

MISSOURI RIVER BASIN TOTAL MAXIMUM DAILY LOAD

Water Body: Hiawatha City Lake
Water Quality Impairment: Atrazine

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasin: Tarkio-Wolf

County: Brown

HUC 8: 10240005

HUC 11 (HUC 14s): 060 (010)

Drainage Area: Approximately 0.82 square miles.

Conservation Pool: Area = 4 acres, Maximum Depth = 5.5 meters, Mean Depth = 2.2 meters

Designated Uses: Secondary Contact Recreation, Expected Aquatic Life Support, Drinking Water, Industrial Water Supply, and Food Procurement

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

Impaired Use: Expected Aquatic Life Support and Domestic Water Supply are impaired from Atrazine

Water Quality Standard: Atrazine: 3 ug/l (ppb) (KAR 28-16-28e(c)(2)(F)(ii) and (3)(A))

2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

Level of Support for Designated Use under 303(d): Not Supporting Aquatic Life and Domestic Water Supply Uses.

Monitoring Sites: Station 011601 in Hiawatha City Lake.

Period of Record Used: Two surveys in 1992 and 1996.

Current Condition: Atrazine, a herbicide, is applied to agricultural fields in early spring, prior to planting. With heavy rainfalls in spring, Atrazine is transported on sediment and in a dissolved phase into streams and lakes. When a sample was taken in 1992, the concentration was too small to be detected. Contrastingly, in 1996, the Atrazine concentration was 9.2 ug/L. Given this concentration, there is approximately 0.73 pounds of Atrazine in Hiawatha City Lake.

Interim Endpoints of Water Quality (Implied Load Capacity) at Hiawatha City Lake over 2005 - 2009:

The desired endpoint will be Atrazine concentrations at or below 3 ug/L by 2009. Seasonal

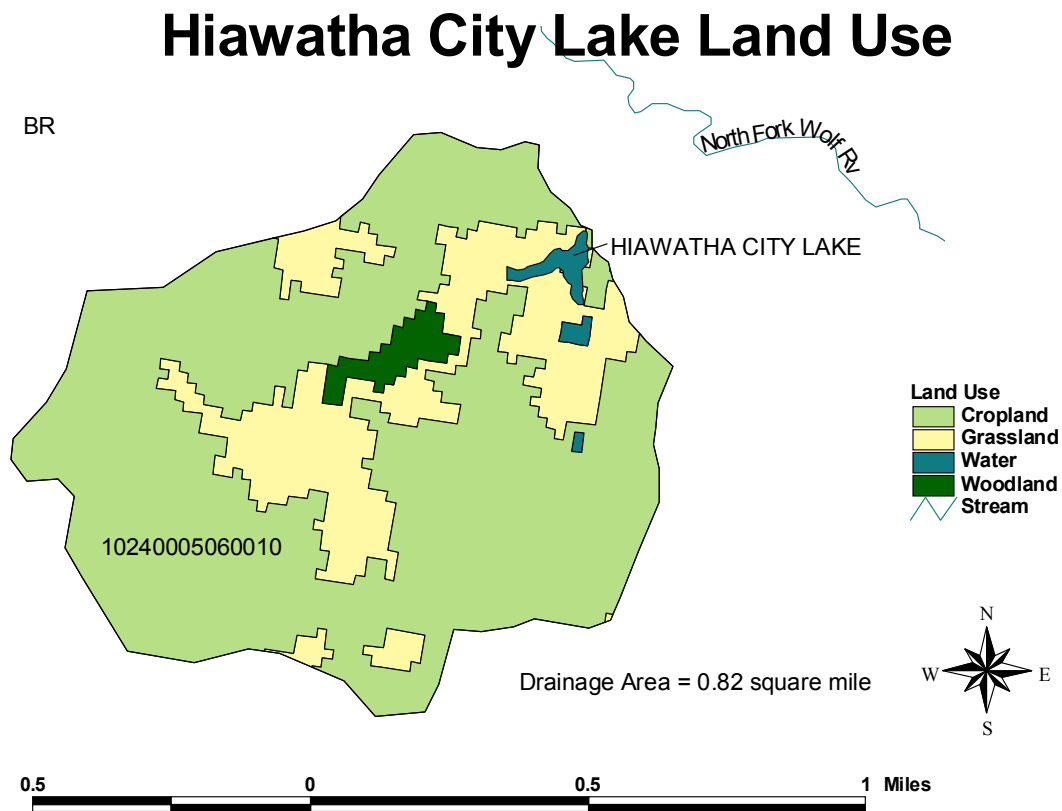
variation in endpoints will not be defined by this TMDL since the reservoir integrates the spring runoff season with the high use summer season by its flow detention characteristics. The desired endpoint will apply to samples taken between April and October over 2005-2009.

This endpoint will be reached as a result of expected 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 endpoints indicates loads are within the loading capacity of the lake, water quality standards are attained with minimal excursions and full support of the designated uses of the lake has been restored.

3. SOURCE INVENTORY AND ASSESSMENT

Land Use: The watershed around Hiawatha City Lake has a moderate potential for nonpoint source pollutants. The main source of Atrazine within Hiawatha City Lake is probably runoff from agricultural lands where the herbicide has been applied. Land use coverage analysis indicates that 75.2 % of the watershed is cropland (Figure 1).

Figure 1



1999 Published Estimates

	Acres of Corn for Grain	Acres of Sorghum for Grain	Acres of Soybeans
Brown County	89,300	14,800	110,000

Contributing Runoff: The watershed's average soil permeability is 0.9 inches/hour according to NRCS STATSGO database. About 100% of the watershed produces runoff even under relatively 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. Generally, storms producing less than 0.5"/hr of rain will generate runoff from only 31.4% of this watershed, chiefly along the stream channels.

4. ALLOCATION OF POLLUTANT REDUCTION RESPONSIBILITY

Point Sources: Since there are no point sources located in the lake watershed and this impairment is primarily associated with agricultural nonpoint source pollution, the Wasteload Allocation assigned to point sources under this TMDL is zero.

Non-Point Sources: As described in the Source Assessment, the drainage has a high proportion of cropland and a strong propensity for runoff. The Load Allocation is estimated loadings of Atrazine reduced by 67.4% annually in order to achieve full support of the lake uses, leaving 0.214 pounds of Atrazine within the lake.

Defined Margin of Safety: The margin of safety will be 0.024 pounds of Atrazine (ten percent of the Atrazine load capacity), allowing 0.214 pounds to be retained by the lake.

State Water Plan Implementation Priority: Because the Hiawatha City Lake is used for drinking water and impaired due to elevated levels of pesticides, this TMDL will be a Medium Priority for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Tarkio-Wolf (HUC 8: 10240005) with a priority ranking of 13 (High Priority for restoration).

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

5. IMPLEMENTATION

Desired Implementation Activities

1. Implement proper mix of pesticide use best management practices, including incorporation, application timing, banding, alternative weed control and buffer zones

2. Implement necessary storage and handling site best management practices
3. Install necessary grass buffer strips along streams.
4. Increase label compliance by applicators
5. Harmonize water quality protection measures and use directions on labels of products containing Atrazine

Implementation Programs Guidance

Non-Point Source Pollution Technical Assistance - KDHE

- a. Support Section 319 demonstration projects for reduction of Atrazine runoff from grain sorghum cropland.
- b. Provide technical assistance on practices geared to establishment of vegetative buffer strips.
- c. Guide federal programs such as the Environmental Quality Improvement Program, which are dedicated to priority subbasins through the Unified Watershed Assessment, to priority subwatersheds and stream segments within those subbasins identified by this TMDL.

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

- a. Provide pesticide management areas for storage, mixing and handling.
- b. Provide pesticide management practices to minimize pesticide spillage

Riparian Protection Program - SCC

- a. Establish or reestablish natural riparian systems, including vegetative filter strips and streambank vegetation.
- b. Develop riparian restoration projects in cropland areas

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 grain sorghum producers on pesticide management
- b. Provide technical assistance on buffer strip design and minimizing cropland runoff and construction of pesticide handling pads

Pesticide Management Program - KDA

- a. Implement pesticide bulk containment regulations
- b. Increase label compliance by pesticide applicators
- c. Harmonize product labels regarding use and protection measures
- d. Continue basin pesticide education efforts through Kansas State and commodity associations

Time Frame for Implementation: Pollutant reduction practices should be installed within the

priority subwatersheds after 2006. Evaluation of Atrazine sources to lake and identification of potential management techniques should occur prior to 2006.

Targeted Participants: Primary participants for implementation will be agricultural producers operating within the drainages of the priority subwatersheds. Implemented activities should be targeted at those areas with greatest potential to impact the lake. Nominally, this would be activities located within one mile of the streams including:

1. Total corn and sorghum acreage
2. Location of tile drain outlets draining into streams.
3. Location of pesticide storage, mixing and handling sites
4. Cultivated riparian areas
5. Number of pesticide applicators
6. Use of pesticide products containing Atrazine

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 2006: The year 2006 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, sampled data from Hiawatha City Lake should indicate probable sources of Atrazine within the watershed, and plans should be in place to initiate implementation.

Delivery Agents: The primary delivery agents for program participation will be 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 Missouri 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: Pesticide management has proven to be effective in reducing Atrazine levels in Perry Lake. Many voluntary approaches were promoted through the Pesticide Management Area established on the Delaware River Subbasin. Most of those producers raised corn. The key to effectiveness will be equivalent participation by other producers in the Hiawatha City Lake drainage area. The milestones established under this TMDL are intended to gage the level of participation in those programs implementing this TMDL.

Should participation significantly lag below expectations over the next five years or monitoring indicates lack of progress in improving water quality conditions from those seen in 1996, the state may employ more stringent conditions on agricultural producers in the watershed through extension of the Pesticide Management Area in order to meet the desired endpoints expressed in this TMDL.

6. MONITORING

Further sampling and evaluation should occur once before 2005 and once between 2005 and 2009.

7. FEEDBACK

Public Meeting: A public meeting to discuss TMDLs in the Missouri Basin was held February

28, 2001 in Atchison. 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 Missouri Basin.

Public Hearing: A Public Hearing on the TMDLs of the Missouri Basin was held in Hiawatha on May 29, 2001.

Basin Advisory Committee: The Missouri Basin Advisory Committee met to discuss the TMDLs in the basin on October 3, 2000, February 28 and May 29, 2001.

Milestone Evaluation: In 2006, evaluation will be made as to the degree of impairment which has occurred within the drainage and current condition of Hiawatha City Lake. Subsequent decisions will be made regarding implementation approach, follow up of additional implementation and implementation in the nonpriority subwatersheds.

Consideration for 303d Delisting: Hiawatha City Lake 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 the applicable 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 during Fiscal Years 2002-2006.