

1 Introduction & Background

Introduction

Previous versions of Volume One of the *Kansas Water Plan (KWP)* included large amounts of information about Kansas water management challenges. For 25 years, the Plan has followed largely the same format and has grown larger with every version as updates were added and new priorities identified through the planning process.

During stakeholder discussions held prior to beginning the current update, individuals who are the audience for the *KWP* were consulted about its format and content. Overwhelmingly, stakeholders told us that the *KWP* had become so large and full of information that it was difficult to use. Furthermore, they indicated that there was too much redundancy resulting in confusion as to what the priority issues are and uncertainty about what current policies and activities are the focus.

This version consolidates the content and reduces redundancy allowing the reader to derive an overview of the topics and providing electronic links for more detailed information. The following topics are included as an introduction to water planning and management in Kansas:

- Brief History of Kansas Water Planning
- Kansas Water Planning Process Today
- State Water Plan Fund
- Management of Water in Kansas
- Physical Setting and Climate
- Groundwater
- Surface Water
- Water Quality
- Interstate Waters

Brief History of Kansas Water Planning

The *KWP* is one of the primary tools used by the State of Kansas to address current water resources issues and to plan for future needs. The *KWP* guides coordination of local, state and federal actions. Statutory authority and basic guidance for formulating the *KWP* is contained in the [State Water Resources Planning Act](#).

Early Planning Efforts

Kansas water issues have been studied, characterized and documented since creation of the Kansas Water Commission in 1917. The commission was directed by the legislature to “work out a systematic general plan for the complete development of each watershed in the state”. The commission produced a 400 page report, “Surface waters of Kansas, 1895-1919.” In 1927, the commission was dissolved and replaced with the Division of Water Resources within the State Board of Agriculture ([K.S.A. 74-506 et. seq.](#)). The legislature again directed that “general plans for the complete development of each watershed in the state” be prepared. Funding was not provided and it was not until 1947 that the first report was officially prepared.

During these years, the emphasis was on data gathering to characterize the water resources of the state. Many technical studies were prepared as officials recognized that to assess needs and identify priorities, baseline conditions of water resources across the state needed to be established.

1950s to 1960s

Disastrous widespread flooding in 1951 followed by se-

vere droughts in the mid 1950's focused attention on weather extremes of the state. In 1954 funding for a comprehensive water resource study was allocated from the State Emergency Fund. The resulting document "*Water in Kansas*" was presented to the Governor and legislature on January 2, 1955. A key recommendation was "to provide the necessary organizational structure, personnel and funds to prepare and maintain a state plan of water resources development." The Kansas Water Resources Board (KWRB) was established in 1955 to fulfill this recommendation. The KWRB determined that the twelve major river basins in the state would delineate hydrologic boundaries for subsequent resource inventories, problem identification and planning needs that were compiled between 1955 and 1963.

The culmination of this work was the [*State Water Plan Act*](#) of 1963 which mandated the preparation of a state water plan by the KWRB in cooperation with other agencies. In 1965, the Board submitted a draft of proposed legislation which was enacted as the *Kansas Water Plan*.

During the 1960s, the Board prepared reports on special water districts, groundwater, water quality control needs, irrigation, water law, and water demands for industrial, municipal and rural domestic uses. Over the next decade, KWRB became an important partner with local and state stakeholders and the federal government in many water resources development projects. These included the construction of federal dams and reservoirs by the U.S. Army Corps of Engineers (Corps) and the Bureau of Reclamation (Bureau), construction of watershed dams by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) and development of rural water districts using financial assistance from the USDA Farmer's Home Administration. Much of this activity was federally driven and some state laws were developed to complement federal programs. Water resource development was in full swing during these decades.

1970s to 1980s

Continuing into the 1970s, the KWRB expanded into studies of mineral intrusion areas as well as placing increased emphasis on conservation and management in the *KWP*. By the 1970s, rising costs and public environmental concerns altered the water resources development landscape. The era of intense water resources development was coming to an end as the need for a more management-oriented approach to water resources was recognized. Drought again gripped much of Kansas in 1976 and there was increasing concern about rapid depletion of groundwater supplies in western Kansas. Recognizing this change in

priority, the *Governor's Task Force on Water Resources* was created in 1977. The Task Force reinforced the importance of the *KWP* in achieving interagency coordination for water resource and policy planning. A proposed reorganization to consolidate the functions of the KWRB, the Division of Water Resources and the water related functions of the Division of Environment of the Kansas Department of Health and Environment was discussed but not recommended.

Consolidation continued to be evaluated however and during the 1981 legislative session the KWRB was replaced by the [*Kansas Water Office*](#) (KWO) and the [*Kansas Water Authority*](#) (KWA) effective July 1, 1981. The KWO became the new coordination agency charged with development of a state plan addressing water development, conservation and management. Comprised of 13 appointed citizen members representing various water resources interests and 11 state agency representatives, duties of the KWA include:

- Consulting with and advising the Governor, Legislature and Director of the KWO on water management issues;
- Reviewing plans of any state or local agency related to the water resources of the state;
- Studying laws related to water resource management issues and recommending new or amendatory legislation;
- Recommending coordination of water resource management activities and
- Approving amendments to the *KWP*.

KWO staff began immediately to reformulate the *KWP* to reflect current responsibilities and policies and development of and modifications to existing programs needed to meet new challenges. Throughout the early 1980s numerous public meetings were held as various drafts and revisions to the *KWP* were presented. The Kansas legislature endorsed the comprehensive, continuous coordinated planning process used to develop the *KWP* that is still used today. It was during this time that citizen advisory groups or [*Basin Advisory Committees*](#) (BAC) were organized in each basin to ensure continued public involvement in the water planning process. Another significant accomplishment was establishment of the *State Water Plan Fund* (SWPF) which is dedicated to implementation of water related programs or projects identified in the SWP.

1990s

With the institutional structure of the planning process, coordination and water resource focus in place, the *KWP*

was regularly updated with guidelines to agencies on an annual basis and recommendations for SWPF expenditures were made. Efforts continued to ensure that the *KWP* was relevant for water resource planning for both policy and basin priorities in Kansas. Public input continued through the BACs and was enhanced with statewide public meetings on relevant issues.

Kansas Water Planning Process Today

With a new century came a renewed evaluation of the water planning process. In 2002, an extensive review of water resource agencies was again undertaken. An enhanced coordination process was established, including a Natural Resources Subcabinet comprised of agency executives named by the Governor. The subcabinet met weekly through 2011 to discuss and coordinate common issues. While the authority establishing the Subcabinet was not renewed, agency personnel continue to meet regularly, recognizing the benefit of enhanced communication and agency coordination.

The last revision of the *KWP* was in 2009. Through the years, content of the *KWP* has greatly expanded and as of 2009, when the last update was accomplished, the plan consisted of four separate volumes. [Volume One](#) provides an overview of the water planning process and purpose and highlights a history of water planning. [Volume Two](#) covers statewide management policies and objectives. [Volume Three](#) covers the 12 basin sections and their priority issues. An [atlas](#) of maps and graphics depicts the resource conditions for each basin. A supplementary [Program Manual](#) (Redbook) describes various state and federal water resource programs.

The Kansas water planning process continues to incorporate the three key state water plan characteristics mandated by the *State Water Resources Planning Act*: comprehensive, coordinated and a continuous adaptive planning approach. Adaptive planning is the cornerstone upon which the planning process and the *KWP* rest. This view of water resource planning supports the ability of the decision-making process to be flexible in response to changing current and future conditions and promotes adjustments from the current situation which do not foreclose future resource use options.

Accordingly, this new revision of the *KWP* streamlines the information contained within. With 25 years of experience in Plan implementation, redundancies across issues have been eliminated. Previous versions of the *KWP* emphasized priority issues that oftentimes occurred in several basins. This new version focuses on statewide and regional

priority issues cross referenced to relevant basins. Striving to maintain a comprehensive resource for water resource professionals while managing the length of the documents, links are embedded within the text to guide readers to additional information.

Water Plan objectives are organized around overarching goals that articulate the intent of the *Water Resource Planning Act* while recognizing current challenges. The water planning process today continues to rely on public input throughout development of the Plan. BACs and other stakeholders provide valuable advice concerning issue identification and policy development.

No one knows what the future holds. What is known is that water and management, conservation and development of the state's water resources will continue to be critical to the state. Water planning for current and future needs will continue.

State Water Plan Fund

The [State Water Plan Fund](#) (SWPF) is a statutory fund created by the 1989 Kansas Legislature for the purpose of implementing the [Kansas Water Plan](#).

The SWPF is subject to appropriation acts by the Legislature and may be used for the establishment and implementation of water-related projects or programs and related technical assistance. Funding from the SWPF may not be used to replace full-time equivalent positions or for recreational projects that do not meet the goals or objectives of the *KWP*.

Historically, the SWPF has generated around \$17 to \$20 million dollars annually. Revenue for the SWPF is generated from the following sources:

- Fees on sale or use of municipal, industrial and stockwater
- Fees Imposed on Fertilizer and Pesticides
- Sand Royalty Receipts
- Pollution Fines
- Clean Drinking Water Fee Fund
- State General Fund Transfer
- Economic Development Initiatives Fund

The state water planning process annually recommends to the Legislature and the Governor where the money should be allocated, and is generally dispersed through state and local agency budgets. While the SWPF is a dedicated fund to be used to implement the [KWP](#), the past few years have seen rescissions as the state has faced overall budget chal-

lenges due to the economic downturn. As a result, in 2012, only \$14 million was available to the SWPF.

The [Division of Conservation, Department of Agriculture](#) is the largest recipient and utilizes funds for the following programs: Water Resources Cost Share Program, Aid to Conservation Districts, Multipurpose Small Lakes Program, Nonpoint Source Program, Watershed Dam Construction, Water Quality Buffer Initiative, Conservation Reserve Enhancement Program (CREP), Water Supply Restoration Program and Riparian and Wetland Protection Program.

The [Department of Health and Environment](#) uses the SWPF for Contamination Remediation, Total Maximum Daily Load (TMDL) Initiatives, Watershed Restoration and Protection Strategy, and the Nonpoint Source Program. The [Kansas Department of Wildlife, Parks and Tourism](#) uses funds to support stream biological monitoring among other programs. The [Division of Water Resources, Department of Agriculture](#) uses SWPF to address Interstate Water Issues and Subbasin Water Resources Management. The [University of Kansas Geological Survey](#) utilizes funds for Assessment of the Ogallala-High Plains aquifer.

The [Kansas Water Office](#) uses funds for Assessment and Evaluation, Geographical Information System (GIS) Database Development, Reservoir Storage Operation and Maintenance, Technical Assistance to Water Users, Water Resource Education, Weather Stations, Weather Modification and the City of Wichita Aquifer Storage and Recovery Project.

Use of the funds by the recipients may vary from year to year however the above uses are typical of SWPF expenditures.

Management of Water in Kansas

State policy regarding water management is guided by the [Water Appropriation Act](#) which asserts that water in the State of Kansas is dedicated to the use of the people of the state, with the state charged to manage that resource. As such, surface and groundwater can be appropriated for beneficial use of that water, without waste, if that use does not cause impairment of an existing, more senior water right and does not unreasonably affect the public interest. A water right does not constitute ownership of such water, only the right to use it for beneficial purposes. The date of a water right, and not the type of use, determines the priority to divert and use water at any time when supply is not sufficient to satisfy all water rights.

Water stored in federal reservoirs comes under another major management policy—the *State Water Plan Storage Act*. KWO has authority to claim a reservation right to collect and store water in space the state owns in 13 federal reservoirs. KWO then contracts with municipal and industrial customers for a long term water supply.

The [Kansas Water Resources Planning Act](#) provides statutory authority for addressing water management in the [KWP](#). This Act establishes long-range goals for the management, conservation and development of the waters of the state, including:

- The development, to meet the anticipated future needs of the people of the state, of sufficient supplies of water for beneficial purposes;
- the reduction of damaging floods and of losses resulting from floods;
- the protection and improvement of the quality of the water supplies of the state;
- the sound management, both public and private, of the atmospheric, surface and groundwater supplies of the state;
- the prevention of the waste of the water supplies of the state;
- the prevention of pollution of the water supplies of the state;
- the efficient, economic distribution of the water supplies of the state;
- the sound coordination of the development of the water resources of the state with the development of the other resources of the state; and
- the protection of the public interest through the conservation of the water resources of the state in a technologically and economically feasible manner.

Management of Kansas ground and surface water fits into six categories:

- River-reservoir management;
- Stream reaches with established Minimum Desirable Streamflow;
- Streams outside of Minimum Desirable Streamflow protected areas;
- The Ogallala-High Plains aquifer;
- Groundwater outside of the Ogallala-High Plains aquifer; and
- Interstate water management.

In addition to state laws and policies for water management, other significant management entities include [Groundwater Management Districts](#), [public water suppli-](#)

ers, [conservation districts](#), Resource [Conservation and Development Councils](#), [watershed districts](#) and individuals who make wise water use decisions.

Overall, Kansas water resources are mature in development. Efficient management and expanded conservation are necessary to assure an adequate supply of water for the future. Potential for development of new water resources is very limited. Volume II of the 2009 *KWP* provides a detailed discussion of all aspects of [water management](#) in Kansas.

Physical Setting and Climate

The physical Kansas that we experience today is the result of geologic and climatic factors interacting over eons of time. The resultant soils, topography and drainage patterns, along with the climate, have helped influence where people live, work and play and the types of activities that they pursue.

Kansas, with an area of 82,277 square miles, lies at the center of the contiguous United States and about 700 miles south of the geographic center of North America, which is located in North Dakota. The land surface of Kansas slopes gently from west to east with elevations ranging from 4,039 feet at Mt. Sunflower in Wallace County to 679 feet at the point where the Verdigris River leaves the state in Montgomery County. The approximate mean elevation of the state is 2,000 feet. Overall land use in the state is dominated by rural uses (94%), with developed land (4%), federal land (1%) and water (1%) making up the remainder. Of the 99% of land that is non-federal, cropland dominates (53%), followed by rangeland (32%), pastureland (5%), forestland (3%) and other rural uses (1%).

Kansas water resources are groundwater dominated in the western half of the state and surface water dominated in the eastern half. Climate is a significant factor in this variability, with semi-arid conditions, low precipitation (typically 16 to 22 inches annually) and limited surface water in western Kansas. There are aquifers in eastern Kansas; however they are generally much more limited in extent and yield than the aquifers in western Kansas.

Twelve major river basins spanning 10 different eco-regions are recognized in Kansas for general planning purposes. Six basins in the northern part of the state drain to the Missouri River and six basins in the southern part of the state drain to the Arkansas River basin; all eventually drain to the Mississippi River. Major rivers include the Arkansas, Kansas and Neosho. The state's largest river,

the Missouri, forms the northeast border of the state. Streamflow volume in eastern Kansas is much greater than in the west due to greater total precipitation and increasing runoff rates from west to east. Also noteworthy is the much greater annual volume of discharge generally experienced in streams located in the Missouri basin as compared with streams in the Arkansas basin.

Wide seasonal and year-to-year variations in flow are experienced in Kansas streams as shown in the historic record. Surface water and groundwater are parts of a complex hydrologic system, and a change in one can impact the other. Culturally induced groundwater level declines have resulted in decreases in baseflow in hydraulically connected streams.

There are seven primary freshwater aquifer sources in the state. The most developed sources are in unconsolidated sediments: the Ogallala-High Plains aquifer, the alluvial aquifers and to a lesser extent the Glacial Drift aquifers. There are also several bedrock aquifers: the Dakota, the Ozark, the Osage and Flint Hills, along with a few more minor aquifers.

Kansas has a continental climate characterized by large variations in temperature, both seasonally and from day-to-day, and by concentration of precipitation during the growing season. Far from the tempering influence of the ocean and without any mountain barrier to the north, Kansas is subject to occasional outbreaks of Arctic air during winter and hot, dry air masses from the desert southwest during summer. Nine climatologic divisions in the state are used to determine normal values for precipitation, temperature and other variables based on a 30 year period of record as recommended by the World Meteorological Association. The current climate normal values are based on the period 1981 – 2010 and show statewide patterns of normal annual total precipitation, normal annual temperature and the normal number of days between the last frost of spring and the first frost of autumn. Current normal monthly total precipitation and average temperatures for each climate division are also available.

Periodic recurrence of drought conditions in Kansas illustrates climate variability. Drought differs from other natural disasters in that its onset is generally slow, but it may persist for a long period of time. Drought impacts are cumulative, first affecting soil moisture and agriculture, but ultimately affecting groundwater levels, streamflow and reservoir storage if the drought is severe and persistent. A common index used in the United States is the Palmer Drought Severity Index (PDSI). The PDSI is used in preparation of monthly [Drought Reports](#) for the state. The

year 1956 was the worst of the 1952 – 1957 drought period, which is considered the “drought of record” in Kansas.

Floods also illustrate climate variability. Four great floods, including that of 1993, have occurred on the Kansas River since the beginning of European settlement. The other great floods were 1844, 1903 and 1951.

An emerging issue regarding water management strategies is climate change. There is continuing disagreement about the degree to which human activity has been responsible for change and on how to best respond to change. Proposals to reduce greenhouse gas emissions have received the most attention to mitigate climate change but adaptation is another strategy that is being considered. Widely agreed upon models forecast even more variability in weather and climate resulting in more extreme droughts and floods. Because Kansas is an agricultural state, both of these phenomenon have the potential to upset the historic patterns of benefits attributed to a healthy agricultural economy.

State demographics are also changing. The most significant population trend has been the increased movement of people from rural to urban areas. As a result of this population shift, the state’s population is increasingly being concentrated in its most urban counties. Concentrated populations are more vulnerable to climate variability and due diligence in protecting water resources and adapting to future climate variability may be important to maintaining and improving the quality of life and the state’s economy.

Volume Three of the *KWP* addresses these challenges in more detail.

Groundwater

Recognizing the interconnection between surface and groundwater, all water in the state is allocated and managed according to the [Kansas Water Appropriation Act](#) of 1945 administered by the [Division of Water Resources, Kansas Department of Agriculture](#) (DWR). Even with a permit program in place as a result of the *Appropriation Act*, during the 1960’s and 70’s, authorization and construction of hundreds of irrigation wells resulted in effective mining of the [Ogallala-High Plains aquifer](#) in many parts of western Kansas and significant declines of the water table due to over appropriation. In response, several water management programs were introduced to help conserve the important diminishing resource.

The [Groundwater Management District \(GMD\) Act](#) was enacted in 1972. The purpose of the Act was to preserve

basic water law doctrine as established in the *Appropriation Act* while establishing the right and responsibility of local water users to determine their destiny with respect to groundwater use. Following procedures laid out in the Act, five GMDs were formed, covering most of the extent of the High Plains aquifer. Regulations developed by the Chief Engineer include issues such as well spacing, prohibitions on wasting water, safe-yield and depletion formulas and metering requirements. The Act gave the GMDs the flexibility to adopt management practices based on local hydrologic conditions.

In 1978, the Kansas legislature authorized provisions for initiation and designation of [Intensive Groundwater Control Areas](#) (IGUCAs). The *Kansas Groundwater Management District Act* allows the Chief Engineer to implement additional corrective controls in areas where it is determined, through a public hearing process, that groundwater levels are declining excessively, the rate of groundwater withdrawal exceeds the rate of recharge, unreasonable deterioration of groundwater quality has occurred or may occur, or other conditions exist warranting additional regulation to protect public interest. Eight IGUCAs have been designated. An IGUCA can be established to address local or regional concerns and can be initiated by a group of stakeholders, the GMD or the Chief Engineer, and provides the only explicit authority for mandated water rights reductions.

Other management tools for groundwater include a 1988 Act that made water use reporting mandatory for all non-domestic water rights. Kansas has an annual [groundwater level monitoring program](#) that includes about 1,400 wells in central and western Kansas. The *Central Kansas Water Bank* was established in 2005 and offers market based approaches to water conservation. Delineation of aquifer subunits is used to enhance and prioritize groundwater management in specific areas of high decline. Conservation tools include improving irrigation efficiency, the [Conservation Reserve Enhancement Program](#) (CREP) and the [Water Right Transition Assistance Program](#) (WTAP).

The 2011 legislative session enacted several modifications to existing laws concerning “use it or lose it” conditions, extension of the Water Banking Program, clarification of water right divisions and modifications to Flex Accounts. A new program, “*Local Enhanced Management Areas*” (LEMAs), an alternative to IGUCAs, was established to provide flexibility in promoting local conservation initiatives and provides another tool for local implementation of management alternatives.

Surface Water

A comprehensive set of rules and regulations governs surface water. The primary law for non impounded water is the [Kansas Water Appropriation Act](#). The majority of the state's streams are fully appropriated, at least during the irrigation season from July 1 to September 30. Only the Kansas, Missouri, Little Blue and Spring rivers are still open to new appropriations for those months. There has also been a trend of reduced runoff and lower streamflow in basins during a multi-year drought, for comparable levels of precipitation, possibly related to changes in land use and/or an increase in groundwater use.

[Minimum desirable streamflow](#) (MDS) requirements were made part of the [Kansas Water Appropriation Act](#) by the Kansas legislature to ensure base flows in certain streams, to protect existing water rights, and to meet in-stream water uses related to water quality, fish, wildlife, and recreation. [MDS](#) is set on 23 streams at 33 locations. The Chief Engineer protects streamflows by administration of water rights junior to the MDS priority date of April 12, 1984.

[Reservoirs](#) are an important component of surface water resources. Reservoirs are used, in part, to provide dependable water supplies in streams with highly variable flow. The state owns water supply storage in 13 of the 24 federal reservoirs in Kansas. Most of the reservoirs are built in the eastern half of Kansas in areas where higher precipitation, increased runoff and lower evaporation rates make the lakes more sustainable. The reservoirs were built to serve multiple purposes, including flood control, irrigation, fish and wildlife benefits, recreation, navigation and water quality. The state and municipal owned storage in the reservoirs provides public water supply for more than two-thirds of the state's population. State owned storage water is delivered to customers through a [Water Marketing Program](#) and a [Water Assurance Program](#). The state's population growth projections indicate Kansas will be increasingly reliant on the reservoirs.

Management of rivers and associated federal reservoirs is becoming increasingly complex, as more limitations and demands are placed on the river-reservoir systems. To assist with decision making, hydrologic computer modeling has been developed or is underway for several river-reservoir systems: Neosho, Marais des Cygnes, Verdigris, Smoky Hill and Kansas River systems.

Other tools for reservoir management include legal authority to store water, operations of the river-reservoir system, regulation manuals and lake level management plans.

Challenges to managing reservoir supplies include identifying a method to pay for additional storage and the operation and maintenance costs, protecting the reservoirs from losing storage from sedimentation, increasing storage at key reservoirs to regain storage already lost to sedimentation, and reducing or eliminating the Corps releases of water from Kansas River reservoirs to support navigation on the Missouri River, a practice of marginal benefit to the nation and detrimental to Kansas interests.

Water Quality

The [Kansas Water Resources Planning Act](#) provides statutory authorization for addressing water quality management in the [Kansas Water Plan](#). This Act established long-range goals for the management, conservation and development of the waters of the state, including:

- Protection and the improvement of the quality of the water supplies of the state; and
- Prevention of the pollution of the water supplies of the state.

Water quality management falls into two general categories: surface water quality and groundwater quality. Differing laws and policies govern each category, although the [Kansas Water Appropriation Act](#) governs both. Kansas has primacy for implementing the Federal [Clean Water Act](#) (CWA) which is administered by the [Kansas Department of Health and Environment](#) (KDHE) with important roles played by other state agencies. This primacy administration includes enactment of state statutes and administrative regulations consistent with federal policy and the various assessment and reporting requirements involved.

Kansas has also: 1) established an extensive [surface water quality monitoring program](#); 2) developed numerous [Total Maximum Daily Loads](#) (TMDLs) to restore impaired waters 3) implemented an innovative [Watershed Restoration and Protection Strategy](#) (WRAPS); and 4) developed a nutrient reduction plan.

Section 303 of the CWA requires primacy states to set [surface water quality standards](#) for waters within their jurisdictions. Water quality standards define uses for water bodies and identify specific water quality criteria to support those uses. These standards also contain antidegradation policies designed to protect improvements in water quality and existing high quality waters. Once surface water quality standards have been adopted by the states and approved by the Environmental Protection Agency (EPA), they are used in determining [National Pollutant Discharge Elimination System](#) (NPDES) permit limits, water body

impairment status and TMDL endpoints.

All Kansas surface waters have been determined to be either classified, meaning they are subject to meeting *Kansas Surface Water Quality Standards*, or unclassified. The designated uses of classified surface waters are listed in the [Kansas Surface Water Register](#). These designated use categories are: Aquatic Life Use (special, expected or restricted); Contact Recreational Use (five subcategories); Domestic Water Supply Use; Food Procurement Use; Ground Water Recharge; Industrial Water Supply Use; Irrigation Use and Livestock Watering Use. If a designated use for a specific water body is contested, a Use Attainability Analysis may be conducted.

Federal legislation of significance primarily to groundwater quality includes the [Resource Conservation and Recovery Act of 1976](#) (RCRA) the associated [Comprehensive Environmental Response, Compensation and Liability Act \(Superfund\) of 1980](#) (CERCLA), and the [Superfund Amendments and Reauthorization Act of 1986](#). These Acts address solid and hazardous wastes and storage tanks. KDHE also has primacy for implementing these [acts](#). The [Kansas Corporation Commission](#) (KCC) has authority to regulate and remediate oil and gas exploration and extraction activities that may affect water quality.

The 1996 amendments to the federal [Safe Drinking Water Act](#) (SDWA), while focused on finished drinking water at the tap, also calls for source water assessments of public water systems treating raw water. Sources of raw water may be either surface water or groundwater. These assessments identify potential sources of drinking water contaminants.

Interstate Waters

Interstate water management applies to all surface and groundwater that flows into and out of Kansas. Management issues concern both quality and quantity. Water compacts provide a legal arrangement between states to equitably divide and apportion the water supply of a river or river basin.

Kansas is a member of the [Republican River Compact](#), the [Big Blue River Compact](#), and two *Arkansas River Compacts*, one with [Colorado](#) and one with Oklahoma. Kansas also is a member of the [Missouri River Association of States and Tribes](#) (MoRAST).

Kansas has undertaken litigation in recent years on both the *Arkansas River Compact* with Colorado and the *Republican River Compact* with Nebraska. The purpose of

these lawsuits was to force adherence to the compact provisions and provide adequate and sustainable water supplies to Kansas. The U.S. Supreme Court ruled in favor of the State of Kansas on the Arkansas River litigation and the Republican River lawsuit was settled out of court. These two actions should ensure that Kansas receives its entitlement under the compacts.

The *Kansas-Oklahoma* and the *Kansas-Blue River* compacts have been less controversial as water shortages in these interstate basins due to overuse have not been severe. This is largely due to the lack of influence of irrigation pumping on overall water availability when the rivers reach Kansas.

While no compact is in place, active management of the Missouri River is another important activity. The Corps operates a system of six reservoirs on the Missouri River. The issues are complex and include flood management, drought management, navigation, endangered species, fish and wildlife habitat, economic, cultural and historic resources. The MoRAST oversees and coordinates activities, research and implementation of recommendations.

No interstate compacts are in place for groundwater. However two aquifers of significant interstate concern are the [High Plains aquifer](#) and the [Ozark Plateau aquifer](#) system.

While interstate water quantity issues have been important since the 1940s, an emerging concern is interstate water quality. Water reaching the Kansas border from Colorado has selenium and salinity issues for which [TMDLs](#) have or are being developed. Water leaving Kansas draining to Oklahoma, especially from the Arkansas, Verdigris and Neosho basins, impacts Oklahoma reservoirs heavily used for water supply and recreation. Similar issues exist in water from Kansas draining to reservoirs in Missouri. It is important that water quality in streams leaving the state be as high quality as possible, especially concerning nutrients and sediment, so that detrimental impacts to downstream reservoirs in neighboring states are minimized.

To ensure communication and coordination for water quality issues, Kansas participates in interagency activities with these states. The [Grand River Watershed Alliance](#) coordinates activities in the Neosho River basin. Efforts are underway to establish a working interagency coordination group for the Verdigris basin, based on a study by the Tulsa District Corps of Engineers for Oologah Reservoir in Oklahoma. A recent EPA funded study outlines actions to be taken to address interstate issues in the Marais des Cygnes basin which crosses out of Kansas into Missouri in the east.