

Missouri Basin High Priority Issue Watershed Restoration and Protection Approved January 2008

Issue

Water quality is addressed through a combination of restoration and protection efforts using both voluntary, incentive-based approaches and regulatory programs. The protection and restoration of watersheds draining to the Missouri River is a high priority in the [Missouri Basin](#). With the urbanization of the southern part of the basin, protection and restoration of these watersheds has become more important.

Water Quality Impairments

Many streams within the basin are experiencing water quality impairments. Fecal coliform bacteria and biological stressors are the most prevalent stream impairments. Sedimentation and eutrophication due to nutrient loading are the primary water quality problems affecting reservoirs in this basin.

Surface waters not meeting water quality standards in the basin are included on the 2006 303d list of impaired waters.⁽¹⁾ High priority Total Maximum Daily Loads (TMDLs) for impaired surface waters in the Missouri basin were originally submitted to the Environmental Protection Agency for approval in 1998 by the Kansas Department of Health and Environment (KDHE). An additional round of TMDL development was completed in 2007. High priority TMDL watersheds are identified to target technical and financial assistance for implementation of non-point source pollution management practices to address designated pollutants.

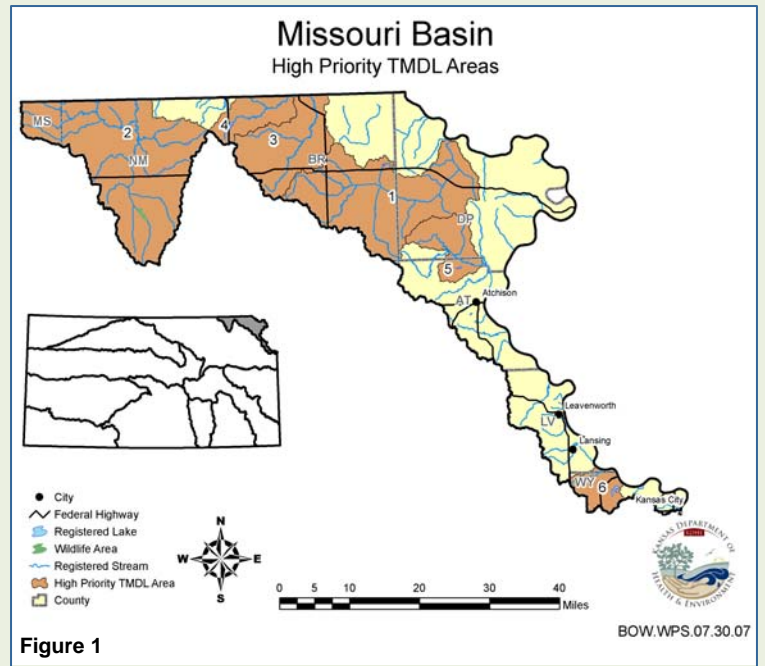


Figure 1

A TMDL is the maximum amount of a pollutant that a water body can receive without violating water quality standards. Since pollution can arrive via point and non-point sources, the TMDL development process identifies contributing sources for the pollutant loads. High priority TMDL areas are shown in Figure 1 and Table 1.⁽¹⁾

**TABLE 1
MISSOURI BASIN HIGH PRIORITY TMDLS**

MAP ID	WATERBODY	IMPAIRMENTS	HUC 11 WATERSHEDS
STREAM SEGMENT			
1	Wolf River	FCB, BIO	10240005060
2	Big Nemaha River	FCB, BIO	10240007010
			10240007021
			10240007030
3	Walnut Creek	FCB	10240008050
LAKES			
4	Pony Creek Lake	E	10240008050
5	Atchison State Fishing Lake	E	10240011010
6	Wyandotte Co. Lake	E	10240011030

Note: For each of the high priority lakes in the basin, the TMDL only applies to the area upstream of the lake.

Key:
 E: Eutrophication, biological community impacts and excessive nutrient/organic loading
 BIO: Biology
 FCB: Fecal Coliform Bacteria
 HUC: U.S. Geologic Survey Hydrologic Unit Code
 See the KDHE TMDL website for additional information⁽¹⁾

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Surface Water Nutrient Reduction

Nutrient sources within the basin include both point and non-point sources. The major point sources in the basin include large wastewater treatment plants which are regulated under the National Pollutant Discharge Elimination System (NPDES) Program (Figure 2) administered by KDHE.

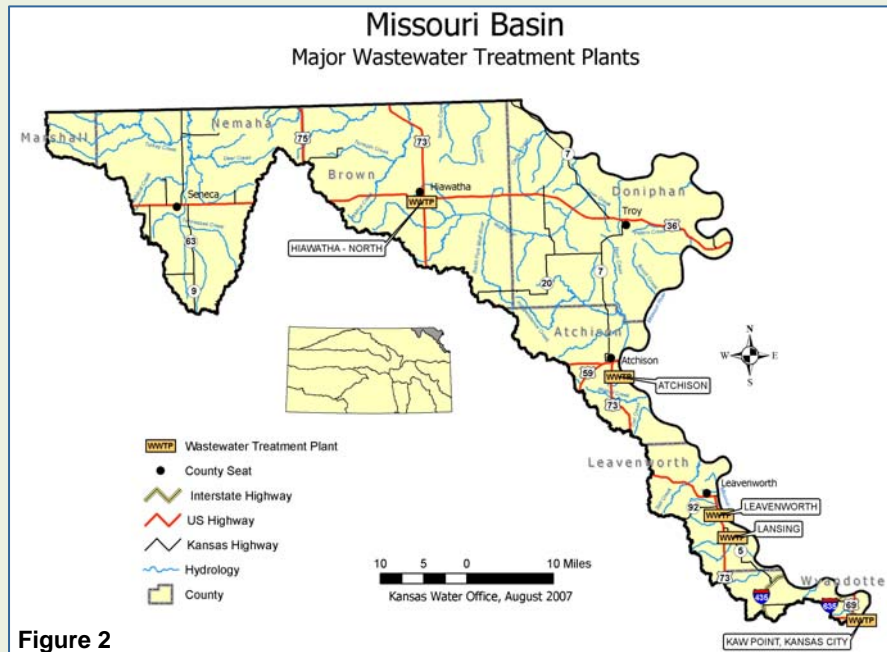


Figure 2

The *Kansas Surface Water Nutrient Reduction Plan*,⁽²⁾ developed by KDHE, outlines a statewide strategy for reducing the export of total nitrogen (TN) and total phosphorus (TP) in surface waters leaving the state. This involves additional reductions in nutrients from point source discharges through the NPDES Program and reductions in non-point sources through development and implementation of Watershed Restoration and Protection Strategies (WRAPS).

The Nutrient Reduction Plan includes Improvement Potential Index (IPI) maps for Kansas counties for TP and TN reductions.⁽²⁾ A scale (low potential improvement to high potential improvement) was developed for: phosphorus fertilizer use, excess on-farm manure phosphorus quantity, nitrogen fertilizer use, nitrogen fertilizer transport potential and excess on-farm manure nitrogen quantity.

These values were used to calculate IPI values for nitrogen (scale 1-20) and phosphorus (scale 1-10) on a county-by-county basis. The higher the ranking value, the greater the relative potential for improvements produced within that county. It should be noted that the IPI is a relative measure. It does not mean a county with an

IPI of eight can make twice the improvement of a county with an IPI of four. The higher IPI only suggests there is a greater possibility of improvement. In the Missouri basin, Nemaha County showed an improvement potential range of 8.1 - 12.0 for TN with Brown County showing a range of 4.1 - 8.0 TN. The IPI index range for TP was 6.1 - 8.0 for both counties. All other counties in the basin had an IPI index of less than 2 for TN and TP.

Nonpoint sources of pollution include both agricultural and urban areas. KDHE has not assigned nonpoint source nutrient loads to the Missouri River due to the impractical nature of sampling for Kansas specific inputs. The Missouri basin, however, has one of the largest nutrient point sources in the state at the Kaw Point wastewater treatment plant in Kansas City, Kansas. While no data on nutrient reduction are available for the Kansas portion of the Missouri basin because of a lack of non-point source data, efforts are being made to work with Kansas City, Kansas to study nutrient reduction at the Kaw Point treatment plant.

Source Water Protection

All [public water suppliers](#) in the basin completed source water assessments in cooperation with KDHE in 2004.⁽³⁾ The next step, is the development of voluntary source water protection plans.

Of the 17 public water suppliers in the basin which treat raw water, four use [surface water](#) and 14 use ground water (one uses both). Each source water assessment included a susceptibility score which can help communities determine which contaminants pose the most significant threat to their water supply. A score generated from the susceptibility analysis, indicates whether the susceptibility range is low, moderate or high for potential threats of contamination in an assessment area.

KDHE provided public water suppliers susceptibility scores in the following contaminant categories: microbiological, nitrates (applicable for ground water only), pesticides, inorganic compounds, synthetic organic compounds, volatile organic compounds, sedimentation (surface water only), and eutrophication/phosphorus (surface water only).

Of public water suppliers using ground water in the Missouri basin, 64% had low susceptibility scores and 36% had moderate scores. Of public water suppliers using surface water, 25% had low susceptibility scores and

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75% had moderate scores. The most commonly identified problems with ground water were volatile and synthetic organic compounds, pesticides and microbes. The most commonly identified problems with surface water were volatile and synthetic organic compounds, inorganic compounds, sediment and eutrophication/phosphorus.

For communities using ground water, development of a wellhead protection program is recommended. For communities using surface water, the development of a watershed restoration and protection strategy (WRAPS) is the best mechanism to ensure water quality protection for their public water supply. The Missouri basin has three complete and approved source water protection plans as of 2004.⁽³⁾

Wetland and Riparian Area Management

The primary approach to wetland and riparian area management in the basin focuses on providing technical and financial assistance to landowners to protect and restore these resources in priority watersheds through the implementation of best management practices. Water quality has been a primary focus with implementation efforts targeted to high priority TMDL watersheds (Figure 2). All conservation districts in the basin have developed wetland and riparian protection plans.

Watershed Restoration and Protection Strategies

Watershed Restoration and Protection Strategies (WRAPS) are stakeholder-driven management plans designed to address multiple water resource issues within a specific watershed. The WRAPS process provides a means to integrate objectives from multiple local, state and federal programs into a comprehensive, coordinated strategy for a specific watershed. This can include TMDL attainment, nutrient reduction, source water protection, riparian and wetland management and other natural resource objectives.

A basin-wide Missouri River WRAPS is currently being developed.⁽⁶⁾ It is anticipated that WRAPS projects in the basin will encompass priority areas for TMDL implementation, areas with a high improvement potential index for nutrient reduction, source water assessment areas and priority areas for wetland and riparian protection.

An important consideration for watershed restoration and protection in this basin, particularly in the southern portion of the watershed, is urbanization. Between 2000 and

2006, the population of Leavenworth County increased by 4,929 or 7.2%. All other counties in the basin experienced declines in population. Although Wyandotte County declined in population by 1.5% over the period, it remains the most urbanized county in the basin.

As the amount of impervious surface in a watershed (i.e. rooftops, roads, parking lots, etc.) increases, water resources can be adversely impacted. Runoff volume increases and additional pollutants associated with urban environments may enter streams and ponds unless preventive steps are taken by local government and urban residents. Sound land use planning and storm water management are essential to limit adverse effects.

Local [land use](#) planning and zoning authorities provide cities and counties effective tools to minimize the potential impacts of development on water resources. Urban stormwater management programs can be implemented to manage the amount of impervious surface in urbanizing watersheds and properly control increased runoff resulting from urbanization. Programs that provide technical assistance and education to urban residents regarding actions that can reduce or eliminate potential pollution sources also play an important role. These programs can be integrated with WRAPS projects to ensure a comprehensive approach to watershed management in urban areas.

Another consideration for watershed restoration and protection in the basin will be the potential for conversion of Conservation Reserve Program (CRP) acreage back to production agriculture as contracts expire. Of the 90,251.6 acres enrolled in six of the seven Kansas counties contained wholly or partly in the Missouri basin, contracts on 18,942.1 acres expired on September 30, 2007.⁽⁴⁾ The total CRP acreage in Wyandotte County is restricted under the Freedom of Information Act, but is considered to be minimal. If land is taken out of permanent grass cover, implementation of best management practices will be needed to minimize potential adverse impacts to water resources within the basin.

Other Watershed Related Activities

- The seven counties either wholly or partly within the basin have adopted local sanitary/environmental codes or participate in the Local Environmental Protection Program.
- Doniphan, Leavenworth and Wyandotte counties have countywide planning and zoning programs.
- All conservation districts in the basin have adopted nonpoint source pollution management plans.

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Grants under the State Water Quality Buffer Initiative have also been awarded in Doniphan, Marshall and Nemaha counties to support buffer coordinators and facilitate enrollment of stream buffers in continuous CRP.

- Of cities in the basin, Kansas City, Kansas, Leavenworth and the Kansas portion of St. Joseph located west of the Missouri River have been issued Phase II Permitted Municipal Separate Storm Sewer System under the NPDES Stormwater Program.
- As of December 2006, there were three active contamination sites being remediated through the State Water Plan Program (Contamination Remediation)
- There are six organized [watershed districts](#) in the basin.

Applicable Kansas Water Plan Objectives

- By 2010, reduce the average concentration of bacteria, biochemical oxygen demand, solids, metals, nutrients, pesticides and sediment that adversely affect the water quality of Kansas lakes and streams.
- By 2010, ensure that water quality conditions are maintained at a level equal to or better than year 2000 conditions.
- By 2010, reduce the average concentration of dissolved solids, metals, nitrates, pesticides and volatile organic chemicals that adversely affect the water quality of Kansas ground water.
- By 2010, maintain, enhance or restore priority wetlands and riparian areas.

Basin Specific Objectives

- By 2010, over 25% of the high priority TMDLs identified in 2001 and 2007 for the Missouri basin will have data supporting their delisting as impaired on the 2012 Kansas 303(d) list.
- By 2010, all public water suppliers will complete and implement a source water protection plan.
- By 2015, nutrient reduction goals will be included in all WRAPS projects within the basin.
- By 2015, integrate urban stormwater management goals into all urban area WRAPS and support the implementation of urban stormwater management projects as outlined in WRAPS action plans.

Recommended Actions

1. Work with stakeholder groups to incorporate TMDL implementation, nutrient and sediment reduction, and urban stormwater management goals into applicable WRAPS projects.
2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans.

Resources

1. Kansas Department of Health and Environment, Bureau of Water. 2007. *Watershed Planning and TMDL Program*. www.kdheks.gov/tmdl
2. Kansas Department of Health and Environment, Bureau of Water. December 2004. *Surface Water Nutrient Reduction Plan*, www.kdheks.gov/water
3. Kansas Department of Health and Environment, Bureau of Water. 2004. *Kansas Source Water Assessment Report*. www.kdheks.gov/nps/swap
4. USDA Farm Service Agency. 2007. *Summary of Active and Expiring CRP Cropland Acres by County* www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crt
5. Kansas Water Office. 2006. *Kansas Water Plan Water Quality Policy and Institutional Framework Section*.
6. Kansas Department of Health and Environment, Bureau of Environmental Remediation. December 2005. *Basin Updates and Site Accomplishments*
7. Kansas Department of Health and Environment, Bureau of Water. 2007. *Kansas Watershed Restoration and Protection Strategy*. www.kdheks.gov/nps/wraps