

UPPER ARKANSAS RIVER SUBBASIN  
WORKING GROUP

**RECOMMENDATIONS**  
**FOR THE**  
**UPPER ARKANSAS ALLUVIAL CORRIDOR**  
**AND**  
**DITCH SERVICE AREA**

KANSAS DEPARTMENT OF AGRICULTURE  
DIVISION OF WATER RESOURCES

SUBBASIN WATER RESOURCES MANAGEMENT PROGRAM

FEBRUARY 2002

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## I. Introduction

In 1998, local, state, and federal agencies along with area water resource users formed the Upper Arkansas Subbasin Working Group to develop a management program to address water resource concerns in the Subbasin. The primary area of focus for this Subbasin program is the alluvial corridor from the Kansas/Colorado state line eastward to the Ford/Edwards County line and the ditch service areas located in eastern Kearny and western Finney counties. The alluvial corridor and ditch service areas represent the only true renewable water bearing units in the Upper Arkansas Subbasin and warrant effective management of the water resources in an effort to sustain economic viability to the region, enhance the current administration of water rights, and minimize the impacts of drought conditions. The Upper Arkansas Working Group is composed of representatives from the Associated Ditches of Kansas, Southwest Kansas Groundwater Management District #3, Kansas Department of Agriculture/Division of Water Resources (KDA/DWR), Kansas Geological Survey, municipalities, local stakeholders, and other local, state, and federal agencies with interests in the Upper Arkansas Subbasin.

### Water Resource Issues

In 1994, the Kansas Water Plan identified several water and related land resource concerns in the Arkansas River Corridor. The goal of the Arkansas River Corridor Subbasin Plan is to identify the interrelated nature of the water resource issues, seek state agency and other programs that can assist in resolving these issues, and assure these activities are integrated. The land and water resource concerns are:

- 1) Protection of interstate Arkansas River Compact entitlements
- 2) Water quality
- 3) Groundwater declines
- 4) Flooding and flood damage prevention
- 5) Access for recreational/riparian habitat and land ownership

The Subbasin Water Resource Management Program (SWRMP) was developed as a program under KDA/DWR and funded through State Water Plan funds to assist with development of strategies to address these items of concern, The Kansas Water Office through the State Water Plan provided guidelines to the Upper Arkansas SWRMP to develop a comprehensive, long-term water resource management plan for the Upper Arkansas Subbasin with the assistance of the Upper Arkansas Working Group and others knowledgeable on land and water resources. According to the State Water Plan, management strategies should address concerns with:

- 1) Groundwater declines
- 2) Reduced stream flow

- 3) Surface water/groundwater interactions
- 4) Related water quality concerns

In addition, the Upper Arkansas SWRMP was developed to allow local input on specific water resource issues in the subbasin. This allows representatives from the community to identify and develop voluntary management strategies that address water resource concerns of special interest to the local community within the subbasin in addition to those items listed under the State Water Plan. Management strategies shall be developed in accordance with the current rules and regulations governing water rights in the state of Kansas, the provisions of the Arkansas River Compact, and the IGUCA order in place on the Upper Arkansas Subbasin alluvial corridor.

Recommendations of the Upper Arkansas Working Group related to specific authorities of the Kansas Department of Agriculture, Division of Water Resources, are to be submitted to the Chief Engineer for approval and subsequent implementation. All other recommendations are to be submitted to the Kansas Water Authority for consideration as part of the state water planning process and implementation through the appropriate agencies.

#### Subbasin Water Resource Management Program (SWRMP) Mission Statement

The SWRMP is a proactive program, developed to formulate and implement voluntary, subbasin specific, long-term water resource management programs under the current water rights administrative system, with input from the regulated community and general public.

The SWRMP accomplishes the aforementioned mission using the following key elements:

- 1) Establish a working relationship with interested members who represent all aspects of water use within the subbasin.
- 2) Review technical reports, existing hydrologic data, and other data relevant to the subbasin.
- 3) Collect additional data as needed to achieve a thorough multi-disciplinary understanding of the past and present conditions of the subbasin.
- 4) If necessary, develop a computer model that simulates the hydrologic conditions of the subbasin and projects the outcome of such conditions into the future.
- 5) Facilitate the Working Group in the development of a water management program that meets the approval of the Chief Engineer. This program must be of a practical and realistic nature that is developed within the context of the current water rights administrative system and takes into account the economic and social viability of the subbasin. The approved management program will be implemented in coordination with KDA/DWR water appropriations staff and the effectiveness of the program will be reviewed and assessed on a periodic basis.

## **II. Statements of Conditions in the Upper Arkansas Subbasin**

### Geology

1) The area above the Bear Creek Fault zone is characterized as an alluvial trench that overlies impermeable Cretaceous bedrock. This reach is in contrast to the area downstream from the Bear Creek Fault where the alluvium is underlain by thick heterogeneous sediments, permeable and impermeable, which comprise the High Plains (Ogallala) aquifer. Throughout most of the alluvial corridor, the alluvial and High Plains aquifers are homogeneous and hydraulically connected.

2) Downstream from the Bear Creek Fault, within the alluvial corridor, a thin discontinuous impermeable layer lies between the alluvial and High Plains aquifer. This impermeable layer increases in thickness and continuity eastward into Gray and Ford Counties.

3) The absence or discontinuity of impermeable layers between the alluvial and High Plains aquifers, downstream from the Bear Creek fault, allows for hydraulic connection between the aquifer systems.

4) North of the river in Kearny, Finney, and Gray Counties, thick impermeable sediments layers are common in the High Plains aquifer. South of the river, impermeable sediments are thin or absent within the High Plains aquifer.

### Groundwater

1) There are two primary aquifer systems in the Upper Arkansas Subbasin that are directly or indirectly influenced by stream flow in the Arkansas River: the alluvial and underlying High Plains aquifers.

2) In eastern Gray and Ford Counties, the presence of thick continuous shale layers between the aquifers restricts downward migration of alluvial groundwater to the underlying High Plains aquifer.

3) Prior to intensive well development during the mid-20th century, the High Plains and alluvial aquifers were hydraulically connected and discharged to the Arkansas River.

4) From the 1950's to the mid-1970's, the number of high capacity wells tapping the High Plains aquifer increased dramatically. Long-term regional draw down of the High Plains aquifer resulted in significant water table declines, which lowered the water table of the High Plains aquifer below the alluvial aquifer.

5) The formation of two saturated zones (alluvial and High Plains aquifer) and the similar lithology of both aquifers, facilitated the potential for downward migration

of alluvial groundwater to the High Plains aquifer, particularly in corridor areas where shale layers between the two aquifers are thin and discontinuous.

6) Discharge from the High Plains aquifer to the Arkansas River is absent throughout most of the subbasin due to the lowering of the High Plains aquifer below the alluvium.

### Streamflow

1) Streamflow in the Upper Arkansas River has been regulated by John Martin Reservoir under the Arkansas River Compact since 1948.

2) Prior to the construction of John Martin Reservoir, the Arkansas River was a 'losing' stream during spring high flow periods. A significant amount of the spring flow infiltrated into the surrounding High Plains aquifer. Subsequently, during summer and winter low flow periods, groundwater from the underlying aquifer and alluvial bank storage discharged to the river, thus the Arkansas River became a 'gaining' stream.

3) Surface runoff from large rainfall events below John Martin Reservoir and/or spills from John Martin Reservoir can create high flows in the Arkansas River that travel eastward into Kansas.

4) An appreciable quantity of irrigation return flows and seepage from irrigated fields in eastern Colorado discharge to the Arkansas River and flow into Kansas.

5) From the 1950's to the mid-1970's, the lowering of the High Plains Aquifer below the streambed, changed the Upper Arkansas River system from a discharging (gaining) stream to a recharging (losing) stream during the summer and winter months.

6) Effectively, all flows of the Arkansas River allocated to Kansas through the provisions of the Arkansas River Compact have been appropriated by existing surface water rights and are diverted from the Arkansas River. These surface water diversions in Kansas have occurred since the 1880's. The provisions of the Compact require that all water released from John Martin Reservoir to Kansas shall be put to beneficial use. Surface water is put to beneficial use upstream of Garden City by six irrigation canals under their vested surface water rights.

7) One of the few gaining reaches in the Upper Arkansas River is located near the town of Kendall in Hamilton County. The small stream flow gain in this reach reflects discharge from the underlying alluvial aquifer to the river due to a progressive decrease in the width and thickness of the alluvial aquifer near Kendall and just east of Bear Creek Fault. When the easterly trending alluvial subsurface flows encounter the alluvium in this area, there is a bottleneck effect

on groundwater flow, and alluvial groundwater discharges to the stream in order for all subsurface flows to transverse the narrow alluvial conduit. East of this reach, the Arkansas River returns to a losing stream as stream flow infiltrates into the alluvial and High Plains aquifers.

8) The river typically loses flow from Kendall east to Garden City and into central Gray County, in part because of diversions from the ditch systems in Kearney and Finney counties. However, most of the annual loss in flow in this reach of the river exceeds the total sum of irrigation diversions. The natural loss of flow to the underlying aquifers has been aggravated by the long-term regional drawdown of the High Plains aquifer below the alluvial aquifer.

9) The High Plains aquifer sustains baseflow in the Arkansas River, beginning east of Dodge City in Ford County, and continuing eastward into the Middle Arkansas River Subbasin.

10) Dense growth of phreatophytes (particularly salt cedar) along the Upper Arkansas River riparian corridor results in substantial losses of surface and groundwater from evapotranspiration. Phreatophytes also impede the conveyance of surface flows by encroaching on the river channel. It is estimated that during the peak summer months of June, July, and August, 1 acre of adult salt cedar may evapotranspire a total of 7 acre-foot of water per day.

### Surface Water Irrigation

1) Within Kansas, there are currently six active ditches upstream of Garden City that use Arkansas River water: Frontier, Amazon, Great Eastern, Southside, Farmers and Garden City canals.

2) The Frontier Ditch diverts water in Colorado and returns a portion of unused water to the river above Syracuse. The Amazon Ditch and the Great Eastern Ditch divert water from the same headgate east of Kendall and convey water to Lake McKinney. Water for the Great Eastern Ditch moves through Lake McKinney to irrigate eastern Kearny County. The Amazon Ditch continues to the northeast portion of Kearny County. The Southside Ditch diverts water a few miles downstream from the Amazon/Great Eastern headgate and has been used as an alternative conveyance system for the Farmers and Garden City ditch service areas to avoid significant transit losses in the river between the Southside headgate and Deerfield. This water returns to the river just west of Deerfield and is diverted at the Farmers/Garden City headgate downstream of Deerfield to irrigate areas near Holcomb and Garden City.

3) The cumulative quantity of seepage from irrigated lands, irrigation canals, and surface water storage facilities located in the northern ditch service area provides recharge to the alluvial and High Plains aquifers that underlie the ditch service areas.

See Appendix B1, page 20, Map of the Upper Arkansas Subbasin Service Areas and Ditches.

### Ditch Diversion and Aquifer Relationships in the Ditch Service Areas of Kearny and Finney Counties

- 1) Changes in water levels for wells within the northern ditch service area in Kearny and Finney Counties can be attributable to a combination of groundwater development and recharge from Arkansas River water diverted for irrigation. The pumping of ground water for irrigation causes declines in the water levels, whereas variations in the amount of ditch irrigation produces changes in recharge, causing water levels to rise.
- 2) Large declines in ground water levels underlying the ditch irrigated area from 1970 to the early 1980's correspond to a period of decreasing ditch diversions in the 1970's and early 1980's. During this period the amount of groundwater needed to supplement surface water irrigation was substantial. Therefore, the large ground-water withdrawals produced substantial water level declines during a period with only a relatively small amount of recharge from diversion canals and surface water irrigation. A similar situation occurred from 1990 to 1994 as groundwater was needed to offset the lower than average quantity of surface water available for irrigation. From 1995 to 1999, an increase in surface water resulted in an increase in water levels, an increase in recharge, and minimal use of groundwater wells for supplemental irrigation.
- 3) Frequent recharge to the High Plains Aquifer occurs within the ditch irrigated area as a result of canal leakage and application of surface water.

### Water Quality

- 1) Prior to anthropogenic development, it is likely that ambient salinity (sulfate) conditions of the Arkansas River were above 250 mg/L sulfate due to the interaction of the Arkansas River with gypsum deposits in the Pierre Shale in eastern Colorado.
- 2) At present, the salinity of the Arkansas River is at least three times what it was in the 1850's. This is due in large part to the tremendous amount of surface water diversion and irrigation return flow to the stream system by eastern Colorado ditches since the 19<sup>th</sup> century. This activity has increased the salinity of the Arkansas River water dramatically.
- 3) The salinity of Arkansas River water entering Kansas is a direct result of long-term anthropogenic practices in eastern Colorado that has aggravated the natural ambient salinity to high levels.

- 4) Seepage from irrigation canals and fields irrigated with Arkansas River water spread saline water farther from the river, however, this water (albeit saline) is beneficial as recharge to the underlying aquifer. A percentage of diverted Arkansas River water recharges the underlying High Plains aquifer within the ditch service area through canal leakage (~1%/mile) and aerial application of ground and surface water onto irrigated fields (~15%).
- 5) From the 1950's to the mid-1970's, the hydraulic separation between the alluvium and underlying High Plains aquifer created the potential for downward migration of alluvial groundwater to the underlying High Plains aquifer. As water levels declined in the High Plains aquifer, saline water from the alluvium began to migrate farther from the river.
- 6) The majority of High Plains aquifer wells that were drilled in the 50's, 60's, and 70's were gravel packed to ground surface. These wells, both active and abandoned, may provide a pathway for applied irrigation water to reach the lower saturated zone of the High Plains aquifer.
- 7) The water quality of the High Plains aquifer underlying the ditch service areas north of the river in Kearny and Finney Counties has become more saline with time (currently: >1000 mg/L sulfate). In addition, the water quality of the High Plains aquifer underlying the alluvium throughout most of the Upper Arkansas Subbasin has become more saline (currently: >1000 mg/L sulfate).

#### Channel Conditions

- 1) Prior to anthropogenic practices, the channel of the Upper Arkansas River was characterized as a braided stream.
- 2) At present, the channel throughout most of the Upper Arkansas River is incised, narrow, and non-braided. Changes in the channel morphology of the Upper Arkansas River were brought about by three phenomena: 1) a reduction in peak flows due to construction of the upstream reservoirs, 2) water use in Colorado and Kansas, and 3) encroachment on the channel and flood way by non-native salt cedar. The cumulative effects of these changes have increased the potential for extensive impacts during a flood event downstream from John Martin Reservoir.
- 3) Of particular importance is the encroachment of non-native salt cedar onto the Upper Arkansas River channel. Salt cedar is a drought tolerant, high water consuming tree that competitively inhibits the growth of preferred Cottonwood and Willow. Salt cedar encroachment inhibits the conveyance of surface flows and consumes large quantities of surface and groundwater.

### III. Working Group Recommendations

The following recommendations are the result of many discussions on the aforementioned items among members of the working group. These recommendations are not intended to preempt the statutory process of the Kansas Water Appropriation Act, provisions of the Arkansas River Compact, provisions of the Arkansas River Intensive Groundwater Use Control Area (IGUCA), or any other legal authority. ***The recommendations are listed in no particular order.***

The recommendations developed by the Working Group pertain to:

- A) River Channel Maintenance
- B) Water Quality
- C) Public Water Supply
- D) Intrastate Water Supply
- E) Interstate Water Supply

### IV. Description of Recommendations

#### A. River Channel Maintenance

***Look at possibilities to rehabilitate stretches of the Arkansas River channel to: 1) Improve conveyance of surface water deliveries, 2) Minimize flood impacts along the corridor, and 3) Minimize phreatophyte consumption.***

Results from the U.S. Army Corps of Engineers-Tulsa District Upper Arkansas River Channel Capacity Study indicated that the channel capacity of the Arkansas River from the Colorado/Kansas stateline east to Dodge City has been moderately to severely encroached by a combination of factors such that most of the channel cannot convey a discharge of 3000 cfs. Such factors include non-native phreatophyte (salt cedar) introductions, stream obstructions, sand operations, and urbanization. Although some factors may have more importance than others, concern has been expressed that encroachment of the channel by phreatophytes has impacted the channel to effectively convey surface water to surface water irrigators, increased the potential for flood impacts, and reduces the amount of water that is otherwise entitled to existing water rights. It is felt that restoration of the channel through salt cedar removal and other methods will help to address these issues. The results of this idea would be beneficial in increasing the conveyance and efficiency of the channel, in addition to freeing up water used by noxious salt cedar. ***A pilot project to rehabilitate a small portion of the channel is recommended by the working group to ascertain the effectiveness of this idea.*** The project will be recommended to the Kansas Water Authority by an appointed member of the Upper Arkansas Subbasin Working Group.

See Appendix A1, page 16, Funding Sources and Technical Assistance Options for River Channel Maintenance.

## **B. Water Quality**

***Encourage federal and interstate cooperation on water quality issues in the Arkansas River as they relate to TMDL's, irrigation return flows, and public water supplies. Also, look at conjunctive use management of both groundwater and surface water in Kansas and address water quality impairment concerns.***

The Upper Arkansas River is one of the most saline rivers in the United States. High total dissolved solids (TDS) and sulfate levels have been concentrated by irrigation practices in Colorado. Studies have shown that the highly saline surface water is infiltrating into the underlying alluvial and High Plains aquifers and has been occurring during the last 50+ years. This infiltration of poor quality water presents important concerns for domestic and public water supplies.

Prevention of the degradation of the quality of the groundwater aquifers in the Upper Arkansas Subbasin becomes increasingly important as it pertains to public drinking water supplies and domestic wells. It is important to note that long-term water quality recommendations must be realistic, and must acknowledge that the river (and portions of the alluvial and High Plains aquifers) will always have concentrations for some parameters (i.e. TDS, sulfate, and selenium) far in excess of relevant criteria and standards. It should be noted that there are several state programs currently available that may assist the Upper Arkansas Subbasin in addressing water quality. The following recommendations are proposed by the Working Group to address water quality issues:

### **1. Encourage federal and interstate cooperation on water quality issues in the Arkansas River as they relate to TMDL's, irrigation return flows, and public water supplies.**

Results of the Total Maximum Daily Load (TMDL) program for the Upper Arkansas Subbasin conducted in 1999/2000 provided insight into the direct and indirect impacts of saline Arkansas River water on the alluvial and High Plains aquifers in the subbasin. As of 2000, the Upper Arkansas Subbasin TMDL for sulfate has been set a medium priority and deferred for five years to allow for additional studies, development of a management program in the Upper Arkansas Subbasin, and allow the process of interstate cooperation to address the sulfate issue. There is currently a discrepancy between Environmental Protection Agency (EPA) Regions VIII and VII on acceptable sulfate concentrations in the Arkansas River in Colorado and Kansas, respectively. Discussions are ongoing to resolve that discrepancy at the governor's level and to find methods to reduce salinity levels in Arkansas River water.

**2. Look at conjunctive use management of both groundwater and surface water in Kansas and address water quality impairment concerns.**

The Upper Arkansas Subbasin Working Group supports additional studies to determine feasibility of a basin-wide program to plug well gravel packs that convey poor quality water to the Ogallala Aquifer. Additionally, the Working Group supports future research on management practices to mitigate the effects of degrading water quality on irrigated crops.

**C. Public Water Supply**

***Determine economically feasible, incentive-based programs for the mechanical treatment of water for municipalities and other public water supplies.***

This recommendation is practical for public water supplies and rural water districts if sufficient support and funds are available, due to the enormous costs of installing water treatment plants that would remove sulfate and TDS from the water supplies. Further study and targeting cost-share support should be a focus.

See Appendix A2, page 17, Funding Sources and Technical Assistance Options for Public Water Supply.

**D. Intrastate Water Supply**

***Identify potential areas along the corridor that may be used for aquifer recharge and/or surface water storage with the use of Arkansas River water during periods of excess river flow, and promote water rights purchase to the extent necessary for stream/aquifer recovery.***

During the late 1960's and early 1970's, an effort was made by entities in the Upper Arkansas Subbasin to look into the feasibility for the construction of a reservoir on the Arkansas River upstream of Garden City. Several proposed reservoir locations near the towns of Syracuse, Coolidge, Hartland, and Kendall were considered during the decade-long search for a suitable reservoir site. Regardless of the proposed reservoir location, the objectives of a reservoir on the Arkansas River would 1) provide enhancements in the efficient administration of surface water; 2) minimize impacts of flood events; 3) provide recreational opportunities; 4) capture excess water in the Arkansas River; 5) provide a tool for better water management; 6) promote aquifer recharge and 7) improve water quality. All proposals for a reservoir were met with impediments that ranged from difficulty in obtaining cooperation from landowners to increases in federal loan interest rates.

The idea of reservoir construction in the Upper Arkansas subbasin was rekindled in 1999 through the Upper Arkansas SWRMP forum. Concern over the recent damages inflicted by the flood pool releases from John Martin Reservoir in May/June 1999, Colorado's intention to increase their reservoir storage capacity to meet their municipal and industrial needs, and excess surface water flowing out of the subbasin stimulated discussion. A request was made for a feasibility study to determine possible methods to enhance the uses of excess surface water within the context of current water law and without violation to vested surface water rights.

In late 2000, the Southwest Kansas Groundwater Management District #3 (GMD #3) board approved the allocation of contract funds with Spronk Water Engineers to conduct a reconnaissance study to determine the feasibility of the development of excess flows in the Arkansas River between the state line and Garden City. GMD #3 also asked the Upper Arkansas Working Group to incorporate the idea of additional storage facilities on the Arkansas River as a proposed project for consideration under the Water Conservation Projects Fund (K.S.A. 82a-1803).

See Appendix A3, page 18, Water Conservation Projects Fund.

The working group also recommends:

- 1. Consideration of the feasibility of using existing ditches for aquifer recharge/storage during periods of excess river flows by including Spronk Water Engineers Arkansas River Storage Investigation Report as a basis for further investigations.**
- 2. Future proposals for changes in point of diversion for surface water rights should include the condition that the measurement of the diverted water remain at the original point of diversion.**
- 3. The Upper Arkansas Subbasin be considered as a priority area for funding of the Water Rights Purchase Program.**

The purpose of the Water Rights Purchase Program is to provide State cost share assistance with a local entity to purchase water rights to minimize and/or reverse the decline of groundwater levels in specific areas of the subbasin. The State Conservation Commission has proposed rules and regulations for the Water Rights Purchase Program. The objectives of the State Conservation Commission program are as follows:

- a) To recover streamflow in depleted streams.
- b) To protect existing alluvial and groundwater aquifers from further depletion.
- c) To provide an economic incentive for conversion to dry land farming.

- d) To extend the life of a mined regional water supply by lowering the demand placed on that supply.
- e) To restore and protect aquatic and other wildlife habitats.

This program allows a water right holder to voluntarily sell a water right. Once the water appropriation is purchased, it would be placed under the custodial care of the State and retired from further use.

#### **E. Interstate Water Supply**

***Consider what additional actions or resources are needed to ensure that correct administration of the Arkansas River under the Compact occurs. Also, consider what additional actions or resources are needed to ensure that Colorado's system improvements provide compliance with the provisions of the Arkansas River Compact and equitable benefits to Kansas.***

##### **1. Permanently fund a water engineer, technician, and clerical position to monitor river operations.**

To ensure that Colorado maintains compliance with the Compact and that Kansas' entitlements to Section 2, transit loss, and offset account waters are met, it was proposed by the Upper Arkansas Subbasin Working Group that additional staff and resources are needed in KDA/DWR to actively monitor Colorado's actions. It is envisioned that this new position and additional resources would protect the allocation and administration of Kansas' entitlement of Arkansas River water and would minimize future impairments by Colorado to Kansas.

Through recommendations from the Upper Arkansas working group and KDA/DWR, a request to fund a position dedicated to ensuring correct administration of the Arkansas River and Colorado's compliance with provisions of the Arkansas River Compact are satisfied has been submitted. It is recommended that the Interstate Water Litigation Fund (K.S.A. 82a-1802(c)(2)) provide funds for this position.

## **APPENDIX A**

### **Funding Sources and Technical Assistance Options**

## **A1: Funding Sources and Technical Assistance Options for River Channel Maintenance**

### **1. Kansas Department of Agriculture – Division of Water Resources *Stream Obstructions Program***

Anyone desiring to change the course, current, or cross section of a stream must have prior written approval of the Chief Engineer. Activities may include construction of dams, channel modifications, and other stream obstructions.  
Contact: Water Structures Program 785-296-2933

### **2. US Bureau of Reclamation *Water Conservation Field Services Program***

Designed to encourage water conservation, assist water agencies to develop and implement effective water management and conservation plans, coordinate with state and other local conservation program efforts, and generally foster improved water management on a regional, statewide, and watershed basis. Areas of emphasis include water management planning, conservation education, demonstration of innovative technologies, and implementation of conservation measures.

Contact: USBR Area Manager Nebraska-Kansas Area Office  
308-389-4622

### **3. US Army Corps of Engineers *Snagging and Clearing for Flood Control***

The Corps is authorized to make improvements for flood control by removing accumulated snags and other debris and by clearing and straightening the channels in streams. Projects must be cost-efficient and must be cost-shared.  
Contact: Tulsa District Coordinator, General Planning Branch, Planning Division,  
918-669-7196

## **A2: Funding Sources and Technical Assistance Options for Public Water Supply**

1. Kansas Department of Housing and Commerce  
*Small Cities Community Development Block Grant Program*

Community Improvement Projects include water improvements. Grants awarded on a competitive basis once per year.

Contact: Marilyn Graham 785-296-3004

2. Kansas Department of Health and Environment  
*Water Supply State Revolving Fund*

This program makes low interest loans for projects to protect public health by improving water works. Loans made to cities and rural water districts to finance construction of drinking water treatment plants and water distribution systems.

Contact: Bureau of Water 785-296-5500

3. Kansas Department of Health and Environment  
*Public Water Supply*

The department operates a program that provides approximately \$40 million in below market interest rates for public water supply infrastructure improvements.

Contact: Bureau of Water 785-296-5500

4. US Environmental Protection Agency  
*Drinking Water State Revolving Fund*

Program features funding to small and disadvantaged communities and to programs that encourage pollution prevention as a tool of ensuring safe drinking water. Installation of new treatment facilities will improve the quality of drinking water and better protect public health.

Contact: Clean and Safe Water SRF Branch, Water Wetlands and Pesticides Division 913-551-7030

### **A3: Water Conservation Projects Fund**

Kansas Water Office  
*Water Conservation Projects Fund*

This fund offers another source of financial support needed to implement any recommendations from the working group that promote water conservation. As stated under K.S.A. 82a-1803(c), monies credited to the water conservation projects fund may be expended only for the purpose of paying all or a portion of the costs of the following water management, conservation, administration and delivery projects, in those areas of the state lying in the Upper Arkansas river basin and directly impacted by the provisions of the Arkansas River Compact between this state and the state of Colorado.

The directly impacted area would include the Arkansas River Intensive Groundwater Use Control Area (IGUCA) and ditch service areas upstream from Garden City. In addition, areas east of Garden City within the Arkansas River IGUCA and areas along the periphery of the current ditch service areas could be considered under the water conservation projects fund if it can be shown that those areas have been, or currently are, directly impacted by provisions of the Arkansas River Compact.

The Director of the Kansas Water Office and the Chief Engineer of the Division of Water Resources shall review and approve proposed projects, submitted by any person or entity, for which monies in the fund will be expended. The Director and Chief Engineer shall give priority to: 1) projects that achieve the greatest water conservation efficiency for the general good; and 2) projects that have been required by the Division of Water Resources that commenced on or after July 1, 1994. The Director of the Kansas Water Office retains the authority in expenditures from the water conservation projects fund.

The Upper Arkansas Working Group and Upper Arkansas Basin Advisory Committee have developed project recommendations for consideration under the water conservation projects fund that include but are not limited to: 1) projects required by the Chief Engineer; 2) irrigation efficiency upgrades, for both surface and groundwater systems; 3) projects that more efficiently manage the Arkansas River water within the provision of the Arkansas River Compact through storage or additional diversion systems; 4) a pilot project for channel and streambank restoration; 5) water right purchases on a limited basis for water critical areas; 6) windbreaks and other vegetative practices to decrease crop evapotranspiration; 7) conservation education that would be focused on issues relevant to the Arkansas River Corridor; and 8) funding for research on water conservation tools and practices. Statutory Authority: K.S.A. 82a-1801 thru 82a-1803.

## Appendix B

### Maps

B1: Map of Upper Arkansas Subbasin Service Areas and Ditches

