

NEOSHO RIVER BASIN TOTAL MAXIMUM DAILY LOAD

Water Body: Mined Land Wildlife Area Unit #42 Water Quality Impairment: Dissolved Oxygen

Subbasin:	Middle Neosho
County:	Cherokee
HUC 8:	11070205
HUC 11 (HUC 14):	060 (030)
Ecoregion:	Central Irregular Plains - Cherokee Plains (40d)
Drainage Area:	Approximately 53.9 acres
Conservation Pool:	Area = 4.6 acres Maximum Depth = 0.4 meter (1.3 feet)
Designated Uses:	Secondary Contact Recreation; Expected Aquatic Life Support; Food Procurement
Authority:	State (Kansas Department of Wildlife and Parks)
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 038841 in Mined Land WA Unit #42 (Figures 1 & 2).

Period of Record Used: Four surveys during 1997 - 2000.

Current Condition: At the surface, the average dissolved oxygen concentration was 5.2 mg/L. The highest dissolved oxygen concentration (8.0 mg/L) was seen in 2000. The lowest level (3.6 mg/L), an insufficient amount of dissolved oxygen for aquatic life support, was detected in 1997. (See below the table and Appendix A).

Average Concentrations of Samples from the KDHE Lake Monitoring Program

Date	Dissolved Oxygen (mg/L)	Phosphorus (mg/L)	Chlorophyll a (ppb)	Secchi Disc Depth (m)
8/18/97	3.6	0.140	2.60	0.40
8/18/97	3.6	0.080	5.80	
8/10/98	4.5	0.089	16.20	0.30
8/10/98	4.5	0.087	21.50	
8/9/99	4.6	0.056	8.50	0.30
8/9/99	4.6	0.050	6.80	
8/7/00	8.0	0.070	28.50	0.30
8/7/00	8.0	0.060	9.50	

It is doubtful that the low dissolved oxygen observed within the top meter of Mined Land WA Unit #42 is due to either organic or nutrient loads and subsequent eutrophication. The phosphorus to chlorophyll a yield is low. The average total phosphorus concentration is 79 ppb. The average chlorophyll a concentration is 12.4 ppb, well below the desired concentration of 20 ppb for secondary contact recreation. Light is a limiting factor (Appendix B).

Figure 1

Mined Land Lake #42 Wetland TMDL Reference Map



The dissolved oxygen impairment (throughout the water column) appears to be the result of shading by cattails in the wetland. Light cannot penetrate the cattail canopy, and the algae are unable to photosynthesize and produce oxygen. The oxygen that is in the water column gets used up, and the dissolved oxygen levels drop below the water quality standard of 5 mg/L. This impairment of numeric criteria can be attributed to natural processes.

Figure 2

Mined Land Lake #42 Wetland



Interim Endpoints of Water Quality (Implied Load Capacity) at Mined Land WA Unit #42 over 2007 - 2011:

The desired endpoint will be summer dissolved oxygen concentrations at or above 5.0 mg/L. Refined endpoints will be developed in 2007 to reflect additional sampling and artificial source assessment and confirmation of impaired status of wetland.

3. SOURCE INVENTORY AND ASSESSMENT

The formerly mined land was donated from the Pittsburg and Midway Coal Company to the Kansas Fish and Game Commission. The Kansas Department of Wildlife and Parks manages the property now. The Mined Land WA Unit #42 is a strip-mined pit that filled with water. The

watershed has a very low potential for nonpoint source pollutants. Presently, the Mined Land WA Unit #42 is surrounded by healthy grassland (79.6% of area), woods (2.2%), and numerous lakes and wetlands (18.2%). The mined land wildlife area has a diverse habitat and an abundance of fishes, waterfowl, and other wildlife.

4. ALLOCATION OF POLLUTANT REDUCTION RESPONSIBILITY

Additional monitoring over time will be needed to ascertain the dissolved oxygen characteristics of the wetland and ascertain any level of impairment.

Point Sources: A current Wasteload Allocation of zero is established by this TMDL because of the lack of point sources in the watershed. Should future point sources be proposed in the watershed and discharge into the impaired segments, the current wasteload allocation will be revised by adjusting current load allocations to account for the presence and impact of these new point source dischargers.

Nonpoint Sources: Dissolved oxygen declines appear to be due to the dense cattail canopy. Nonetheless, no external sources or loads should discharge into the wetland, 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 wetland. Background levels within the wetland 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: Because the dissolved oxygen impairment in Mined Land WA Unit #42 is due to natural processes, this TMDL will be a Low Priority for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Middle Neosho (HUC 8: 11070205) with a priority ranking of 24 (Medium Priority for restoration).

Priority HUC 11s: The watershed is within HUC 11 (060).

5. IMPLEMENTATION

Desired Implementation Activities

Minimize anthropogenic oriented contributions of loading of Biochemical Oxygen Demanding substances to the wetland.

Implementation Programs Guidance

Until the 2007 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 2002 to 2007.

Targeted Participants: Primary participants for implementation will be the Kansas Department of Wildlife and Parks. A detailed assessment of sources will be conducted by KDHE over 2002-2007.

Milestone for 2007: The year 2007 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, sampled data from Mined Land WA Unit #42 will be reexamined to confirm the impaired status of the wetland. Should the case of impairment remain, source assessment, allocation, and implementation activities will ensue.

Delivery Agents: The primary delivery agents for program participation will be the Kansas Department of Wildlife and Parks, 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 Extension.

Reasonable Assurances:

Authorities: The following authorities may be used to direct activities in the watershed to reduce pollutants.

1. 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.
2. 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.
3. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control nonpoint source pollution.
4. 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.
5. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.
6. The *Kansas Water Plan* and the Neosho 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 Low Priority consideration and should not receive funding until after 2007.

Effectiveness: Minimal control can be exerted on natural contributions to loading.

6. MONITORING

Further sampling and evaluation should occur once before 2007.

7. FEEDBACK

Public Meetings: Public meetings to discuss TMDLs in the Neosho Basin were held January 9, 2002 in Burlington and March 4, 2002 in Council Grove. 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 Neosho Basin.

Public Hearing: Public Hearings on the TMDLs of the Neosho Basin were held in Burlington and Parsons on June 3, 2002.

Basin Advisory Committee: The Neosho Basin Advisory Committee met to discuss the TMDLs in the basin on October 2, 2001, January 9, March 4, and June 3, 2002.

Discussion with Interest Groups: Meetings to discuss TMDLs with interest groups include:
Kansas Farm Bureau: February 26 in Parsons and February 27 in Council Grove

Milestone Evaluation: In 2007, evaluation will be made as to the degree of implementation which has occurred within the watershed and current condition of Mined Land WA Unit #42. Subsequent decisions will be made regarding the implementation approach and follow up of additional implementation in the watershed.

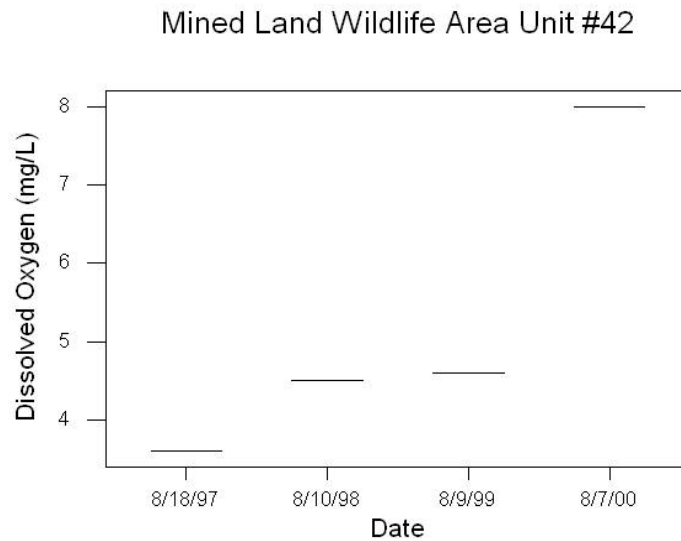
Consideration for 303(d) Delisting: The wetland will be evaluated for delisting under Section 303(d), based on the monitoring data over the period 2007-2011. Therefore, the decision for delisting will come about in the preparation of the 2012 303(d) list. Should modifications be made to the applicable water quality criteria during the ten-year implementation period, consideration for delisting, desired endpoints of this TMDL and implementation activities may be adjusted accordingly.

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 2003 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 2003-2007.

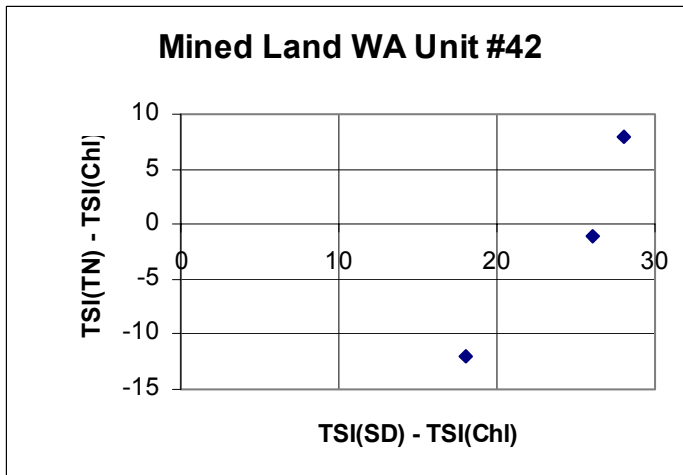
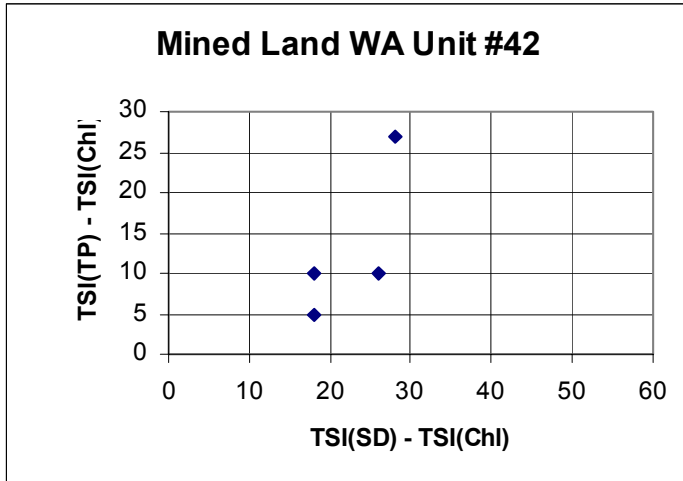
Bibliography

Lisceck, Bonnie C. Methodology Used in Kansas Lake TMDLs [web page] Jul. 2001;
<http://www.kdhe.state.ks.us/tmdl/eutro.htm> [Accessed 17 May 2002].

Appendix A - Boxplot



Appendix B - Trophic State Index Plots



The trophic state index plots indicate that light is the limiting factor due to clay turbidity.

Approved September 30, 2002