

Lower Arkansas Basin High Priority Issue Watershed Restoration and Protection Approved January 2007

Issue

The restoration of watersheds with impaired water quality and the protection of watersheds above public water supply reservoirs and ground water sources used for drinking water supplies are high priority in the [Lower Arkansas Basin](#). Three main components guide watershed restoration and protection efforts: achievement of Total Maximum Daily Loads, development of Source Water Protection Plans, and restoration and protection of wetland and riparian areas.

Description

Water quality and related water resource issues are addressed through a combination of watershed restoration and protection efforts utilizing voluntary, incentive based approaches, as well as regulatory programs.

Water Quality Impairments

[Surface waters](#) not meeting surface water quality standards in the basin are included on the 2004 303d list.

High priority Total Maximum Daily Loads (TMDLs) for impaired surface waters in the Lower Arkansas basin were submitted to the Environmental Protection Agency (EPA) for approval on June 29, 2000. An additional round of TMDL development was completed in 2006. Table 1 provides information on rivers and lakes within the basin that are designated as high priority for TMDL implementation. Figure 1 shows the location of these areas within the basin. High priority TMDL watersheds are used to target voluntary, incentive based programs that provide technical and financial assistance for implementation of nonpoint source pollution management practices that can address designated pollutants.

Six additional TMDLs covering nutrient impairments were drafted and submitted for public review from September 13 to 30, 2006; these TMDLs were submitted to EPA in late 2006. Atrazine impairments on the Little Arkansas River and its tributaries are being addressed through a watershed management plan implemented through the Little Arkansas Watershed Restoration

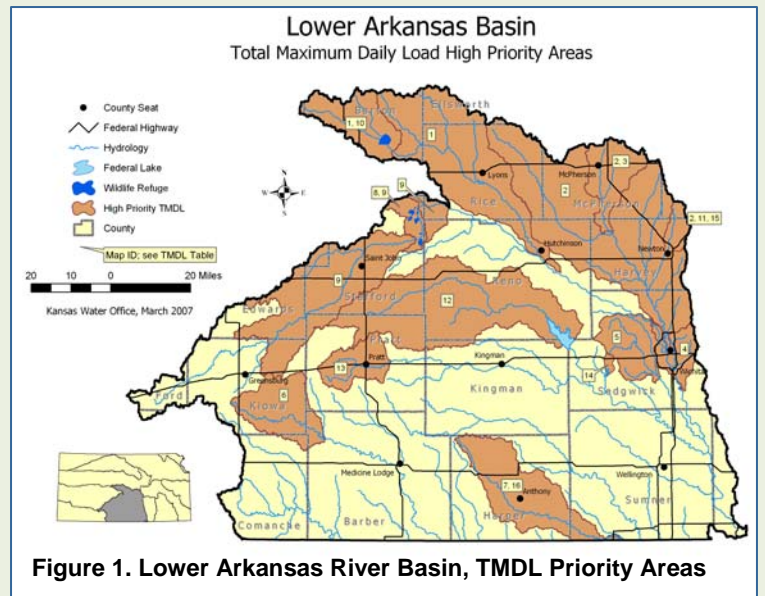


Figure 1. Lower Arkansas River Basin, TMDL Priority Areas

and Protection Strategy (WRAPS). This alternative, categorized by EPA in its 2006 listing guidance as a “4B alternative”, addresses the impairment in lieu of a TMDL.

Table 1

Map ID	Waterbody	Impairments	HUC 8 Watersheds
1	Cow Creek Watershed	BAC, DO	11030011
2	Little Arkansas River Watershed	BAC, NUTR, SILT, ATZ	11030012
3	Turkey Creek Watershed	DO	11030012
4	Arkansas River below Wichita	BAC	11030010 11030013
5	Cowskin Creek Watershed	BAC, , BIO	11030013
6	Upper Medicine Lodge River Watershed	BAC	11060003
7	Bluff Creek Watershed	BAC, DO	11060005
8	Quivira Big Salt Marsh Watershed	EUTRO	11030009
9	Quivira Little Salt Marsh Watershed	EUTRO	11030009
10	Cheyenne Bottoms Watershed	EUTRO	11030011
11	Newton City Park Lake Watershed	EUTRO	11030012
12	Cheney Lake Watershed	EUTRO, SILT	11030014
13	Pratt County Lake Watershed	EUTRO	11030015
14	Lake Afton Watershed	EUTRO	11030016
15	Sand Creek Watershed	NITRATE	11030012
16	Lake Anthony	EUTRO, SILT	11060005

DO: Low dissolved oxygen in upper 3 meters of water column over deepest location in water body
 EUTRO: Eutrophication, biological community impacts and excessive nutrient/organic loading. If applicable, the Eutrophication TMDLs are bundled with pH, aquatic plants, and/or DO impairments. These impairments are all interrelated and effected by nutrient loading.
 NUTR: Nitrogen and Phosphorus
 BAC: Bacteria
 BIO: Biology impairment caused by excessive sediment, nutrients or organic matter
 ATZ: Atrazine concentrations exceed 3 ppb on annual average and in a significant number of periodic samples
 NITRATE: Nitrate concentrations exceed 10 ppb in surface water

**Lower Arkansas Basin High Priority Issue
Watershed Restoration and Protection
Approved January 2007**

A complete description of each TMDL is available on the Kansas Department of Health and Environment TMDL website.⁽⁹⁾

Surface Water Nutrient Reduction

Nutrient sources within the basin include both point and nonpoint sources. The major point sources in the basin include large wastewater treatment plants, which are regulated under the National Pollutant Discharge Elimination Systems (NPDES) Program (Figure 2).

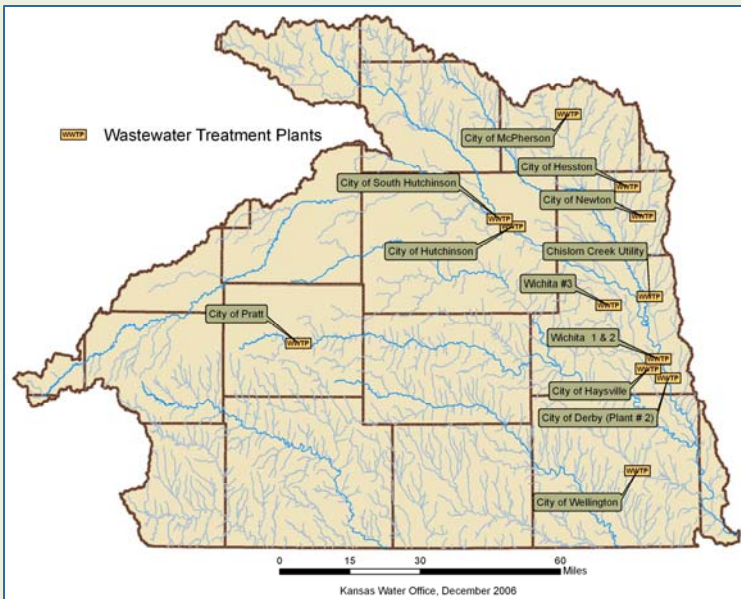


Figure 2. Major Wastewater Treatment Facilities in LARK Basin

A major component of the Kansas Surface Water Nutrient Reduction Plan (Plan) involved looking at nitrogen transport to the Gulf of Mexico. In order to calculate the contribution of nitrogen to the Gulf, nitrogen concentrations of waters exiting the state borders were collected and estimated.

As predicted by studies from the USGS, only a small amount of nitrogen is expected to be transported from watersheds in the upper part of the Arkansas River basin to the Gulf of Mexico. Thus, to try to predict the contribution the Upper Arkansas basin makes to the Lower Arkansas basin would be difficult. It should also be noted that while the Upper Arkansas basin is not predicted to produce a significant surface water impact, exfiltration to local aquifers could produce significant ground water impacts. Furthermore, TMDLs on the Arkansas River between Great Bend and Hutchinson are influenced by nutrient loading coming from the Upper Arkansas Basin. Therefore, some degree of nutrient reduction should be expected from the eastern portion of the Upper Arkansas basin.

Since there are no “exit points” for the Upper Arkansas basin, all contribution from this basin is added to the Lower Arkansas basin where the Arkansas River exits Kansas into Oklahoma. Therefore, for the purpose of the Plan, the Upper and Lower Arkansas River basins were combined as a single composite basin.⁽⁶⁾

The primary nonpoint sources of pollution include both agricultural and urban areas. Table 2 shows the relative contributions of point and nonpoint sources in the Lower Arkansas and Upper Arkansas basins for total phosphorous and nitrogen leaving the state.

Parameter (Ton/Year)	State Total	Upper and Lower Arkansas Basin	% of State Total
TN Leaving State	51,205	6,943	14%
TP Leaving State	7,670	1,582	21%
Point Source TN	10,600	3,503	33%
Point Source TP	2,836	886	31%
Nonpoint Source TN	40,605	3,440	8%
Nonpoint Source TP	4,834	696	14%

Parameter (Ton/Year)	UARK & LARK Basin Total	Point Source	Point Source %	Non-point Source	Nonpoint Source %
TN	6,943	3,503	50%	3,440	50%
TP	1,582	868	56%	696	44%

The Plan, 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.⁽⁶⁾ This involves additional reductions in nutrients from point source discharges through the NPDES Program and reduction in nonpoint sources through development and implementation of Watershed Restoration and Protection Strategies (WRAPS). The Plan includes Improvement Potential Index (IPI) maps for Kansas counties for TP and TN reductions (see [Water Quality Policy Section](#) for statewide maps; basin maps Figures 3 and 4). In the Lower Arkansas basin, Barton, Rice, Reno, Stafford and Pratt counties showed the highest improvement potential for TN. Barton, Stafford, Pratt, Reno and McPherson counties showed the highest improvement potential for TP. These counties should receive priority consideration for the installation of nutrient management and reduction practices.

Lower Arkansas Basin High Priority Issue Watershed Restoration and Protection Approved January 2007

Source Water Protection

The KDHE, Bureau of Water administers programs related to public water supplies, wastewater treatment systems, the disposal of sewage and nonpoint sources of pollution. Programs are designed to provide safe drinking water, prevent water pollution and assure compliance with state and federal laws and regulations such as the Clean Water Act and Safe Drinking Water Act. State Water Quality Standards include provisions for alternative disposal of treated wastewater and residue material resulting from the waste treatment process.⁽¹⁰⁾ KDHE's minimum standards for the design of water pollution control facilities include guidelines for agricultural application of wastewater and sludge. Reuse of treated wastewater may contribute to water conservation within the basin.

All public water suppliers in the basin have completed Source Water Assessments in cooperation with KDHE. The next step, which is voluntary, is the development of source water protection plans.⁽⁴⁾

There are 118 [public water suppliers](#) in the basin, including 28 rural water districts. There are currently four public wholesale water supply districts in the basin. Ground water is the primary source for most public water supplies, accounting for over 90% of the total supply. The two major sources of ground water are the Equus Beds aquifer in Harvey, McPherson, eastern Reno and north-

ern Sedgwick counties, and the Great Bend Prairie aquifer, predominately underlying Pratt, Stafford, southern Barton, Edwards, Kiowa and Reno counties. Cheney Reservoir, constructed on the North Fork of the Ninnescah River in Reno County, supplies a portion of the water supply for Wichita. Wellington Lake serves as a [surface water](#) supply for the City of Wellington.

Each Source Water Assessment includes a susceptibility score that can help communities determine which contaminants pose the most significant threat to their water supply. A susceptibility score was generated from the susceptibility analysis and indicates whether the susceptibility range is low, moderate or high for potential threats of contamination in an assessment area. Each public water supplier received susceptibility scores in the following contaminant categories: microbiological, nitrates (ground water only), pesticides, inorganic compounds, synthetic organic compounds, volatile organic compounds, sedimentation (surface water only) and eutrophication-phosphorus (surface water only).

Of the public water suppliers using ground water in the Lower Arkansas River Basin, 41% had low susceptibility scores, 58% had moderate scores and one had a high score. Of the public water suppliers using [surface water](#) in the Lower Arkansas River Basin, 33% had low susceptibility scores, 67% had moderate scores and none had high scores.

Improvement Potential Index (IPI) for Total Nitrogen in Surface Waters

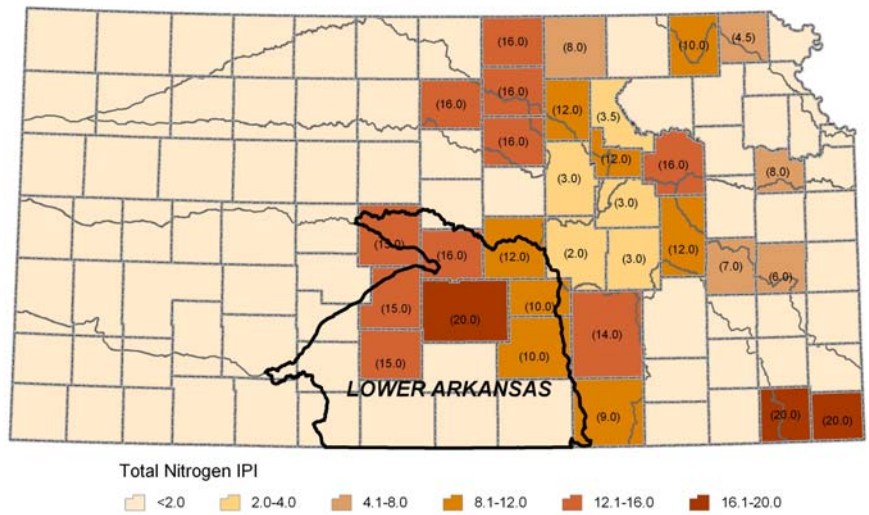


Figure 3. Improvement Potential Index (IPI) for Total Nitrogen (TN) in LARK River Basin

Improvement Potential Index (IPI) for Total Phosphorus in Surface Waters

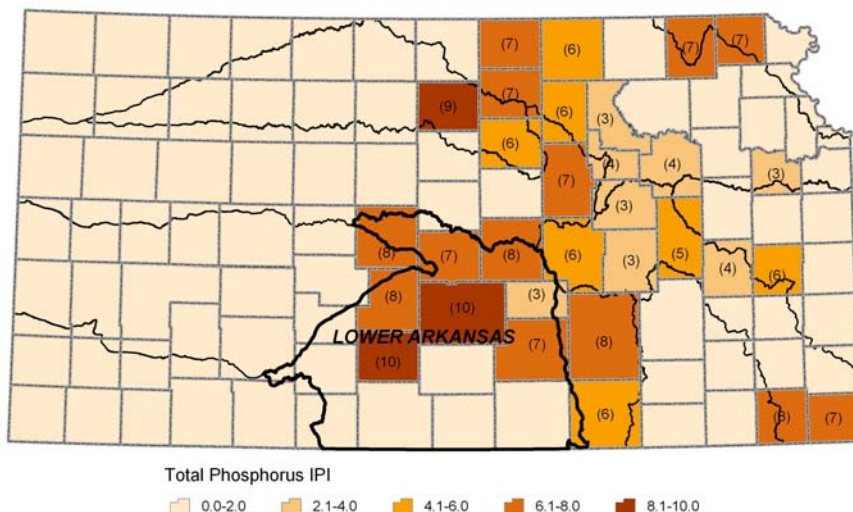


Figure 4. Improvement Potential Index (IPI) for Total Phosphorus (TP) in LARK River Basin

**Lower Arkansas Basin High Priority Issue
Watershed Restoration and Protection
Approved January 2007**

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.

Wetland and Riparian Area Management

The primary approach to wetland and riparian 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 1). In addition, several watersheds have been identified in the Kansas Wetlands and Riparian Areas Protection and Restoration Implementation Plan as areas of high biological importance and a priority for implementation activities. Sixteen 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 watershed 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.⁽⁵⁾

The watershed above Cheney Reservoir in the basin has been identified as a watershed of significant state interest for development and implementation of WRAPS. A WRAPS project is being implemented in this watershed as well as other watersheds within the basin including the Little Arkansas River watershed (see [WRAPS Project Status Map in the Water Quality Policy Section](#)). Watersheds in the WRAPS projects currently underway in the basin encompass priority areas for TMDL implementation, areas with a high improvement potential index for nutrient reduction, source water assessments areas and priority areas for wetland and riparian protection, and other watershed issues.

A consideration for watershed restoration and protection in the basin is the potential for conversion of Conservation Reserve Program (CRP) acreage back to production

agriculture as contracts expire. Of the acres enrolled in the twenty Kansas counties contained wholly or partly within the Lower Arkansas basin, 330,872 acres will expire in 2007. Of those, 107,695 acres (33%) will be offered a 5-year reenrollment option and 73,127 acres (22%) will receive a 10-year reenrollment option.⁽⁸⁾ 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 in the basin.

Other Watershed Related Activities

- All the counties within the basin have a sanitarian funded by the Local Environmental Protection Program (LEPP).
- Counties in the basin that have countywide planning and zoning programs include Barton, Cowley, Ford, Harper, Harvey, Kingman, Marion, McPherson, Pawnee, Reno, Rice, Sedgwick and Sumner.
- All conservation districts in the basin have adopted nonpoint source pollution management plans. Buffer coordinators have also been employed in nine counties in the basin to facilitate enrollment of stream buffers in the continuous CRP and State Water Quality Buffer Initiative.
- Several entities and municipalities in association with the Wichita urban area are included in the Phase I and Phase II NPDES Stormwater Program. A list of affected communities is available on the KDHE website.⁽¹¹⁾
- There are seven organized [watershed districts](#) in the basin.

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 WRAPS action plans, including those addressing high priority TMDLs and counties with high Improvement Potential Index values for nutrient reduction.

**Lower Arkansas Basin High Priority Issue
Watershed Restoration and Protection
Approved January 2007**

Page 5

Resources

1. *Kansas Water Plan* Water Quality Policy and Institutional Framework Section, 2006.
2. *Kansas Water Plan* Lower Arkansas Basin Section, Watershed Restoration and Protection Issue, November 2003.
3. Kansas Department of Health and Environment, Bureau of Environmental Remediation, Basin Updates and Site Accomplishments, December 2005.
4. Kansas Department of Health and Environment, Bureau of Water, Kansas Source Water Assessment Report, www.kdheks.gov/nps/swap, 2004.
5. Kansas Department of Health and Environment, Bureau of Water, Kansas Watershed Restoration and Protection Strategy, www.kdheks.gov/nps/wraps, 2006.
6. Kansas Department of Health and Environment, Bureau of Water, Surface Water Nutrient Reduction Plan, www.kdheks.gov/water, December 2004.
7. Kansas Department of Health and Environment, Bureau of Water, Watershed Planning and TMDL Program, www.kdheks.gov/tmdl, 2006.
8. USDA Farm Service Agency, www.fsa.usda.gov, 2006.
9. Kansas Department of Health and Environment, Bureau of Water, Watershed Planning Section Map and lists of TMDLs. <http://www.kdheks.gov/tmdl/index.htm>
10. Kansas Department of Health and Environment, Division of Environment, Bureau of Water. K.A.R. 28-16-120 and 28-16-28C State Water Quality Standards.
11. Kansas Department of Health and Environment, Division of Environment, Bureau of Water, Municipal Stormwater Program. [http://www.kdheks.gov/stormwater/download/Phase I and II MS4s in Kansas.pdf](http://www.kdheks.gov/stormwater/download/Phase_I_and_II_MS4s_in_Kansas.pdf)