

# LOWER ARKANSAS RIVER BASIN TOTAL MAXIMUM DAILY LOAD

**Water Body: Slate Creek W.A.**  
**Water Quality Impairment: Chloride**

## 1. INTRODUCTION AND PROBLEM IDENTIFICATION

**Subbasin:** Middle Arkansas-Slate      **County:** Sumner

**HUC 8:** 11030013      **HUC 11 (HUC 14):** 020 (060)

**Drainage Area:** Approximately 8.9 square miles.

**Conservation Pool:** Area = 26 acres, Maximum Depth = 0.3 meter

**Designated Uses:** Secondary Contact Recreation; Expected Aquatic Life Support; Food Procurement, Groundwater Recharge

**1998 303d Listing:** Table 4 - Water Quality Limited Lakes

**Impaired Use:** Chronic Aquatic Life Support

**Water Quality Standard:** 352 mg/l for Chronic Aquatic Life Support

In stream segments where background concentrations of naturally occurring substances, including chlorides and sulfates, exceed the water quality criteria listed in Table 1a of KAR 28-16-28e(d), at ambient flow, the existing water quality shall be maintained, and the newly established numeric criteria shall be the background concentration, as defined in KAR 28-16-28b(e). Background concentrations shall be established using the methods outlined in the "Kansas implementation procedures: surface water," dated June 1, 1999. (KAR 28-16-28e(b)(9)).

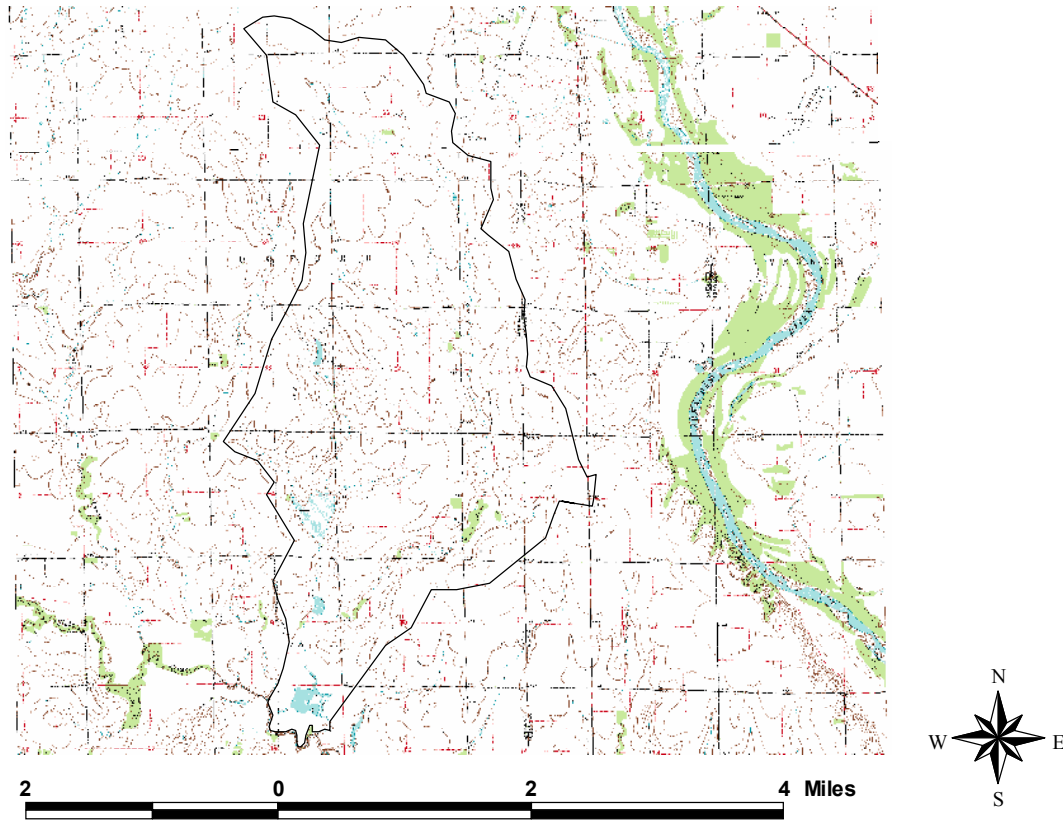
## 2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

**Monitoring Sites:** Station 014201 in Slate Creek W.A.

**Period of Record Used:** Three surveys during 1997-1999.

**Current Condition:** Slate Creek W.A. has notably elevated chloride concentrations, averaging 27,591 mg/L. The chloride concentration has varied over time. The average concentration was 15,454 mg/L in 1997, rose to 46,626 mg/L by 1998, and dropped to 20,692 mg/L in 1999. (The average chloride concentration of water flowing in Slate Creek, near Wellington is 110 mg/L).

# Slate Creek WA Watershed



**Figure 1**

## **Interim Endpoints of Water Quality (Implied Load Capacity) at Slate Creek W.A. over 2005 - 2009:**

The ultimate endpoint for this TMDL will be to achieve the Kansas Water Quality Standards fully supporting Chronic Aquatic Life Support. This TMDL will, however, be phased. The current standard of 352 mg/L of chloride was used to establish the TMDL however, salt beds contribute chloride to the wetland. As such, the wetland has highly elevated chloride levels from this natural source. This natural background of chloride, estimated to be considerably higher than 352 mg/L, makes achievement of the Standard impossible.

Kansas Implementation Procedures for Surface Water allow for a numerical criterion based on natural background to be established using the mean of at least five concentration observations. Samples from lakes need to be collected outside of the regulatory mixing zone. The specific wetland criteria to supplant the general standard will be developed concurrent with Phase One of

this TMDL following the appropriate administrative and technical Water Quality Standards processes. Meanwhile, an endpoint has been developed based on currently available information and is 27,591 mg/L from data collected over 1997-1999. The Phase Two TMDL will be based on the future standard.

### **3. SOURCE INVENTORY AND ASSESSMENT**

**Background:** The Wellington Formation, that underlies the wetland watershed, is predominantly shale with minor amounts of limestone and dolomite, siltstone, and gypsum and anhydrite. In the subsurface, there are thick salt beds. These salt beds account for most of the chloride in the wetland. There are observed groundwater discharge and recharge at this wetland area.

Water that enters the wetland contains lower concentrations of chloride. Water is lost from direct evaporation and transpiration from the surfaces of plants. With the decrease of water, the concentration of chloride in the wetland increases.

**Oil Wells:** Slate Creek W.A. is located above an oil field. In Oxford, there are 5 active and 5 inactive oil operators. According to the “Oil & Gas Well Locations Across Kansas” Map produced by the Kansas Corporation Commission, active and abandoned wells are located in the watershed. Oil brine may be retrieved during drilling and then disposed onto the soil surface or to surface water.

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

More detailed assessment of sources and confirmation of the chloride concentrations in the wetland must be completed before detailed allocations can be made. The general inventory of sources within the drainage does provide some guidance as to areas of load reduction.

**Point Sources:** Since this impairment is primarily associated with background and nonpoint source pollution, there will be no Wasteload Allocation assigned to point sources for chloride under this TMDL.

**Nonpoint Sources:** Water quality violations are partially due to nonpoint source pollutants. Background levels are attributed to geology and evapotranspiration. Chloride concentrations contributed by anthropogenic sources should be reduced by 10%, and thus the Load Allocation within the wetland is chloride concentrations not to exceed 22,349 mg/L.

**Defined Margin of Safety:** Because there will not be a traditional load allocation made for chloride, the margin of safety will be framed around the desired endpoint. Therefore, evaluation of achieving the endpoint should use values set 10% less (2,759 mg/L) than the stated endpoint to mark full support of the aquatic life designated use of the lake in this watershed.

**State Water Plan Implementation Priority:** Because Slate Creek W.A. has unknown groundwater interactions, 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 (High Priority for restoration).

**Priority HUC 11s:** The wetland is within HUC 11 (020).

## 5. IMPLEMENTATION

### Desired Implementation Activities

1. Minimize anthropogenic oriented contributions of chloride loading to the wetland.

### Implementation Programs Guidance

Until the 2005 assessment of the continuation of monitoring is made, no direction can be made to those implementation programs.

**Time Frame for Implementation:** Continued monitoring over the years from 2001 to 2005.

**Targeted Participants:** No targets until 2005 assessment.

**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 Slate Creek W.A. will be reexamined to confirm the impaired status of the wetland and the suggested background concentration. 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 Kansas Water Office and the Kansas Department of Agriculture.

### 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. 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.

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

5. 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 pollutant 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.

**Effectiveness:** Improvements in reducing chloride loading to streams can be accomplished through appropriate brine disposal. Minimal control can be exerted on natural contributions to loading.

## 6. MONITORING

KDHE will collect chloride samples from Slate Creek W.A. in 2000, as a part of an EPA grant project. Further sampling and evaluation should occur in once before 2005 and once between 2005 and 2010.

## 7. FEEDBACK

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

**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 2005, evaluation will be made as to the degree of impairment which has occurred within the drainage and current condition of Slate Creek W.A. Subsequent decisions will be made regarding implementation approach and follow up of additional implementation.

**Consideration for 303d Delisting:** Slate Creek W.A. 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 2004.

Approved November 13, 2000.