

KANSAS-LOWER REPUBLICAN BASIN TOTAL MAXIMUM DAILY LOAD

Waterbody: Washington County State Fishing Lake Water Quality Impairment: Dissolved Oxygen

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasin: Lower Little Blue

County: Washington

HUC 8: 10270207

HUC 11: 083

Drainage Area: Approximately 5.86 square miles.

Conservation Pool: Elevation 1383; Volume 1181 acre-feet

Designated Uses: Secondary Contact Recreation; Aquatic Life Support

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

Impaired Use: Aquatic Life Support

Water Quality Standard: Dissolved Oxygen: 5 mg/L (KAR 28-16-28e(c)(2)(A))

2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

Monitoring Sites: Station 010901 in Washington Co. SFL

Period of Record Used: Two prior surveys--1989 & 1995

Current Condition: In the Washington Co. SFL, the dissolved oxygen concentration decreases with increased depth. At the surface, the average concentration was 5.8 mg/L, a sufficient amount of dissolved oxygen for aquatic life support. However, near the bottom of the lake, the average concentration dropped to 2.2 mg/L.

Model projections suggest that Washington Co. SFL has a moderate-to-high potential for oxygen depletion within the hypolimnion, as do many lakes in Kansas. Indeed, the lower than normal dissolved oxygen levels in the surface waters of this lake can be attributed to the lower than normal algae community. Based on observed mean total phosphorus, mean summer chlorophyll a should be about 16 ppb, rather than <7 ppb. While the lake can become turbid at times this alone does not explain the low algal biomass. Competition with macrophytes also does not explain the low algal biomass. If the macrophyte community were dense enough to compete with the phytoplankton, we should still observe abundant oxygen. Since we do not, it must be concluded that the high macrophyte cover does not come with a corresponding high density within plant beds. This aspect of the macrophyte community will be revisited in 1999.

While dissolved oxygen was low enough to trigger the standards, it should also be stated that dissolved oxygen does not drop below 3.0 mg/L within the water column. The dissolved oxygen regime is “marginal” rather than a hard impairment.

Interim Endpoints of Water Quality (Implied Load Capacity) at Washington Co. FSL over 2004 - 2008:

The desired endpoint will be dissolved oxygen levels at or above 5 mg/l over 80% of the water column. This endpoint reflects the likelihood that some lower oxygen values are to be expected in the lake depths close to the bottom. Refined endpoints will be developed in 2004 to reflect additional sampling and artificial source assessment and confirmation of impaired status of lake.

3. SOURCE ASSESSMENT

Sixty-nine percent of watershed is grassland, 4% woodland and 27% cropland. No external factors for low dissolved oxygen levels is apparent. Low levels may be a feature of this state fishing lake.

4. ALLOCATION OF POLLUTION REDUCTION RESPONSIBILITY

No apparent external sources can be attributed as the cause of low dissolved oxygen conditions. Additional monitoring over time will be needed to ascertain the dissolved oxygen characteristics of the lake and the macrophyte community.

Point Sources: Since this impairment is not associated with point source pollution, there will be no Wasteload Allocation assigned to point sources under this TMDL.

Non-Point Sources: Dissolved oxygen declines appear to be a natural feature of the state fishing lake. Nonetheless, no external sources or loads should discharge into the lake, thereby aggravating the declines in oxygen. Therefore, the Load Allocation of Biochemical Oxygen Demanding substances will be set at zero for external sources around the state fishing lake. Background levels within the lake remain to be determined.

Defined Margin of Safety: The margin of safety provides some hedge against the uncertainty of loading and the dissolved oxygen endpoint. Therefore, the margin of safety will be expected levels of dissolved oxygen over 5 mg/l to ensure meeting the endpoint.

State Water Plan Implementation Priority: As a small lake with an uncertain dissolved oxygen impairment, this TMDL will be a Low Priority for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Lower Little Blue Subbasin (HUC 8: 10270207) with a priority ranking of 10 (Highest Priority for restoration work).

Priority HUC 11s and Stream Segments: Because of the localized extent of the lake, the focus of implementation priority should be the lake and its drainage area.

5. IMPLEMENTATION

Desired Implementation Activities

Model projections indicate only small water quality improvements can be derived from BMPs.

Implementation Programs Guidance

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

Timeframe for Implementation: Pollution reduction practices should be installed after the year 2008.

Targeted Participants: Primary participants for implementation will be targeted activities identified by follow up assessment of sources, conducted by KDHE and KDWP.

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

Milestone for 2004: The year 2004 marks the mid-point 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 dissolved oxygen problem. Should sampled data from station 010901 indicate growing problems with dissolved oxygen impairment, the assessment will be accelerated.

Delivery Agents: Depending upon the probable source, the primary delivery agents for program participation will be the Kansas Department of Wildlife and Parks.

Reasonable Assurances:

Authorities: The following authorities may be used to direct activities in the lake to provide protection.

1. 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.
2. 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.
3. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.
4. The *Kansas Water Plan* and the Kansas-Lower Republican 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. This TMDL is a Low Priority consideration and should not receive funding until after 2004.

Effectiveness: Further source assessment is required before the effectiveness can be determined.

6. MONITORING

The KDHE monitoring program will be maintained, and the macrophyte community will be assessed in 1999. Additional evaluation of the dissolved oxygen conditions will be made over 2000-2004 in order to evaluate continued listing on the 2004 Section 303d list of impaired waters.

7. FEEDBACK

Public Meetings: Public meetings to discuss TMDLs in the KLR Basin were held March 10, 1999 in Topeka, April 27 in Lawrence and April 29 in Manhattan. 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 Kansas-Lower Republican Basin.

Public Hearing: A Public Hearing on the TMDLs of the Kansas-Lower Republican Basin was held in Topeka on June 3, 1999.

Basin Advisory Committee: The Kansas-Lower Republican Basin Advisory Committee met to discuss the TMDLs in the basin on December 3, 1998; January 14, 1999; February 18, 1999; March 10, 1999; May 20, 1999 and June 3, 1999.

Discussion with Interest Groups: Meetings to discuss TMDLs with interest groups include:
Agriculture: November 10, 1998; December 18, 1998; February 10, 1999; April 10, 1999, May 4, 1999, June 8, 1999 and June 18, 1999.
Municipal: November 12, 1998, January 25, 1999; March 1, 1999; May 10, 1999 and June 16, 1999.
Environmental: November 3, 1998; December 16, 1998; February 13, 1999; March 15, 1999, April 7, 1999 and May 3, 1999.
Conservation Districts: March 16-18, 24-25, 1999

Milestone Evaluation: In 2004, evaluation will be made as to the degree of water quality improvement which has occurred within and around the lake. Subsequent decisions will be made regarding additional measures, upon evaluation of the need for continued listing under Section 303d.

Consideration for 303d Delisting: This lake will be evaluated for delisting under Section 303d, based on the monitoring data over the period 1999-2003. Therefore, the decision for delisting will come about in the preparation of the 2004 303d list. Should modifications be made to the applicable water quality criteria during the implementation period, consideration for delisting may be made in earlier 303d listings.

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 January 26, 2000.