

Kansas Water Plan

Access to Water Releases from Kanopolis Reservoir

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Issue

Currently, no water is released from water supply storage owned by the state in Kanopolis Reservoir to meet downstream needs. Releases have been made from water quality storage which is owned and operated by the Corps of Engineers (Corps). Those releases have been treated as natural flow, and therefore have been diverted by downstream water users. A large irrigation community, as well as the City of Salina, exists downstream in the Smoky Hill River valley, with both surface and groundwater rights.

Access to water from water supply storage is currently obtained through Water Marketing Program contracts or storage ownership through the Water Assurance Program and is limited to municipal and industrial uses only. There is a desire to improve operation of the Kanopolis Reservoir–Lower Smoky Hill River system to meet in lake and downstream needs.

Background

Kanopolis is one of 13 reservoirs in Kansas developed by the Corps in which the state owns water supply storage. Kanopolis Dam was completed in 1946 and the lake filled in 1948. Kanopolis is authorized for flood control, irrigation, recreation, fish and wildlife, water quality, downstream low flow augmentation, navigation, hydroelectric power and water supply. Water supply was added in 2002 when a reallocation was completed and the state purchased storage. The irrigation purpose was initially authorized dependent on an irrigation district being developed to use and pay for water; there currently is no irrigation district. Navigation and hydroelectric power are no longer operating purposes.

There are water rights totaling 37,267 acre-feet per year from surface and alluvial groundwater sources in the 101 miles of river below Kanopolis Dam to the confluence of the Smoky Hill and Saline Rivers. Figure 1 shows the location of diversions from the Smoky Hill River and the alluvial aquifer downstream of Kanopolis Reservoir. The majority are appropriations for irrigation and municipal use, including the City of Salina. Table 1 summarizes usage by type and source.

These surface rights, granted under the Water Appropriation Act by the Chief Engineer, Department of Agriculture–Division of Water Resources (DWR), are for a right to divert natural flow. Releases from Kanopolis to date have been treated as natural flow hence positively contributing to the downstream water right holders' ability to divert water. The surface irrigation rights priority dates are as old as June 28, 1945; only six of these downstream irrigation water rights are vested, but the majority are senior to the water reservation rights held by the state for water stored in Kanopolis.

Requests for additional Water Marketing Program contracts from Kanopolis, as well as the drought during 2006 brought increased attention to the operation of Kanopolis Reservoir. In 2006, consideration of a potential modification of minimum water quality releases high-

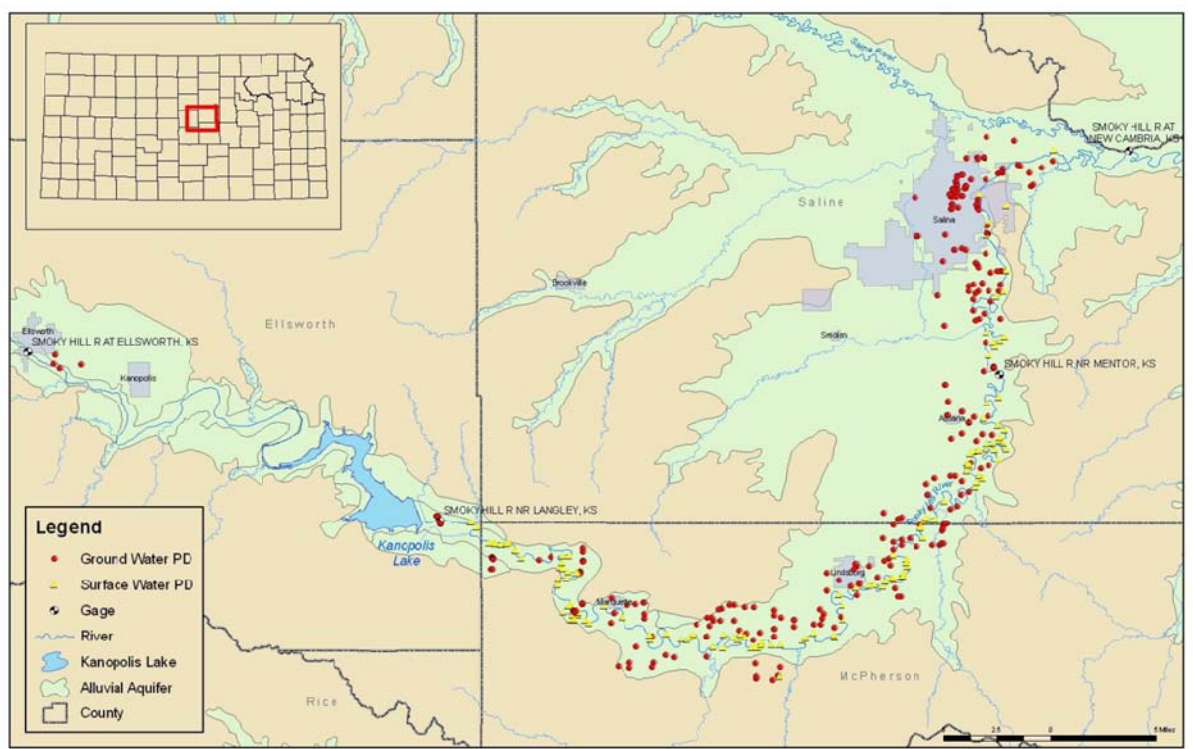


Figure 1. Water Appropriations in the Smoky Hill River Valley, Kanopolis Reservoir to New Cambria

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lighted the importance of the river, and those reservoir releases, to downstream water users.

gress. Irrigation was an original authorized purpose of the reservoir, though an irrigation district was a required prerequisite. The multipurpose storage (formerly conservation) encompasses the purposes of recreation, water quality, water supply, fish and wildlife, irrigation and includes sediment

**Use Made of Water and Source of Supply
Represents conditions as of February 26, 2007**

	Domestic	Industrial	Irrigation	Municipal	Recreation	Stockwater	Total
Surface	12.79	29.70	7,694.60	5,028.07	245.75	0	13,101.90
Ground	70.98	594.91	14,446.08	8,470.27	234.27	439.80	24,256.32
Total	83.77	624.61	22,140.68	13,498.33	480.02	439.80	37,267.20

Table 1. Lower Smoky Hill Total Authorized Quantity (AF)

Note: Rights are those included in the Lower Smoky Hill Model Area

Reallocation and State Acquisition of Kanopolis

The state acquired water supply storage in Kanopolis Reservoir in 2002. Prior to that date, the Corps developed and adopted a reallocation report. As a result of this and Congressional action water supply storage was made available. Previously, the Kanopolis Pool Rise Study, completed in 1996, considered the effects of a pool rise and costs. Municipal and industrial use (water supply) was added to purposes of Kanopolis Lake in 1999 when reallocation of storage was authorized as part of Public Law 106-53 by the 106th Congress.

The Reallocation Study completed in 2001, analyzed a 20,000 acre-foot reallocation that included a 12,500 acre-foot reallocation from the existing multipurpose pool combined with a 2-foot pool rise into the flood pool for an additional 7,500 acre-feet of water supply storage. The pool rise was not sought by Kansas at that time as the 12,500 acre-feet of storage was determined sufficient to meet the anticipated needs.

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 Reservoir after adjusting for sedimentation of 40 years. This storage was designated for municipal and industrial water supply and was added to the State Water Marketing Program.

The Corp's 1998 Water Supply Handbook states "Municipal and Industrial, while not defined in legislative history, have been defined by the Corps to mean supply for uses customarily found in the operation of municipal water systems and for uses in industrial processes." Agricultural irrigation is not ordinarily found among customers of a municipal system and, therefore, has not been considered eligible to be included in a project under the M&I authority unless so specifically authorized by Con-

storage. The operating procedures in effect in 2001 recognize these beneficial purposes for the multipurpose storage. (USACE, Kansas City District, December 2001, Final Reallocation report for Kanopolis Lake, Kansas)

The 7,500 acre-feet of water supply storage that could be acquired with a 2-foot pool rise could be justified with present applications on file with the KWO for Water Marketing Program contracts from Kanopolis storage, as well as the interest in access to releases from stored water downstream. Although the 2001 Reallocation Report determined the additional 7,500 acre-feet would not have a significant negative impact, if this reallocation was sought today, a dam safety evaluation must be completed and the project certified to meet current Corps dam safety criteria. A Corps Phase 1 dam safety evaluation has designated Kanopolis a dam safety action class (DSAC) IV, low risk based on hydrologic adequacy. A DSAC IV dam is considered marginally safe, with confirmed or unconfirmed dam safety issues. The probability of failure is low but the dam may not meet all essential Corps guidelines. This classification triggers elevated monitoring and evaluation, but not plans for risk reduction measures. A Phase 2 dam safety evaluation with a detailed hydrologic adequacy evaluation is currently in progress. The state requested by letter in May, 2010 that the Corps continue all necessary evaluation to complete the reallocation. A determination will be made once the evaluations are complete whether or not the state will pursue the pool rise and purchase of additional water supply storage.

Water Reservation Rights

The Director of the KWO has authority, under the State Water Plan Storage Act, to acquire a water reservation right to store water for water supply or water quality in reservoirs where the state controls storage. A water reservation right is the right to store all natural inflow into the reservoir not needed to satisfy downstream water rights that are senior to the state's reservation right.

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The KWO holds two water reservation rights in Kanopolis Reservoir, one for water supply and the second for water quality. Both were accepted by the Chief Engineer in June 2002. Both include a provision to bypass 20 cubic feet per second (cfs) of inflow prior to water being stored.

Water Marketing Program

In the State Water Plan Storage Act, the authorizing statute for the Water Marketing Program, water in state owned storage in Kanopolis Reservoir is recognized as water belonging to the state, subject to the provisions of the Storage Act. In the Act, the Kansas Water Authority (KWA) is given the power to authorize use of such storage. To do so, the KWA must determine if the proposed use of water in the reservoir under state control is in the public's interest.

The Water Marketing Program provides long-term contracts (10-40 years) for raw water from state owned storage in Kanopolis and other federal reservoirs. Regulations developed under the Storage Act limit long-term contractual access to storage to municipal and industrial use.

Available Yield

The Storage Act dictates that "the director shall not contract for withdrawals of water from a particular reservoir which in the director's opinion are in excess of the yield capability from the conservation storage water supply capacity in such reservoir committed to the state computed to provide water through a drought having a 2% chance of occurrence in any one year with the reservoir in operation. This is commonly referred to as the 2% yield of the reservoir" (KSA 82a-1305.) The yield was updated during routine review by KWO in 2008 to an estimated availability of 6.5 million gallons per day (MGD) in 2048 with expected sedimentation.

Surplus Contracts

Water within the conservation pool storage that is not needed to meet contractual obligations within a given year may be authorized to be contracted under a term not to exceed one year. Surplus contracts have been authorized for irrigation purposes under an authorization contained in the Water Resources Development Act of 1986 (WRDA).

Water Marketing Contracts and Applications

Post Rock Rural Water District (Post Rock) is the only current water marketing customer using water from Kanopolis Reservoir. Post Rock has a contract for 400 million gallons per year (1,228 acre-feet), to meet the demand that serves over 3,000 customers in parts of eight counties in north central Kansas.

Five active applications have been filed with the KWO (See Table 2.) The total in the applications exceeds Kanopolis Lake's uncommitted yield.

Applicant Name	Date Application Expires	Quantity in Gallons	Quantity (AF)
Public Wholesale Water Supply Dist. No. 15	6/17/2012	2,555,000,000	7841
City of McPherson Board of Public Utilities	4/6/2016	3,650,000,000	11201
Post Rock Rural Water District	6/22/2016	730,000,000	2240
City of Russell	6/23/2016	465,000,000	1427
White Energy Partners	7/14/2016	550,000,000	1688
Total		7,950,000,000	24397

Table 2. Pending Applications for Water Marketing Contracts

In June, 2006 the KWA approved the City of McPherson's request to negotiate for a contract from Kanopolis Reservoir. One of the significant findings that must occur during the negotiation is the justification of the quantity of water requested. The KWO has met with McPherson to discuss the need; no contract has been finalized.

In November 2006, KWA considered Post Rock's request to negotiate for additional water from the Water Marketing Program. Because the quantity requested was significantly more than their current use, it appeared to overlap with the applications submitted by the City of Russell and White Energy Partners, and total applications far exceeded remaining yield, the KWA directed a set of questions be addressed during negotiations beyond the statutory required findings (K.S.A. 82a-1311a). Those included:

- The short, mid and long term needs for public water supply in the region;
- The role that Wilson Reservoir may play in meeting public water supply needs in the area;
- The nature of the contracting entity;
- The role use of storage will play in meeting downstream water supply needs,
- The quantity required to meet the needs.

The background and recommendations in this policy paper are the result of work that was completed in response to this action.

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Minimum Releases

The Corps has retained ownership of 53.4% of the multi-purpose pool for a water quality pool. The releases from the water quality pool are generally intended to meet in-stream needs such as water quality and fish and wildlife support. This pool is covered by a water quality reservation right held by the Kansas Water Office. This unique ownership/reservation right holding arrangement was established by a Memorandum of Understanding between the state and Corps in 1985.

Minimum releases from Kanopolis as shown in Table 3 are specified in the Lake Regulation Manual.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Release	10	10	15	20	30	50	50	50	50	25	15	10

Table 3. Monthly Minimum Releases

In March 2006, Post Rock expressed concern that continuing the minimum releases as scheduled could have significant negative impact on the lake level and compromise their ability to withdraw water from the lake under contract. At that time, the water quality pool was 75% full. By the end of the year, the capacity was down to 40% and the KWO predicted storage would be at 10% by the end of the following year if 2006 conditions persisted. This is significant since the minimum releases from the water stored in the water quality pool were being used to supplement natural flow downstream and were relied upon primarily by the downstream water right community.

Near the end of 2006 in response to the potential for low water quality storage levels, the KWO proposed submitting a deviation request to the Corps to temporarily change the minimum release schedule. A public meeting was held March 13, 2007 to present the proposal to the affected stakeholders. More than 100 members of the public attended the meeting to express concerns about lowering minimum releases. Ultimately, wet conditions returned in 2007 negating the need for a reduction in minimum releases at that time. The situation in 2006 and discussion in early 2007 established the need for a better understanding of the hydrologic system and potentially a better management of the reservoir releases.

Smoky Hill Groundwater Model

The KWO entered into a contract with the Kansas Geological Survey (KGS) in 2007 to determine the hydrologic relationship between the alluvial aquifer and the Smoky Hill River. The modeling was completed in 2009. The

lower Smoky Hill River Valley Groundwater Model was used to simulate climatic, streamflow and pumping conditions and their effects on the surface and groundwater supplies. (KGS Open-file Reports 2008-20 and 2009-20)

Discussions with the irrigation community; cities of Salina and Lindsborg; and Post Rock, the sole in-lake water supply user, were initiated during the development of the model and have been an integral part of the process to understand the system and to develop an improved management plan for the releases from Kanopolis Reservoir. A component of any revision to the current minimum release schedule will include an improved definition of downstream needs and lake storage to meet

those needs. A key finding of the model is that the alluvial groundwater wells do

not appear to benefit from storage releases, with the exception of those in the Salina area.

Impact of Reservoir Releases on Lake Levels

The KWO initiated an analysis of the impact of minimum water quality releases on lake levels and corresponding impact on water supply and recreational use. The review covered the entire period of record for which streamflow information was available (1948-2008.) Two significant findings of this work set in motion continued evaluation, discussion and direction:

1. The vast majority of times, downstream uses are met with available natural flow generated downstream of Kanopolis; no additional releases are needed.
2. Improvements can be made in meeting both in-lake and downstream needs with modifications of the minimum release schedule to meet a downstream target flow rather than a set schedule.

Continued evaluation of these findings using the OASIS model, a river/reservoir model utilized by the KWO, has led to the quantification of water supply storage needed to meet downstream needs.

In all of the management options under discussion, a modification of the established schedule of minimum releases and access to those releases has been assumed. Because this would require a modification of the Corps' Kanopolis Reservoir lake regulation manual, early and ongoing discussion with the Corps has been a part of the analysis. The Kansas City District of the Corp of Engineers recently studied the release schedule using their

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version of a river/reservoir model, RiverWare. The conclusions of their work included:

- A modified set release schedule results in substantially more water left in storage than the current operations.
- Releasing water to meet a target provides significant water saving over a set monthly release.

A formal modification of the regulation manual will still be required to implement a revised minimum release approach.



Center Pivot Irrigation, Trego County, Kansas

OPTIONS AND RECOMMENDATIONS

There is interest by the state in allowing downstream water users to access releases from storage from Kanopolis Lake. Six options are identified below: 1) No Change; 2) Update of Minimum Release Schedule; 3) Use of Water Marketing Program Contracts; 4) Lower Smoky Assurance District; 5) Formation of a Lower Smoky Special District; and 6) State Owned Storage operated in the public interest.

Option 1 – No Change

Under the no change option, the minimum release schedule is unchanged and operates with no downstream protection of diversions. Results of the OASIS model of the system indicate that current operations will meet downstream needs most of the time, but significantly deplete storage in Kanopolis Reservoir under extended dry periods. Under this option, the irrigators continue to assume risk of water right administration during drought and Salina will need to rely on new groundwater sources or contract with the state for stored water to meet their projected needs. Downstream water rights

remain vulnerable to any protection of minimum releases that may occur in the future. Under this option, access to water in storage is only through the Water Marketing Program.

Option 2 – Update of Minimum Release Schedule

This option would modify the minimum release schedule to allow releases from water quality storage to be less than the current minimum if that minimum release is not needed. Releases from water quality storage, up to the current minimum, may be made to meet downstream target flows at the USGS Mentor gage as determined by water quality needs. These releases would be protected from diversion to the level of the established target flow. Releases beyond what is needed for the downstream target, up to the current minimum release, could be made for downstream water right holders, and would be treated as natural flow.

This option would require a lake regulation manual change by the Corps. A review of the needs for a Kanopolis Reservoir manual change will be completed as part of a current planning assistance for states (PAS) study of the Kansas River system. Under this option, downstream water right holders would have no additional costs for water; however, during times of low flow, they would be vulnerable to water right administration if releases from water quality storage are not sufficient to meet the target flow.

Option 3 – Use of Water Marketing Contracts

The Water Marketing Program allows for contracts for up to 40 years. The statute allows for a term of less than 10 years, if desired by the applicant. The total of long term contracts available in a given reservoir is limited to the amount computed to provide water through a drought having a 2% chance of occurrence in any one year with the reservoir in operation.

Water within the conservation pool storage that is not needed to meet long term contractual obligations within a given year may be authorized to be contracted under a “surplus contract” for a term not to exceed one year. The quantity available in any given year will vary depending on other contracted quantities and is limited to 10% of the yield capability of the conservation pool of the reservoir.

Under this option, individual water users, including irrigators, could contract for water for a length of time determined by the user. A Water Marketing contract requires a minimum payment of 50% of the contract quantity,

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whether or not it is utilized. (Calendar year 2010 rate is \$0.25 per thousand gallons; CY 2011 will be \$0.33/1000 gallons.)

The Water Marketing Program does not statutorily prohibit contracts with irrigation users, though a regulation change would be required. There may be a need to modify the contract with the federal government through which the storage was purchased since it is specific for municipal and industrial uses. There would be no long term protection under an annual surplus contract. Cost is likely a prohibiting factor.

Under this option, the modification of the water quality release schedule as described in Option 2 would also be pursued. Irrigators would have access to that minimum release if not needed to meet the downstream target. The most likely situation where this option would help is a junior irrigator in a downstream location.

Option 4 – Lower Smoky Assurance District

This option is to allow all water right holders below Kanopolis Reservoir to form an assurance district. The assurance district would purchase storage that would be operated for the benefit of eligible water right holders in accordance with an operations agreement negotiated between the users, the KWO and the DWR. Eligible water right holders are determined by the Chief Engineer, DWR, based on a determination of the benefit of increased flow in the river to the water right. It is assumed these would be primarily surface water users, based on the KGS model, as it appears that no ground water rights, with the exception of those in the Salina area, would benefit. Eligible water right holders would vote to form an assurance district. If holders of 50% of the water rights (by quantity) vote to form, the district forms and all eligible water right holders become members of the district.

Membership in a water assurance district is currently limited to municipal and industrial water right holders so this option would require state legislative action. An operations agreement between the district, KWO and DWR would define releases from the lake and the amount of storage dedicated for the district.

This option would also include the modification of the water quality release schedule as described in Option 2. A determination of additional water supply storage needed to meet the needs of the district would be made by the KWO using the OASIS model. The amount of storage to be purchased would be determined by the

district based on the membership and the level of protection desired. Bylaws, decision-making procedures, and the distribution of costs of storage among the members of the district would be left to the discretion of the district. DWR would protect releases from the district owned water supply storage to assure access by the members of the district.

The cost for this option would be dependent on the amount of storage needed. The district would negotiate with KWO for the purchase of state-owned storage. This option may require modification of the state's contract with the Corps to allow for purchase of the storage by the special district.

Option 5 – Lower Smoky Hill River Special District

This option is for the development of a new entity that is able to negotiate for and finance the purchase of storage in Kanopolis Reservoir. Membership would be voluntary and would be made up of downstream users who benefit from releases from storage. These would be primarily surface water users, based on the KGS model, as it appears that no groundwater rights, with the exception of those in the Salina area, would benefit. Individual irrigators would form a separate entity for the purpose of membership in the special district.

The amount of storage to be purchased would be determined by the special district based on the membership and the level of protection desired. Bylaws, decision-making procedures, and the distribution of costs of storage among the members of the district would be left to the discretion of the district.

This option would require new statutory authority establishing a special district with the ability to purchase storage and assess costs to its members. Legislation may also be required to define the irrigation entity.

The district costs would include purchase and maintenance of storage, as well as administration and enforcement. The cost would be dependent on the amount of storage needed. The special district would negotiate with KWO for the purchase of state-owned storage. Since this option would also include the modification of the water quality release schedule as described in Option 2, the amount of additional storage required would be determined in conjunction with the KWO. An operations agreement between the KWO, DWR and the special district would be negotiated once the district was formed. Releases from district owned storage would be protected for the members of the special district.

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This option may require modification of the state's contract with the Corps to allow for purchase of the storage by the special district.

Option 6 – State Owned and Operated Storage

The KWA currently makes a public interest determination in considering contracts for water from storage in the Water Marketing Program. However, the Water Resource Planning Act (K.S.A. 82a-920 et al) clearly envisions a broader benefit to the use of water in storage in the state. In this option, the state would make operational decisions on the use of water in state owned storage considering all uses. Decisions on the use of water in storage would be made with all stakeholders providing input. The operational model for the Lower Smoky Hill River would be utilized as a decision support tool.

Both the Water Marketing and Water Assurance Programs are operated under the principle of "user pays." Legislative action to broaden access to storage beyond municipal and industrial uses would be necessary; many of the State Water Plan Storage Act provisions would need to be revised or repealed depending on the approach. Even more significant in implementation of this option is the development of a funding stream to pay for the state's financial obligations.

Recommendation

Option 5 is recommended – the development of a Lower Smoky Hill River Special District. The creation of a Special District would allow stakeholders to choose to be involved in ownership and management of storage to meet downstream needs.

IMPLEMENTATION CONSIDERATIONS

State and Federal Legislative and Legal Action

At the state level, legislation is needed to create a Lower Smoky Hill Special District. The legislation needs to define the Special District membership, operation and legal abilities or allow for the program rules and regulations to cover the details.

The Special District membership would include an irrigation organization as well as other water uses and a mechanism to represent those water right holders. Separate legislation may be required to allow for the formation of an irrigation entity for the purposes of membership in the special district. Voluntary membership would be limited to those water rights that benefit from streamflow as determined by the hydrologic and river modeling.

The state will formally seek authority to determine the use of all state owned storage and request a change to the Kanopolis Reservoir operation manual from the federal government.



Kanopolis Reservoir. Photo courtesy Kansas Water Office

KWO would negotiate sale of storage to the Special District; the KWA would approve the contract for sale.

Administrative Requirements

A modification of the water quality release schedule to meet a downstream target flow should be adopted by the Corps of Engineers.

An operations agreement is needed to protect releases made for the Special District along with a possible modification of the water reservation right to allow additional uses.

Financial Requirements

Financial requirements to the state for the option are fairly minimal initially. The implementation of a special district and legislative changes can be pursued with existing resources. The Lower Smoky Basin Model is complete and can be updated in house by the KWO. The administration of water rights when releases for the special district are made would be a Kansas Department of Agriculture-Division of Water Resources responsibility. The composition of the district will determine the degree of administration that may be needed.

The significant financial impact, if any, would be borne by the district for the purchase and operation of storage and administration of the district. The total cost to the district would equal the state's capital cost to purchase

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to storage and administer and enforce the operations of the district, as well as a proportionate share of the Corps operation and maintenance cost.

Implementation Schedule

Legislation

Legislation to authorize a special district would be introduced in the 2011 legislative session.

Contracts and Agreements Modification

Discussion on many of the policy issues discussed in the paper has been initiated with the federal government. Formal clarification of state authority over the state owned storage is a key to this option. A lake operation manual change may need to be sought or an agreement to modify releases completed. .

Assuming state legislation is passed in early 2011, the reservation right modification would be requested of the Chief Engineer.

With the completion of a contract with the Corps for additional storage or agreement that state owned storage may be sold for purposes that include irrigation, a contract with the Special District may be completed.

REFERENCES

US Army Corps of Engineers, Kansas City District, December 2001, *Final Reallocation report for Kanopolis Lake, Kansas*

Kansas Geological Survey, *Open-file Reports 2008-20 and 2009-20.*

State Water Plan Storage Act, K.S.A. 82a-1301 et al. (Water Marketing Program and State water reservation rights. <http://www.kslegislature.org/legsrv-statutes/getStatuteInfo.do>)

State Water Resource Planning Act. K.S.A. 82a-920 et al