



# MIDDLE ARKANSAS SUBBASIN NEWSLETTER

OCTOBER 2006

## MIDDLE ARKANSAS SUBBASIN MODEL RESULTS

For the last few decades, ground water levels have been declining in most of the High Plains aquifer in the Middle Arkansas River subbasin. The water-level declines have decreased ground water discharge to the Arkansas River, causing declining streamflow. Because of these declines, the Division of Water Resources (DWR) and the Kansas Water Office (KWO) contracted with the Kansas Geological Survey to construct a calibrated, numerical ground water model to provide additional information on the nature of stream-aquifer interactions and the effect of ground water pumpage for use in planning and management

of water resources. The numerical ground water model was constructed for the area extending from northeast Ford County through much of Edwards and Pawnee counties to north-central Stafford and southern Barton counties.

The development of a calibrated transient model that simulated ground water flow and stream-aquifer interactions during the period of 1944-2004 was the major focus of the project.

Five different scenarios were simulated with the calibrated transient model.

*Continued on page 2*

## UPCOMING MEETINGS

Joint Basin Advisory Committee Meeting

1:30 p.m.  
October 12, 2006

Fair Building  
Kinsley Fairgrounds  
Kinsley, Kansas

Kansas Water Authority Meeting

9 a.m.  
November 16-17, 2006

Highland Hotel and Convention Center

Great Bend, Kansas

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## UPPER ARKANSAS RIVER CREP

The State of Kansas seeks to obtain federal funds through the United States Department of Agriculture for the purpose of encouraging irrigators along the upper Arkansas River corridor to enroll in a Conservation Reserve Enhancement Program (CREP). This voluntary program would provide incentives and cost sharing to participants who enroll their land in eligible conservation practices, such as native vegetation or wildlife conservation, for 14 to 15 years.

Reducing irrigation demands on the stream-aquifer system will help slow aquifer declines, mitigate the spread of saline waters into the aquifer, and help restore stream and riparian health.

The primary goal of the Upper Arkansas River CREP is to sustain the resources of the Arkansas River valley, including its regional ground water supply and wildlife habitat. This CREP is designed to reduce water quantity shortages in a voluntary and cost-effective manner by focusing on the irrigated lands adjacent to and influencing the Arkansas River from the state line to the confluence with the Rattlesnake Creek in the east. Additional resource concerns to be addressed through this CREP are improved water quality, protection of the sustainability of public water supplies and improved wildlife habitat. Landowners would receive incentive payments for acres enrolled in the program converted to vegetation for the length of the contract with water right retirement.

Contact Susan Stover at [stover@kwo.state.ks.us](mailto:stover@kwo.state.ks.us) or 1-888-KAN-WATER for further information.

## **MIDDLE ARKANSAS SUBBASIN MODEL RESULTS** *(Continued from page 1)*

One scenario involved running the model for 1944-2004 using increased stream inflows during 1980-2004. The results indicated that a small increase in stream inflow recharges the aquifer, but a large increase in stream inflow passes through the subbasin. The increased stream recharge reduced the storage decline in the aquifer by less than 10 percent.

The other four scenarios involved simulations of future conditions (50-year period 2005-2054) using different pumping strategies under the climatic conditions of 1980-2004.

- A scenario with continued pumping at current levels indicated that ground water levels continue to decline (decrease in storage), causing further decreases in streamflow and lateral outflow of ground water. The decrease in lateral ground water outflow may be decreasing the ground water inflow to the Rattlesnake Creek subbasin that borders the southeast side of the Middle Arkansas subbasin.
- A scenario in which there was no pumping showed that the long-term water-level declines in the main aquifer that began in the late 1970s start to reverse within a few years after the wells are shut off. The change from streamflow loss to increase takes a few years longer to respond due to the need to raise water levels enough to create substantial baseflow and reduce stream loss. Most of the aquifer storage lost from the late 1970s to 2004 is regained after about 20 years.
- Two scenarios involving reduced pumping were run, one with a 24 percent reduction of pumping in the proposed area for the Conservation Reserve Enhancement Program (CREP) in the subbasin. The other scenario went with the retirement of water rights in the Circle K Ranch in southwest Edwards County. Although the losses in aquifer storage, streamflow, and lateral ground water outflow were not as great in the CREP as in the continued pumping scenario, those losses continued during the 2005-2054 simulation. Retiring the Circle K Ranch water rights decreases the rate of aquifer storage loss and increases the average flow of the Arkansas River, but only to a limited extent in the general vicinity of the ranch.

For a complete report on the numerical model of the Middle Arkansas River subbasin, visit Kansas Geological Survey's website at [www.kgs.ku.edu/HighPlains/mid\\_ark\\_model.htm](http://www.kgs.ku.edu/HighPlains/mid_ark_model.htm).

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## **WHAT'S HAPPENING IN THE PAWNEE-BUCKNER-SAWLOG SUBBASIN**

On June 19, 2006, the chief engineer initiated proceedings to amend the order that established the Pawnee Valley Intensive Groundwater Use Area (IGUCA) to include the part of the Pawnee-Buckner-Sawlog subbasin located in Hodgeman, Ness and Pawnee counties. These proceedings will include a public hearing on October 24 in Larned to determine whether the Pawnee Valley IGUCA should be expanded and, if so, to define the new boundaries and the corrective control provisions necessary to regulate ground water use within those boundaries.

The hearing will be open to the public, but only parties to the proceedings will have an opportunity to present argument and evidence and to conduct cross-examination of witnesses.

Public comments will be received on October 25 in Larned for persons who do not wish to become parties but who want to give their statements for the record. Written statements can be submitted to the chief engineer before 5 p.m. on the last day of the hearing.

Contact Eve Tracy at (785)296-3705 for more information on the proceedings to amend the Pawnee Valley IGUCA.

## **EQIP QUICK RESPONSE AREA PROGRAM**

Despite the drought this year, irrigation pumps were idle on 7,510 formerly irrigated acres. They will be idle for the next three years as well.

Farmers opted to turn off their pumps for four years to help conserve water in the High Plains aquifer in exchange for a rental payment. This year was the first one for the "Quick Response Area" program financed through the Ground and Surface Water Conservation Program within the Environmental Quality Incentive Program (EQIP). The program, focused on water quantity concerns, is administered by the Natural Resources Conservation Service (NRCS).

"We had a lot of interest in the program, thanks in large measure to the promotional help received from the Groundwater Management Districts," says Gaye Benfer, EQIP manager with NRCS. A total of 231 applications, representing 22,601 irrigated acres, were received this year. Had they all been accepted, the payment would have been \$6.7 million. Only 105 contracts, valued at \$2.3 million, and covering 7,510 acres, were approved. The payment will idle pumps for four years.

Benfer is expecting an even greater response this year given the high cost of fuel and other crop production inputs. Sign-up for the next four-year quick response water conservation program (crop years 2007-2010) is on going until December 15, 2006. Applications received through that date will be reviewed and successful applicants will be notified.

The program will continue to target priority areas in the four western Groundwater Management Districts and the Ogallala aquifer fringe. In exchange for converting irrigated land to grazing, dryland crop production or forages for four years, a farmer will receive a payment of \$100 per irrigated acre for three years. The accepted acreage would be eligible for 50 percent cost share on pasture and range seeding. If a farmer opted to retire his water right, an additional 70 percent cost share is available for well plugging and capping.

Priority areas in GMD No. 4 have been identified in Thomas, Sherman and Sheridan counties. Counties in the district will take turns having priority areas. In GMD No. 1, the quick response areas are two-mile buffers around public water supply well fields and around unincorporated communities that rely solely on public wells. In GMD No. 3, the quick response areas are geared to protect public water supply wells within the district. A proposed complementary program, the Conservation Reserve Enhancement Program, is expected to help protect public water supplies within its boundaries along the Arkansas River. Irrigated land conversion in this priority area has the potential to restore base flow, movement of ground water from the aquifer to surface water. Big Bend GMD No. 5's quick response areas are the middle reach of the Arkansas River and the Rattlesnake Creek. Both areas are identified in the Kansas Water Plan as priority areas to achieve sustainable yield management and recover base flow to the rivers. GMD No. 5 will supplement the federal government's payment by paying the annual rental rate for the fourth year of the contract. The federal program calls for making a rental payment for three out of four years.

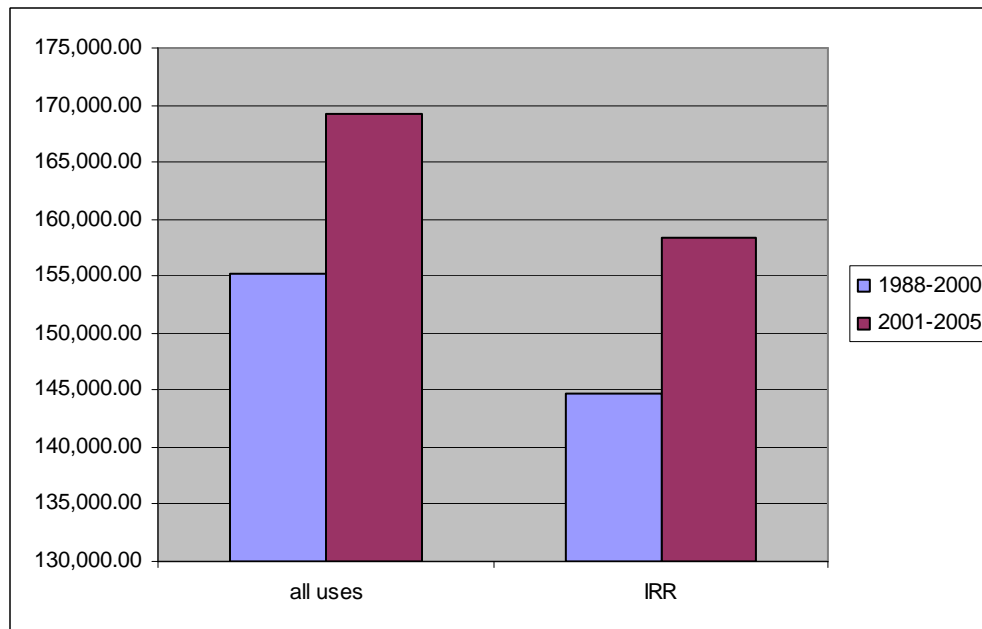
In the Ogallala aquifer fringe area, an area administered by the Kansas Department of Agriculture's Division of Water Resources, the quick response areas are focused on stream corridors where Ogallala-fed base flow has been declining. They include Prairie Dog and Beaver creeks in northwest Kansas, North and South Forks of the Solomon River, and in Hodgeman County. The water-bearing zone of the Ogallala-High Plains aquifer in Hodgeman County is limited, but landowners tapping into a buried former river channel are reporting water level declines and pressure losses.

To be eligible, acres must have been in irrigation two out of the last five years. At least half of the application acres must be within the quick response area and 66 percent or more of the acreage has to have been irrigated with at least six inches per acre. Additional ranking points will be awarded if the application acres are enrolled in the Water Rights Conservation Program administered by the Kansas Department of Agriculture's Division of Water Resources.

Detailed eligibility requirements are available from Natural Resources Conservation Service field offices in the respective areas.

## KANSAS IRRIGATION FACTS

(FROM KSU RESEARCH AND EXTENSION AND DIVISION OF WATER RESOURCES)



- Three million irrigated acres in Kansas
- Revenue from irrigated acres in Kansas exceeds \$1 billion annually
- Irrigation consumes 85 percent of total water use in Kansas
- Irrigation water is applied to 14 percent of the states cropland
- Irrigated acres account for 33 percent of total crops produced
- Irrigation water use for the years 1988-2000 was 144,732 acre-feet, for the years 2001-2005 it is 158,350 acre-feet an increase of 6.60 percent