

LOWER ARKANSAS RIVER BASIN TOTAL MAXIMUM DAILY LOAD

Water Body: Newton City Park Lake
Water Quality Impairment: Eutrophication

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasin: Little Arkansas

County: Harvey & Marion

HUC 8: 11030012

HUC 11 (HUC 14): 040 (050 & 060)

Drainage Area: Approximately 58.1 square miles.

Conservation Pool: Area = 55.9 acres, Maximum Depth = 2 meters

Designated Uses: Secondary Contact Recreation; Expected Aquatic Life Support; Food Procurement

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

Impaired Use: All uses are impaired to a degree by eutrophication

Water Quality Standard: Nutrients - Narrative: The introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life. (KAR 28-16-28e(c)(2)(B)).

The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation. (KAR 28-16-28e(c)(7)(A)).

Newton City Park Lake TMDL Reference Map

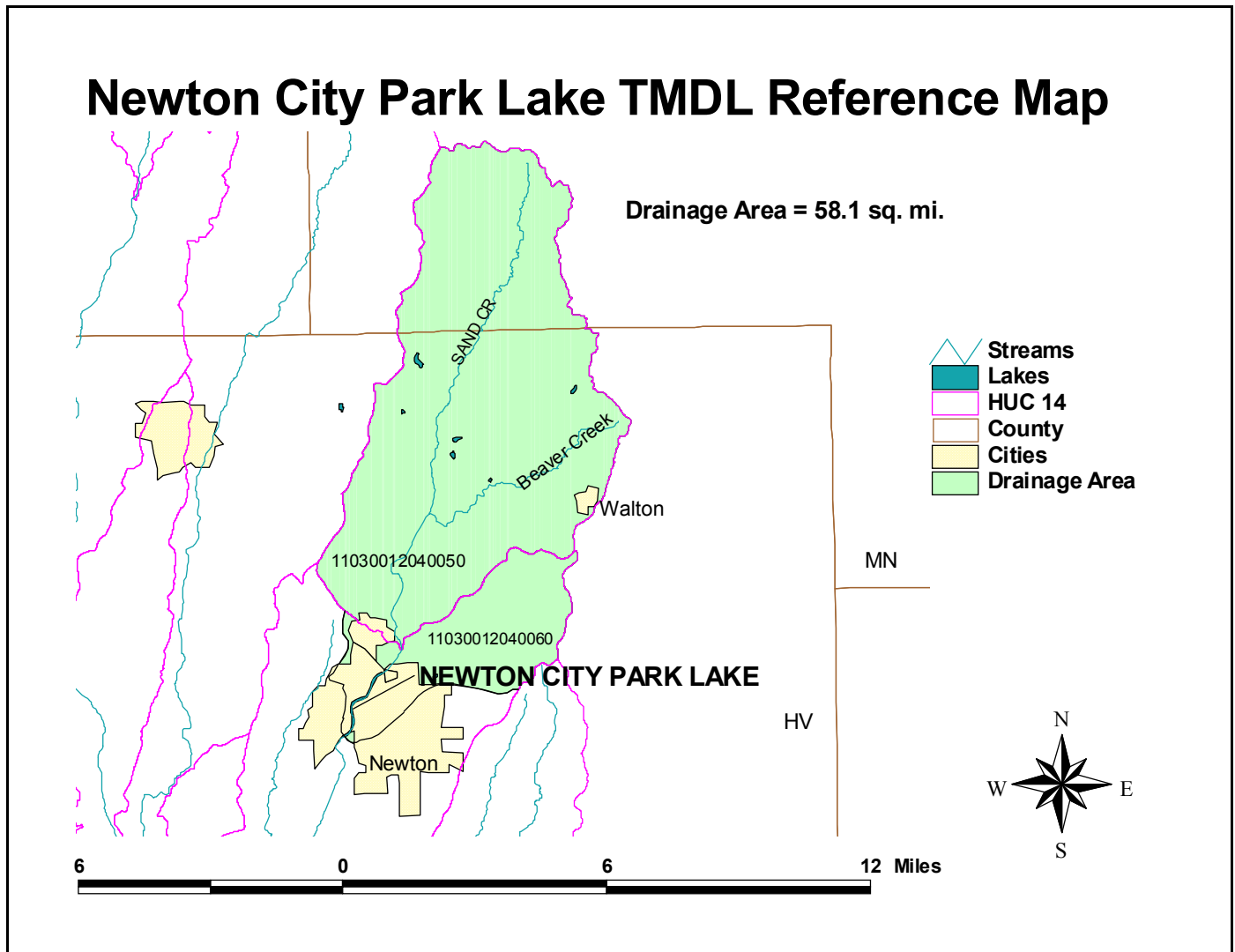


Figure 1

2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

Level of Eutrophication: Hypereutrophic, Trophic State Index = 71.42

Monitoring Sites: Station 064201 in Newton City Park Lake.

Period of Record Used: Two surveys during 1989 and 1994.

Current Condition: Newton City Park Lake has elevated chlorophyll a concentrations averaging 64.4 ppb. This relates to a Trophic State Index of 71.42, indicating hypereutrophic conditions.

The Trophic State Index of 71 is derived from the chlorophyll a concentration. Trophic state assessments of potential algal productivity were made based on chlorophyll a concentrations, nutrient levels and values of the Carlson Trophic State Index (TSI). Generally, some degree of eutrophic conditions is seen with chlorophyll a concentrations over 12 ug/l and hypereutrophy occurs at levels over 30 ug/l. The Carlson TSI, derives from the chlorophyll concentrations and scales the trophic state as follows:

- | | |
|-----------------------|-----------------|
| 1. Oligotrophic | TSI < 40 |
| 2. Mesotrophic | TSI: 40 - 49.99 |
| 3. Slightly Eutrophic | TSI: 50 - 54.99 |
| 4. Fully Eutrophic | TSI: 55 - 59.99 |
| 5. Very Eutrophic | TSI: 60 - 63.99 |
| 6. Hypereutrophic | TSI: ≥ 64 |

The chlorophyll a to total phosphorus yield is moderately high. The phosphorus concentration has increased over time. The average concentration was 94 ppb in 1989 and rose to 295 ppb by 1994. Phosphorus may be the primary limiting factor, but flushing rates may be important as well. Light does not appear to be limiting.

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

In order to improve the trophic condition of the lake from its current hypereutrophic status, the desired endpoint will be summer chlorophyll a concentrations at or below 20 ug/l, corresponding to a trophic state of eutrophic conditions by 2009. Refined endpoints will be developed in 2005 to reflect additional sampling and artificial source assessment and confirmation of impaired status of lake.

3. SOURCE INVENTORY AND ASSESSMENT

NPDES: One NPDES permitted facility is located within the watershed. Walton MWTP has a two-cell, waste stabilization pond and discharges into an unnamed stream that flows into Beaver Creek. This point source contributes an estimated 12% of the total annual phosphorus load. The population of Walton is expected to increase (1.7 %) through the year 2020. Based on the anticipated water use in 2020, the capacity of Walton MWTP (design flow = 0.05 MGD) is sufficient to handle the increase.

Land Use: The watershed around Newton City Park Lake has a very high potential for nonpoint source pollutants. An annual phosphorus load of 21,826 pounds per year is necessary to correspond to the concentrations seen in the lake. **(Figure 2)**

The primary source of phosphorus within Newton City Park Lake is probably runoff from agricultural lands where phosphorus has been applied. Land use coverage analysis indicates that 83.1% of the watershed is cropland. In 1998, the total amount of fertilizer sold in Harvey and Marion Counties was 66,475 tons. Assuming that the drainage area of Newton City Park Lake

covers 3.9 percent of the counties, then 2,613 tons of fertilizer were bought and potentially used with the watershed.

Fertilizer applications to lawns within the drainage and stormwater delivery to the lake are probable loading sources. Five percent of the watershed is urban. Stormwater from the residential area adjacent to the lake flows directly into the lake. The populations of Newton and Walton are expected to grow through 2020.

Phosphorus from animal waste is a contributing factor. Nine percent of land around the lake is grassland; the grazing density of livestock is low in the summer and high in the winter. Animal waste, from confined animal feeding operations, adds to the nitrogen and phosphorus load going into Newton City Park Lake. There are 9 beef and 5 swine feeding operations in the watershed, accounting for up to 5,125 animal units.

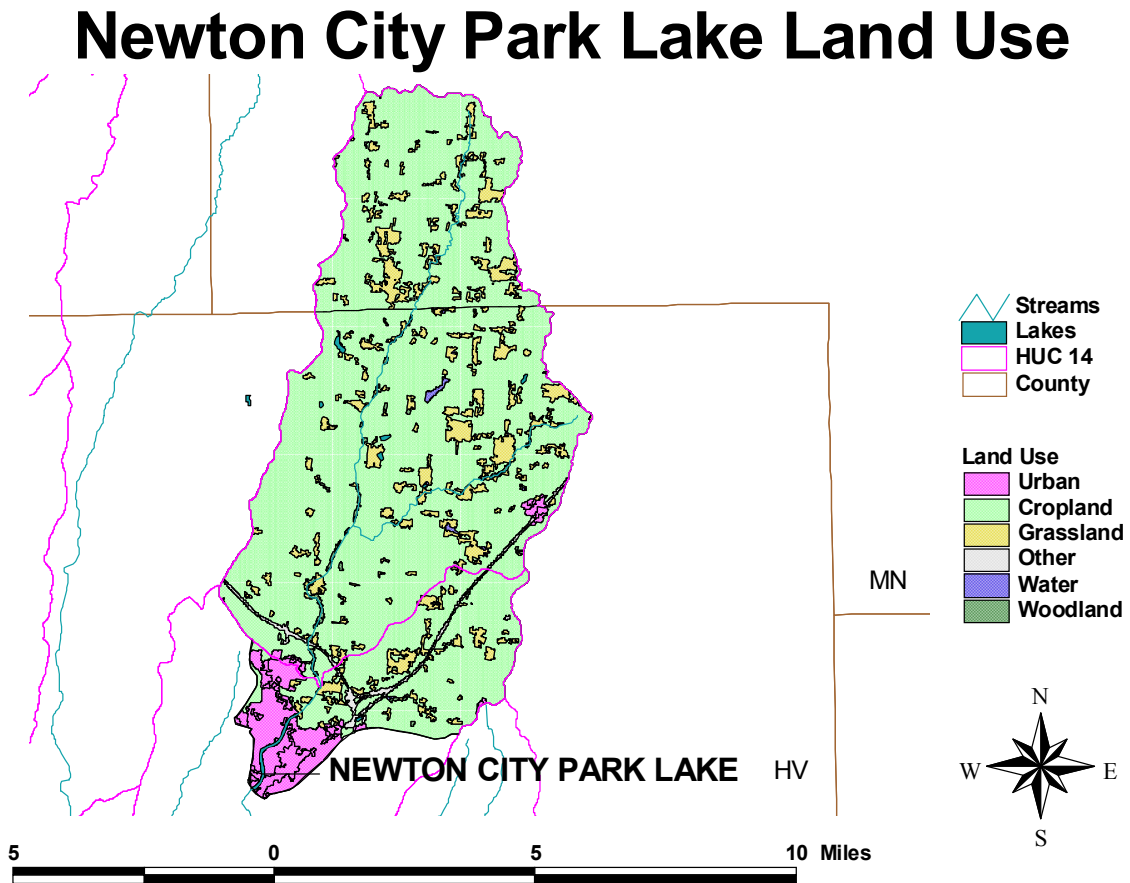


Figure 2

Contributing Runoff: The watershed’s average soil permeability is 0.9 inches/hour according to NRCS STATSGO data base. About 99% 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 6% of this watershed, chiefly along the stream channels.

Background Levels: Nutrient recycling from the sediments in the lake is likely contributing available phosphorus to the lake for algal uptake. Resuspension of sediment occurs with the high flushing rate and from the resident fish community. Geological formations contain small amounts of phosphorus (up to 0.5% of total weight), and may contribute to phosphorus loads.

Newton City Park Lake NPDES and CAFO Sites

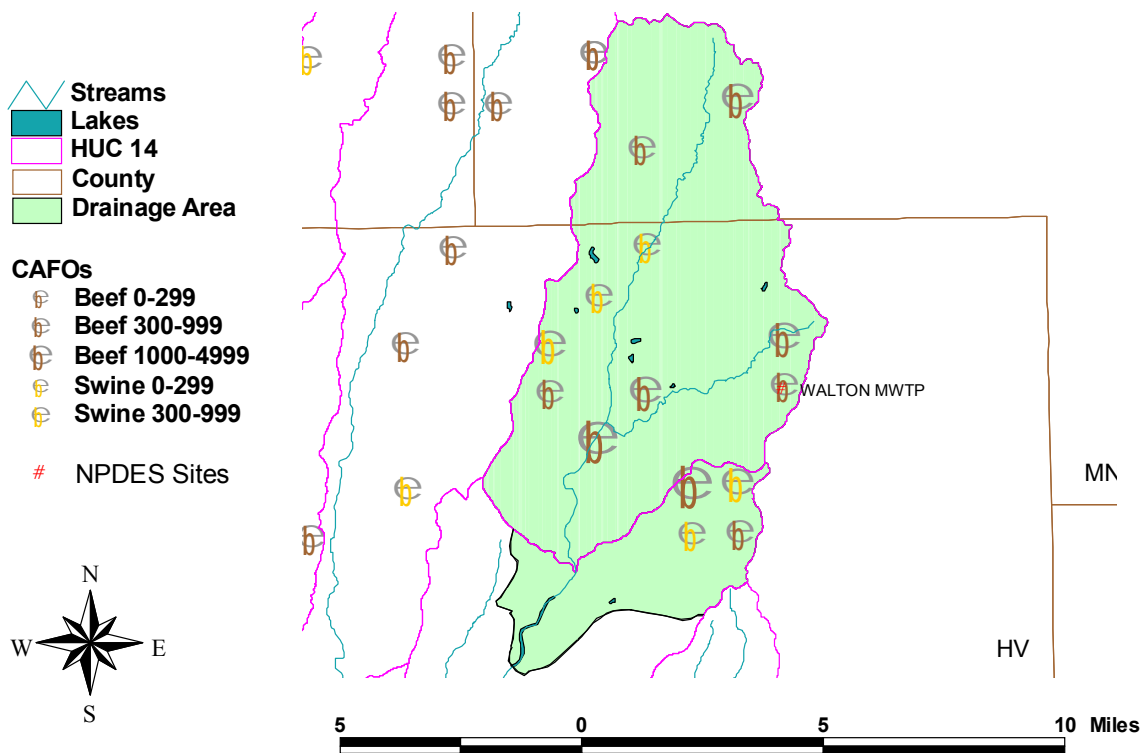


Figure 3

4. ALLOCATION OF POLLUTANT REDUCTION RESPONSIBILITY

More detailed assessment of sources and confirmation of the trophic state of the lake 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: This impairment is partially associated with a municipal waste treatment plant. Ongoing inspections and monitoring of the NPDES site will be made to ascertain the contributions that have been made by the source. The Wasteload Allocation should be at 786 pounds per year, a decrease of 70%, which should result in a decrease in available phosphorus.

Nonpoint Sources: Water quality violations are predominantly due to nonpoint source pollutants. Background levels may be attributed to nutrient recycling. The assessment suggests that cropland, urban runoff, and animal waste contribute to the elevated phosphorus concentrations in the lake. Generally a Load Allocation of 5,107 pounds per year, leading to a 70% reduction in available phosphorus is necessary to reach the endpoint.

Defined Margin of Safety: The margin of safety provides some hedge against the uncertainty of variable annual total phosphorus loads and the chlorophyll a endpoint. Therefore, the margin of safety will be 655 pounds per year of total phosphorus taken from the load capacity to ensure that adequate load reduction occurs to meet the endpoint.

State Water Plan Implementation Priority: Because Newton City Park Lake is in the Little Arkansas watershed, where reductions in bacteria, sediment and nutrients are also sought, the opportunity to place compatible BMPs in the watershed above the lake warrents this TMDL be a High Priority for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Little Arkansas (HUC 8: 11030012) with a priority ranking of 14 (High Priority for restoration).

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

5. IMPLEMENTATION

Desired Implementation Activities

There is ample opportunity to reduce nonpoint and point source nutrient/silt loads to Newton City Park Lake, with a good chance to improve overall water quality and use support levels. Attention should be given to both the agricultural interests and the Walton MWTP. Some of the recommended agricultural practices are as follows:

1. Implement soil sampling to recommend appropriate fertilizer applications on cropland.
2. Maintain conservation tillage and contour farming to minimize cropland erosion.
3. Install grass buffer strips along streams.
4. Reduce activities within riparian areas.
5. Implement nutrient management plans to manage manure application to land.

Additionally, lake management can be employed to reduce sedimentation in lake and associated in-lake nutrient inputs.

Implementation Programs Guidance

NPDES - KDHE

- a. Ensure proper monitoring, permitting, and operations of municipal wastewater systems to limit nutrient and BOD discharges.

Stormwater Management - KDHE

- a. Assist city with evaluation of Best Management Practices which will lead to reduction in nutrient loading from urban settings during runoff into lake.

Nonpoint Source Pollution Technical Assistance - KDHE

- a. Support Section 319 demonstration projects for reduction of sediment runoff from agricultural activities as well as nutrient management.
- b. Provide technical assistance on practices geared to establishment of vegetative buffer strips.
- c. Provide technical assistance on nutrient management in vicinity of streams.
- d. Assist evaluation of stormwater quality from urbanized areas of watershed.

Fisheries Management - KDWP

- a. Assist evaluation in-lake or near-lake potential sources of nutrients to lake.
- b. Advise city on application lake management techniques which may reduce nutrient loading and cycling in lake.

Water Resource Cost Share Program - SCC

- a. Apply conservation farming practices, including terraces and waterways, sediment control basins, and constructed wetlands.

Nonpoint Source Pollution Control Program - SCC

- a. Provide sediment control practices to minimize erosion and sediment and nutrient transport.

Riparian Protection Program - SCC

- a. Establish or reestablish natural riparian systems, including vegetative filter strips and streambank vegetation.
- b. Develop riparian restoration projects.
- c. Promote wetland construction to assimilate nutrient loadings.

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 agricultural producers on sediment, nutrient, and pasture management.
- b. Educate livestock producers on livestock waste management and manure applications and nutrient management planning.
- c. Provide technical assistance on livestock waste management systems and nutrient management plans.

- d. Provide technical assistance on buffer strip design and minimizing cropland runoff.
- e. Encourage annual soil testing to determine capacity of field to hold phosphorus.

Time Frame for Implementation: Pollutant reduction practices should be installed within the priority subwatersheds during the years 2001-2005, with minor follow up implementation, including other subwatersheds over 2005-2009.

Targeted Participants: Primary participants for implementation will be city and state fisheries managers in Newton and agricultural producers within the drainage of the lake. Initial work in 2005 should include local assessments by conservation district personnel and county extension agents to locate within the lake drainage:

1. Total row crop acreage
2. Cultivation alongside lake
3. Drainage alongside or through animal feeding lots
4. Livestock use of riparian areas
5. Fields with manure applications
6. Uncontrolled entry points for urban runoff

Milestone for 2005: The year 2005 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, sampled data from Newton City Park Lake should indicate evidence of reduced phosphorus levels in the conservation pool elevations relative to the conditions seen over 1989-1994.

Delivery Agents: 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 Extension. Lake management consultations will be made by the Kansas Department of Wildlife and Parks.

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 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 High Priority consideration.

Effectiveness: Nutrient control has been proven effective through conservation tillage, contour farming, and use of grass waterways and buffer strips. The key to success will be widespread utilization of conservation farming within the watersheds cited in this TMDL.

6. MONITORING

Additional data, to establish nutrient ratios, source loading and further determine mean summer lake trophic condition, would be of value prior to 2005. Further sampling and evaluation should occur once before 2005 and twice 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, 1999, November 8, 1999, January 13, 2000, March 9, 2000 and June 1, 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 Newton City Park Lake. Subsequent decisions will be made regarding implementation approach, follow up of additional implementation and implementation in the nonpriority subwatersheds.

Consideration for 303d Delisting: Newton City Park Lake 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 during Fiscal Year 2001-2005.

Approved September 11, 2000.