

Smoky Hill-Saline Basin High Priority Issue Lower Smoky Hill River Water Management January 2009

Page 1

Issue

Efficient management of the Smoky Hill River System, Kanopolis Lake and downstream reservoirs for beneficial water uses is needed.

Efficient management of the resources related to Kanopolis Lake and the Smoky Hill River below the dam is needed to meet the water needs under varying climatic conditions. Review of the available supply, expected demands and potential management scenarios to meet water appropriations and water marketing goals has been initiated.

Comprehensive understanding and management of the system and water use are needed to balance the water releases from Kanopolis Lake and the additional demands for water in the basin. An approach is needed that will allow the use of storage to meet contemporary needs, yet respect the current commitments under contract, and appropriated rights.

Description

The Smoky Hill River runs the west-east extent of the [basin](#). Two federal reservoirs are located on the Smoky Hill River in the state, Cedar Bluff Reservoir in Trego County, operated by the U.S. Bureau of Reclamation (Bureau) and Kanopolis Lake, 100 miles downstream of Cedar Bluff, in Ellsworth County. Kanopolis Lake is operated by the U.S. Army Corps of Engineers (Corps).

Kanopolis Lake was initially authorized for flood control, irrigation and recreation purposes. Kanopolis Dam was completed in 1946 and the lake filled in 1948. The irrigation purpose of Kanopolis Lake was never developed due to the lack of an irrigation district downstream of the lake. Kanopolis Lake provides flood protection and storage of water for municipal and industrial use, along with fish, wildlife and recreation benefits. Storage capacity in the multipurpose pool (for municipal and industrial use) in the State Water Marketing Program is presently estimated at 22,607 acre feet. Kanopolis Lake was analyzed by the Kansas Water Office (KWO) to determine what water supply yield can be expected during a two percent chance drought. The yield was revised by KWO in 2008 to an estimated availability of 6.5 million gallons per day (MGD) in 2048, reduced from earlier estimates.

⁽³⁾ The yield was originally estimated as 15.4 MGD, reduced to 12.9 MGD yield after 40 years due to storage loss from sedimentation. The most recently reduced yield is related to loss of inflow into the lake. Since 1950, there has been a significant reduction to the flow volume

gain between the Bunker Hill and Ellsworth gages upstream of the lake. This loss has reduced the volume of inflow to Kanopolis Lake.

In June 2002, the Kansas Water Office (KWO) and the Corps finalized a contract for the purchase of 46.6% of the multipurpose pool. This is an estimated 12,500 acre-feet of public water supply storage in Kanopolis Lake after adjusting for sedimentation of 40 years.

Kanopolis is the major source of municipal and industrial water to over 12,000 customers in parts of eight counties in north central Kansas through Post Rock Rural Water District (Post Rock). Post Rock has a contract for 400 million gallons per year (MGY) to meet this demand. Post Rock is the only current public water supply using water from Kanopolis Lake, leaving 7.5 MGD yield based on present yield estimates.

Like all Corps lakes, Kanopolis has a lake regulation manual that contains operating guidance. Releases from storage are made according to set schedules, most of which were established decades ago. The conservation storage pool typically contains a percentage identified as the water quality pool. Releases from this pool are generally intended to meet instream needs such as water quality and fish and wildlife support.

Recent drought years have brought attention to the operation of Kanopolis Lake. Specifically of concern are the water releases and lake levels during times of little or



Kanopolis Lake. Photo courtesy Kansas Geological Survey.

Smoky Hill-Saline Basin High Priority Issue Lower Smoky Hill River Water Management January 2009

no inflow, such as in 2006, and the needs of downstream water users. In the 101 miles of river below Kanopolis Dam to the New Cambria gage, which is located east of the confluence of the Smoky Hill and Saline rivers, there are nearly 300 water rights for an authorized quantity totaling 43,123 acre feet per year from surface and alluvial ground water sources.⁽¹⁾ The larger portions of this quantity are appropriations for irrigation, and municipal and industrial use, including the City of Salina.

Table 1 and Figure 1 provide basic water appropriation and use information for the stream and ground water system below Kanopolis to the New Cambria gage.

Six active applications totaling 23.4 MGD are on file with the KWO, including one from Post Rock Rural Water District for water stored (26,259.656 acre feet) in Kanopolis. This amount exceeds Kanopolis Lake's 2009 uncommitted yield of 7.5 MDG (8,401 acre feet per year).⁽⁵⁾

In November 2006, the Kansas Water Authority (KWA) identified specific information needed before negotiating

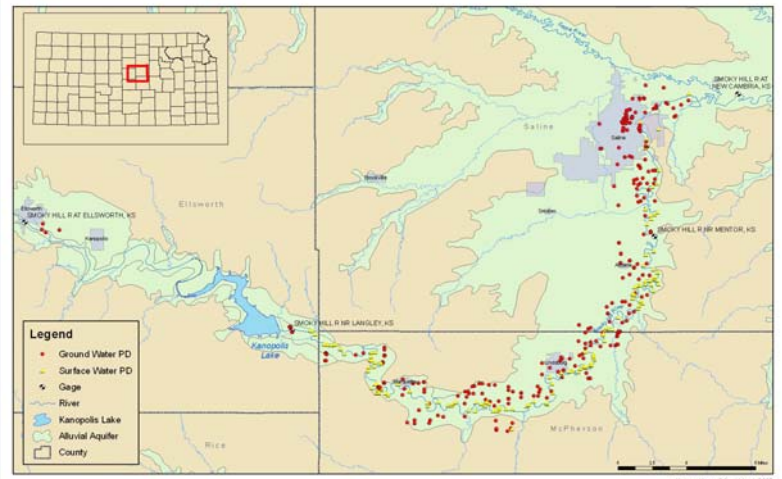


Figure 1. Water Appropriations in the Smoky Hill River Valley, Kanopolis Lake to New Cambria.

any additional [water marketing contracts](#) from storage in Kanopolis Lake. Work began in 2007 and is ongoing to meet the informational needs. These include:

- Stream/aquifer and reservoir models of the Smoky Hill River and Kanopolis Lake.

Table 1
2008 Appropriations Below Kanopolis to New Cambria Gage

298 Authorized Water Appropriations
Use Made of Water (Acre-Feet)

Source	Domestic	Industrial	Irrigation	Municipal	Recreation	Stock	Other	Total
Surface	1	0	7,403	5,028	246	0	6,958	19,636
Ground	20	1,368	11,544	8,188	207	102	2,058	23,487
Total	21	1,368	18,947	13,216	453	102	9,016	43,123

Irrigated Acres Authorized by Source		
Surface	Ground	Total
8,047	10,239	18,286

2006 Reported Water Use Below Kanopolis to Mentor Gage

276 Water Rights Reporting
Use Made of Water (Acre-Feet)

Source	Domestic	Industrial	Irrigation	Municipal	Recreation	Stock	Other	Total
Surface	0	0	1,968	4,206	196	0	0	6,370
Ground	0	370	5,349	3,287	129	63	904	10,102
Total	0	370	7,317	7,493	325	63	904	16,472

2006 Reported Irrigated Acres by Source		
Surface	Ground	Total
2,155	6,456	8,611

Smoky Hill-Saline Basin High Priority Issue Lower Smoky Hill River Water Management January 2009

- Assessment of the impact of minimum releases, both in-lake and downstream.
- An updated yield of water marketing storage using data from 1948 through present.
- Determination of interest and needs of communities and rural water districts in the area.
- Determination of impact on the lake level with full water marketing use.

Recommended Actions

The compilation and evaluation of data related to the hydrologic system along with a comparison of the system water budget to supply needs are essential in determining actions. All of the recommended actions will be completed with input and awareness of stakeholders in the area.

1. Complete and maintain the hydrologic model of the Smoky Hill River valley. Use the model to understand the relationship between the alluvial aquifer, streamflow and reservoir releases.
2. Incorporate the updated Kanopolis Lake yield information in the aquifer model to better understand impacts on the reservoir and hydrologic system.
3. Determine the impact of full utilization of the Water Marketing Program supply on lake level and corresponding recreation and downstream uses.
4. Develop a basic supply and demand analysis using population and demand trends and reported water use. Compare to information developed in above models.
5. Identify options to meet water use needs in the area based on results of models and other pertinent data. This may include review of the Kanopolis Lake Regulation Manual as part of the river system operation.
6. Develop an action plan to address preferred options for management needs based on hydrologic analysis/water budget and considering economic impacts.

Resources

1. Kansas Department of Agriculture-Division of Water Resources. 2008. Water Right Database-Water Resource Information System (WRIS).
2. Kansas Geological Survey. 2008. Smoky Hill River model – under development.
3. Kansas Water Office. May 2008. *Kanopolis Water Supply Yield Analyses and Review of Reservoir Inflow Depletions*.
4. Kansas Water Office. 2006, November 16. *Preliminary Findings Request by Rural Water District No. 1, Ellsworth County, DBA Post Rock Rural Water Supply District to Purchase Water From Kanopolis Lake for Water Supply Purposes*.
5. Kansas Water Office. 2008. Surplus Water Available in Water Marketing Program Lakes Calendar Year 2009. p 21-22.