

# LOWER ARKANSAS BASIN TOTAL MAXIMUM DAILY LOAD

## Waterbody: Little Arkansas River Subbasin Water Quality Impairment: Fecal Coliform Bacteria

### 1. INTRODUCTION AND PROBLEM IDENTIFICATION

**Subbasin:** Little Arkansas

**Counties:** Sedgwick, Harvey, McPherson,  
Marion, Reno and Rice

**HUC 8:** 11030012

**HUC 11:** 010 (Upper Little Arkansas), 020 (Turkey Creek), 030 (Middle Little Arkansas), 040 (Emma and Sand Creeks), 050 (Lower Little Arkansas-Chisholm Creek)

**Drainage Area:** 1327 miles<sup>2</sup> at Valley Center

**Main Stem Segments:** 1, 3, 5, 9, 10, and 14, starting at confluence of Arkansas River, headwaters in Rice County near Geneseo.

**Tributary Segments** (non-listed segments in *italics*):

*Jester Creek (2)*  
*West Fork (18)*  
*Gooseberry Creek (17)*  
Sand Creek (4)  
*Mud Creek (16)*  
*Unnamed Trib (26)*  
Emma Creek (6 & 7)  
West Emma (8)  
*Kisiwa Creek (15)*  
*Black Kettle Creek (368)*  
Turkey (Sun) Creek (11 & 12)  
Dry Turkey Creek (13)  
*Unnamed Trib (24)*  
Running Turkey Creek (25)  
*Sand Creek (23)*  
*Lone Tree Creek (20)*  
*Dry Creek (22)*  
*Salt Creek (21)*  
*Horse Creek (19)*

**Designated Uses:** Primary and Secondary Contact Recreation on Main Stem Segments and Sand Creeks  
Secondary Contact Recreation on remaining tributaries

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

**Impaired Use:** Primary and Secondary Contact Recreation on all listed segments

**Water Quality Standard:** Fecal Coliform Bacteria: 900 colonies per 100 mL for Primary Contact Recreation in April - October K.A.R 28-16-28e(c)(7)(B) (disapproved);  
2000 colonies per 100 ml for Secondary (KAR 28-16-28e(c)(7)(C))

Classified streams may be excluded from applying these criteria when streamflow exceeds flow that is surpassed 10% of the time ((KAR 28-16-28c(c)(2))

## 2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

**Level of Support for Designated Use under 303(d):** Partially Supporting

**Monitoring Sites:** Stations 246 near Alta Mills; 282 near Valley Center; 533 on Turkey Creek; 534 on Emma Creek; 535 on Sand Creek; 703 on Kisiwa Creek and 705 on Black Kettle Creek

**Period of Record Used:** 1987--1999 for Alta Mills and Valley Center; 1990, 1994 and 1998 for Emma, Sand and Turkey Creeks; 1994 and 1998 for Kisiwa Creek and 1995 and 1999 for Black Kettle Creek

Flow Record: USGS Station 07143650 near Alta Mills, 07144200 near Valley Center; 1974 - 1999.

**Long Term Flow Conditions:** Estimated 7Q10 = 0.6 cfs at Alta Mills; 5.3 cfs at Valley Center; 10% Exceedence Flows = 300 cfs at Alta Mills; 650 cfs at Valley Center

**Current Conditions:** Load duration curves were assembled for three seasons: Spring (Mar-Jul), Summer-Fall (Aug-Oct) and Winter (Nov-Feb) based on long term average monthly flows. Cumulative frequency of flows in the watershed indicate a strong gain in flow at baseflow conditions between Alta Mills and Valley Center. Alta Mills principally indicates the beginning of the interactive zone of the Little Arkansas River with the surrounding Equus Beds Aquifer. The river has been noted to gain flow even under drought conditions, owing to ground water discharge to the river downstream from Alta Mills. Under runoff conditions, the entire watershed contributes flow and the gain between the two gages drops to about two fold. Estimates of flow duration on the three main tributaries indicates that Emma Creek is likely to have the most flow, followed by Turkey Creek and Sand Creek.

**NUMBER OF SAMPLES OVER BACTERIA STANDARD OF 2000 BY FLOW AND SEASON**

Station	Season	0 to 10%	10 to 25%	25 to 50%	50 to 75%	75 to 90%	90 to 100%	Cum Freq.
<b>Valley Cntr</b>	Spring	3	2	1	1	0	0	7/36=19%
	Summer	2	2	1	0	0	0	5/19=26%
	Winter	1	0	0	0	0	0	1/21= 5%
<b>Alta Mills</b>	Spring	3	3	1	1	2	0	11/41=27%
	Summer	2	2	0	0	0	0	4/24=17%
	Winter	0	0	0	0	0	0	0/24=0%

The distribution of violations relative to the standard of 2000 colonies per 100 ml over 1987-2000 shows that 17% of the samples at both Valley Center and Alta Mills were over the standard. Most of the violations were associated with runoff conditions indicated by flows exceeded less than 75% of the time. Examining the violations at Valley Center, all but two of the 13 incidents were associated with concurrent violation at Alta Mills. The lowest flow associated with violations at Valley Center was 73 cfs, a value which was historically exceeded 65% of the time in the spring. Samples of 10,000 colonies or more were associated with flows exceeded less than 15% of the time.

**CONCURRENT SAMPLES TAKEN AT TIMES OF VALLEY CENTER VIOLATIONS**

Date	V.C. FCB	Flow	Pct Excd	A.M. FCB	Flow	Pct Excd
3-25-87	15,000	8090 cfs	1%	6,600	6170 cfs	1%
6-24-87	6,400	796 cfs	15%	48,000	828 cfs	9%
5-25-88	5,000	243 cfs	30%	14,000	63 cfs	36%
5-24-89	48,000	1350 cfs	10%	45,000	1300 cfs	7%
6-5-91	2,600	73 cfs	65%	2,900	39 cfs	38%
5-8-96	77,000	2860 cfs	5%	10,000	296 cfs	16%
7-8-98	31,000	940 cfs	13%	26,000	722 cfs	11%
8-24-88	3,000	107 cfs	26%	9,000	68 cfs	17%
8-23-89	15,000	977 cfs	6%	4,300	375 cfs	6%
8-11-93	2,800	182 cfs	18%	400	53 cfs	20%
8-16-95	6,000	2110 cfs	3%	600	289 cfs	8%
9-15-99	4,600	178 cfs	18%	3,400	56 cfs	20%
11-4-98	2,000	9600 cfs	0.2%	N/A	7580	0.2%

Samples taken on Emma, Sand and Turkey Creeks on 7-8-98 were also high, 35,000, 22,000 and 12,000, respectively. Samples taken on 11-4-98 were 16,000, 10,000 and 10,000, respectively. It would appear that violations at Valley Center are tied to runoff throughout the watershed, indicating that sources throughout the watershed deliver bacteria loads toward the watershed outlet, provided high flows move the fecal matter from contributing areas quickly.

There are four incidents of elevated bacteria sampled at Alta Mills which do not have corresponding violations at Valley Center. Two of those dates have no data from Valley Center and it is possible that samples taken at those times would have been in excess of 2000 colonies. Two samples were associated with relatively low flow (80-89% exceedance) in July. The rotational sites at Turkey, Emma and Sand Creeks showed violations in 14%, 21% and 23% of the samples taken in the three years of monitoring. Four samples taken from Kisiwa Creek in 1994 and 1998 exceeded 2000 colonies. Two of seven samples taken from Black Kettle Creek in 1995 and 1999 exceeded the secondary standard. Once again, these samples corresponded mostly to runoff conditions seen within the watershed. Limited sampling on the river in Sedgwick County indicated little change from Sedgwick to Valley Center, the two incidents of exceedance were associated with the falling limb from peak flows within five days of the sampling. Sampling by Kansas Biological Survey in summer and fall of 1999 did not find violations.

**INCIDENTS OF EXCEEDENCE OF BACTERIA STANDARD AT ALTA MILLS**

Date	Alta Mills FCB	Flow	Pct Exceedance
8-25-87	51,000	2090 cfs	2%
6-27-89	25,000	504 cfs	12%
7-25-90	3,600	8 cfs	89%
7-8-92	4,400	13 cfs	80%

The corresponding runoff conditions associated with most of these violations, the higher frequency of springtime violations and the lack of winter exceedences appear to indicate that watershed runoff and non-point sources are contributing to the excessive bacteria levels.

**Desired Endpoints of Water Quality at Sites 246 and 282 over 2005 - 2010:**

The ultimate endpoint for this TMDL will be to achieve Kansas Water Quality Standards fully supporting both Primary Contact Recreation and Secondary Contact Recreation. This TMDL will, however, be phased. Kansas adopted a Primary Contact Recreation standard of 900 colonies per 100 ml but EPA subsequently disapproved that standard. This standard was used to establish a load duration curve shown in the TMDL curve. It is recognized, however, that the Primary Contact Recreation Standard will be revised in the future in accordance with national guidance. A revised Primary Contact Recreation TMDL curve will be established in Phase Two of this TMDL to reflect changes in this Standard. For Phase One the endpoint will be to achieve the Secondary Contact Recreation value of 2,000 colonies per 100 ml and this Phase One load

curve is also 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, 650 cfs. Monitoring data plotting below the TMDL curve will indicate attainment of the water quality standards.

This endpoint 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 endpoint 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 are sixteen NPDES permitted municipal wastewater dischargers located within the Little Arkansas subbasin above the Valley Center monitoring site. The Sedgwick County cities discharge below the site. Most permits are set to expire in 2002.

MUNICIPALITY	STREAM REACH	SEGMENT	DESIGN FLOW	TYPE	WATERSHED
Geneseo	Upper Little Ark	14	0.075 MGD	Mech	Upper Little Arkansas
Little River	Upper Little Ark	14	0.060 MGD	Lagoon	Upper Little Arkansas
Windom	Upper Little Ark	14	0.0275 MGD	Lagoon	Upper Little Arkansas
Buhler	Upper Little Ark	14	0.168 MGD	Oxid.Dch	Upper Little Arkansas
McPherson	Dry Turkey Creek	13	2.000 MGD	Mech	Turkey-Sun
Galva	Turkey Creek	12	0.058 MGD	Lagoon	Turkey-Sun
Inman	Blaze Fork	N/A	0.132 MGD	Lagoon	Turkey-Sun
Moundridge	Black Kettle Creek	368	0.233 MGD	Lagoon	Mid Little Arkansas
Burrton	Kisiwa Creek	15	0.120 MGD	Lagoon	Mid Little Arkansas
Halstead	Little Arkansas	10	0.420 MGD	Mech	Mid Little Arkansas
Memorial Home	Black Kettle Creek	368	0.010 MGD	Lagoon	Mid Little Arkansas
Goessel	Middle Emma Crk	7	0.060 MGD	Lagoon	Emma & Sand Crks
Hesston	Middle Emma Crk	7	1.300 MGD	Mech	Emma & Sand Crks
Newton	Sand Creek	4	3.000 MGD	Mech	Emma & Sand Crks
Walton	Beaver Creek	26	0.038 MGD	Lagoon	Emma & Sand Crks
Sedgwick	Sand Creek	4	0.292 MGD	Mech	Emma & Sand Crks
Valley Center	Little Arkansas	1	0.500 MGD	Mech	Lower Little Arkansas
Park City	Chisholm Creek	8*	1.080 MGD	Mech	Lower Little Arkansas
Kechi	M Fk Chisholm Cr	36*	0.0936 MGD	Lagoon	Lower Little Arkansas

\* formerly in Mid-Ark-Slate Subbasin

Population projections for these municipalities to the year 2020 indicate growth for most of the towns. Projections of future water use and resulting wastewater appear to remain under design flows for each of the wastewater systems. Most cities appear to have additional treatment capacity available. Since most of the excursions from the water quality standards appear to occur under flow conditions of less than 75% duration, with most associated with runoff events and the lack of violations at lower flows in summer and winter, point source impacts appear to be minimal to the watershed. Impacts from municipal lagoons appear to be local in nature and insignificant at the downstream monitoring site. Permit limits are in place for the mechanical treatment plants and most of the larger systems utilize ultraviolet treatment to disinfect their wastewater.

**Livestock:** There are 51,151 animal units registered, certified or permitted within the watershed, distributed among 191 operations. Most of these operations are either swine (59) or beef (61) followed by dairy (46). These livestock facilities have waste management systems designed to minimize runoff entering their operations or retaining runoff 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. Grazing densities during the summer appear heaviest in the Upper Little Arkansas watershed and in the drainages to the west of the river. Relatively high density is seen in the Chisholm Creek drainage above Park City. Winter grazing patterns indicate heaviest concentrations along upper Sand Creek with fairly uniform distribution throughout the remainder of the subbasin.

**Land Use:** The subbasin is 78% cropland and 19% grassland with 1% in woodland. The following table characterizes the five watersheds in terms of drainage and land use.

HUC 11	Watershed Name	Drainage Area	% Grassland	% Cropland	% Woodland	% Urban
010	Upper Little Ark	335	41	56	1.6	0.6
020	Turkey-Sun	355	9	88	0.5	1.6
030	Mid Little Ark	254	20	76	0.3	3.5
040	Emma & Sand Crk	379	8	87	1.1	2.5
050	Lower Little Ark	81	18	66	0.8	15

County inventories of livestock indicate that among the six counties of the subbasin, Reno and Rice counties had the most cattle, Harvey and McPherson counties had the most hogs and Rice and McPherson counties had the most chickens.

**On-Site Waste Systems:** The heaviest population densities appear centered around the major cities of the sub-basin. The lightest concentration of people is in the northwest portion of the subbasin and along the river above Halstead. All counties within the drainage are expected to grow over the next 20 years, but patterns in rural areas outside incorporated municipal systems indicate declines, except in Sedgwick County. Therefore, pressure by increased numbers of on-

site waste systems is not likely to contribute to the problem, except between Sedgwick and Wichita. The infrequent excursions from the water quality standards seem to indicate a lack of persistent loadings from such systems on any grand scale. It is likely that the contribution of high bacteria loads from on-site waste systems is restricted to local areas.

**Contributing Runoff:** The watershed ranges in average soil permeability of 2.8 inches/hour in the Upper Little Arkansas watershed to 0.8 and 0.9 inches per hour in Turkey and Emma and Sand Creek watersheds according to NRCS STATSGO data base. A majority of the watershed produces runoff even under relative low (1.5"/hr) potential runoff conditions. 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. Even under very low (<1"/hr) potential conditions, the entire Turkey Creek watershed will runoff, as will 98% of the Emma and Sand Creek Watersheds and 74% of the Upper Little Arkansas. Generally, storms producing less than 0.5"/hr of rain will generate runoff from only 5% of these 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 seasonal TMDL curves 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 up to the high flow exclusion value.

**Point Sources:** Ten of the 19 municipal facilities rely on lagoon systems for wastewater detention and long holding times to minimize the release of fecal bacteria to receiving streams. The remaining nine mechanical systems have permits limits set at existing water quality standards for bacteria. Five facilities presently utilize ultraviolet irradiation to eradicate bacteria from the wastewater effluent. The NPDES permits for the other four facilities, McPherson, Buhler, Halstead and Geneseo have been reissued with schedules of compliance to reduce fecal coliform bacteria in the effluent. All but Geneseo are currently under construction. All wastewater systems are currently designed to accommodate growth. The point sources are responsible for maintaining their systems in proper working condition and appropriate capacity to handle anticipated wasteloads of their respective populations. State and NPDES permits will continue to be issued on 5 year intervals, with inspection and monitoring requirements and

conditional limits on the quality of effluent released from these lagoons. Ongoing inspections and monitoring of the systems will be made to ensure that minimal contributions have been made by these sources.

Since the 7Q10 flow condition is generally exceeded 99% of the time, the Wasteload Allocation is defined as the flow regime between 75 and 100% exceedence. For Alta Mills, this would be flows from 0-8.5 cfs in Winter, 0-16 cfs in Spring and 0-4 cfs in Summer. For Valley Center, the flow ranges would be 0-33 cfs in Winter, 0-55 cfs in the Spring and 0-20 cfs in the Summer season. Future NPDES and state permits will be conditioned such that discharges from permitted facilities will not cause violations of the applicable bacteria criteria at these low flows.

**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 the primary cause of water quality violations. Background levels attributed to wildlife might be represented by the low loads plotting below each of the seasonal curves. Most of the livestock facilities rely on lagoon systems for wastewater detention and long holding times to minimize the release of fecal bacteria to receiving streams. The previous assessment suggests that livestock in small family operations and on pastureland may contribute to the occasional excursions from the water quality standards seen in the three seasons.. Given the runoff characteristics of the watershed, overland runoff can easily carry waste material into streams.

Activities to reduce fecal pollution should be directed toward the smaller, unpermitted livestock operations and rural homesteads and farmsteads in the watershed. The Load Allocation assigns responsibility for maintaining water quality below the TMDL curve over flow conditions exceeded less than 75% of the time. Best Management Practices will be directed toward those activities such that there will be minimal violation of the applicable bacteria criteria at higher flows. On-Site waste system integrity should be addressed, primarily in Sedgwick County.

**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 criteria (800 colonies for primary contact recreation; 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. Furthermore, the NPDES permits for mechanical treatment plants contain permit limits of geometric means not to exceed 200 colonies.

**State Water Plan Implementation Priority:** This TMDL will be a High Priority for implementation, because this watershed influences water quality in the Equus Beds and the Arkansas River and to take advantage of placing bacteria, nutrient and sediment BMPs within the watershed.

**Unified Watershed Assessment Priority Ranking:** This watershed lies within the Little Arkansas Subbasin (HUC 8: 11030012) with a priority ranking of 14(Highest Priority for restoration work).



**Priority HUC 11s and Stream Segments:** Because of the propensity for this drainage to produce runoff, leading to excursions from the water quality standards, priority will be given to the upper watersheds within the sub-basin. Specifically, the Upper Arkansas watershed above Halstead, Turkey Creek, Emma Creek and Sand Creek will be the highest priorities. Furthermore, priority should be given to activities along Kisiwa Creek leading to the main stem.

## **5. IMPLEMENTATION**

### **Desired Implementation Activities**

1. Renew state and federal permits and inspect permitted facilities for permit compliance
2. Install proper manure and livestock waste storage
3. Install grass buffer strips along streams.
4. Install pasture management practices, including proper stock density on grasslands
5. Remove winter feeding sites in proximity to streams
6. Reduce livestock use of riparian areas
7. Insure proper on-site waste system operations in proximity to main streams.

### **Implementation Programs Guidance**

#### **NPDES and State Permits - KDHE**

- a. Municipal permits for facilities in the watershed will be renewed after 2002 with continuation of disinfection requirements, bacteria monitoring and permit limits preventing excursions in bacteria criteria.
- b. Livestock permitted facilities will be inspected for integrity of applied pollution prevention technologies.
- c. Registered livestock facilities with less than 300 animal units will apply pollution prevention technologies.
- d. Manure management plans will be implemented.

#### **Non-Point Source Pollution Technical Assistance - KDHE**

- a. Support Section 319 demonstration projects for pollution reduction from livestock operations in watershed.
- b. Provide technical assistance on practices geared to small livestock operations which minimize impact to stream resources.
- c. Guide federal programs such as the Environmental Quality Improvement Program, which are dedicated to priority subbasins through the Unified Watershed Assessment, to priority watersheds and stream segments within those subbasins identified by this TMDL.

#### **Water Resource Cost Share & Non-Point Source Pollution Control Programs - SCC**

- a. Provide alternative water supplies to small livestock operations
- b. Develop improved grazing management plans
- c. Reduce grazing density on pasturelands
- d. Install livestock waste management systems for manure storage
- e. Implement manure management plans

- f. Install replacement on-site waste systems
- g. Coordinate with USDA/NRCS Environmental Quality Improvement Program in providing educational, technical and financial assistance to agricultural producers.

**Riparian Protection Program - SCC**

- a. Design winter feeding areas away from streams
- b. Develop riparian restoration projects

**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 livestock producers on riparian and waste management techniques.
- b. Provide technical assistance on livestock waste management design.
- c. Continue Section 319 demonstration projects on livestock management.

**Agricultural Outreach - KDA**

- a. Provide information on livestock management to commodity advocacy groups.
- b. Support Kansas State outreach efforts.

**Local Environmental Protection Program - KDHE**

- a. Inspect on-site waste systems within one mile of main tributary streams.

**Timeframe for Implementation:** Pollution reduction practices should be installed within the priority subwatersheds over the years 2001-2005, with follow up implementation thereafter..

**Targeted Participants:** Primary participants for implementation will be small livestock producers operating without need of permits within the priority watershed. Implemented activities should be targeted at those areas with greatest potential to impact the stream. Nominally, this would be activities located within one mile of the streams including:

1. Facilities without water quality controls
2. Unpermitted permanent feeding/holding areas
3. Sites where drainage runs through or adjacent livestock areas
4. Sites where livestock have full access to stream and stream is primary water supply
5. Grazed acreage, overstocked acreage and acreage with poor range condition
6. Poor riparian sites
7. Near stream feeding sites
8. Failing on-site waste systems

Some inventory of local needs should be conducted in 2001 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.

**Milestone for 2005:** The year 2005 marks the mid-point of the ten year implementation window for the watershed. At that point in time, milestones should be reached which will have at least two-thirds of the landowners responsible for the facilities and sites cited in the local assessment participating in the implementation programs provided by the state. Additionally, sampled data from the seven monitoring stations should indicate evidence of reduced bacteria levels at median conditions relative to the conditions seen over 1987-1999.

**Delivery Agents:** 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. The Groundwater Management No. 2 managing the Equus Beds Aquifer will promote appropriate management practices to protect surface and ground water supplies. Producer outreach and awareness will be delivered by Kansas State Extension and agricultural interest groups such as Kansas Farm Bureau or Kansas Livestock Association, the Kansas Pork Producers Council and the Kansas Dairy Association. On-site waste system inspections will be performed by Local Environmental Protection Program personnel for Sedgwick, Harvey and Reno counties.

#### **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 watershed and its TMDL is a High Priority consideration.

**Effectiveness:** Non-point source controls for livestock waste have been shown to be effective in reducing pollution in locales such as the Herrington Lake watershed.. The key to effectiveness is participation within a finite subwatershed to direct resources to the activities influencing water quality. The milestones established under this TMDL are intended to gauge the level of participation in those programs implementing this TMDL.

Should voluntary participation significantly lag below expectations over the next five years or monitoring indicates lack of progress in improving water quality conditions from those seen over 1990-1999, the state may employ more stringent conditions on nonpoint sources in the watershed in order to meet the desired endpoints expressed in this TMDL. The state has the authority to impose conditions on activities with a significant potential to pollute the waters of the state under K.S.A. 65-171d. If overall water quality conditions in the watershed deteriorate, a Critical Water Quality Management Area may be proposed for the watershed, in response.

## 6. MONITORING

KDHE will continue to collect bimonthly samples at Stations 246 and 282, including fecal coliform samples over each of the three defined seasons during the initial implementation period. During the evaluation period (2005-2009), more intensive sampling will need to be conducted under specified seasonal flow conditions in order to determine the achievement of the desired endpoints 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 at this phase if less than 10% of samples exceed the applicable criterion at flows under 650 cfs with no samples exceeding the criterion at flows under 450 cfs.

Concurrent sampling at the Alta Mills site and applicable rotational stations should be centered around the sampling at Valley Center in order to sample the entire watershed under similar conditions. Sampling of the five rotational sites on the tributaries within the watershed should be done in 2001, 2005 and 2009 in order to evaluate the impact of implementation activities. Use of the real time flow data available at the Valley Center stream gaging station can direct sampling efforts. Concurrent flow measurements should be made at the rotational sites to further the define the hydrologic contributions from the tributaries in the watershed.

USGS should complete analysis of SSURGO soil data and 30-m resolution DEM topographic data to evaluate the relative runoff contributing areas within the watershed and provide greater resolution on where implementation activities would be most effective. This analysis should be complete in 2000.

Monitoring of bacteria levels in effluent will be a condition of NPDES and state permits for facilities, including those using lagoons as the method of wastewater treatment. This monitoring will continually assess the functionality of the systems in reducing bacteria levels in the effluent released to the streams.

Local program management needs to identify its targeted participants of state assistance programs for implementing this TMDL. This information should be collected in 2000 in order to support appropriate implementation projects.

## **7. FEEDBACK**

**Public Meetings:** Public meetings to discuss TMDLs in the Lower Arkansas Basin were held March 9, 2000 and April 26-27, 2000 in Wichita, Hutchinson, 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 Basin.

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

**Basin Advisory Committee:** The Lower Arkansas Basin Advisory Committee met to discuss the TMDLs in the basin on September 27, November 8, 1999; January 13, 2000; March 9, 2000 and June 1, 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, January 20, 2000, April 27, 2000 and May 25, 2000.  
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 2005, evaluation will be made as to the degree of implementation which has occurred within the watershed and current condition of the Little Arkansas River. Subsequent decisions will be made regarding the implementation approach and follow up of additional implementation in the watershed.

**Consideration for 303d Delisting:** The 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 water quality criteria during the ten year implementation period, consideration for delisting, desired endpoints of this TMDL and implementation activities may be adjusted accordingly. Once KDHE and EPA agree to an appropriate metric to evaluate Primary Contact Recreation and establish a water quality standard using such a parameter, this TMDL will be modified to incorporate that criterion.

At this phase of the 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 303d 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 for Fiscal Years 2001-2005.

Approved August 9, 2000.