

# LOWER ARKANSAS RIVER BASIN TOTAL MAXIMUM DAILY LOAD

## Waterbody: Sandy Creek Water Quality Impairment: Fecal Coliform Bacteria

### 1. INTRODUCTION AND PROBLEM IDENTIFICATION

**Subbasin:** Lower Salt Fork Arkansas

**Counties:** Barber and Harper

**HUC 8:** 11060004

**HUC 11 (HUC 14s):** 020 (010, 020, 030 and 040)

**Drainage Area:** 173.7 mi<sup>2</sup>

**Main Stem Segment:** 37; starting at the Oklahoma border; headwaters in northwest Harper County.

**Tributary Segments:** West Branch, Sandy Creek (67)  
Camp Creek (68)

**Designated Uses:** Expected Aquatic Life Support on all segments  
Secondary Contact Recreation on all segments  
Food Procurement on Sandy Creek and West Branch, Sandy Creek

**1998 303(d) Listing:** Table 1 - Predominant Non-point Source and Point Source Impacts

**Impaired Use:** Secondary Contact Recreation

**Water Quality Standard:** Fecal Coliform Bacteria: 2000 colonies per 100 ml for Secondary (KAR 28-16-28e(c)(7)(C))

### 2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

**Level of Support for Designated Use under 1998 303(d):** Partially Supporting Secondary Contact Recreation

**Monitoring Sites:** Station 619 near Ruella

**Period of Record Used:** 1991, 1995 and 1999 (1999 data includes Kansas Biological Survey samples from that year)

**Flow Record:** USGS Station 07149602; calculated flow based on measurements at 07149602 and data from Station 07149000 (Medicine Lodge River near Kiowa)

**Long Term Flow Conditions:** 10% Exceedence Flow = 48 cfs, 7Q10 = 1 cfs

**Current Conditions:** Since loading capacity varies as a function of the flow present in the stream, this TMDL represents a continuum of desired loads over all flow conditions, rather than fixed at a single value. The calculated flow duration data were examined from the Sandy Creek Gaging Site. The seasonal component of the duration data could not be examined because of lack of a permanent gage on Sandy Creek. High flows and runoff equate to lower flow durations; baseflow and point source influences generally occur in the 75-99% range. A load curve was established for the Secondary Contact Recreation criterion by multiplying the flow values along the curve by the applicable water quality criterion and converting the units to derive a load duration curve of colonies of bacteria per day. This load curve represents the TMDL since any point along the curve represents water quality at the standard at that flow. Historic excursions from WQS are seen as plotted points above the load curves. Water quality standards are met for those points plotting below the applicable load duration curves.

Excursions were seen during all times of the year. Twenty percent of the samples from water quality site 619 were over the criteria. This would represent a baseline condition of partial support of the impaired designated use for the site. There were no excursions in the 1999 samplings.

**NUMBER OF SAMPLES OVER BACTERIA STANDARD OF 2000 Cts/100 mL BY FLOW**

Station	Season	0 to 10%	10 to 25%	25 to 50%	50 to 75%	75 to 90%	90 to 100%	Cum Freq.
Ruella (619)	Annual	1	0	1	1	0	1	4/20 = 20%

**Desired Endpoints of Water Quality (Implied Load Capacity) at Site 619 over 2005 - 2009:**

The ultimate endpoint for this TMDL will be to achieve Kansas Water Quality Standards fully supporting Secondary Contact Recreation. The endpoint will be to achieve the Secondary Contact Recreation value of 2,000 colonies per 100 ml and this load curve is shown in the TMDL figure. The Kansas Standards allow for excursions above these criteria when the stream flow exceeds flow that is surpassed 10% of the time, for this instance, 48 cfs. Monitoring data plotting below the TMDL curve will indicate attainment of the water quality standards.

Seasonal variation in endpoints is accounted for by notation of the sample date on the annual TMDL curve and will be evaluated based on monitoring data from 2003 and 2007. Monitoring data plotting below the TMDL curve will indicate attainment of the water quality standards.

These endpoints will be reached as a result of expected, though unspecified, reductions in loading from the various sources in the watershed resulting from implementation of corrective actions and Best Management Practices, as directed by this TMDL. Achievement of the endpoints indicate loads are within the loading capacity of the stream, water quality standards are attained and full support of the designated uses of the stream has been restored.

### 3. SOURCE INVENTORY AND ASSESSMENT

**NPDES:** There is one NPDES permitted municipal wastewater discharger within the watershed.

MUNICIPALITY	STREAM REACH	SEGMENT	DESIGN FLOW
Attica	Camp Creek	68	0.12 mgd

Attica uses a three cell lagoon system to handle its wastewater. Population projections for Attica to the year 2020 indicate modest declines. Projections of future water use and resulting wastewater appear to be within design flows for the current system’s treatment capacity. The excursion from the water quality standard appears to occur under all flow conditions. Of significance to point sources are the excursions under low flow in all seasons, especially during winter, indicating that point sources may have an impact under lower flows in the watershed.

**Livestock Waste Management Systems:** Three operations are registered, certified or permitted within the watershed. All facilities are located in the upper third of the watershed and located within a mile of West Sandy Creek. Potential animal units for all facilities in the watershed total 749. The actual number of animal units on site is variable, but typically less than potential numbers.

**Land Use:** Most of the watershed is grassland (61% of the area) and cropland (38% of the area). Based on 1997 water use reports, less than 1% of the cropland in the watershed is irrigated. Both the watershed’s off-season grazing density and growing season grazing density are comparatively high for the Lower Arkansas River Basin.

**On-Site Waste Systems:** The watershed’s population density is very low, 1 - 11 persons/mi<sup>2</sup>. The rural population projections for Barber and Harper Counties through 2020 show moderate declines. While failing on-site waste systems can contribute bacteria loadings, their impact on the impaired segments is very limited, given the size of the rural population.

**Contributing Runoff:** The watershed’s average soil permeability is 3.6 inches/hour according to NRCS STATSGO data base. About 56% of the watershed produces runoff even under relative low (1.5"/hr) potential runoff conditions. Under very low (<1"/hr) potential conditions, this potential contributing area is greatly reduced (10%). Runoff is chiefly generated as infiltration

excess with rainfall intensities greater than soil permeabilities. As the watersheds' soil profiles become saturated, excess overland flow is produced. Generally, storms producing less than 0.5"/hr of rain will generate runoff from only 3% of this watershed, chiefly along the stream channels.

**Background Levels:** Some fecal bacteria counts may be associated with environmental background levels, including contributions from wildlife, but it is likely that the density of animals such as deer is fairly dispersed across the watershed resulting in minimal loading to the streams below the levels necessary to violate the water quality standards..

#### **4. ALLOCATION OF POLLUTION REDUCTION RESPONSIBILITY**

The nature of bacteria loading is too dynamic to assign fixed allocations for wasteloads and non-point loads. Instead, allocation decisions will be made which reflect the expected reduction of bacteria loading under defined flow conditions. These flow conditions will be defined by the presumed ability of point or non-point sources to be the dominant influence on stream water quality. Therefore, the allocation of wasteloads and loads will be made by demarcating the annual TMDL curve at a particular flow duration level. Flows lower than that designated flow will represent conditions which are the responsibility of point sources to maintain water quality standards, those flows greater than the designated flow are the responsibility of non-point sources.

**Point Sources:** Point sources are responsible for maintaining their systems in proper working condition and appropriate detention volume to handle anticipated wasteloads of their respective populations. Attica relies on a lagoon system for their wastewater. Ongoing inspections and monitoring of this system will be made to ensure that minimal contributions have been made by this source.

The Wasteload Allocation is defined at the flow condition where the design flows represent more than 10% of the flow or the 7Q10, whichever is greater, thereby exerting influence on the water quality of the stream. For Sandy Creek at this location, that flow condition would be flows of 0-2 cfs. Such flows have been exceeded 75-99% of the time. Future NPDES and state permits will be conditioned such that discharges from permitted facilities will not cause violations of the applicable bacteria criteria at or below this flow.

**Non-Point Sources:** Based on the assessment of sources, the distribution of excursions from water quality standards and the relationship of those excursions to runoff conditions, non-point sources are seen as a significant cause of water quality violations. Background levels are not significant as a cause of the problem. Implementation of non-point source pollution control practices should be taken within one mile of Sandy Creek, Camp Creek and West Sandy Creek.

Activities to reduce fecal pollution should be directed toward the smaller, unpermitted livestock operations and rural homesteads and farmsteads along the creek. The Load Allocation assigns

responsibility for maintaining water quality below the TMDL curve over flow conditions exceeded less than 75% of the time.

**Defined Margin of Safety:** Because there will not be a traditional load allocation made for fecal bacteria, the margin of safety will be framed around the desired endpoints of the applicable water quality standards. Therefore, evaluation of achieving the endpoints should use values set 100 counts less than the applicable criteria (1,900 colonies for secondary contact recreation) to mark full support of the recreation designated use of the streams in this watershed. By this definition, the margin of safety is 100 colonies per 100 ml and would be represented by a parallel line lying below each seasonal TMDL curve by a distance corresponding to loads associated with 100 colonies per 100 ml.

**State Water Plan Implementation Priority:** Because recent samplings indicate no violations and additional source assessment is needed to identify contributing activities which might create impairments along the targeted stream segments, this TMDL will be a Medium Priority for implementation.

**Unified Watershed Assessment Priority Ranking:** This watershed lies within the Lower Salt Fork Arkansas River Subbasin (HUC 8: 11060004) with a priority ranking of 41 (Medium Priority for restoration work).

**Priority HUC 11s and Stream Segments:** Until additional assessment is done on the main stem and tributary reaches between 2000-2005, priority focus of implementation after 2005 will concentrate on installing best management practices adjacent to Sandy, West Sandy and Camp Creek.

## 5. IMPLEMENTATION

### Desired Implementation Activities

1. Minimize non-point oriented contributions of bacteria loading to river.

### Implementation Programs Guidance

Until additional assessment of probable non-point sources is made, no direction can be made to those implementation programs.

**Time frame for Implementation:** Additional non-point source pollution reduction practices should be installed within one mile of the main stem and directly contributing tributaries after the year 2005 re-evaluation and confirmation of the impairment.

**Targeted Participants:** Primary participants for implementation will be any targeted activities identified by follow up assessment of sources, conducted by KDHE, conservation district personnel and county Local Environmental Protection Program staff.

Based on the local assessment, implementation activities should focus participation within those areas with greatest potential for impact on stream resources.

**Milestone for 2005:** The year 2005 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, additional monitoring data from Station 619 will be reexamined to confirm the impaired status of the streams within this watershed. Should the case of impairment remain, additional source assessment, allocation and implementation activities will ensue.

**Delivery Agents:** Depending upon confirmation of impairment and assessment of probable sources, the primary delivery agents for program participation will be 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.

### **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.A.R. 28-16-69 to -71 implements water quality protection by KDHE through the establishment and administration of critical water quality management areas on a watershed basis.
4. 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.
5. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control non-point source pollution.
6. 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.
7. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.

8. 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 TMDL is a Medium Priority consideration and should not receive funding until after 2005.

**Effectiveness:** Improvements in reducing bacteria loading to streams can be accomplished through appropriate management and control systems for livestock waste.

## 6. MONITORING

KDHE will continue to collect bimonthly samples at rotational Station 619, including fecal coliform samples over each of the three defined seasons. During the evaluation period (2005-2009), more intensive sampling may need to be conducted under specified seasonal flow conditions in order to determine the achievement of the endpoint of this TMDL. The manner of evaluation will be consistent with the assessment protocols used to establish the case for impairment in these streams. Following current (1998) Kansas assessment protocols, monitoring will ascertain if less than 10% of samples exceed the applicable criterion at flows under 48 cfs with no samples exceeding the criterion at flows under 26 cfs.

## 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.

**Public Hearing:** A Public Hearing on the 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, November 8, 1999; January 13, March 9, 2000.

**Discussion with Interest Groups:** Meetings to discuss TMDLs with interest groups include:  
Sedgwick County Technical Advisory Group: August 8, October 14, November 15, 1999

and January 20, 2000.

Agriculture: January 12, February 2 and 19, 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 watershed and current condition of the listed stream segments. Subsequent decisions will be made regarding implementation approach and follow up on additional implementation in subwatersheds.

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

For this TMDL, assessment for delisting will evaluate if the percent of samples over the applicable secondary contact recreation criterion is less than 10% for samples taken at flows below the high flow exclusion over the monitoring period of 2005-2009. This assessment defines full support of the designated use under water quality standards as measured and determined by current Kansas Water Quality Assessment protocols. These assessment protocols are similar to those used to cite the stream segments in this watershed as impaired on the Kansas 1998 Section 303(d) list. As protocols and assessments for impairment change for future 303(d) lists, the monitoring data collected under this TMDL will use these new assessments and protocols for delisting consideration.

**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.

Approved July 27, 2001.