

LOWER ARKANSAS RIVER BASIN TOTAL MAXIMUM DAILY LOAD

Waterbody: Smoots Creek Water Quality Impairment: Fecal Coliform Bacteria

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasin: South Fork Ninescah

Counties: Kingman and Reno

HUC 8: 11030015

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

Drainage Area: 159.1 mi²

Main Stem Segment: 2; starting at the confluence with the Ninescah River; Headwaters in north central Kingman County.

Tributary Segment: Spring Creek (8)

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 Segment

Expected Aquatic Life Support on Spring Creek

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

Impaired Use: Primary and Secondary Contact Recreation

Water Quality Standard: Fecal Coliform Bacteria: 900 colonies per 100 ml for Primary Contact Recreation in April-October (K.A.R. 28-16-283(c)(7)(B)) (disapproved); 2,000 colonies per 100 ml for Secondary Contact Recreation (K.A.R. 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 Contact Recreation

Monitoring Sites: Station 661 near Murdock

Period of Record Used: 1993, 1997 and 1999 (Kansas Biological Survey samples in 1999)

Flow Record: USGS Station 07145220; calculated flow based on measurements at 07145220 and data from Station 07145200 (SF Ninnescah nr Murdock)

Long Term Flow Conditions: 10% Exceedence Flow = 71 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 Smoots Creek Gaging Site. The seasonal component of the duration data could not be examined because of lack of a permanent gage on Smoots Creek. High flows and runoff equate to lower flow durations, baseflow and point source influences generally occur in the 75-99% range. Load curves were established for Primary and 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. These load curves represent 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 noted during a warmer month (August) of the year. Thirteen percent of the samples from water quality site 661 were over the criteria. This would represent a baseline condition of partial support of the designated uses for the site.

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.
Murdock (661)	Annual	0	0	1	0	0	1	2/15 = 13%

Desired Endpoints of Water Quality (Implied Load Capacity) at Site 661 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, 71 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 2000 and 2004. 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 is one NPDES permitted municipal wastewater discharger within the watershed.

MUNICIPALITY	STREAM REACH	SEGMENT	DESIGN FLOW
Pretty Prairie	Smoots Cr	2	0.1 mgd

Pretty Prairie uses a trickling filter system to treat its wastewater and is susceptible to large counts of bacteria being present in its effluent. The violation at low flow conditions may be tied to this effluent. The city is under a NPDES permit with conditions for preparing a plan and schedule to provide disinfection in the future. Population projections for Pretty Prairie to the year 2020 indicate slight growth (5% increase from 1990). Projections of future water use and resulting wastewater appear to be within design flows for the current system’s treatment capacity. 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: Seven operations are registered, certified or permitted within the watershed. All facilities are located within one mile of the Smoots Creek main stem or primary tributaries, but three of the facilities are located below the monitoring site. Potential animal units for facilities within one mile of the main stem total 2,785. The actual number of animal units on site is variable, but typically less than potential numbers.

Land Use: Most of the watershed is cropland (67% of the area) and grassland (30% of the area). The off-season grazing density of livestock is fairly high for the Lower Arkansas Basin as is the watershed’s growing season grazing density. The grassland is mainly located along the main stem, in Kingman County, and in the upper portion of the watershed. Based on 1997 water use

reports, approximately 6.5% of the cropland in the watershed is irrigated. Most irrigation occurs away from the main stem either in the upper reaches of the watershed in Kingman County or in the middle section of the watershed in Reno County.

On-Site Waste Systems: The watershed's population density is very low, 4 - 11 persons/mi². The rural population projections for Reno and Kingman 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 and magnitude of other sources in the watershed.

Contributing Runoff: The watershed's average soil permeability is 3.0 inches/hour according to NRCS STATSGO data base. About 26.5% 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 still about 21.5%. 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 5% 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. Pretty Prairie relies on a single stage trickling filter treatment system for their wastewater. Anticipated upgrades and 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 Smoots Creek at this location, that flow condition would be flows of 0 - 1.55 cfs. Such flows have been exceeded 90-99% 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 the river or any directly contributing tributary.

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 90% 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 current sampling data indicates this watershed has a limited number of violations, the point source is planning for disinfection and additional source assessment is necessary to examine which contributing activities might contribute to 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 S. F. Ninneschah Subbasin (HUC 8: 11030015) with a priority ranking of 15 (High 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 prior to 2005 will concentrate on installing disinfection treatment at Pretty Prairie. Implementation after 2005 will install best management practices adjacent to Smoots Creek and directly contributing tributaries.

5. IMPLEMENTATION

Desired Implementation Activities

1. Install appropriate disinfection technology for wastewater treatment at Pretty Prairie
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. Review developed plans and designs for Pretty Prairie to install disinfection in its treatment process and incorporate within the next NPDES permit.
- 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 stem and tributary streams.

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 661 will be reexamined to confirm the impaired status of the streams within this watershed. Should the case of impairment remain, 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 in 2001, 2005 and 2009 at rotational Station 661, 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 71 cfs with no samples exceeding the criterion at flows under 41 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:

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 watershed and current condition of Smoots Creek. Subsequent decisions will be made regarding implementation approach and follow up on additional implementation in subwatersheds.

Consideration for 303(d) Delisting: Smoots 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 review 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.