.4 %) and Geuda Springs (- 7.7 %) to the year 2020. According to current water use and resulting wastewater, both waste treatment plants look to have sufficient treatment capacity available. Given the small design flows relative to the expected low flow of the Arkansas River, local municipal point sources may have insignificant impact on the impaired reaches. The larger of the facilities is located below the

monitoring site. Under low flow conditions, there may be some influence by the large volume of effluent discharged upstream by Wichita.

Livestock Waste Management Systems: Three operations are permitted within the watershed, accounting for a potential of up to 1,240 animal units. There are two cattle and one swine operations in the Arkansas River watershed. All permitted livestock facilities have waste management systems designed to minimize runoff entering their operations or detaining runoff emanating from their areas. Such systems are designed for the 25 year, 24 hour rainfall/runoff event, which would be indicative of flow durations well under 10 percent of the time. The actual number of animal units on site is variable, but typically less than permitted numbers. Tracking the excursions from the water quality standards to flow conditions at the tributary stations indicates that most excursions are related to ongoing runoff or the aftermath of a runoff event placing waste in the stream. Many of the facilities are located adjacent to the stream segments with a higher susceptibility to runoff.

Land Use: Most of the watershed is cropland (54.7 %). A combined total of 67,451 tons of fertilizer was bought in Sumner and Cowley Counties in 1998. Four point three percent of these counties lie within the watershed. Assuming an even distribution, about 2,900 tons of fertilizer were bought and used in the watershed in 1998.

Thirty-five percent of the watershed is grassland. The summer and winter grazing densities of livestock are average.

Background Levels: Seven percent of the Arkansas River watershed is woodland. Leaf litter falls into the streams and decomposes increasing the oxygen demand. Small amounts of phosphorus are contributed from the watershed soils. Nitrogen loads may be contributed from the atmosphere.

4. ALLOCATION OF POLLUTION REDUCTION RESPONSIBILITY

There is a direct, yet unquantified relation between nutrient loading and biological integrity. Decreased loads should result in aquatic communities, indicative of improved water quality. The ability of biological data to integrate the various physical and chemical impacts of the entire watershed on the aquatic community defies allocation of specific nutrient loads between point and nonpoint sources. Additionally, no specific relationship between the observed ambient nutrient levels and the biological impairment indicated by the MBI value could be established. Because biological integrity is a function of multiple factors, the initial pollution load reduction responsibility will be to decrease the average condition of nutrients and sediment over the range of flows encountered on the Arkansas River. Future monitoring will be designed to uncover the actual reasons for the impairment, and this TMDL will be adjusted to reflect the new information.

For this phase of the TMDL, an average condition is considered across the seasons, to establish goals of the endpoint and desired reductions. Therefore, average ambient levels are multiplied by

the average flow estimated for the Arkansas River. This is represented graphically by the integrated area under each load duration curve established by this TMDL. The area is segregated into allocated areas assigned to point sources (WLA) and nonpoint sources (LA). Future growth in wasteloads should be offset by reductions in the loads contributed by nonpoint sources. This offset along with appropriate limitations should eliminate the impairment.

Point Sources: There are two municipal facilities releasing effluent into the watershed. The existing loads contributed by these facilities are unknown and will need to be determined in the future through monitoring of effluent and ambient receiving streamflow. Most of the effluent volume discharges below the monitoring site, nonetheless, the incoming effluent from the upstream Wichita area likely influences flow conditions which were exceeded 75% of the time on the Arkansas River. Therefore, the allocation for point sources is demarcated by the area under each respective load duration curve bounded from 75% to 100%. At this stage of the TMDL, the assumed condition is maintenance of current conditions at those low flows, presuming an offset of lower nonpoint loading at higher flows. The Wasteload Allocation represents the load in the stream which the point sources contribute. In most cases, this is a function of permit limits and plant performance; in the case of nutrients and BOD, there is some assimilation and degradation of the constituents in transit while flowing downstream. Further refinement of this allocation will come with information on effluent concentrations and developed nutrient criteria for streams, resulting in specific permit limits in the second stage of this TMDL.

Nonpoint Sources: Given the runoff characteristics of the watershed, overland runoff can easily carry sediment, phosphorus, and nitrogen from the watershed into the stream reaches. The composition of the watershed indicates a mixture of rural and urban nonpoint sources which may contribute to the downstream impairment. These sources tend to become dominant under higher flow conditions. Therefore, the area under the load duration curves bounded from 1-75% constitutes the Load Allocation for this TMDL. Because of the predominant loads under runoff conditions, the Load Allocation will be a reduction of nutrient loadings such that average phosphorus concentrations are below 70 ppb in stream and nitrate concentrations average below 1200 ppb.

TMDL Goals and Gross Allocations for the Arkansas River at Arkansas River

	MBI	Total Phosphorus	Potential Available N	BOD	TSS
Current	4.81	4.2 tons/day	8.85 tons/day	38.6 tons/day	890 tons/day
Reduction	0.31	0.1 tons/day	1.27 tons/day	0.7 tons/day	307 tons/day
TMDL	4.5*0*	4.1 tons/day	7.58 tons/day	37.9 tons/day	583 tons/day
WLA		*0.01 tons/day*	*0.02 tons/day*	*0.26 tons/day*	*0.48 tons/day*
LA		*4.1 tons/day*	*7.58 tons/day*	*37.6 tons/day*	*582 tons/day*

Defined Margin of Safety: Given the variable nature of the MBI values seen on this stream, additional biological measures are necessary to assure indications of good aquatic community

health. Therefore, the defined Margin of Safety for this TMDL will be a proportion of EPT individuals making up at least 55% of the sample population when MBI values are 4.5 or lower. This will ensure that the majority of aquatic macroinvertebrate population is composed of pollution intolerant taxa. This measure may also correlate with the availability of adequate habitat in the stream to support such a community.

State Water Plan Implementation Priority: Because additional source assessment and definition of the relationship between aquatic community response and nutrient loading are needed, and numeric nutrient criteria will be developed over the next five years, this TMDL will be a Medium Priority for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Middle Arkansas–Slate Subbasin (HUC 8: 11030013) with a priority ranking of 6 (Highest Priority for restoration work).

Priority HUC 11s and Stream Segments: The Middle Arkansas–Slate subwatershed should be the priority focus of implementation since the monitoring station is in that subbasin.

5. IMPLEMENTATION

Desired Implementation Activities

1. Implement necessary soil sampling to recommend appropriate fertilizer applications on cropland
2. Maintain necessary conservation tillage and contour farming to minimize cropland erosion.
3. Install necessary grass buffer strips along streams.
4. Reduce activities within riparian areas
5. Install proper manure storage
6. Implement necessary nutrient management plans to manage manure application to land
7. Monitor wastewater discharges for excessive nutrient loadings

Implementation Programs Guidance

NPDES - KDHE

a. Monitor effluent from wastewater systems to determine their nutrient contributions and ambient concentrations of receiving streams.

b. Ensure proper monitoring, permitting, and operations of municipal wastewater systems to limit nutrient and BOD discharges after numeric criteria are established.

Nonpoint Source Pollution Technical Assistance - KDHE

a. Support Section 319 demonstration projects for reduction of sediment runoff from agricultural activities as well as nutrient management.

b. Provide technical assistance on practices geared to establishment of vegetative buffer strips.

c. Provide technical assistance on nutrient management in vicinity of streams.
d. Assist evaluation of stormwater quality from urbanized areas of watershed.
e. Evaluate any potential anthropogenic activities which might contribute nutrients to the river as part of an overall Watershed Restoration and Protection Strategy

Technical Services - KDHE

a. Incorporate numeric nutrient criteria into water quality standards after final EPA nutrient criteria guidance is issued.

Local Environmental Protection Program - KDHE

a. Support inspection of on-site wastewater systems to minimize nutrient loadings

Water Resource Cost Share & Nonpoint Source Pollution Control Programs - SCC

a. Apply conservation farming practices, including terraces and waterways, sediment control basins, and constructed wetlands.
b. Provide sediment control practices to minimize erosion and sediment and nutrient transport

Riparian Protection Program - SCC

a. Establish or reestablish natural riparian systems, including vegetative filter strips and streambank vegetation.
b. Develop riparian restoration projects
c. Promote wetland construction to assimilate nutrient loadings

Buffer Initiative Program - SCC

a. Install grass buffer strips near streams.
b. Leverage Conservation Reserve Enhancement Program to hold riparian land out of production.

Extension Outreach and Technical Assistance - Kansas State University

a. Educate agricultural producers on sediment, nutrient and pasture management
b. Provide technical assistance on buffer strip design and minimizing cropland runoff
c. Encourage annual soil testing to determine capacity of field to hold phosphorus

Time Frame for Implementation: Pollutant reduction practices should be installed within the priority subwatersheds after the year 2005. To some degree, reduction practices associated with reducing bacteria impairment will have an impact on reducing nutrient loads to the stream. Monitoring of wastewater and receiving stream quality should commence with the renewal of permits.

The second stage involves incorporating refined allocations and load reductions including permit limits which should be in place after final EPA guidance has established numeric criteria and those criteria have been incorporated into Kansas water quality standards.

Targeted Participants: Primary participants for implementation will likely be agricultural producers operating within the drainage of the priority subwatershed. Initial work in 2005 should include an inventory of activities in those areas with greatest potential to impact the stream, including, within a mile of the stream:

1. Total rowcrop acreage
2. Cultivation alongside stream
3. Fields with manure applications
4. On-site wastewater discharges to stream
5. Condition of riparian areas
6. Presence of livestock along stream

Some inventory of local needs should be conducted in 2005 to identify such activities. Such an inventory would be done by local program managers with appropriate assistance by commodity representatives and state program staff in order to direct state assistance programs to the principal activities influencing the quality of the streams in the watershed during the implementation period of this TMDL.

Municipal point sources will initiate monitoring and subsequently treat effluent to reduce nutrient loading once EPA guidance and numeric criteria are in place. Some assessment of stormwater quality coming from urbanized areas of the watershed will be needed to direct any appropriate stormwater management practices.

Milestone for 2006: The year 2006 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, adequate source assessment should be complete which allows an allocation of resources to responsible activities contributing to the nutrient impairment. Additionally, biological data from Arkansas River over 2001-2005 should not indicate trends of reduced support of the aquatic community. Numeric nutrient criteria should be established by 2005 and sampled data from Arkansas River should indicate evidence of reduced nutrient levels relative to the conditions seen over 1980-1999.

Delivery Agents: The primary delivery agents for program participation will be the point source dischargers, the conservation districts for programs of the State Conservation Commission, and the Natural Resources Conservation Service. Producer outreach and awareness will be delivered by Kansas State Extension and agricultural interest groups such as Kansas Farm Bureau and Kansas Livestock Association and grain crop associations. On-site waste system inspections will be performed by Local Environmental Protection Program personnel for Sedgwick County.

Reasonable Assurances:

Authorities: 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 KDHE to regulate the discharge of sewage into the waters of the state.

2. K.S.A. 65-171d empowers the Secretary of 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. 2-1915 empowers the State Conservation Commission to develop programs to assist the protection, conservation and management of soil and water resources in the state, including riparian areas.

4. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control nonpoint source pollution.

5. 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.

6. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.

7. The *Kansas Water Plan* and the Lower Arkansas 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% of the fund to programs supporting water quality protection. This watershed and its TMDL are a **Medium Priority** consideration. Priority should be given to activities which reduce loadings of bacteria and nutrients to the stream prior to 2005.

Effectiveness: Nutrient control has been proven effective through conservation tillage, contour farming and use of grass waterways and buffer strips. The key to success will be widespread utilization of conservation farming and waste management within the watersheds cited in this TMDL.

Technology exists for nitrogen and phosphorus removal and can be placed in wastewater systems with proper planning and design.

Should participation significantly lag below expectations over the implementation period or monitoring indicates lack of progress in improving water quality conditions from those seen over 1980-1999, the state may employ more stringent conditions on agricultural producers in the watershed through establishment of a Critical Water Quality Management Area in order to meet the desired endpoints expressed in this TMDL.

6. MONITORING

As numeric nutrient criteria become established, KDHE will continue to collect seasonal biological samples from Arkansas River for three years over 2001 - 2005 and an additional three years over 2005-2009 to evaluate achievement of the desired endpoint. Routine monitoring of nutrient content of wastewater discharged from treatment systems will be expected under reissued NPDES and state permits.

Additional source assessment needs to be conducted and local program management needs to identify its targeted participants of state assistance programs for implementing this TMDL. This information should be collected in 2001-2005 in order to support appropriate implementation projects.

7. FEEDBACK

Public Meetings: Public meetings to discuss TMDLs in the Lower Arkansas River Basin were held March 9, 2000 and April 26-27, in Hutchinson, Wichita, Arkansas City and Medicine Lodge. An active Internet Web site was established at http://www.kdhe.state.ks.us/tmdl/ to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas River Basin. A draft of this TMDL has been maintained on the website since June 1, 2000 and modifications to the original draft have been available to the public for viewing and review up to the date of submitting this TMDL to EPA.

Public Hearing: A Public Hearing on the original draft of these TMDLs of the Lower Arkansas River Basin was held in Wichita on June 1, 2000.

Basin Advisory Committee: The Lower Arkansas River Basin Advisory Committee met to discuss the TMDLs in the basin on September 27, and November 8, 1999; January 13 and March 9, 2000. The Committee recommended approval of the Basin Plan which set high priority TMDLs in the basin, thereby, delegating medium and low priority status to this and subsequent TMDLs for the basin. The Kansas Water Authority approved the Basin Plan on July 11, 2000.

Discussion with Interest Groups: Meetings to discuss TMDLs with interest groups include:

Agriculture: January 12, February 2 and 29, 2000

Environmental: March 9, 2000
Conservation Districts: November 22, 1999
Industry: December 15, 1999, January 13, February 9 and 22, 2000
Local Environmental Protection Groups: September 30, November 2, December 16, 1999

Milestone Evaluation: In 2006, evaluation will be made as to the degree of impairment which has occurred within the drainage and current condition of Arkansas River. Subsequent decisions will be made regarding implementation approach, follow up of additional implementation and implementation in the nonpriority subwatersheds. The second stage of this TMDL is anticipated to begin in 2006 after the adoption of numeric criteria in water quality standards.

Consideration for 303d Delisting: Arkansas River will be evaluated for delisting under Section 303d, based on the monitoring data over the period 2005-2009. Therefore, the decision for delisting will come about in the preparation of the 2010 303d list. Should modifications be made to the applicable nutrient criterion during the ten-year implementation period, consideration for delisting, desired endpoints of this TMDL and implementation activities may be adjusted accordingly.

Incorporation into Continuing Planning Process, Water Quality Management Plan and the Kansas Water Planning Process: Under the current version of the Continuing Planning Process, the next anticipated revision will come in 2002 which will emphasize revision of the Water Quality Management Plan. At that time, incorporation of this TMDL will be made into both documents. Recommendations of this TMDL will be considered in Kansas Water Plan implementation decisions under the State Water Planning Process after Fiscal Year 2005.

APPENDIX

CALCULATIONS OF CURRENT AND DESIRED LOADS

Estimated Existing Loads calculated by average flow and average concentration:

Total Phosphorus: 2160 cfs * 0.727 mg/l * 5.4/2000 = 4.2 T/D
Nitrate: 2160 cfs*1.368 mg/l*5.4/2000 = 8.0 T/D
Ammonia: 2160 cfs*0.145 mg/l*5.4/2000 = 0.85 T/D
BOD: 2160 cfs* 6.62 mg/l*5.4/2000 = 38.6 T/D
TSS: 2160 cfs* 152.7 mg/l*5.4/2000 = 890 T/D

Desired Loads recalculated using lower ambient concentrations:

Total Phosphorus: 2160 cfs * 0.70 mg/l * 5.4/2000 = 4.1 T/D
Nitrate: 2160 cfs* 1.20 mg/l*5.4/2000 = 7.0 T/D
Ammonia: 2160 cfs* 0.1 mg/l*5.4/2000 = 0.58 T/D
BOD: 2160 cfs*6.5 mg/l*5.4/2000 = 37.9 T/D
TSS: 2160 cfs*100 mg/l*5.4/2000 = 583 T/D

Wasteload Allocations calculated by design flow and desired or permitted concentrations

Sum of upstream dischargers = 2.114 MGD (3.27 cfs)

Total Phosphorus: 3.27 cfs * 1.00 mg/l * 5.4/2000 = 0.01 T/D
Nitrate: 3.27 cfs*1.4 mg/l*5.4/2000 = 0.01 T/D
Ammonia: 3.27 cfs*1.0 mg/l*5.4/2000 = 0.01 T/D
BOD: 3.27 cfs*30 mg/l*5.4/2000 = 0.26 T/D
TSS: 3.27 cfs*55 mg/l*5.4/2000 = 0.48 T/D

Load Allocations found by subtracting Wasteload Allocation from Desired Load:

Total Phosphorus: 4.1 T/D
Nitrate: 7.0 T/D
Ammonia: 0.57 T/D
BOD: 37.6 T/D
TSS: 582 T/D

Approved July 27, 2001.