

Upper 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 ground water sources used for drinking water supplies and irrigation are high priority in the [Upper Arkansas basin](#). Three main components guide water quality efforts; achievement of Total Maximum Daily Loads (TMDL), development of Source Water Protection Plans, and restoration and protection of wetland and riparian areas.

The Upper Arkansas River has problems with both low flows and very saline water quality as it enters Kansas from Colorado.⁽¹⁴⁾ The flow in the Arkansas River has been impacted by uses of water in Colorado since the late 1940s and the operation of John Martin Reservoir through the provisions of the Arkansas River Compact. The streamflow issue is being addressed with improved Arkansas River Compact compliance and monitoring. Improved water quality is necessary as the river crosses the state border. Poor quality surface water is seeping into and degrading the good water quality High Plains aquifer along the river corridor. The degradation is impacting or threatening public water supply wells along the river corridor. Protection of the fresh ground water in the region is critical for municipal, industrial and agricultural uses.

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.

The state continues to protect its interest in the Arkansas River Compact with Colorado. Final resolution of the reimbursement for past damages of the Kansas v. Colorado No. 105 lawsuit over compact violations by Colorado resulted in monetary awards. These funds have been credited according to law.⁽¹⁵⁾ After litigation expenses were recovered, two thirds of the monetary award was deposited into a Water Conservation Projects Fund and one third was credited to the State Water Plan for water conservation projects. The Water conservation Projects Fund is now the Western Water Conservation Fund, administered by the Southwest Kansas Groundwater Management District No. 3.

Water Quality Impairments

Surface waters not meeting surface water quality standards in the basin are included on the 303d list.⁽¹⁶⁾ High priority TMDLs for impaired surface waters in the Upper Arkansas basin were approved by the Environmental Protection Agency (EPA) in September 2000 and again in February 2008. 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.⁽⁹⁾

A selenium TMDL on the Arkansas River from Coolidge to Pierceville was approved in 2008. Biological data from

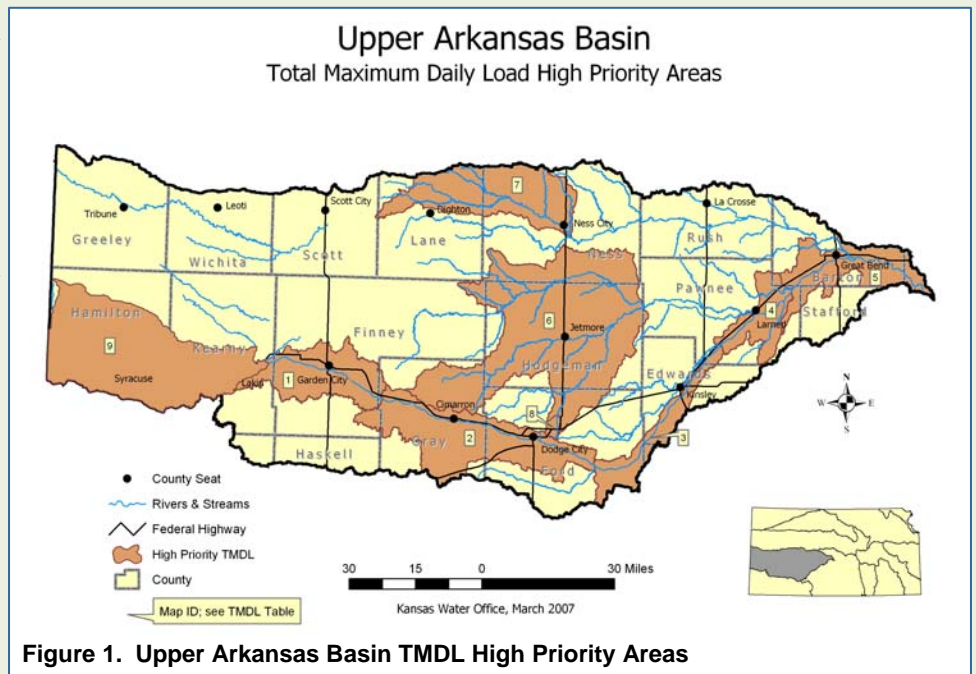


Figure 1. Upper Arkansas Basin TMDL High Priority Areas

the Kansas Biological Survey indicate that selenium is accumulating within the biota of the river, often above the fish tissue criteria proposed by EPA. Previous analyses indicate ambient in-stream selenium levels regularly exceed existing state criteria for aquatic life. Current analysis by Colorado State University is focusing on the increase in selenium seen between John Martin Dam in Colorado and the stateline, the reason for the high selenium levels since the cessation of surplus water in the valley in June 2000, and reviewing ongoing research on Best Management Practices.

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Colorado currently has adopted a temporary modification to its Table of Value Standards for dissolved selenium on the Arkansas River (22.5 ppb). The Colorado Arkansas River Water Quality Standards were revised in 2007. In 2007, Kansas Department of Health and Environment (KDHE) provided testimony to Colorado to highlight the need for reduced selenium concentrations. As part of the Colorado Water Quality Standards review process, Kansas proposed stateline selenium levels of 7 ppb in April through October and 10 ppb in November to March, consistent with the TMDL.

Map ID	Waterbody	Impairments	HUC 8 Watersheds
1	Arkansas River below Garden City to Pierceville	BAC	11030001 11030003
2	Arkansas River - Garden City to Ford	BAC	11030003 11030004
3	Arkansas River - Ford to Kinsley	BAC	11030004
4	Arkansas River - Kinsley to Dundee	BAC	11030004
5	Arkansas River - Dundee to Great Bend	BAC	11030004 11030008
6	Pawnee River/Buckner Creek Watershed	BAC	11030005 11030006
7	Walnut Creek Watershed	BAC	11030007
8	Ford County Lake Watershed	EUTRO, DO, pH	11030006
9	Arkansas River from Stateline to Pierceville	SEL	11030001 11030003

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.
 BAC: Bacteria
 SEL: Selenium – typically set at some natural background level that exceeds the current chronic aquatic life criterion of 5 ppb

KDHE's testimony focused on establishing the desired selenium level for the Kansas segment of the Arkansas River and collaborative management of Arkansas River water quality by the two states.

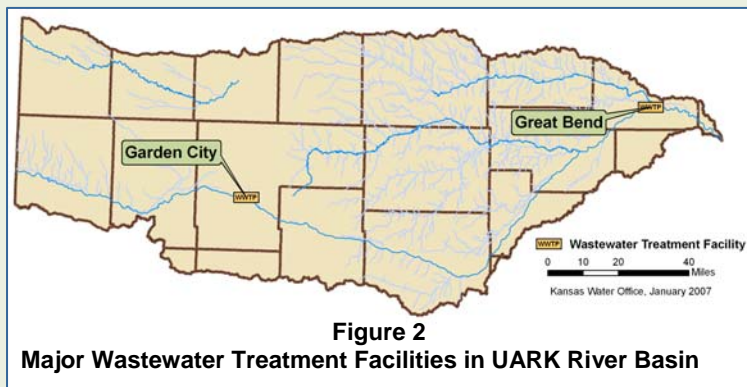
A complete description of each TMDL is available on the KDHE TMDL website.⁽¹⁷⁾

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 System (NPDES) Program (Figure 2).

A major component of the Kansas Surface Water Nutrient Reduction Plan (Plan) involved looking at nitrogen transport to the Gulf of Mexico.⁽⁸⁾ In order to calculate the contribution of nitrogen to the Gulf, nitrogen concentrations of waters exiting the state borders were collected and estimated. 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.



As predicted by studies from the U.S. Geological Survey, 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, infiltration 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. Additionally, nutrient loading leaving Kansas along the Arkansas River may be implicated for causing eutrophication problems in Kaw Lake in Oklahoma.

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

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Based on [land use](#), the nonpoint sources in this basin are overwhelmingly agricultural. To add urban in as a "co-primary source" may leave the impression that urbanized areas play more of a role than they actually do. The three urban areas in the basin, Garden City, Great Bend and Dodge City all fall under the Phase 2 stormwater rules, so their runoff is addressed as a point source under NPDES.

Table 2

Upper and Lower Arkansas River Basin Nutrient Reduction Data

(Source: KDHE, Bureau of Water, February 15, 2006)

Statewide Perspective

Parameter (Ton/Year)	State Total	UARK & LARK 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%

Basin Perspective

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

The Kansas Surface Water Nutrient Reduction 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. 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 Nutrient Reduction Plan includes Improvement Potential Index (IPI) maps for Kansas counties for TP and TN reductions (see [Water Quality Policy Section](#) for statewide maps; Figure 3 & 4). In the Upper Arkansas basin, Barton, Rice and Stafford counties showed the highest improvement potential for both TN and TP. These counties should receive priority consideration for the installation of nutrient management and reduction practices.

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

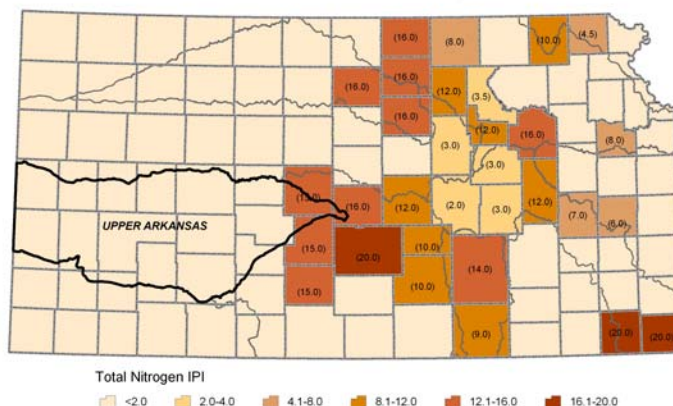


Figure 3

Improvement Potential Index (IPI) for Total Nitrogen (TN) in the UARK River Basin

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

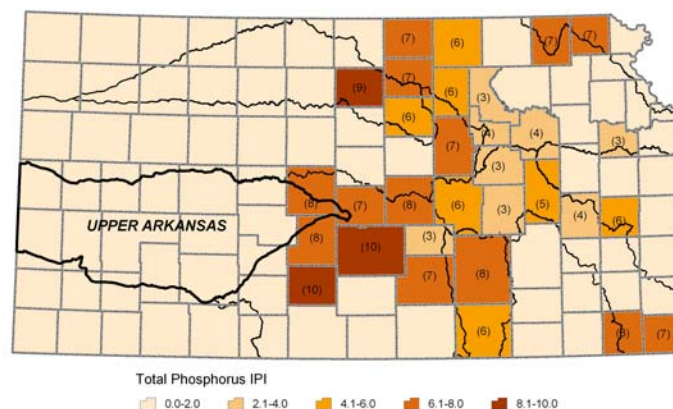


Figure 4

Improvement Potential Index (IPI) for Total Phosphorus (TP) in the UARK River Basin

Source Water Protection

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.⁽⁶⁾

There are 46 public water suppliers in the Upper Arkansas basin, two of which are rural water districts. Ground water is the primary public water supply source in the basin. The major source of ground water is the Ogallala-High Plains aquifer.

Each Source Water Assessment included 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 an analysis that indicates whether the susceptibility range is low, moderate, or high for potential threats of contamina-

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tion 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 Upper Arkansas River Basin, 50% had low susceptibility scores, 50% had moderate scores.

The Kansas Corporation Commission (KCC) regulates rates, service and safety of public utilities, as well as, oil and gas production. KCC has established minimum surface casing requirements for oil and gas pipelines in each county in the Upper Arkansas River Basin to protect fresh and usable water.⁽⁴⁾ Water well construction and abandonment is regulated by the KDHE.

For communities using ground water, development of a wellhead protection program is recommended. For communities using surface water, the development of a 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. Seventeen conservation districts in the basin have developed wetland and riparian protection plans.

Channel capacity and conveyance is an inter-related problem with water quality and streamflow. Reduced flows over an extended period and the reduction of peak flows have allowed channel encroachment. Encroachments are from a variety of sources, including agricultural land use, sand mining and non-native vegetation. The heavy growth of tamarisk (salt cedar) has significantly altered the conveyance of the channel as well as the flow patterns. These findings were consistent with an aerial survey conducted by the Kansas Department of Agriculture in 2004-2006. According to the survey, ap-

proximately 56% of the corridor from the stateline to Hutchinson is infested with tamarisk with the heaviest infestation closer to the stateline. Tamarisk is a nonnative, invasive plant that quickly displaces native vegetation, interfering with natural plant succession and nutrient cycling, and chokes irrigation canals in Kansas. The resulting invasive thickets provide poor grazing and forage for wildlife and livestock; however, it does provide a windbreak. The dense growths also increase fire hazards, decrease water quality and generally use more water than native vegetation. Activities and programs targeted at reducing tamarisk infestation are outlined in the *10-Year Strategic Plan for the Comprehensive Control of Tamarisk and Other Non-Native Phreatophytes*.



Tamarisk flowers. Photo courtesy Kansas Water Office

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.⁽⁷⁾ This can include TMDL attainment, nutrient reduction, source water protection, riparian and wetland management and other natural resource objectives.

WRAPS projects have been initiated in the eastern portion of the Upper Arkansas River watershed (see WRAPS Project Status Map in the [Water Quality Policy Section](#)).⁽¹⁾ WRAPS projects currently underway in the basin encompass priority watersheds 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.

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A 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 acres enrolled in the nineteen Kansas counties contained wholly or partly within the Upper Arkansas basin, 522,448 CRP acres expired in 2007. Of those, 85,393 acres (16%) were offered a 5-year reenrollment option and 102,773 acres (20%) received a 10-year reenrollment option.⁽¹¹⁾ 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.

In December, 2007, the State of Kansas entered into an agreement with United States Department of Agriculture (USDA) for the purpose of encouraging irrigators along the upper Arkansas River corridor to enroll in a Conservation Reserve Enhancement Program (CREP). The state seeks to enroll up to 20,000 acres into the program over the next five years. In return for annual payments, irrigators permanently retire water rights and put acres in a conservation planting for 14-15 years. Reducing irrigation demands on the stream-aquifer system will help slow the aquifer declines, mitigate the spread of saline waters into the aquifer, and help restore stream and riparian health.

Other Watershed Related Activities

- All the counties within the basin have a sanitarian funded by the Local Environmental Protection Program (LEPP).
- All counties in the basin, except Kearny and Ness, have countywide planning and zoning.
- All conservation districts in the basin have adopted nonpoint source pollution management plans. Buffer coordinators have also been employed in six counties in the basin to facilitate enrollment of stream buffers in the continuous CRP and State Water Quality Buffer Initiative.
- There are five organized [watershed districts](#) in the basin.
- Western Water Conservation Project Fund conservation activities recognize water quality issues and are taking water quality impacts into consideration.

Recommended Actions

1. Work with stakeholder groups to incorporate TMDL implementation and nutrient and sediment reduction 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.
3. Continue coordination of agencies' programs and activities to achieve the high priority TMDLs, and show water quality improvements. Lead state agencies include KDHE, SCC, along with Kansas Department of Wildlife and Parks and Kansas Water Office (KWO). Include others as appropriate.
4. Continue inter-agency cooperation and update the water issue strategic plan (WISP) to address the complex inter-state Upper Arkansas Water Quality concerns. Key state agencies include KDHE, SCC, Kansas Department of Agriculture – Division of Water Resources (DWR), and KWO. Include others as appropriate.
5. Encourage enrollment in the Conservation Reserve Enhancement Program (CREP) with emphasis on acres enrolling in the Conservation Practice (CP9) to develop or restore shallow water areas.

Resources

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2. Kansas Water Plan Upper Arkansas Basin Section, High Priority Total Maximum Daily Loads, November 2003.
3. *Kansas Water Plan* Upper Arkansas Basin Section, Upper Arkansas River Water Quality and Streamflow, August 2005.
4. Kansas Corporation Commission. Minimum Surface Casing Requirements. <http://www.kcc.state.ks.us/conservation/kcc/casingIntro.htm>.
5. Kansas Department of Health and Environment, Bureau of Environmental Remediation, Basin Updates and Site Accomplishments, December 2005.

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