

**Kansas Water Authority Meeting  
McPherson, Kansas  
10:00 a.m. – December 12, 2017**

<i>Time</i>	<i>Agenda Item</i>	<i>Presenter</i>	<i>KWA Advice</i>	<i>KWA Decision</i>	<i>Page No.</i>
10:00 am	<b>Call to Order/Introductions</b>	Gary Harshberger			
10:05 am	<b>Welcome from Kansas Municipal Utilities</b>	Brad Mears			
10:15 am	<b>Approval of Minutes of October 10, 2017</b>			X	2
10:20 am	<b>KWA PWS Committee</b>	Dennis Schwartz			4
	<i>2018 Surplus Water Report</i>	Cara Hendricks		X	
	<i>Wolf Creek Marketing Contract</i>	Cara Hendricks		X	
	<i>City of Lawrence Application and Request to Negotiate</i>	Cara Hendricks	X		
10:40 am	<b>Water Research Coordination</b>	Dan Devlin	X		11
11:10 pm	<b>KWA RAC Operations Committee</b>	Greg Graff		X	27
11:20 am	<b>Vision Implementation Update</b>	Matt Unruh			30
	<i>Smoky Hill-Saline RAC/City of Hays Conservation Day</i>	Martha Tasker	X		
	<i>State of the Resource Public Meetings</i>	Angela Anderson & Lori Kuykendall	X		
11:40 am	<b>Kansas Water Quality Update</b>	Jaime Gaggero, KDHE	X		
12:10 pm	<b>Working Lunch Break</b>				
	<b>Welcome and Update from McPherson BPU</b>	Tim Maier			
	<b>CHS Refinery Presentation</b>	Alan Burghart			
12:45 pm	<b>KWA Annual Report to the Governor and Legislature</b>	Earl Lewis		X	31
1:30 pm	<b>Equus Beds/GMD2 Sustainability Assessment Update</b>	Steve Hieger,E-W RAC; Don Whittemore, KGS; Tim Boese, GMD2			
2:15 pm	<b>Legislative Update</b>	Ginger Harper	X		54
	<i>Interim Committee Summary</i>	Tracy Streeter & Burke Griggs			
2:45 pm	<b>Director's Report</b>	Tracy Streeter	X		--
3:00 pm	<b>New Business</b>				
3:15 pm	<b>Adjourn</b>				
3:15 pm	<b>Facility Tour – Upon Adjournment</b>				

Upcoming Kansas Water Authority Meetings: January 23-24, 2018, Topeka, KS

## Minutes

### KANSAS WATER AUTHORITY Conference Call

October 10, 2017

Conference Call

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**CALL TO ORDER:** Chairman Gary Harshberger called the **October 10, 2017** Kansas Water Authority meeting to order at **8:35** a.m. on the phone.

**MEMBERS PRESENT:** Gary Harshberger, Chairman; Mike Armstrong; John Bailey; Mark Fischer; Greg Graff; Randy Hayzlett; Calvin Kissick; Brad Loveless; Karma Mason; Ted Nighswonger; Dennis Schwartz; Tracy Streeter

**MEMBERS ABSENT:** Alan King; Lynn Wobker

#### **APPROVAL OF MINUTES:**

**Motion No. 10-17-01** It was moved by **Karma Mason** and seconded by **Brad Loveless** the **August 16-17, 2017** Minutes for the Regular Meeting of the Kansas Water Authority be approved as presented. **Motion carried with no dissenting votes.**

It was moved by **Calvin Kissick** and seconded by **Mark Fischer** the September 6, 2017 conference call minutes of the Kansas Water Authority be approved as presented. **Motion carried with no dissenting votes.**

#### **KWA/RAC OPERATIONS:**

**Greg Graff** and **Matt Unruh** presented a resolution from the Cimarron RAC.

**Motion No. 10-17-02** It was moved by **Greg Graff** and seconded by **Ted Nighswonger** to approve the resolution to improve communication and coordination with regional stakeholders as well as Ogallala Aquifer users in Oklahoma, with a meeting in Liberal to focus on stakeholders within Beaver and Texas Counties in Oklahoma. **Motion carried with no dissenting votes.**

#### **KWA Planning Update**

*State of the Resource*

**Matt Unruh** presented an update on the State of the Resource report and planning for upcoming RAC meetings.

#### **BUDGET UPDATE:**

*Budget Committee*

**Karma Mason** provided this update.

*Annual Report to the Governor and Legislature*

**Earl Lewis** & **Ginger Harper** presented the draft Table of Contents and outline.

#### **RESEARCH COORDINATION:**

*Research Coordination*

**Earl Lewis** provided this update.

**KWA RAC COMMITTEE:**

*Hays Water Conservation Field Day: Smoky Hill-Saline RAC*

**Martha Tasker & Diane Knowles** provided this update.

*Drought Exercise: Marais des Cygnes, Neosho and Verdigris RACs*

**Lori Kuykendall, Angela Anderson and John Black** provided this update.

**DIRECTOR'S REPORT:** **Tracy Streeter** provided the Director's Report.

**NEW BUSINESS:**

**UPCOMING MEETINGS:** December 12, 2017, McPherson, KS  
January 23-24, 2018, Topeka, KS

**Adjournment** The KWA adjourned at **10:04** a.m.

# MEMO



DATE: December 7, 2017  
TO: Kansas Water Authority  
FROM: Dennis Schwartz, Chair, Public Water Supply Committee  
Cara Hendricks, P.E.  
RE: Public Water Supply Committee Update

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www.kwo.org

The purpose of this memorandum is to provide an update to the Authority regarding the following items related to the KWA Public Water Supply (PWS) Committee and associated PWS programs:

Action Items:

- Recommend approval of 2018 Surplus Water Report as presented to PWS Committee on 12/7/17 subject to minor edits to John Redmond Reservoir information upon execution of Wolf Creek Water Marketing Contract
- Recommend approval of the Wolf Creek Water Marketing Contract upon receipt and review of the final negotiated contract and in consideration of the following conditions:
  - Based on the general terms and conditions and Final Findings as discussed by the Committee on 12/7/17
  - Any occurrences to the contract prior to the KWA meeting shall be submitted to the PWS Committee for review, and shall not substantially change the terms and conditions of the contract

Informational Items:

- City of Lawrence Water Marketing Contract Application and Request to Negotiate

## **Surplus Water Available in Water Marketing Program Lakes, Calendar Year 2018 (Surplus Water Report)**

Approval of this report by the KWA gives the Director the permission to enter into contracts for water considered to be surplus during the calendar year. The Calendar Year (CY) 2018 Surplus Report includes the changes made annually to the report, with a few additional updates as noted below. Kansas Water Office staff provided the draft 2018 Surplus Water Report to the Committee at the Dec. 7<sup>th</sup> meeting for review. The draft report is included in with the mailing materials.

The other changes include:

- Recent updates and refinement of KWO's model for Melvern resulted in a significant increase in yield.
- Operational changes made to Milford's Lake Level Management Plan were incorporated into the model, resulting in a greater reduction in yield.
- Placeholder in Pending Applications for Wolf Creek for water from John Redmond Reservoir
- Addition to the Clinton Lake Pending Application table for the City of Lawrence application

*The Public Water Supply Committee recommends that the Kansas Water Authority approve the Surplus Water Available in Water Marketing Program Lakes, Calendar Year 2018 report and authorize the Director to enter into surplus water supply contracts for water defined to be surplus by the report, subject to the inclusion of minor edits to the John Redmond Reservoir information pending execution of the Wolf Creek Water Marketing Contract.*

## **Request for Approval of Wolf Creek Water Marketing Contract**

On August 17, 2017, the Kansas Water Authority approved the Director of the Kansas Water Office to enter into negotiations with the Kansas Gas and Electric Company (KGE), as the contract's operating agent and on behalf of the owners in Wolf Creek Nuclear Operating Corporation for a contract to withdraw and use water from John Redmond Reservoir for the purposes of serving Wolf Creek Nuclear Generating Station in Burlington, Kansas. The existing marketing contract (No. 76-2) is a fixed-rate contract with an end date of Dec. 31, 2017.

Since that time, both parties have been working to negotiate the terms and conditions of the new water marketing contract. At the time of the PWS Committee meeting on Dec. 7, 2017, the negotiated contract had not yet been finalized by both parties, with only a few minor items yet to be determined. Anticipating that the negotiated contract will be ready for review at the full Authority, the Kansas Water Office (per the other party’s approval) presented to the PWS Committee the general terms and conditions of the contract.

The new contract is substantially the same as original 40-year contract with some changes:

- Reflects current entity names as collective “Purchaser”
- Slight decrease in annual contract quantity from current contract  
→ 9,368 million gallons per year (9,672 million gallons per year in previous contract)
- 5-year term at variable rate  
→ Both parties plan to continue efforts to evaluate and determine long-term options

In addition to the general terms and conditions of the negotiated contract, the Kansas Water Office provided the Final Findings to the PWS Committee, also attached to this memorandum. The PWS Committee recommends approval of the Wolf Creek Water Marketing Contract upon receipt and review of the final negotiated contract and in consideration of the following conditions:

- Based on the general terms and conditions and the Final Findings as discussed by the Committee on 12/7/17
- Any occurrences to the contract prior to the KWA meeting shall be submitted to the PWS Committee for review, and shall not substantially change the aforementioned terms and conditions of the contract

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*Based on the Final Findings, and in consideration of the conditions as provided herein, the Kansas Water Office recommends that the Kansas Water Authority approve the negotiated contract with the Kansas Gas and Electric Company, the Kansas City Power & Light Company, and Kansas Electric Power Cooperative, Inc. for the purchase of water from John Redmond Reservoir for the purpose of an industrial water supply to serve Wolf Creek Nuclear Generating Station located in Burlington, Kansas.*

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### **City of Lawrence Water Marketing Contract Application and Request to Negotiate**

On Nov. 30, 2017, the Kansas Water Office hosted a meeting for all Clinton Lake water marketing customers. The meeting was attended by representatives from the City of Baldwin, City of Lawrence, and Douglas County RWD #1 through #6. The primary purpose of the meeting was to convene the entities that hold current water marketing contracts for raw water from Clinton Lake in order to provide general information regarding the marketing contract process. In the next few years, the remaining capped rate contracts for raw water from Clinton Lake will be expiring, and the associated entities will need to decide whether they would like to renew the contracts.

<b>Contract No.</b>	<b>Customer</b>	<b>Annual Contract Maximum Gallons</b>	<b>2017 Maximum Gallons</b>	<b>Rate \$/1000 Gallons</b>	<b>Contract End Date</b>
77-1	City of Lawrence	3,468,957,286	3,468,957,286	\$0.10	12/29/2019
77-2	Douglas County Rural Water Dist. No. 5	45,620,891	45,620,891	\$0.10	12/29/2019
77-3	City of Baldwin	323,128,999	323,128,999	\$0.10	12/29/2019
77-4	Douglas County Rural Water Dist. No. 1	47,516,490	47,516,490	\$0.10	12/29/2019
77-5	Douglas County Rural Water Dist. No. 4	68,431,337	68,431,337	\$0.10	12/29/2019
79-1	Douglas County Rural Water Dist. No. 3	684,273,174	684,273,174	\$0.10	12/13/2021
79-2	Douglas County Rural Water Dist. No. 6	23,759,981	23,759,981	\$0.10	12/13/2021
90-1	Douglas County Rural Water Dist. No. 1	14,258,172	14,258,172	\$0.38	1/1/2031
90-2	Douglas County Rural Water Dist. No. 6	9,503,298	9,503,298	\$0.38	1/1/2031
90-3	Douglas County Rural Water Dist. No. 2	80,728,250	80,782,250	\$0.38	1/1/2031
90-5	City of Lawrence	1,387,481,489	1,387,481,489	\$0.38	1/1/2031
95-2	Douglas County Rural Water Dist. No. 4	105,488,095	105,488,095	\$0.38	10/26/2035
95-3	Douglas County Rural Water Dist. No. 5	128,298,541	128,298,541	\$0.38	10/26/2035

The planned outcome of the meeting was to determine the options that the group would like the Kansas Water Office to pursue, in terms of a cost/rate analysis and administrative feasibility. It was further communicated to the group that any

options/scenarios determined to be pursued will have to be vetted by the PWS Committee and by the full KWA prior to approval to move forward with contract negotiations, or other proposed actions.

On Nov. 30, 2017, the City of Lawrence submitted a Water Marketing Contract Application (as attached), and on Dec. 1, 2017, the City submitted the request to negotiate. The City's desired timeline puts them ahead of the other entities with regard to application process for new contracts. As a result of the City's request, all Clinton Lake marketing customers were notified. At the Dec. 7<sup>th</sup> meeting, the PWS Committee discussed the application and considered the City's request to negotiate. The PWS Committee acted to table the City's request to negotiate at this time, and has directed KWO staff to provide additional information related to the scenarios requested by the Clinton Lake group.

The PWS Committee plans to meet in late January (prior to the next KWA meeting) to review the additional information and will reconsider the City's request to negotiate at that time.

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*This report is for information only. No action is needed at this time.*

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**FINAL FINDINGS**  
**REQUEST OF THE KANSAS GAS AND ELECTRIC COMPANY, THE KANSAS CITY**  
**POWER & LIGHT COMPANY, AND KANSAS ELECTRIC POWER COOPERATIVE, INC.**  
**TO RENEW A CONTRACT FOR WATER SUPPLY**  
**FROM JOHN REDMOND RESERVOIR**  
**December 7, 2017**

In accordance with K.S.A. 82a-1305, which states, in part:

"Whenever the authority finds that a proposed withdrawal and use of water, other than surplus waters, is in the interest of the people of the state of Kansas and will advance the purposes set forth in article 9 of chapter 82a of Kansas Statutes Annotated, and amendments thereto, it shall authorize the director to enter into negotiations for the purpose of entering into written contracts with any person for withdrawal and use within or without the state of waters from conservation storage water supply capacity committed to the state."

The Director of the Kansas Water Office (KWO) submits the following information for Kansas Water Authority (KWA) review to determine whether to approve the negotiated contract with the Kansas Gas and Electric Company, the Kansas City Power & Light Company, and Kansas Electric Power Cooperative, Inc. (herein referred to as "the Applicant") for the purchase of water from John Redmond Reservoir for the purpose of an industrial water supply to serve Wolf Creek Nuclear Generating Station located in Burlington, Kansas. Before a contract can be signed, the KWA must find that:

1. The proposed sale is in the public interest, and
2. It will advance the purposes of the State Water Planning Act and the State Water Plan.

If the KWA finds that these two criteria are met, the negotiated contract with the Applicant should be approved.

In accordance with K.S.A. 82a-1311a(c), the Kansas Water Authority shall consider the following items in determining whether the proposed contract is in the best interest of the people of the State of Kansas and whether benefits to the State for approving the contract outweigh the benefits to the State for not approving the contract.

- 1. The present and future water supply needs of the Applicant.** The Applicant has requested a 5-year water marketing contract with an annual contract maximum of 9,368,000,000 gallons (9,368 mgy). The Applicant's current marketing contract, which has been in place for 40 years beginning in 1976, includes an annual contract maximum of 9,672 mgy. As part of the contract renewal process, the Applicant has been working with KWO to determine its current and future water supply needs. Through the use of KWO's current hydrologic model (OASIS), the Applicant has determined that its current water supply needs are slightly less than the quantity included in its current marketing contract. This information is based on current operations, lake level management and pumping scenarios.

In addition to the water marketing contract, the Applicant also owns Water Rights, File Nos. 14,626 and 19,882, which authorize the diversion of natural flows of the Neosho River. Both water rights are

subject to the limitation that 250 cfs of flow remains in the Neosho River downstream from the point of diversion.

2. **Any current beneficial uses being made of the non-contracted water proposed to be diverted.** John Redmond Reservoir yield from water supply storage was calculated by the KWO in 2017 and has a current estimated water supply yield of 11,753 mgd (36,070 af) and 11,210 mgd (34,402 af) through the year 2022, a quantity in excess of the amount proposed. However, additional system modeling with OASIS indicates that John Redmond Water Marketing storage may only be sufficient for the full proposed annual quantity through the year 2022, fully committing all available Water Marketing storage yield. 90% of the water supply storage in the reservoir, and the associated yield, is dedicated for Water Marketing storage, and remaining 10% is allocated to the Cottonwood/Neosho River Basin Water Assurance District. There is only one Water Marketing contract currently in force from the marketing storage, which is the current long-term contract for Wolf Creek Nuclear Generating Station. The new negotiated contract proposes to utilize the same marketing storage that is associated with the current long-term contract.
3. **Any reasonable foreseeable beneficial use of the water.** There are currently no other pending applications for water supply from John Redmond Reservoir.
4. **The economic, environmental, public health and welfare, and other benefits or adverse impacts.** Sufficient water supply is critical to maintaining operations at Wolf Creek Nuclear Generating Station located in Burlington, Kansas. The station utilizes water supply from John Redmond Reservoir to keep its cooling lake, Coffey County Lake, at levels necessary for safe and efficient plant operation. Renewal of the water marketing contract would ensure an adequate water supply to meet their projected needs through the term of the contract.
5. **Alternative sources of water available to the Applicant.** Alternate sources of water for Coffey County Lake have been investigated by the Applicant. One considered source was Melvern Reservoir. Excess water availability from Melvern was evaluated, as was the cost and feasibility of building a pumping facility and pipeline to convey water from the reservoir to Coffey County Lake. Another investigation of an alternate source was led by KWO, with the participation of Westar, which included evaluating the feasibility of building a new reservoir near Wolf Creek specifically for water supply. Both of these alternatives were determined to be less feasible than the current and continued use of John Redmond Reservoir as a water supply source for Coffey County Lake.
6. **The preliminary plan of design, construction and operation of any works or facilities used in conjunction with transporting the water to its point of use.** The Applicant plans to use the same point of diversion as their existing contract.
7. **Whether the proposed purchase is consistent with the state water plan approved by the Legislature.** The proposed contract renewal is consistent with the State Water Plan and the State Water Plan Storage Act.
8. **The date of the application to contract for withdrawal and use of water.** Application No. 251 was received by the KWO from the Purchaser on August 2, 2017.
9. **Minimum streamflow requirements.** Target flows have been set for the Neosho River at USGS gaging stations near Emporia (5 cfs) and Parsons (20 cfs). These target flows are maintained and supported by releases from water quality and assurance district storage in Marion, Council Grove and John Redmond reservoirs. As with the current marketing contract, no adverse impact on minimum streamflow is anticipated with the proposed contract renewal.

**10. Whether the applicant has adopted and implemented a water conservation plan.** The negotiated contract language requires the Purchaser to adopt and implement a water conservation plan that is consistent with the guidelines for conservation plans and practices, developed and maintained by the Kansas Water Office in effect on the date of the execution of the contract and that relate to the use of water at the Wolf Creek Nuclear Generating Station.

Based on these findings, the Kansas Water Office recommends that the Kansas Water Authority approve the negotiated contract with the Kansas Gas and Electric Company, the Kansas City Power & Light Company, and Kansas Electric Power Cooperative, Inc. for the purchase of water from John Redmond Reservoir for the purpose of an industrial water supply to serve Wolf Creek Nuclear Generating Station located in Burlington, Kansas.

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Tracy Strecter, Director

Sam Brownback, Governor

## Water Marketing Contract Application

**Name of Applicant:** City of Lawrence

**Name of Applicant's Authorized Representative:** Mike Lawless

**Mailing Address:**

Street or P.O. Box: PO Box 708  
City: Lawrence  
State: Kansas  
Zip Code: 66044  
Email Address: mlawless@lawrenceks.org

**Reservoir:** Clinton Reservoir

Anticipated Quantity of Water in million gallons per year: 4,857

Peak Daily Rate in million gallons per day: 25

**Intended Use** (municipal, industrial, and/or other – please explain other): Municipal

*Note: The applicant will be required to submit documentation to justify quantity requested.*

**Anticipated Date Contract Will Be Needed:** May 1,2018

In accordance with the State Water Plan Storage Act, K.S.A. 82a-1301, et seq., the receipt date of each application will be stamped thereon and authenticated. The applicant shall notify the Director in writing that they wish to commence negotiations for a contract to withdraw and use water. An application may remain on file for ten years. On or before the tenth anniversary of the application, the applicant may request in writing that the application be extended for a period of up to three years.

Date Stamp:

**NOV 30 2017**

Reviewer's Initials: NW

(For Office Use Only)

Application Number: 253

# MEMO



DATE: December 6, 2017  
TO: Kansas Water Authority  
FROM: Earl Lewis  
RE: Water Research Coordination

900 SW Jackson Street, Suite 404  
Topeka, KS 66612  
Phone: (785) 296-3185  
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As previously discussed by the Kansas Water Authority (KWA), throughout 2017, a research coordination workgroup has continued to meet to identify priorities for research needed to support implementation of the Vision. The workgroup consists of representatives from K-State Research and Extension, Kansas Geological Survey, Kansas Biological Survey, the University of Kansas, U.S. Geological Survey, Kansas Department of Agriculture, Kansas Department of Health and Environment and the Kansas Water Office. No action is being sought at this time.

Earlier this year, the group identified three major areas on which to concentrate efforts: Water Quality, Ogallala-High Plains Groundwater Depletion, and Reservoir Sedimentation. Under each of these broad categories, the group further identified specific areas in need of additional research. The areas that will be addressed first include streambank stabilization effectiveness, irrigation technologies and harmful algal blooms.

As reported to the KWA at the August 2017 meeting, small research coordination teams focusing on each of these areas were convened to discuss the needs for future research. Each of the three teams, led by a selected member of the core workgroup, have now met to identify gaps in the research and existing data in order to determine the resources necessary to fill those gaps. Attached you will find a summary outlining the research priorities identified by each team. These summaries represent the initial compilation of information provided to the team leaders by attendees of these small group meetings. Efforts are currently underway to refine and prioritize the attached lists and identify the top research priorities on which to focus coordination efforts in the coming year.

While these three focus areas have been selected for the initial coordination efforts, many other research efforts continue to be supported and will remain a priority for future research coordination through this workgroup.

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*No action is needed at this time. Information is provided for discussion purposes only.*

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## Vision Implementation Research Coordination

The 50-Year Vision for the Future of Water Supply in Kansas and regional advisory committee action plan identify several research areas necessary to implement Vision action items.

In an effort to promote state-wide collaboration and support of the research needs identified, a workgroup comprised of members throughout the state involved with ongoing research activities tied to water supply and water quality issues in Kansas was convened.

The purpose of the workgroup is to promote communication; support university research studies that, when possible, also benefit Kansas water issue knowledge; and provide opportunities for university researchers and participating agencies to collaborate in research efforts.

Collaborators included (but are not limited to):

- ❖ K-State Research and Extension
- ❖ Kansas Biological Survey
- ❖ Kansas Forest Service
- ❖ Kansas Geological Survey
- ❖ University of Kansas
- ❖ U.S. Geological Survey
- ❖ Kansas Department of Agriculture
- ❖ Kansas Department of Health and Environment
- ❖ Kansas Water Office

*“Annually coordinate with university researchers regarding the Vision for the Future of Water Supply in Kansas to ensure future collaborative research supports the successful implementation of the Vision.”*

The Kansas Water Research Coordination Workgroup met several times in 2017 to identify research areas on which to focus efforts. Three broad research categories were defined and the top three areas of focus were selected for prioritization.

- ❖ Ogallala-High Plains/Groundwater Depletion
- ❖ Reservoir Sedimentation/Loss of Storage
- ❖ Water Quality

The areas that will be addressed first include streambank stabilization effectiveness, irrigation technologies and harmful algal blooms (HABs). Small research coordination teams focusing on each of these areas have been convened to meet and discuss the needs for future research. Other research areas (e.g. sorghum, wheat genetics, produced water, etc.) will be the focus of future research coordination efforts.

Ultimately, the objective of these meetings is to provide an opportunity for subject matter experts to work together to identify gaps in the research and existing data, determine what is needed to fill those gaps, foster better collaboration among the state’s institutions, and maximize funding opportunities.

<i>Ogallala-High Plains/Groundwater Depletion</i>	<i>Reservoir Sedimentation</i>	<i>Water Quality</i>
<b>Vision/Regional Action Plan Identified Needs</b>		
<ul style="list-style-type: none"> <li>• Efficient irrigation technologies</li> <li>• Sorghum Initiative</li> <li>• Water Technology Farms</li> <li>• Alternative, less water intensive crops/feeds</li> <li>• Optimum plant development stages for most efficient water application</li> <li>• Economics of water conservation</li> <li>• Aquifer characterization – index well expansion, groundwater model development/maintenance and modeling of stream-aquifer interactions, playa recharge</li> </ul>	<ul style="list-style-type: none"> <li>• Effectiveness of Best Management Practices - Streambank stabilization</li> <li>• In-lake studies – bathymetric surveys and in-lake sediment sampling</li> <li>• In-stream sediment &amp; stream flow monitoring</li> <li>• Reservoir operations &amp; sediment management</li> </ul>	<ul style="list-style-type: none"> <li>• Harmful Algal Blooms (HABs) - Effectiveness and Cost Benefits of in-lake treatment options/changes to reservoir operations/ experiments to understand bloom formation and toxicity</li> <li>• Nitrates – identification of sources, travel and remedial options</li> <li>• Inventory lower quality waters - type, quantity, location, potential uses and quality</li> <li>• Identification of barriers to allow the use/reuse of lower quality waters</li> <li>• Treatment technologies and water quality standards for reuse</li> </ul>
<b>Recent/Ongoing Water Research Efforts</b>		
<ul style="list-style-type: none"> <li>• Sorghum Research</li> <li>• Wheat- heat &amp; drought tolerant varieties</li> <li>• Alternative forages</li> <li>• On-Farm Demonstration of Water Management Technologies and Mobile Drip Irrigation</li> <li>• Aquifer characterization (Index Wells, Annual Monitoring)</li> <li>• Groundwater Models for GMDs 1, 2, 3 &amp;5</li> <li>• Monitoring the Impacts of Sheridan County 6 Local Enhanced Management Area</li> <li>• Limited Irrigation Crop Insurance/ WCA Calculator</li> <li>• Economic and Policy Implications of Groundwater Conservation in Southwest Kansas</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation of Bathymetric Modification at John Redmond Reservoir</li> <li>• Regional Sediment Management Studies</li> <li>• Bathymetric Surveys</li> <li>• Streambank Assessment of the Cottonwood and Neosho Rivers above John Redmond Reservoir</li> <li>• USGS Stream Gaging &amp; Neosho River Monitoring</li> <li>• Impacts of riparian forests on sedimentation</li> <li>• Understanding and characterizing ephemeral gully erosion</li> </ul>	<ul style="list-style-type: none"> <li>• HAB Studies for Milford and Kansas River</li> <li>• Experimental HAB studies at the KU Field Station</li> <li>• Kansas River Taste and Odor</li> <li>• Water Quality Impacts of Constructed Wetlands on Tile Outlet Terrace Runoff</li> <li>• Produced Water Research</li> <li>• Impacts of Cover Crops on Water Quality</li> <li>• Evaluating BMPs for Poultry Production</li> </ul>

# Irrigation Research Priorities

Submitted by Daniel Devlin, Kansas State University (ddevlin@ksu.edu)  
December 12, 2017

## **1. Measuring water use efficiency of current management practices.**

Proposed project goals and objectives: 1) Develop a spatially-linked, micro-level, temporal database of crop yield, crop groundwater use, monthly rainfall, evapotranspiration, irrigation technology, and soil type for western Kansas; 2) apply econometric techniques to the dataset and estimate measures season-long application efficiency; and 3) inform stakeholders and policy makers of the results.

Procedure: The researchers will work closely with the Kansas Department of Agriculture and the USDA-RMA to develop the data set previously described. Appropriate statistical models will be developed to identify the current level of groundwater use efficiency.

Justification: When modeling groundwater use, economists typically assume an irrigation efficiency of 90% to 95%. These efficiencies are based on the measured application efficiencies of current irrigation technologies and the assumption that producers of irrigated crops are very efficient in their groundwater use. With these assumptions economists typically find that 1) there is very little groundwater conservation associated with the adoption of new irrigation technology, and 2) any reduction in current groundwater use will result in profit losses to the producer. However, recent research suggests that producers in northwest Kansas were able to reduce groundwater use by 20% without negative economic consequences. One explanation for this phenomenon is that current irrigator management efficiency is not as high as currently assumed. Measuring groundwater use efficiency of current management practices has been problematic as the data requirements have not been available. The objective of this research is to spatially merge the cropping system and groundwater use data from the state of Kansas' WIMAS database, the crop yield database from the USDA RMA database, the NRCS SURGO soils data base, and the PRISM precipitation database to create a multi-year farm level database. This data base can then be used to measure groundwater use efficiency of current management practices. The results of this project will be beneficial in promoting the benefits of groundwater conservation, justifying current and future USDA RMA limited irrigation crop insurance products, promoting new irrigation technologies, increasing the social and economic tractability of water-conserving technologies/practices and benchmarking current efforts to promote the adoption of advanced irrigation management technologies

## **2. Improved management and strategies for deficit irrigation.**

- a. Deficit irrigation of corn. Build on existing data sets with different strategies for deficit irrigation.
- b. Targeted deficit irrigation of grain sorghum. Evaluate relatively small amounts of irrigation at targeted times for sorghum. This could allow more water for other crops.

c. Evaluate crop rotations (involving corn, sorghum, wheat, etc.) to spread irrigation over different time periods and amounts and take advantage of rotation effects with a mix of crops.

The projects could look at irrigation being limited by well capacity or by regulated (or voluntary) reduced pumping amounts (LEMA or WCA approach). <https://mail.google.com/mail/u/0/#all>

**3. Leverage the Water Technology Farms to evaluate irrigation efficient intensive cropping systems.** Address the questions of: 1. row spacing 2. Water timing 3. Cropping diversity for optimized water response 4. Tillage/no-till/etc.

**4. Research into advanced dryland production systems and conversion from irrigated to limited/dryland agriculture.** Some areas in western Kansas have already stopped irrigating or have significantly reduced well yields. We expect in the future that are areas will have to move to limited irrigation and back to dryland production. We propose to initiate a significant new, long term research effort in developing advanced dryland production systems. This effort will include an intense research effort around improved tillage, genetics, new crops, rotations, etc. With a significant long term research effort we believe we can develop a system of dryland agriculture that can take the place of or reduce the impact of less irrigated agriculture.

**5. Research on the impact of soil health management regimes combined with other advanced irrigation technologies.**

**6. Impact of limited irrigation on return flow and soil salinity.**

**Issues:** Increased efficiency of irrigation water application through the use of soil moisture sensors and other irrigation technology is expected to reduce the infiltration of soil moisture below the root zone in comparison with irrigation systems that are not as efficient. This could eventually decrease the amount of recharge to the underlying aquifer. In addition, the leaching of soil salts derived from the applied irrigation water as well as from fertilizer, soil weathering, and decomposition of plant matter left after harvest could be decreased, thereby increasing the salinity of the soil during the long term.

**Objectives:**

1. Determine the migration of soil moisture through and just below the root zone of row crops to assess the amount of irrigation return flow under different limited irrigation systems and crop mixes compared to nearby current, more conventional irrigated areas. Estimate the impact of a long-term decrease in return flow to the net inflow reaching the underlying Ogallala aquifer.
2. Assess the relative importance of periodic high precipitation events that provide enhanced precipitation infiltration below the root zone to the return flow in areas of limited compared to more conventional irrigation. Determine the current soil salinity and irrigation water and fertilizer input of salts to the soil in limited irrigation areas compared to nearby current, more conventional irrigated areas and estimate the long-term buildup of soil salinity and the potential effect of that salinity on crop

yields. Assess whether periodic high precipitation events provide enough salt leaching to mitigate potential soil salinity issues in limited irrigation areas.

## **7. Approaches for verifying aquifer water conservation.**

**Issue:** Increased efficiency of irrigation water use gained through technology and change in crop mixes should lead to water conservation for the Ogallala aquifer. However, if the efficiency gains are offset by use of the saved water for increased acreage and more water intensive crops, conservation of water from the aquifer will not occur. The impact of irrigation technology and crop mix adaptations on the Ogallala aquifer, i.e., discernment of true water conservation, can be difficult to quantify and truly link to the adaptations because of influences in climatic variations and other factors controlling net inflow to the aquifer.

### **Objectives:**

1. Determine and predict the change in irrigation water use under different limited irrigation systems and crop mixes compared to nearby current, more conventional irrigated areas during different climatic conditions through the use and understanding of relationships of water use and climatic indices (especially radar precipitation).
2. Determine the effect of water use changes from limited irrigation compared to more conventional irrigation on water levels in the Ogallala aquifer based on the water-balance approach recently developed by the Kansas Geological Survey.
3. Apply both of these methods at different scales across the Ogallala aquifer, from technology farm areas to Water Conservation Areas and Local Enhanced Management Areas and compare to areas defined by different irrigation practices, crop mixes, hydrogeology (including depth to water and locations of focused recharge), and groundwater management district regions.
4. Estimate and compare the net inflows to the Ogallala aquifer from the water-balance approach in the different types of areas. Assess the different components of net inflow to the aquifer over different regions of the Ogallala and determine the most appropriate approaches for discerning the magnitude of the different components. Estimate the impact of the increase in the areas of limited irrigation to components of net inflow in different regions of the aquifer.

## **8. Understand the volume of soil wetted by drip irrigation.**

Technologies to conserve water are a top priority in Kansas. Drip irrigation is one of the most efficient irrigation systems used in agriculture. In drip irrigation, water is slowly applied to the soil surface through small emitters having low-discharge orifices. Drip irrigation is widely used in Kansas and other semi-arid regions. However, the challenge still remains in answering the question, “How much of the soil is wetted with each dripper?” This is critical to know, to provide sufficient water to the root zone. The surface of the soil wetted can be observed, but

the depth of soil irrigated underneath the surface is unknown. It can be assumed that water moves into the soil in the shape of an ellipsoid, and, using the equation for an ellipsoid, one can determine the volume of soil wetted. But equation has never been tested under field conditions. It is proposed to measure the volume of soil wetted by each emitter using the dual-probe heat-pulse method to measure soil water content. This method can measure water in soil on a small scale and at different depths. The measured values can be compared with the predicted values from the ellipsoidal equation. If they agree, then the equation could be used to determine how much irrigation water should be added to wet the soil for plant growth.

#### **9. Understanding the impact of deficit irrigation on on grain quality and final product yield.**

**10. Use of amendments (soil conditioners) to improve water use efficiency.** Soil amendments improve infiltration and soil aggregation, which allow better root growth and crop yield. They have been used for decades, but they have been too expensive to apply on a large scale. With irrigation water becoming scarce, it may be feasible economically to use them to increase water use efficiency.

#### Research Team Members Contributing

Dan Devlin, KSU  
Mandy Stone, USGS  
Jenny Lanning-Rush, USGS  
Donghai Wang, KSU  
Bill Golden, KSU  
Dan Rogers, KSU  
Alan Schlegel, KSU  
Jim Butler, KGS  
Don Whittemore, KGS  
Jonathan Aguilar, KSU  
Chris Beightel, KDA  
Sarah Sexton-Bower, KSU  
Lane Letourneau, KDA  
Susan Metzger, KDA  
Richard Rockel, KWO  
Heidi Mehl, The Nature Conservancy  
Kaitlin Donovan, Kansas Corn  
Dale Fjell, Kansas Corn  
M.B. Kirkham, KSU  
Xiaomao Lin, KSU

## Harmful Algal Bloom (HAB) Research Team: 9-Nov-2017 Meeting

Members at 9-Nov-2017 meeting:

<u>Name</u>	<u>Agency</u>
Jennifer Graham	USGS
Thomas Williams	USGS
Lindsey King	USGS
Ted Harris	KBS
Ed Martinko	KBS
Jerry deNoyelles	KBS
Scott Campbell	KBS
Trevor Flynn	KDHE
Layne Knight	KDHE
Marvin Boyer	USACE-KC
Amy Shields	USEPA
Laura Webb	USEPA
Steve Adams	KDWPT
Nathan Nelson	KSU
Peter Tomlinson	KSU
Aleksey Sheshukov	KSU
Kirk Tjelmeland	KWO

## Tentative HAB research priorities determined at 9-Nov-2017 meeting

### **Identified short-term HAB research priorities**

1. **Aggregation of currently available water quality/HAB associated datasets** from state and federal agencies. Goal is to determine water quality trends related to Kanas reservoirs that have and have not experienced HABs. Specific questions:
  - a. Do long-term nutrient loading/water quality trends differ between reservoirs where HABs have and have not occurred?
  - b. Is reduced sediment loading into reservoirs as a result of streambank projects related to increased HAB events? I.e., Does less sediment into reservoirs increase underwater light availability, and in turn result in more HAB events in light limited reservoirs?
  - c. Does reservoir morphology play a role in HAB occurrence?
2. **Terrestrial- aquatic interactions:** How can current/future watershed work and agricultural practices in the watershed be best directed to decrease nutrient loading - especially HAB-stimulating nutrient forms identified from analyses of aggregation of data and KBS nutrient form experiments- and thus HAB events in downstream reservoirs?

### **Identified long-term HAB research priority**

1. **Are there warning signs before a HAB event occurs?** Specific questions:
  - a. Are there certain bacterial species associated with pre-HAB conditions?
  - b. Can we detect genetic markers for toxin/taste and odor production before HABs occur?

**Cumulative notes from meetings** (red text indicates note was added in most recent meeting)

**1: Historical**

- a. What does historical Water Quality (WQ) and HAB data in KS show? **At large spatial scales – small spatial scales? Temporally? Overall goals with data analyses?**
- b. **What are the differences between HAB and non-HAB reservoirs? Long-term patterns?**
- c. Are WQ conditions becoming more favorable to HABs?
- d. Were some years worse than others – what was correlated with the worst HAB years?
- e. **Can sediment analyses be used to determine historical HABs and WQ changes?**
- f. **Can sediment core/ historical data help calc. nutrient loading budgets?**

**Current known data available for **combined** trend analyses:**

1. KBS
  - a. Data portal: <http://kars.ku.edu/maps/kansaslakes/>
  - b. **Walter Dodd's toxins in KS (report)**
  - c. **93-94 Huggins et al. geosmin**
2. KDHE
  - a. Toxin and cell count sample only (since 2010?)
  - b. Historical lake network: sample main basin for basic nutrients
  - c. KDHE 2015 toxins article
3. USGS
  - a. 3 summers of extensive data on Milford, cont. WQ monitor at Wakefield bridge + basic weather data
  - b. **Synoptic in Republication river**
  - c. Long term data on Cheney reservoir 2001- present
  - d. KS river data: HAB focused water quality study
  - e. **Clinton sediment core study (2011)**
  - f. EPA/USGS 24-hour sampling at Milford --- **& CyAN project (future)**
4. EPA
  - a. WQX has 2007, 12, 17 lake data
  - b. Urban lake data since 2011- 15 in KS, 15 in MO
  - c. **Weekly toxin data on Perry (2017) & Milford (2018)**

- d. BIA- WQ sonde in Delaware river
- 5. KDWPT
  - a. 2011 removal on common carp in Marion (HAB related)
- 6. KSU
  - a. Nutrient/sediment samples in Cheney watershed (07-10/11) – 3 sites
- 7. USACE-KCD
  - a. Biological (some toxin and cell count, WQ – N, P, N-species)
  - b. 3-year intensive sampling of USACE reservoirs
  - c. Bed sediment chemistry
  - d. Some loading estimates
- 8. USACE-Tulsa
  - a. Intensive effort year(s) on Marion
- 9. Some stream/river data
  - a. EPA, USGS

## 2: Nutrient/ Ecological/ Biological research gaps & current questions

- a. Nutrient – HAB interactions: Do different nutrients or nutrient forms stimulate different species or toxins?
- b. Sources of Othro-P in reservoirs from watershed (e.g., Milford)?
- c. Molecular: What are the associated bacterial/**viruses** species with HAB and HAB collapse? Are there indicator species?
- d. **Can we detect toxin/T&O genes before toxin presence (proactive instead of reactive)?**
- e. Molecular: Mechanisms of taste and odor production (geosmin and MIB, others)?
- f. Molecular: Mechanisms on toxin production and species selection (toxic vs non-toxic)?
- g. **How does reservoir morphology/sedimentation affect HAB occurrence and toxicity?**
- h. How does hydrology affect HABs – does residence time matter?
  - i. Current knowledge: KDHE-USACE early drawdown in Milford in 2017; Anecdotal results: Bloom collapsed earlier than past years

## 3: Applied in-lake HAB and/or nutrient management

### Past-projects:

- a. KDHE – Rough fish removal at Marion and Milford: mixed results
- b. KDHE – Milford pool level management/early drawdown: anecdotally successful
- c. KDWPT – Alum on Veteran’s Lake: substantial P reduction

- d. KDHE – Floating wetlands at Lake Meade and Shawnee: mixed or confounding results
- e. EPA – Has list of treatment options on website/ different states have different positions on HAB treatment:<https://www.epa.gov/sites/production/files/2015-11/documents/algal-risk-assessment-strategic-plan-2015.pdf>

**Potential future planned projects:**

- a. USACE-Ultrasonic treatment at Central Park Lake, Milford (in military cove), and Melvern outlet pond
- b. KDHE currently looking at multiple options to treat HABs
- c. Potential RCPP funding for reducing allochthonous nutrient loading into Milford

Applied **Current research gaps:**

- a. Which applied treatments are effective at small scales?
- b. Which applied treatments are effective at large (whole-lake) scales (i.e., Milford)?
- c. For recreational advisories: Is it better to use cell-counts, toxin concentrations, or specific molecular techniques for advisory thresholds?
- d. Is there a “silver bullet” for HAB prevention or treatment?
- e. How do we reduce nutrient inputs to decrease HABs? How long will it take after nutrients have been reduced before HABs decrease?
- f. How can watershed work (especially with Ag crop practices) be best directed to decrease downstream loading and in turn HABs?

**4: Drinking water treatment management**

- a. What sort of treatment guidance is needed for drinking water treatment facilities?
- b. What kinds of training and operational response is needed to deal with HAB compounds?

**5: Economic impact of HABs**

- a. What are the economic impacts of HABs in Kansas? Nationally?
- b. USGS currently is currently working on HAB economic study for US.

**6: Indirect HAB effects**

- a. What impact do HABs have on fish? Zooplankton community?
- b. Can macrophytes be used to decrease HABs?
- c. Can trophic structures be manipulated to decrease HABs?
- d. How do HABs impact wildlife?
- e. Are toxins being transferred throughout food chain?

7. Unintended consequences of current other management options?

- a. Are reduced sediment loads leading to increased water clarity/light, in turn leading to HAB increase?

8. Terrestrial and reservoir interactions in:

- a. Non-substitutable and substitutable nutrient runoff?
- b. Nutrient cycling leading to increased HABs?

9. Education and student projects

- a. Student challenges for mechanical removal?
- b. SBIR grants (USDA or EPA? DOE?)

## I. GAPS IN THE AREA OF STREAMBANK STABILIZATION RESEARCH

Sedimentation is a growing problem in Kansas reservoirs. In an effort to decrease reservoir sedimentation, the state is investing heavily in streambank stabilization projects (SBS). The effectiveness of SBS in controlling sediment loads in streams and ultimately in reservoirs is unknown and, therefore, needs to be evaluated in order to determine the full value of SBS. Also, the geomorphic and environmental consequences of SBS are largely unknown and warrant assessment from hydrological, ecological, and ultimately economical viewpoints, among others.

Specific knowledge gaps identified by the Kansas Streambank Stabilization Research team include:

1. Validation of current hypotheses and assumptions.
  - a. Current SBS are selected based on evidence of significant bank loss.
    - i. What are the underlying causes of documented streambank erosion? This is likely to vary between different Kansas watersheds and may require unique management solutions.
    - ii. What fraction of sediment loads to reservoirs is from streambank erosion vs. other sediment sources?
2. Baseline data.
  - a. Baseline (i.e. “before”) data is sparse or non-existent and must be collected in rivers (and downstream reservoirs) where future SBS will be implemented.
    - i. Characterizing the “natural” variability of sediment load and sources, geomorphology (scour and deposition), habitat, and water quality are needed to assess the effect of SBS on the bend or reach scale.
    - ii. Continuous sediment concentration, grainsize, channel measurements and other geomorphic and sediment parameters need to be measured above and below proposed SBS sites before SBS construction to be able to assess the impact, if any, on sediment loads downstream of SBS sites.
  - b. Baseline data must be collected under a range of different flow regimes, especially during near-bankfull conditions where differences may be most pronounced.
3. Spatial scale effectiveness.
  - a. The spatial scale of SBS effectiveness is unknown.
    - i. The distance downstream that SBS has an effect on sediment transport is unknown.
      1. Will sediment concentration decrease only over a short length of stream only to increase in response to the energy regime of the stream (if velocity doesn’t change for the same flow, the stream will pick up more sediment from erodible areas downstream of the SBS which may mask any reduction in sediment concentration caused by the SBS construction).
    - ii. The amount of SBS required (stream miles, number of eroding stream reaches, etc...) to show a reduction in stream sediment load and reservoir sedimentation is unknown.
  - b. Accurate sediment budgets at the watershed scale are lacking.

- i. How do the 70,000 small impoundments (not counting those in NE or CO) within the watersheds of the federal reservoirs in Kansas influence SBS effectiveness via impacts on upstream sediment yield?
  - ii. In the Big Blue watershed, for example, have implemented SBS considered upstream sediment contributions and sources (i.e., from Nebraska).
- 4. Temporal scale effectiveness.
  - a. How effective are SBS after 1, 5, 10, 25 years of implementation?
  - b. What is the expected lifespan for SBS?
  - c. Lag time to measure changes in sediment transport from SBS is unknown.
    - i. The time required to measure the effect of SBS is likely related to the scale of the effort, the effectiveness of the stabilization, and the geomorphic response to SBS within the stream.
- 5. Relationship between SBS and stream discharge.
  - a. What is the impact of SBS on stream hydrographs, and is this considered in their design?
    - i. If SBS concentrate flow during high-water events and increase the peak of the downstream hydrograph, this could be counter-productive. In contrast, if SBS dissipate flow during high-water events (through increased channel capacity and residence time) and decrease the peak of the downstream hydrograph, this could be quite beneficial for downstream erosion/sedimentation problems.
  - b. At what range of discharges are SBS effective, and what is the shape of the relation between SBS and discharge?
    - i. Presumably SBS would be effective from base-flow to bankfull discharges, then perhaps rapidly decline for extremely high flow events when per-volume sediment delivery rates are the highest.
- 6. Limits on effectiveness or control.
  - a. What are the conditions (e.g., stream discharge) that eventually or abruptly lead to failure?
    - i. Are SBS able to withstand out-of-bank extreme high flow events (e.g. a 100-year flood event or greater)?
  - b. What is the ultimate long-term cost associated with failure?
- 7. Geomorphic changes caused by streambank stabilization are unknown.
  - a. There will be unforeseen geomorphic changes.
    - i. Do these have knock-on effects such as increased flooding?
  - b. Will SBS constrict flood flows and increase vertical bed degradation?
  - c. Will the problem just move up- or down-stream?
- 8. Effectiveness of different SBS designs.
  - a. When existing SBS sites were identified, what other mitigation strategies might have been feasible besides SBS?
    - i. Might riparian and/or floodplain wetland restoration efforts be more cost effective than SBS? The underlying idea is to reduce sediment delivery by

slowing and filtering sediment from floodwaters and perhaps take the peak off the hydrograph.

- b. How do SBS design, size, and location impact effectiveness and lifespan? e.g., what is the difference in effectiveness between riprap vs. woody revetments?
  - c. Are the restoration of natural geomorphic and ecological *processes* rather than fixed end point solutions (i.e., bank stabilization) more cost-effective and sustainable solutions?
    - i. Streams naturally migrate over time to best achieve energy equilibrium among driving and resisting forces. By contrast, SBS are spatially static. What design, size, and location characteristics are necessary to best bring these competing factors into balance?
      - 1. Can we slow the evolutionary timescale of stream migration to make SBS cost-effective on a “long enough” time scale (50-200 years, perhaps)? Remember, the projected 50-100 year lifespan of our federal reservoirs seemed like a long way down the road when they were constructed, yet here we are.
    - ii. Might direct efforts toward restoring floodplain connectivity present a sustainable alternative or complement to SBS?
      - 1. This might include actions such as levee or legacy soil removal, or general restoration of historic connections to floodplain storage areas and anabranch flow paths. The idea is to mimic/restore natural conditions that mitigate extreme high-flow events, thereby reducing the magnitude of the most substantial sediment delivery events.
  - d. Would SBS implementation higher in the watershed, possibly even on headwater streams, be more cost effective than SBS on mainstems?
9. Ecological impacts.
- a. How SBS affect primary, secondary, and higher trophic level productivity or community ecology within the river and downstream reservoirs is unknown.
    - i. Do SBS increase the risk of in-river or downstream reservoir harmful algal blooms, possibly due to increased water clarity or changes to discharge regimes?
    - ii. How are invertebrate (secondary production) and fish communities affected?
10. Economic evaluations.
- a. Have any cost-benefit analyses been conducted regarding SBS? If so, what are the underlying assumptions and considerations?
  - b. Are assumed sediment reductions over the estimated SBS lifespan sufficiently large that SBS installation and maintenance cost is more than offset by estimated savings from maintenance dredging costs over that same time frame?
    - i. This notion might represent the absolute minimum acceptable economic benefit to justify SBS, even though it ignores many other potential direct and indirect costs associated with SBS.

# MEMO



DATE: December 4, 2017  
TO: Kansas Water Authority  
FROM: Greg Graff  
RE: KWA RAC Operations Committee

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The KWA RAC Operations Committee met on December 1, 2017, via conference call. Committee members participating in the call included Greg Graff, Calvin Kissick, and Ted Nighswonger. Lynn Wobker did not participate because of scheduling conflicts but passed along input prior to the call. RAC member advisors Fred Jones and the Honorable Doug Blex also participated in the conference call. Discussion from the meeting included the following topics:

- RAC Membership
- Messages to the KWA from the Missouri and Great Bend Prairie RACs

Relating to RAC Membership, the RAC Operations Committee discussed current vacancies on several of the RACs. The vacancies on the Upper Smoky Hill and Upper Republican RACs are due to continued unfilled positions following the recently completed RAC membership and the new vacancy on the Great Bend Prairie RAC is from John Sweet's pending retirement.

RAC vacancies are currently as follows:

- Great Bend Prairie
  - Public Water Supply (cc)
- Upper Smoky Hill
  - At Large Public (cc)
  - At Large Public 2
- Upper Republican
  - Conservation/Environment (cc)
  - At Large Public 2
  - Agriculture 2

The RAC Operations Committee also discussed RAC messages to the KWA developed at recent RAC meetings from the Missouri and Great Bend Prairie RACs. These messages to the KWA from the Missouri and Great Bend Prairie RACs, along with pertinent background information, KWO staff input, and proposed resolutions are included in this memo.

## MISSOURI REGIONAL ADVISORY COMMITTEE:

**Message:** The Missouri RAC requests funding to complete Phase II of “Addressing Groundwater Goals of the Missouri Regional Planning Area” by the Kansas Geological Survey (KGS). Funding of the study would provide information directly related to Goals #1 & 3.

**Background:** In June of 2016, the Kansas Water Office (KWO) contracted with KGS to document historical ground water quality and quantity for the Missouri Region. KGS was to extract digital and non-digital historical data, compile data into a digital warehouse, construct digital maps (bedrock topography, saturated aquifer thickness, water use and ground water quality) and prepare a final report. The final report was delivered to the Missouri RAC at the June 22<sup>nd</sup> meeting in Atchison. KGS was able to establish and provide a good digital bedrock map, historical water use water quality information. However the level of water in the unconsolidated material remains undetermined and more recent water quality issues, especially nitrates, are unavailable. KGS was asked to present a scope of work to the Missouri RAC at the September 14<sup>th</sup> meeting on the cost of a Phase II that would address these issues. Andrea Brookfield, KGS, presented a scope of work at the meeting that covered 5 years of work in the region. The cost was broken down yearly with the total project ranging from \$87,700 to \$121,700 depending on the number of wells that would be monitored and if new wells would be placed in areas that were lacking existing wells.

**Staff Input:** Staff contacted Andrea Brookfield (KGS) to discuss the study. Currently KGS has one well in the entire region that they are monitoring. One well is insufficient to provide any type of trend data or regionally based data to make management decisions on.

**Resolution:** The Kansas Water Authority recognizes the value of projects such as these and appreciates the input RACs can provide for the priority project development process for State Water Plan funding. RACs providing input to the KWA and KWO on these types of projects is a great way for RACs to continue to engage in the RAC Action Plan implementation process by providing information on annual projects which should be considered for funding. The KWA would like KWO to coordinate with the RACs earlier in the budget development process in future years to review and provide input on the projects identified by the KWO as priority projects to be considered for funding for inclusion within the KWA's budget requests. KWO Regional Planners shall also provide budget overview information to RACs on current State Water Plan expenditures and where those funds are currently being spent.

#### **GREAT BEND PRAIRIE REGIONAL ADVISORY COMMITTEE:**

**Message:** The Great Bend Prairie RAC respectfully requests the KWA provide clarity on the RAC Role in Implementation.

**Background:** Great Bend Prairie RAC discussions on implementation of Regional Goal Action Plans have occurred on numerous occasions at RAC meetings and among RAC as well as with members of other RACs. Great Bend Prairie RAC members expressed differing opinions of KWA expectations ranging from providing advice to the KWA and serving as a link to the public and entities in the region to taking an active role in implementation based on progress reporting requests and questions at KWA meetings.

**Staff Input:** IPM-04, Revised August 20, 2015 describes the purpose of the Regional Advisory Committees as:

- Advise KWO and the KWA in identification of water-related problems, issues and concerns within their region
- Advise the KWO and the KWA in the formulation of revisions to the section of the Kansas Water Plan corresponding to their region
- Advise the KWO and the KWA regarding Kansas Water Plan implementation priorities and actions
- Serve as a link to the public in the region through interaction with various groups and individuals and communicate information on concerns and issues to citizens in the region
- Serve as a link to water management entities in the region to facilitate discussion and input on issue development and implementation
- Advise the KWO and the KWA on issues under consideration for inclusion in the Kansas Water Plan

Committee expectations were discussed at the first RAC meetings held in the Fall of 2015. This discussion included the expectations for individual members and the overall water planning process, including the RACs relationship with KWA. More specifically, the role of RACs was presented as being:

- Eyes & Ears for the KWA and KWO within the Region

- Ambassadors and solicitors of public input
  - Messenger of Vision and RAC actions to ensure future water supply needs are met in region
- Advise, guide, and sometimes lead through action on implementation of goal

In regards to Action Plan Implementation the RACs role included:

- Development of prioritization of goals
- The KWA will encourage the RAC members to help implement the following Vision statement for each region:
- Kansans act on a shared commitment to have the water resources necessary to support the state's social, economic and natural resource needs for current and future generations.
- Plan for action on each goal

**Resolution:** The Kansas Water Authority will coordinate with KWO on the review of IPM-04, Revised August 20, 2015, to open discussions for clarification on the role of the RACs as advisors to the KWA with specific attention being focused on the RACs role in Vision Action Plan implementation.

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*The KWA RAC Operations Committee recommends KWA approval  
of the resolutions for RAC messages to the KWA.*

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# MEMO



DATE: December 7, 2017  
TO: Kansas Water Authority  
FROM: Matt Unruh  
RE: Vision Implementation Update

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Since the October 10, 2017, Kansas Water Authority meeting there have been several implementation of items of note completed at the Regional Advisory Committee (RAC) level in support of *A Long-Term Vision for the Future of Water Supply in Kansas*. These events include a water conservation field day in Hays as well as regional State of the Resource public meetings.

### Smoky Hill-Saline RAC/City of Hays Water Conservation Field Day

The City of Hays, in conjunction with the Smoky Hill-Saline Regional Advisory Committee (RAC), the City of Salina, and the Kansas Water Office, hosted a Water Conservation Field Day on October 13, 2017. This event took place in support of implementation efforts relating to the Smoky Hill-Saline RAC's Regional Goal #4 Action Plan, which discusses ways to increase public water supply water use efficiency for suppliers within the region. Regional Goal #4 for the Smoky Hill-Saline RAC is to "increase public water supply water use efficiency for suppliers within the region."

One way the RAC noted to work towards attainment of this goal was through municipal water conservation field days to increase awareness of existing water conservation measures in place and to share that information with interested stakeholders. Approximately 50 people attended and municipal water conservation programs implemented by the City of Hays such as the rebate program for high efficiency toilets and washing machines, free low flow shower heads, and water smart landscaping programs were highlighted during the field day.

### State of the Resource Public Meetings

As noted within the Vision, "Following the first year of the goal setting process and annually thereafter, the Kansas Water Authority will evaluate progress towards meeting milestones and overall goals and will assess the need for further action. Annual public meetings will be held in each water resource planning region, highlighting the current groundwater, surface water and water storage conditions. Additionally, progress towards achieving the goals will be assessed through the Kansas Water Plan every five years." State of the Resource public meetings being held within each Regional Planning Area will be utilized to help provide this annual snapshot to local stakeholders.

The Marais des Cygnes and Neosho RACs have both recently held State of the Resource public meetings, with the remaining RACs planning on holding meetings in the first part of 2018. These State of the Resource meetings provide the opportunity to share information with the public, key stakeholder groups, and elected officials regarding the current status of water resources within each of the 14 Regional Planning Areas and discuss Vision Regional Goal Action Plan implementation, including work that has been completed and remaining implementation needs.

In conjunction within this annual evaluation noted within the Vision, KWO staff have been working on development of reports which evaluate water resource conditions within each of the 14 Regional Planning Areas. These reports also include an evaluation of implementation progress being made within each of the respective regions as well as discussion on future Action Plan implementation needs.

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*This item is informational purposes only. No KWA action required.*

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# 2018 Kansas Water Authority Annual Report to the Governor and Legislature **DRAFT**





**LETTER FROM KANSAS WATER AUTHORITY CHAIRMAN GARY HARSHBERGER** ..... 3

**VISION FOR FUTURE OF WATER SUPPLY IN KANSAS TIMELINE**.....4

**BLUE RIBBON TASK FORCE RECOMMENDATIONS**.....5

**KWA RECOMMENDATIONS FOR SGF & EDIF TRANSFERS**

**WATER CONSERVATION**

        WATERSHED CONSERVATION PRACTICE IMPLEMENTATION .....6

        STREAMBANK STABILIZATION ..... 6-7

        MILFORD LAKE WATERSHED RCPP PROJECT ..... 7-8

        VISION STRATEGIC EDUCATION PLAN.....8

**WATER MANAGEMENT**

        HARMFUL ALGAE BLOOM PILOT .....9

        CONTAMINATION REMEDIATION .....9

        INTERSTATE WATER COMPACT COMPLIANCE .....10

        WATER STRUCTURES INSPECTIONS.....10

**TECHNOLOGY & CROP VARIETIES**

        IRRIGATION TECHNOLOGY .....10

        WATER TECHNOLOGY FARMS .....11

        VISION IMPLEMENTATION RESEARCH & RESEARCH COORDINATION GROUP .....11

        TELEMETRY .....12

**ADDITIONAL SOURCES OF SUPPLY**

        WATERS LEAVING THE STATE EVALUATION .....12

        EQUUS BEDS CHLORIDE PLUME PROJECT .....13

**MEASURING SUCCESS: STATE OF THE RESOURCE**..... 14-15

**KWA RECOMMENDATIONS FOR SGF & EDIF TRANSFERS**

**WATER CONSERVATION**

        WATERSHED BMP IMPLEMENTATION .....16

        WATER CONSERVATION AREAS .....16

        LOCAL ENHANCED MANAGEMENT AREAS .....17

        HAYS CONSERVATION FIELD DAY.....17

**WATER MANAGEMENT**

        DROUGHT WORKSHOPS .....18

        GMD2/EQUUS BEDS SUSTAINABILITY ASSESSMENT .....18

        WATER TECHNOLOGY FARMS.....19

        SEDIMENT MONITORING AND RESEARCH ..... 19-20

**ADDITIONAL SOURCES OF SUPPLY**

        PRODUCED WATER PILOT ..... 20-21

        LOWER REPUBLICAN RESERVOIR STUDY .....21

**STATE WATER PLAN FUND REVENUE ESTIMATE**.....22

**STATE WATER PLAN FUND EXPENDITURE RECOMMENDATIONS** .....23

**KANSAS WATER AUTHORITY MEMBERSHIP MAP** .....24



**Governor Brownback and Members of the 2018 Kansas Legislature,**

On behalf of the Kansas Water Authority (KWA), I am pleased to provide our 2018 Annual Report. This year’s report highlights people, implementation, process and 2017 accomplishments.



This past year focused on completion of Phase I Action Items and continuing Phase II in each of the four themes for the *Long-Term Water Vision for the Future of Water Supply in Kansas*. Each of the 14 Regional Advisory Committees (RACs) are also diligently working to implement their action plans to achieve their priority goals and educate others on their water issues. Funding became an even sharper focus as the first recommendation of the Blue Ribbon Task Force was to restore the \$8 million in statutory funding (\$6 million State General Fund and \$2 million Economic Development Initiatives Fund). The legislature did hear us in our needs and appropriated \$1.2 million for streambank stabilization, bathymetric surveys, and work on the Kansas River Alluvial Aquifer network. However, more needs persist, and the State Water Plan fund has not been fully funded from statutory sources since 2008.

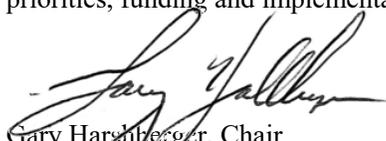
Despite funding limitations, I’m proud to report we have been successful. This past year of the more than 250 action items contained within the Vision, more than 70 percent are in active stages of implementation. The education portion of the Vision has also been in motion with the initiation of the research portion of the public awareness campaign. Several of these items are showcased in this Annual Report. However, completion of many of these action items and initiation of the larger scale action items cannot be executed without additional funding.

We are at a critical turning point for water in our state. As our Vision for water states, “*Kansans act on a shared commitment to have the water resources necessary to support the state’s social, economic and natural resource needs for current and future generations.*” Success stories are being shared as better practices are being implemented all across the state. More than 20 “Be the Vision” recipients have been recognized for their efforts including industry, municipalities and producers. We are calling for all Kansans to join us in this effort. It’s time to commit to taking it to the next level. It’s our foremost responsibility to future generations to appropriately invest in our water infrastructure.

The KWA is embracing its leadership role in the state to responsibly and effectively manage both existing and new revenues to address the most important water issues we face. The need greatly outweighs the available dollars, so it is necessary to carefully consider each project and proposal in order to efficiently and effectively meet our long and short-term goals. As an Authority, we will continue to interface with our RACs, local leadership, elected officials, and state and federal partners to ensure adequate funding and development of water projects to tackle the tough problems. The KWA understands that finding additional revenue is difficult in these times. However, there is “no time BUT the present.” We must be proactive in addressing our water resource now. If we want to address the issues once the crisis occurs, it will be too late.

I know we have the right people and the right organizations and structures in place to take on the task of creating a lasting water future for the state of Kansas. But it will take all of us, acting on a shared commitment and claiming the responsibility to ensure Kansas and this resource is better for both current and future generations. Throughout this Report, we highlight the people, cities, businesses, and others who are meeting this challenge with action. But frankly we are barely scraping the surface of what must happen. It will take more effort, more people, and more resources to get where we need to be. On behalf of the Authority, we invite you and each Kansan to join us in this process, and be part of the larger effort to secure our water future.

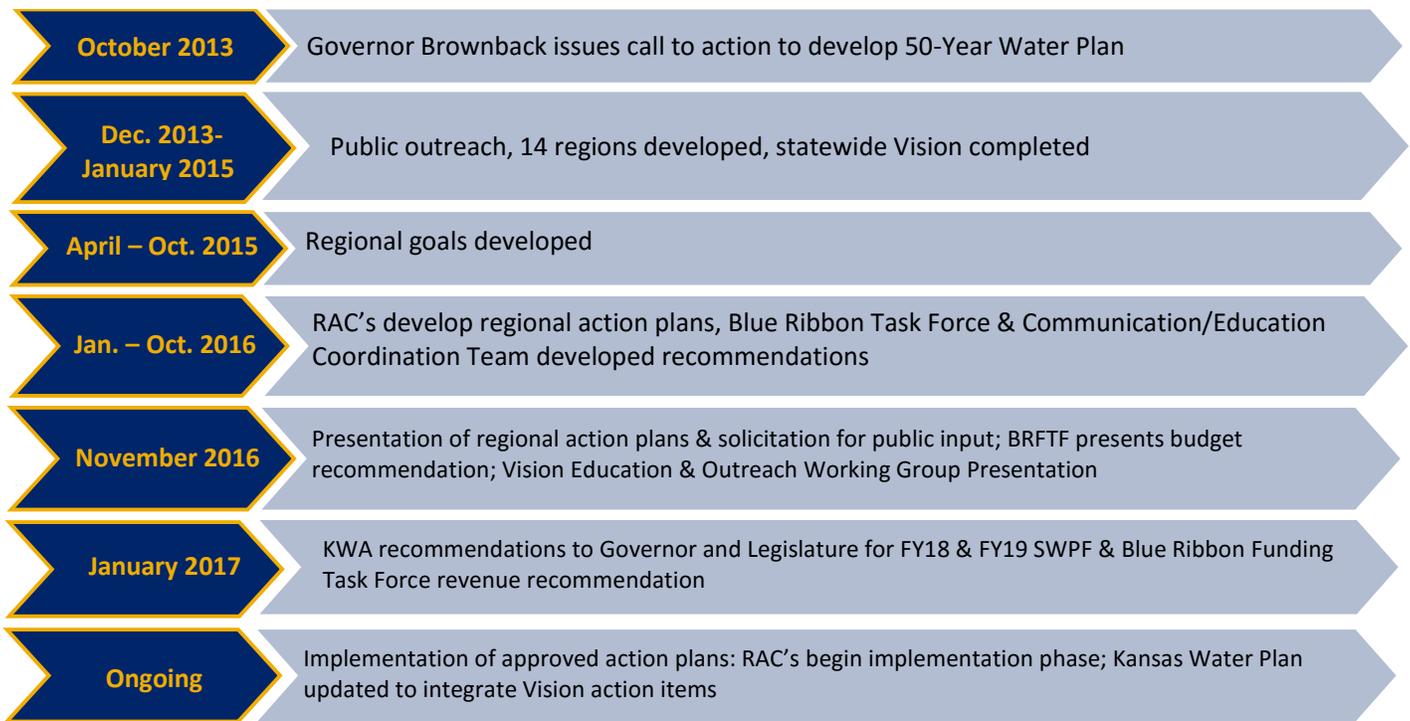
The Kansas Water Authority looks forward to working with you this session as we continue to address Kansas water resource priorities, funding and implementation of the *Vision for the Future of Water Supply in Kansas*.



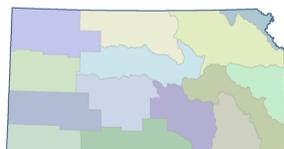
Gary Hershberger, Chair  
Kansas Water Authority

It's been four years since Governor Sam Brownback called for a 50-Year Vision to address Kansas' water supply issues. The public input process involved more than 600 meetings across the state and more than 15,000 Kansans. The final version of the Long-Term Vision for the Future of Water Supply in Kansas was presented in January, 2015. Regional Advisory Committees have developed regional goals based on priority, and action items to implement these goals. As of this publication, of the more than 250 action items contained within the Vision, more than 70 percent are in active stages of implementation.

However, continued Vision implementation will be limited without increased funding for water project, activities, and education in Kansas. As we have learned from others, connecting users to their water source is important for cooperation and coordination as we continue to work toward a long-term water supply.



*The Vision remains a living document that will continue to evolve to meet the needs of Kansans. Presentations around the state are critical in continuing to spread the message.*



*Throughout the report, maps indicate the regions where the implementation actions are taking place, or will take place in the future.*

The Blue Ribbon Funding Task Force for Water Resource Management (Task Force) was formed November 2015, and met seven times during 2016 to evaluate overall financial needs to implement the Vision. The culmination of those meetings resulted in a report issued January 11, 2017. The Task Force came to the consensus that roughly \$55 million in annual funding is needed for full implementation of the Vision.

The KWA took formal action to support this report in December 2016. The Task Force recommended that 1/10 of 1 percent of existing sales tax revenue be dedicated to the State Water Plan Fund, indicating their support for a broad-based funding source to benefit all Kansans and their water resources. Another recommendation was that until a larger funding source is secured, there should be the immediate fulfillment of the \$8 million in statutory demand transfers from the State General Fund (SGF) and the Economic Development Initiatives Fund (EDIF). Multiple stakeholders supported this proposal throughout the legislative session. The legislature partially implemented this recommendation with appropriation of an additional \$1.2 million during the 2017 session.

**KANSAS WATER AUTHORITY RECOMMENDATION**

The KWA recommends an additional \$600,000 in FY2018 and full restoration of the SGF and EDIF transfers in FY2019. The enhancement requests for FY2018 and FY2019 are listed below, and are detailed in subsequent pages of this report.

**KWA SGF/EDIF Budget Enhancement Request FY2018 & FY2019**

<b>Water Conservation</b>	<b>FY2018</b>	<b>FY2019</b>
Vision Strategic Education Plan		\$500,000
Watershed Conservation Practice Implementation – BMP Team		\$1,800,000
Milford Lake Watershed RCPP Project	\$200,000	\$200,000
Streambank Stabilization		\$1,000,000
<b>Water Management</b>		<b>FY2019</b>
Harmful Algae Bloom Pilot	\$400,000	\$500,000
Contamination Remediation		\$400,000
Interstate Water Compact Compliance		\$100,000
Water Structures Inspections		\$200,000
<b>Technology and Crop Varieties</b>		<b>FY2019</b>
Irrigation Technology		\$1,000,000
Water Technology Farms		\$250,000
Vision Implementation Research – Research Coordination Group		\$500,000
Telemetry		\$850,000
<b>Additional Sources of Supply</b>		<b>FY2019</b>
Waters Leaving the State Evaluation		\$200,000
Equus Beds Chloride Plume Project		\$500,000
<b>FY2018 &amp; FY2019 Enhancement Request Total</b>	<b>\$600,000</b>	<b>\$8,000,000</b>

**WATER CONSERVATION**

***Watershed Conservation Practice Implementation - FY2019: \$1,800,000***

Watershed conservation practice implementation within Vision priority watersheds is necessary to protect water supply storage and improve water quality in reservoirs across Kansas. Conservation practice implementation can be either structural, technological or management to

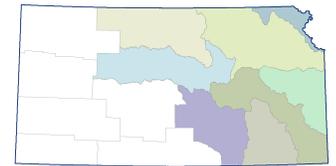


*Riparian buffer strips along the edge of a field are one example of a Watershed Conservation Practice.*

control non-point sources of pollution. Conservation practice implementation has been shown to provide the most cost effective means of addressing these issues.

reduce sediment and nutrient runoff in watersheds above water supply sources in Kansas include but are not limited to terraces, grassed waterways and buffer strips. Water storage is being diminished over time due to reservoir sedimentation and water quality is being impacted in both streams and reservoir by nutrient runoff, potentially resulting in harmful algae blooms, taste and odor issues with drinking water, and impacts to recreation in Kansas.

Currently funding is available from both federal sources, through the Natural Resources Conservation Service (NRCS) and at the state level through the existing State Water Plan Fund. To meet Vision and Regional goals, significant additional funding for watershed conservation practice implementation will provide further cost share opportunities for producers within targeted areas.



Structural conservation practices which can be utilized to

***Streambank Stabilization - FY2019: \$1,000,000***

Streambank stabilization continues to be a key component in the reduction of sediment entering our water supply reservoirs. The Kansas Department of Health and Environment (KDHE), the Kansas Department of Agriculture (KDA), and the Kansas Water Office (KWO) coordinate efforts and resources in order to accomplish streambank protection work to reduce erosion and sedimentation in the watersheds above our highest priority reservoirs. In order to complete projects in the most efficient and cost effective manner, the group operates from pooled funding. Funds available through agency programs for streambank protection projects are targeted to priority areas and administered by this collaborative team. The Kansas Forest Service, Kansas Department of Wildlife, Parks, and Tourism, local conservation districts and local Watershed Resto-

ration and Protection Strategy (WRAPS) groups are also important to the success of this process.

*Estimates indicate nine streambank stabilization projects completed in 2017 will reduce sediment load by 30,000 tons per year.*

Streambank stabilization efforts continue to be concentrated in the three priority Kansas watersheds above Federal reservoirs: the Big Blue/Little Blue Rivers above Tuttle Creek Lake; the Delaware River above Perry Lake; and the Neosho/Cottonwood Rivers above John Redmond Reservoir. In 2017, construction was completed for stabilization of nine streambank sites achieving an estimated sediment load reduction of 30,000 tons per year.

Construction is underway for five sites above Tuttle Lake and five sites above Perry Lake, and engineering design



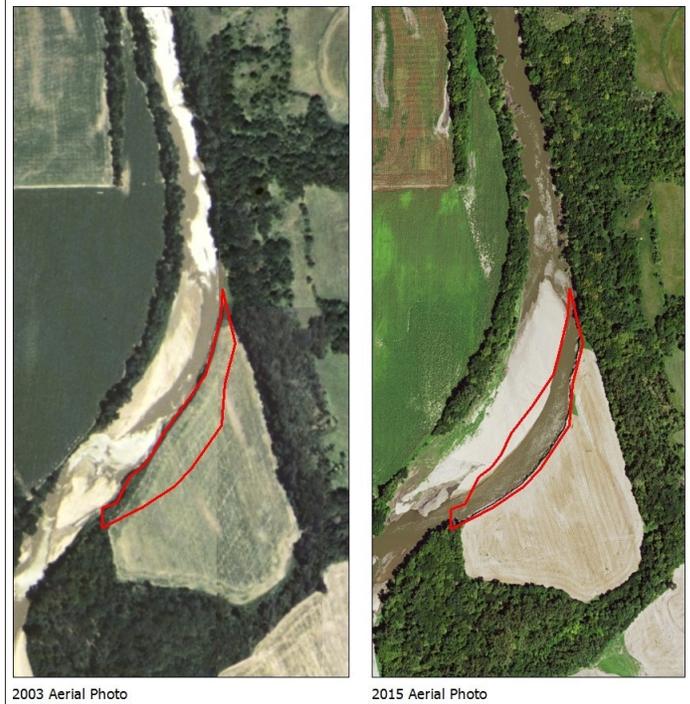
**WATER CONSERVATION**

***Streambank Stabilization, continued:***

of 13 new sites has been initiated above John Redmond and Tuttle Creek Reservoirs.

The table below shows the progress that has been made in these three watersheds, and the amount of work that remains.

*On the right is aerial photography of an actively eroding streambank along the Big Blue River above Tuttle Creek Lake. The red line highlights the land lost to erosion over the course of 12 years. Aerial mapping is used to identify and monitor sites pre- and post-stabilization.*



Priority Watershed	Sites Previously Addressed	Total Sites Remaining to be Addressed		Total Estimated Need*
		Number	Est. of sediment reduction— tons/yr	
John Redmond Reservoir Watershed	33	332	450,891	\$16,502,700
Tuttle Creek Lake Watershed	96	215	514,871	\$14,350,550
Perry Lake Watershed	35	46	70,025	\$2,374,135
Total	164	628	1,035,787	<b>\$33,227,385</b>

***Milford Lake Watershed RCPP Project - FY2018: \$200,000; FY2019: \$200,000***

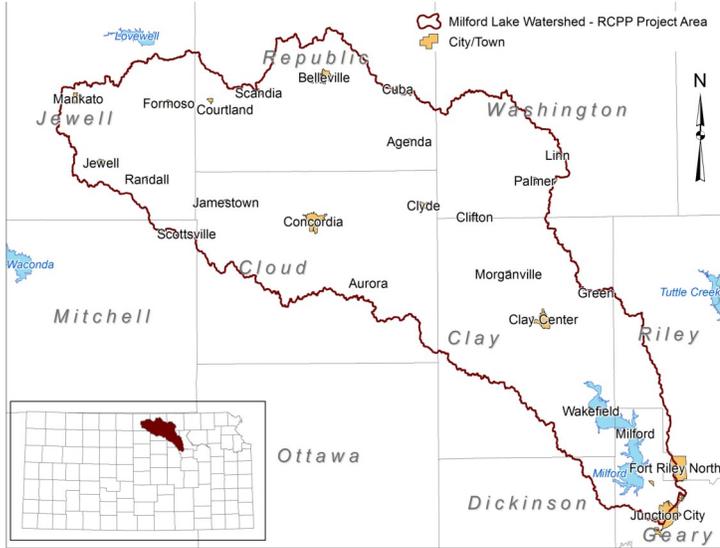
The Regional Conservation Partnership Program (RCPP) is a NRCS initiative which encourages partners to join efforts with producers to increase the restoration and sustainable use of soil, water, wildlife and related natural resources on regional or watershed scales. Through the program, NRCS and partners help producers install and maintain conservation activities in selected project areas through existing NRCS conservation programs. Partners leverage RCPP funding in project areas and report on the benefits achieved. KWO, serving as the lead partner, has submitted a project proposal on behalf of more than 20 additional project partners to establish a RCPP project to address water quality concerns in the Milford Lake watershed. Proposals selected for funding are expected to

be notified in December 2017.

Runoff within the Milford Lake watershed in Kansas is a source of nutrient loading contributing to aquatic conditions which promote formation of harmful algal blooms (HABs) within Milford Lake. This RCPP project will look to implement conservation practices within the Milford Lake watershed to decrease nutrient runoff, thus decreasing the introduction of new nutrient loading contributing to the formation of HABs in Milford Lake. Additional benefits from project implementation include decreased sediment runoff entering surface waters, improvements to fish and wildlife habitat, and improved plant productivity. Funding provided for this pro-

**WATER CONSERVATION**

**Milford Lake Watershed RCPP Project, Cont.:**



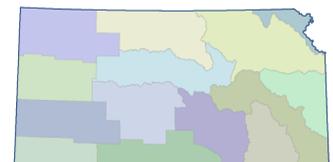
ject will be utilized to provide the KWO partnership contribution to this proposal, leveraging this funding along with other partnership contributions to receive more than \$4 million in funding from NRCS for conservation practice implementation and producer technical assistance. The proposed funding level would be for a five year period to meet the full KWO contributions to the RCPP effort. The map to the left shows the target area for the proposed RCPP in detail.

**Vision Strategic Education Plan - FY2019: \$500,000** Vision Education Details Graphic

The need for additional education and outreach regarding Kansas’ water resources was a recurring theme heard statewide during the Vision public outreach process. There are many existing water-related education programs available for both youth and adults, but the central message is that a coordinated educational resource is lacking, and should be used to better connect Kansans to their water resources. With this in mind, a team, comprised of any and all entities that found value in participating, developed the Education and Public Outreach Supplement to the Vision.

This Supplement sets forth implementation of an education plan that builds upon existing efforts and leads to the development of new statewide programs focusing on water resources. These efforts should begin at the kindergarten level, develop into secondary education, prepare students to go into the workforce in a water related field at the university level, and continue to provide information to the general public and key stakeholders in our state. The ultimate goal is to raise awareness of water issues within the state and increase the knowledge of those working within water-related careers. The funding

for implementation of the Vision Strategic Education Plan would be utilized to further implement Phase I Action Items identified in the Education and Public Outreach Supplement Section of the Vision. This past year, Phase I of the marketing campaign, which focused on market research, was initiated. Next will be development of a statewide marketing campaign specifically for water education and outreach.



**WATER MANAGEMENT**

***Harmful Algae Bloom Pilot - FY2018: \$400,000; FY2019: \$500,000***

Funding for a harmful algae bloom pilot project would be utilized by Kansas Department of Health and Environment to investigate and demonstrate in-lake treatment options such as ultrasound, superoxide or other chemical treatments in the vicinity of the Clay County Park at Milford Lake. The objective of this pilot project is to assess the effectiveness in-lake treatment options and their ability to minimize the impact of harmful algae blooms (HABs) around the City of Wakefield.



*Harmful Algae Bloom in Kansas*

lized to develop a long-term HAB mitigation strategy for Milford Lake to evaluate the best mitigation practices throughout the United States and preferred long-term options for Milford and possibly other Kansas lakes impacted by HABs. This would consist of implementation of identified strategies which may include sonar, additional circulation, phosphorus harvesting, etc. FY2019 funding would be used to either evaluate additional technologies, or begin implementation should one of those tested in FY2018 prove successful. Additional management actions are also being evaluated such as lake level and activities within the watershed.



*26 bodies of water in Kansas were issued either a watch or warning for HABs in 2017.*

Approximately \$350,000 of the requested \$400,000 would be used for such demonstrations. The remaining \$50,000 would be uti-

***Contamination Remediation - FY2019: \$400,000***

The Kansas Department of Health and Environment Orphan Sites Program (OSP) uses State Water Plan Fund (SWPF) for the evaluation, monitoring, and remediation of contaminated soil and groundwater sites when the responsible party is unknown or is unable to undertake



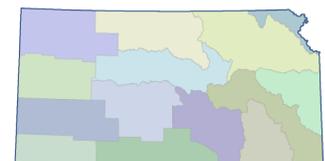
*Drilling and installing one of six monitoring wells in Ingalls, KS*

the necessary action. The OSP was developed with the specific objective of providing a mechanism to address contaminated sites which fall outside the parameters of other clean-up programs. These sites, referred to as orphan sites, generally do not have other funding sources available for complete investigation and cleanup activities or performing

long-term operations and maintenance actions. The program is also designed to address contaminated sites that have no responsible party in a timely manner to protect human health and the environment.

\$400,000 of FY2019 funding is being requested to help with completion of investigation work on currently inventoried sites within the program. Currently it is estimated that an additional \$3,000,000 is necessary to fully complete all investigation work for inventoried sites. Once investigation work is complete for all inventoried sites, additional funding will be needed to conduct remediation activities on the inventoried sites.

*48 orphan sites are listed as "immediate need" by KDHE for evaluation of contaminants.*



**WATER MANAGEMENT**

***Interstate Water Compact Compliance - FY2019: \$100,000***

Kansas has two interstate water engineer positions. These funds would be used to hire an additional interstate water engineer position within Kansas Department of Agriculture – Division of Water Resources in Garden City to monitor Colorado’s compliance with the CO-KS Arkansas River compact. It would be beneficial to Kansas water users to have more capacity to monitor Colorado actions in the basin. These positions would help monitor Colorado water laws, rules and regulations, on-ground management activities, and court decrees to ensure Kansas’ interests in the Arkansas River are protected. They would help compile the Colorado water use records and other information needed to operate the hydrologic-institutional groundwater model that determines Colorado’s compliance with the compact as well as interact with federal agencies on operations of their projects, proposed changes to those operations, and compact related issues. Another duty would be to help with distributing Kansas’ water by coordinating water releases from John Martin Reservoir in Colorado.



***Water Structures Inspections - FY2019: \$200,000***

Kansas Department of Agriculture (KDA) would use the funds to hire an additional staff in Stafford and one in Parsons Field offices to review water structures plans and perform inspections of water structures, channel changes and stream obstructions. These positions would benefit Kansans by reducing travel time and thus increasing timeliness and efficiency of responding to complaints and issuing permits. The positions would perform professional engineering work, involving specialized activities of water resources engineering. The activities include independent review of complex engineering calculations and construction documents for dams, channel changes, stream obstructions, floodplain fills and levees in order to process water structure permits. The work includes field inspections of construction and completed projects, safety inspections, resolution of conflicts, and communication with landowners, contractors and other engineers.



**TECHNOLOGY & CROP VARIETIES**

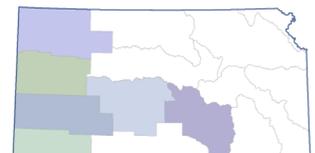
***Irrigation Technology - FY2019: \$1,000,000***

Promotion of adoption of irrigation efficiency technologies and implementation of research-based technology for groundwater usage is one of the tools being utilized across central and western Kansas to provide producers tools and resources to work to maintain crop yields while conserving regional groundwater resources for the future. The \$1,000,000 requested for FY2019 would be utilized to provide incentives to landowners/operators in the Ogallala-High Plains Aquifer



*Irrigation Technology through application in the Ogallala region*

region for irrigation technology adoption. Funding provided for irrigation technology adoption would be targeted to irrigators located in Water Conservation Areas (WCAs) and Local Enhanced Management Areas (LEMAs) to accelerate conservation within the aquifer.



**TECHNOLOGY & CROP VARIETIES**

**Water Technology Farms - FY2019: \$250,000**

Water Technology Farms are public-private partnerships where irrigation technology is demonstrated, related research is conducted on the field scale and water conservation is supported. New irrigation technologies, management techniques and cropping patterns can be tested

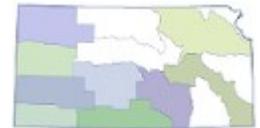


*WaterPACK/ILS Water Technology Farm Field Day*

on a larger scale on these farms. They also provide an opportunity for agronomy, economic, irrigation,

and technology evaluation through institutions such as Kansas State University and Northwest Kansas Technical College. Water Technology Farms have proven to be extremely valuable in expanding the conversation and education of producers and decision makers on water conservation in areas overlying the Ogallala Aquifer.

FY2019 funding would be utilized to continue to provide support for establishment of additional sites and maintenance of existing Water Technology Farms. Efforts are also underway with partners on development of a new type of Water Technology Farm where land management scenarios are evaluated for impacts to water quality conditions.



**Vision Implementation Research & Research Coordination Group - FY2019: \$500,000**

In an effort to promote state-wide collaboration and support of the research needs identified in the Vision, a state-wide research coordination effort has been underway with representatives of K-State Research and Extension, Kansas Geological Survey, Kansas Biological Survey, the University of Kansas, U.S. Geological Survey, Kansas Department of Agriculture, Kansas Department of Health and Environment and the Kansas Water Office. The purpose of this group is to coordinate research needs and to facilitate statewide collaboration to support implementation of the Vision.



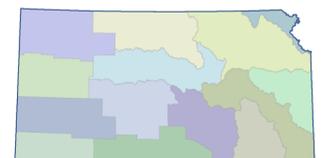
*The Research Coordination Group will address three major areas, including harmful algal blooms, like these seen in Milford Lake.*

areas in need of additional research. The areas that will be addressed first include streambank stabilization effectiveness, irrigation technologies and harmful algal blooms. Beginning in mid-2017, small research coordination teams focusing on each of these areas were convened to meet and discuss the needs for future research. The objective of these meetings is to provide an opportunity for subject matter experts to work together to identify gaps in the research and existing data, determine what is needed to fill those gaps, foster better collaboration among the state's institutions, and maximize funding opportunities.

\$500,000 of FY2019 funding is being requested to fund research and related activities as identified and prioritized by the research group/teams and

In 2017, the group identified three major research areas on which to concentrate efforts at this time: Water Quality, Ogallala-High Plains Groundwater Depletion, and Reservoir Sedimentation. Under each of these broad categories, the group has further identified specific focus

approved by the Kansas Water Authority.



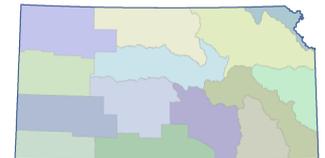
**ADDITIONAL SOURCES OF SUPPLY**

***Telemetry - FY2019: \$500,000***

The Kansas Department of Agriculture -Division of Water Resources (KDA-DWR) currently has approximately 20 telemetry units. These units have been key to studying and understanding complex well-to-well and aquifer interactions mostly in the central and western part of the state. The data collected from these units has been used to verify and augment other regular water level measurements and to develop reports on groundwater impairment. To further develop this program the KDA-DWR would hire staff to install and maintain the telemetry units with the additional funds. Telemetry would allow for remote observation of water right operations to increase management opportunities, study the effects of groundwater pumping on local aquifers and on neighboring wells in near-real time, and enhance enforcement in certain situations.

The proposed activities include installing about 450 telemetry units with a varying mix of water level transduc-

ers to measure the water level in the aquifer, and flow rate loggers to measure the pumping rate at the well. The telemetry units would transmit the data recorded from the water level transducers and the rate loggers to a website where the well owner and KDA would have access to the data to assist with better water management decisions.



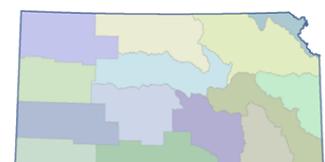
***Waters Leaving the State Evaluation - FY2019: \$200,000***

During the 2016 Legislative Session, Senate Substitute for HB 2059 proposed amendments to the Kansas Water Appropriations Act process pertaining to water right applications proposing to transfer waters exiting the state. The original bill passed the Senate and died in conference committee. The Kansas Water Authority expressed concerns regarding the bill and offered to conduct a policy review of the proposal and report back to the Legislature with its findings and offer any recommendations for legislation.

A study team comprised of John Peck, University of Kansas School of Law, David Pope, former Chief Engineer of the Division of Water Resources, Burke Griggs, Professor of Law, Washburn University and Leland Rolfs, former lead attorney for the Division of Water Resources was requested to develop the study proposal.

The major tenants of the proposal include:

- 2016 S. Sub. for HB 2059, which sought to amend certain procedures for the appropriation of surface water that would otherwise leave the State of Kansas.
- The effect of large-scale transfers of interstate water supplies on Kansas' relations with the water rights and interests of Native American Tribes within the Missouri River Basin and Oklahoma.
- The legal and policy implications of large-scale transfers of interstate water supplies as they relate to the pursuit of effective and optimal methods of securing Kansas' ability to harvest Missouri River Basin flows.

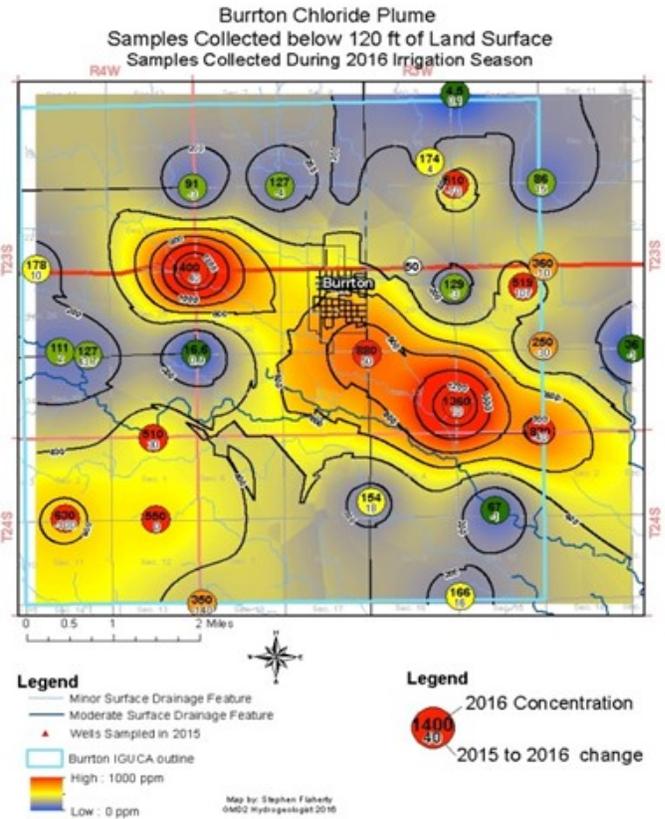


**ADDITIONAL SOURCES OF SUPPLY**

***Equus Beds Chloride Plume Project - FY2019: \$500,000***

Chloride contamination within the Equus Beds Aquifer resulting from previous oil field production has resulted in areas of groundwater which are unsuitable for most uses. Remediation of areas of high chloride concentrations within the Equus Beds would help generate an additional water supply source as well as help protect and prolong the useable lifespan of groundwater wells around areas of chloride contamination.

The Kansas Water Office will collaborate with the City of Wichita and other partners on the development of a plan to remediate the chloride contamination, manage the waste stream and identify potential uses. KWO and the City will seek funding from the Bureau of Reclamation and other partners on a phased approach that would ultimately develop the framework for a pilot treatment project within the Equus Beds Aquifer for the Burrton chloride plume impacting groundwater quality within the region, including Wichita's well field. \$500,000 is requested for FY 2019.



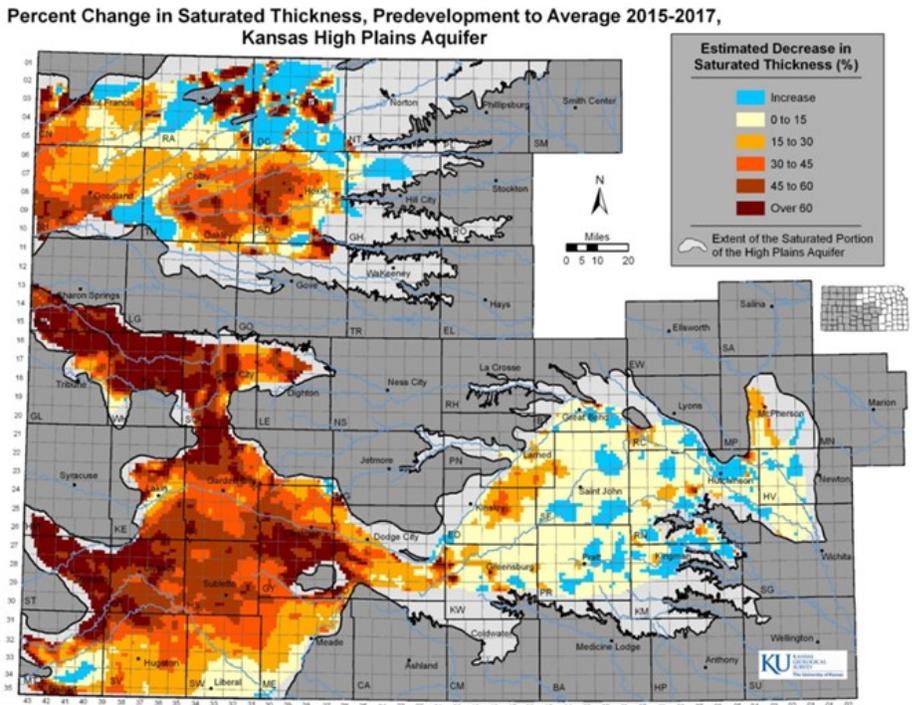
## STATEWIDE PERSPECTIVE

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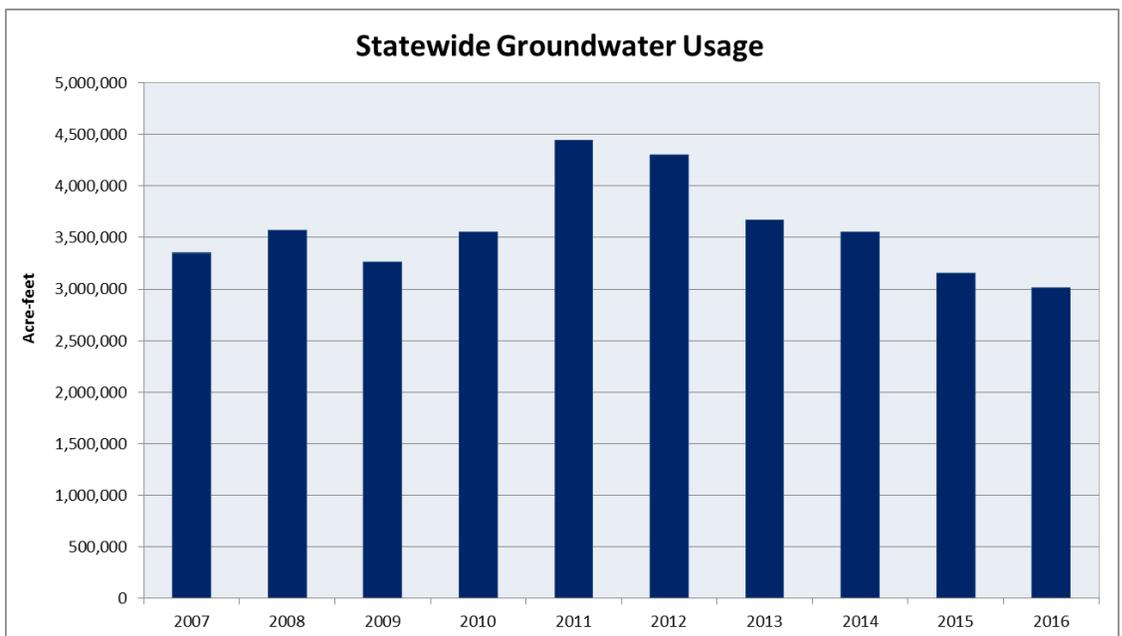
### Groundwater Supply

Efforts continue to take place to further develop and disseminate information about the state’s water resources, including additional data, maps and reports to improve the understanding of the Ogallala-High Plains Aquifer as an aid to water management in western Kansas. Groundwater data collected by partners such as the Kansas Geological Survey, Kansas Department of Agriculture–Division of Water Resources and all five Groundwater Management Districts is compiled and analyzed to determine areas of groundwater decline or recharge over time.

Analysis of water use data by the Kansas Geological Survey (KGS) within the Sheridan-6 LEMA (graph below) shows that the reduction in groundwater usage has been approximately 35% over the last four years when the initial LEMA goal was a 20% reduction and the rate of groundwater decline in the LEMA has slowed as well. Jim Butler of the KGS noted that “The result (of the Sheridan-6 LEMA) is that the decline rate there has gone from about two feet per year to about 5 inches per year without affecting the bottom line of producers in the area. That's a big deal.”

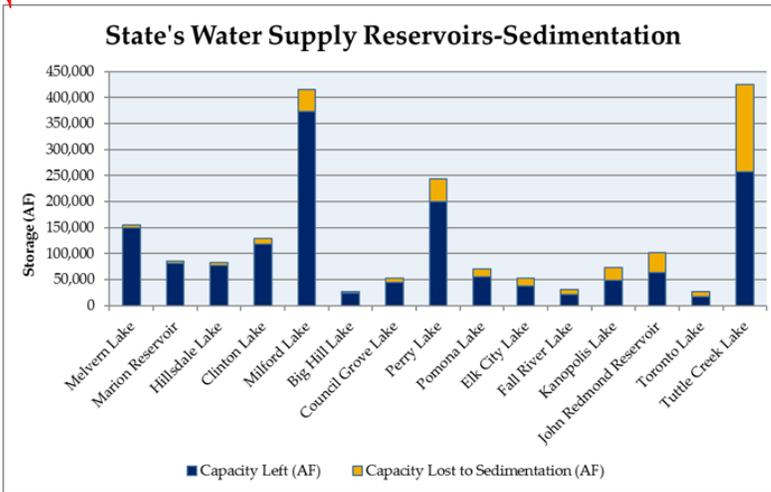


T&O Farms Data



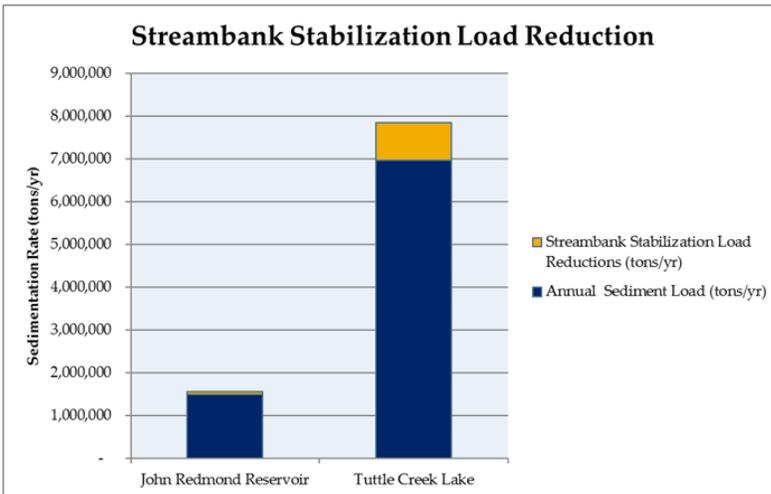
# STATE OF THE RESOURCE

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## Surface Water Supply

Reservoir sedimentation continues to decrease available water supply storage within reservoirs across Kansas. For federal reservoirs such as Kanopolis Lake, John Redmond Reservoir, Toronto Lake, and Tuttle Creek Lake, the amount of capacity lost is now approaching or exceeding 40 percent. Efforts to prolong the usable lifespan of reservoirs such as these and others across the state are dependent upon decreasing the sediment loads entering these reservoirs through work such as streambank stabilization and watershed conservation practice implementation. The graphs on the left illustrate the problem of sedimentation and progress made through streambank stabilization.



## Reservoir Water Quality

Harmful blue-green algal blooms (HAB) continue to impact surface waters in Kansas, including reservoirs utilized for public water supply and recreational purposes. During 2017, 26 water bodies in Kansas were put under public health watches or warnings for the presence of HABs. This is an increase from 2016, when 14 water bodies were confirmed by KDHE to have HABs present. With HABs occurring on an annual basis for waters such as Marion Reservoir and Milford Lake, efforts will continue to be necessary to decrease watershed nutrient loading contributing to the formation of

HABs as well as evaluation of in-lake treatment technologies which can be utilized to decrease the frequency and magnitude of HAB events.

## REGIONAL PERSPECTIVE

*“Following the first year of the goal setting process and annually thereafter, the Kansas Water Authority will evaluate progress towards meeting milestones and overall goals and will assess the need for further action. Annual public meetings will be held in each water resource planning region, highlighting the current groundwater, surface water and water storage conditions. Additionally, progress towards achieving the goals will be assessed through the Kansas Water Plan every five years.”*  
 —Kansas Water Vision

Between December, 2017 and April, 2018, all RACs will hold meetings to evaluate progress. These State of the Resource meetings will provide the opportunity to share information with the public, key stakeholder groups, and elected officials regarding the current status of water resources within each of the 14 Regional Planning Areas and discuss Vision Regional Goal Action Plan implementation, including work that has been completed and remaining implementation needs.

In conjunction within this annual meetings noted above, reports for each region will be developed to evaluate water resource conditions. These reports also include an evaluation of implementation progress being made within each of the respective regions as well as discussion on future Action Plan implementation needs.

WATER CONSERVATION

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**Watershed BMP Implementation Work**

Within the *Vision for the Future of Water Supply in Kansas*, a Phase I action item notes the need to “prioritize



and implement targeted funding in priority watersheds by working with local, state and federal conservation programs and partnerships” to help protect water supply storage and im-

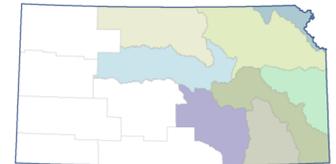
prove water quality in reservoirs across Kansas that provide water to municipal and industrial customers. Partnerships at all levels have had and will continue to play a role in implementation of conservation practices which

*Watershed BMP implementation work has yielded edge of field load reduction estimates of more than 325,000 tons/yr for sediment and 165,000 tons/yr for phosphorus. (Most recent reporting year)*

reduce sediment and nutrient runoff from entering downstream water supply sources.

At the state and federal level, State Water Plan funds administered through the Kansas Department of Health and Environment (KDHE) and Kansas Department of Agriculture – Division of Conservation are used in

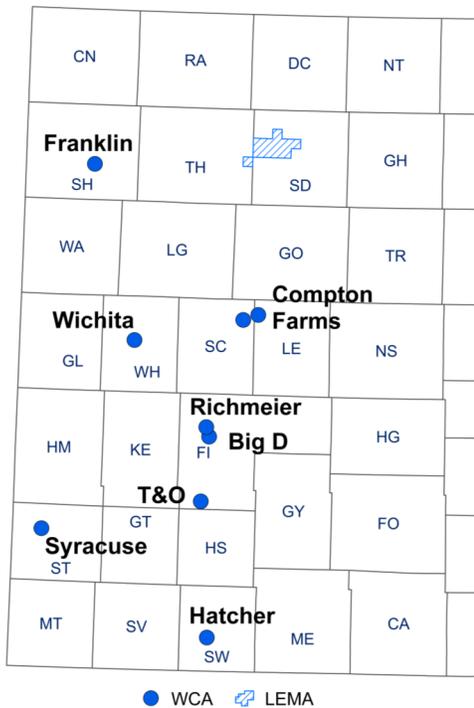
conjunction with funding from the Natural Resources Conservation Service (NRCS) and the Environmental Protection Agency (EPA) to implement the majority of conservation practices within Kansas.



**Water Conservation Areas**

Water Conservation Areas (WCA), defined in statute in K.S.A. 82a-745, allow for increased voluntary measures to conserve water by allowing a landowner or group of landowners to develop their own water management plan for water conservation on their own land and submit it to the Chief Engineer of the Division of Water Resources for

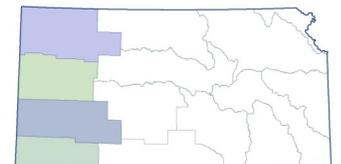
2017 Water Conservation Areas and Local Enhanced Management Areas



*Even with the current WCAs there is still less than 0.4 percent of total eligible acres enrolled in the WCA program statewide.*

approval. In return for overall water conservation, water right owners are allowed more flexibility in how they can use and manage their water over multiple years. WCAs are allowed in areas of the state where groundwater levels are declining or have excessively declined, where the rate of water withdrawal exceeds the rate of water being recharged, where a preventable waste of water is occurring, and where a deterioration of an area’s water quality is occurring.

There are nine active WCAs in Kansas. Six of them were approved in 2017. These include Big D Farms and Richmeier Farms in Finney Co., Hatcher Land Co. LP in Seward Co., the Compton: Lane County Highway 4 Farm in Scott Co., the Compton: Lane County Farm, and the Wichita County WCA.

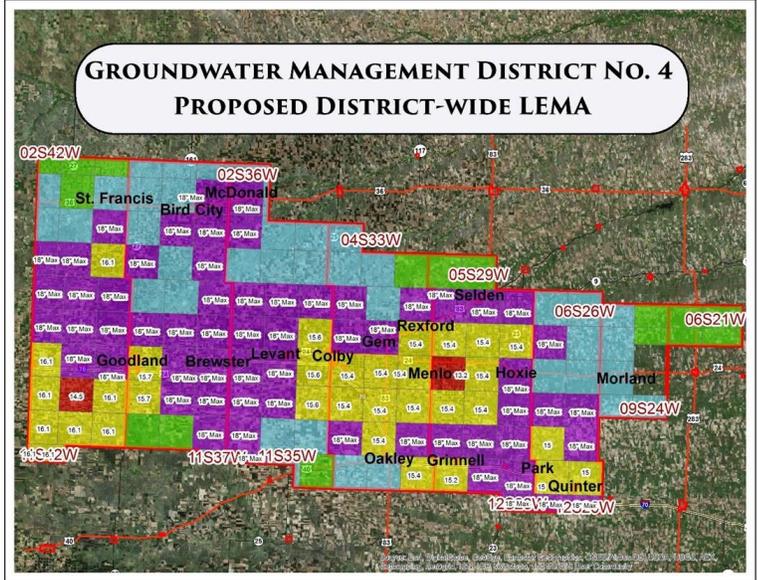


**WATER CONSERVATION**

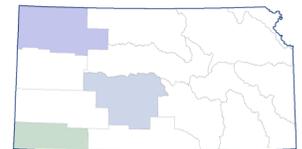
**Local Enhanced Management Areas (LEMAs)**

Currently within Kansas there is one active Local Enhanced Management Area (LEMA), the Sheridan-6 LEMA which covers 99 square miles in Sheridan Co and a small portion of Thomas Co. When initially established, the Sheridan-6 LEMA set a goal to limit water use to no more than 55 acre inches per recently irrigated acre covered by the water right over the 5-year period of the LEMA beginning January 1, 2013 and ending December 31, 2017. Data collected by Groundwater Management District (GMD) #4 and analyzed by the Kansas Geological Survey (KGS) showed that the LEMA has seen notable reductions in the rate of water-level decline. In the decade prior to the establishment of the LEMA, the rate of decline in the area was approximately 23 inches per year. In the first three years of the LEMA, the rate of decline was reduced to around five inches per year. Successful efforts in conserving groundwater resources without causing economic hardship to Hoxie and the surrounding region had resulted in extension of this LEMA for another 5 years through 2022.

Discussions have also taken place during 2017 regarding the potential establishment of three other LEMAs in Kansas, one being a district-wide LEMA covering



Groundwater Management District (GMD) #4, a potential LEMA in Big Bend GMD5 which would help remedy the impairment to Quivira National Wildlife Refuge and water delivered to it from Rattlesnake Creek, and a potential LEMA within GMD3 covering portions of Kearny and Finney Co.



**Hays Conservation Field Day**

The City of Hays, in conjunction with the Smoky Hill-Saline Regional Advisory Committee (RAC), the City of Salina, and the Kansas Water Office, hosted a Water Conservation Field Day on October 13, 2017. This event took place in support of implementation efforts relating to the Smoky Hill-Saline RAC's Regional Goal #4 Action Plan, which discusses ways to increase public water supply water use efficiency for suppliers within the region. One way they chose to accomplish this is through a municipal water conservation field day to increase awareness of existing water conservation measures in



*Water efficient landscaping in Hays.*

place and to share that information with interested stakeholders. Approximately 60 people attended. Municipal water conservation programs implemented by the City of Hays such as the rebate program for high efficiency toilets and washing machines, free low flow shower heads, and water smart landscaping programs were highlighted during the field day.



**Drought Workshops**

Last year a drought tournament was held in Emporia that was funded by the National Oceanic and Atmospheric Administration/Nation Integrated Drought Information System. The Tournament focused on a fictionalized watershed in eastern Kansas using the historic drought period of record. Selected teams chose combinations of measures to have simulated through the modeling in order to achieve the best result in terms of streamflow, reservoir level, and demands met. Building upon the tournament idea and further utilizing the model's capabilities, the Marais des Cygnes, Neosho and Verdigris Regional Advisory Committees (RACs) held a Drought Workshop on September 1, 2017.

fictionalized, as they were in the Tournament, but used actual inputs into the Model that were region specific, including historic inflows, reservoir storage capacities, system demands and downstream target flows. The Model was used to run drought scenarios to show how the model can be used for region specific water planning and to achieve different RAC goals. Thirty-two individuals attended, including two legislators and participants from three states (Kansas, Missouri, and Oklahoma) as well as members from each of the RACs.

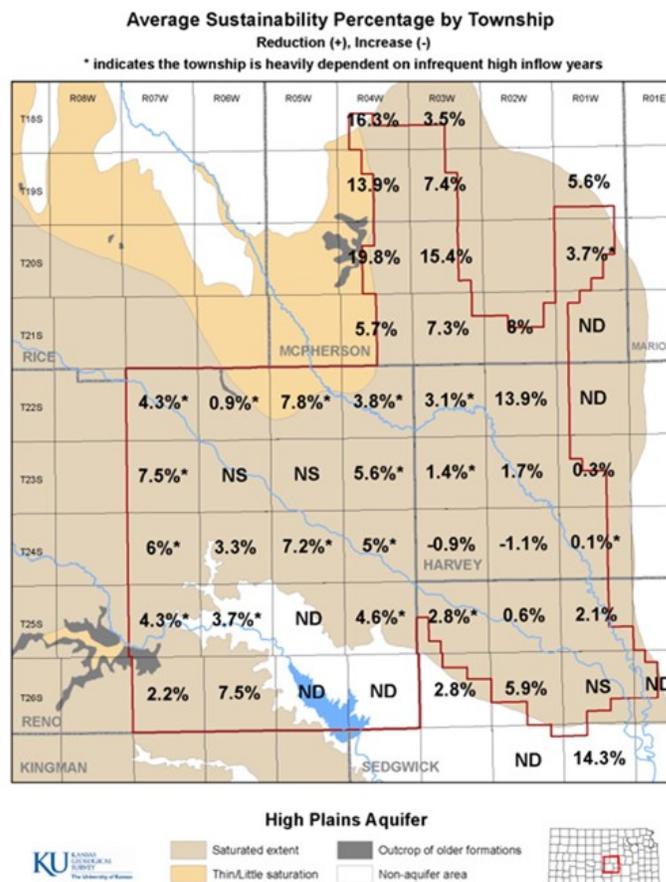
The Drought Workshop was held at the Dwight D. Eisenhower Learning Center at the Wolf Creek Nuclear Power Plant. The watersheds that were used were not



**GMD 2/Equus Beds Sustainability Assessment**

KWO partnered with Equus Beds Groundwater Management District No. 2 (GMD2) to provide funding support for the Kansas Geological Survey (KGS) to conduct a sustainability assessment within the Equus Beds Aquifer region. This project used an approach recently developed at KGS for assessing the prospects for sustainability in the High Plains Aquifer in Kansas.

The objective is to calculate "Qstable," the average annual pumping that would produce stable aerially-averaged water levels over a given area. "Qstable" is calculated using the average annual water-level change and annual reported water use



for an area as described in the following section.

KGS completed this work in early 2017 and shared the results with GMD2 as well as the Equus-Walnut Regional Advisory Committee. GMD2 will utilize data developed through this assessment to evaluate safe yield for the region. The results of this assessment will also be utilized in support of expansion of groundwater modeling data to cover all of GMD2 as well as alluvial aquifer areas south of Wichita to near Belle Plaine.



TECHNOLOGY & CROP VARIETIES

**Water Technology Farms**

Water Technology Farms are public-private partnerships where irrigation technology is demonstrated, irrigation related research is conducted on the field scale and conversations about water conservation are supported. New irrigation technologies, irrigation management techniques, and cropping patterns can be tested on a larger scale on these Water Technology Farms.

*Big D Farms saw a 6.5 bu./acre increase on corn yields with 8 inches LESS water applied.*

During 2017, the Kansas Water Office, along with a number of partners, expanded the Water Technology Farm concept beyond the original three farms to additional areas of the state, specifically where Regional Advisory Committees have identified a need for water conservation and increased irrigation water use efficiency. These new farms included Circle C Farms near Healy and Hatcher Land and Cattle near Liberal.



An addition, workforce development became a part of the Water Technology Farm concept during 2017. Working in partnership with the Northwest Kansas Technical College’s newly developed Precision Agriculture program, 10 Water Technology Farm projects were developed through the school to allow stu-

dents to gain real world experience installing, maintaining, and operating irrigation technologies on lands that local landowners have volunteered the use of to the pro-



gram. With supplier partnerships, students had the opportunity to work with multiple types of soil moisture probes, pivot controls, irrigation scheduling systems and other water management tools.

Data obtained from the Water Technology Farms continues to show positive results. Big D Farms (Garden City Company & Dwane Roth Farm) saw a 6.5 bushel/acre increase on corn yields over traditional methods with almost eight inches less water applied than what neighboring fields applied. When discussing the value of the information obtained from his Water Technology Farm and how it can impact his management decisions, Dwane noted that “Now we are able to efficiently use less inputs, while maintaining or increasing production and profits. I’ve now seen what this technology can do, the data and results have never been so clear. This is what people can do to address their water situation.”



**Sediment Monitoring and Research**

Within the *Vision for the Future of Water Supply in Kansas*, an action item notes the need to “develop a detailed monitoring strategy to assess current and ongoing sediment inflow into public water supply reservoirs”, which will help with the continued development of effective sediment management strategies and target watershed management practices. Through interagency partnerships and coordination with multiple research partners, ongoing efforts continue to put tools in place,

such as sediment monitoring gages, bathymetric surveys, and sediment coring, to monitor sediment entering water supply reservoirs and to evaluate the benefits of sedimentation reduction practices.

In 2017, a contract was executed between the United States Geological Survey (USGS) and the Kansas Water Office (KWO) which allows continued maintenance and operation of suspended sediment

*Continued on pg. 20*

TECHNOLOGY & CROP VARIETIES

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***Sediment Monitoring and Research Continued:***

monitors associated with existing streamgauge locations on the Neosho River at Neosho Rapids, Burlington, Iola and Parsons. The gages and monitors provide near real time information regarding the concentration of sediment flowing in the river above and below John Redmond Reservoir. This information helps in planning practices that limit sedimentation and are needed to monitor the downstream effects of dredging John Redmond Reservoir.

Also this past year, the KWO, per approval by the Kansas Water Authority, entered into an agreement with the U.S. Army Corps of Engineers for the development of a comprehensive plan for the Kansas River Sediment Analysis and Transport Model. The sediment transport model is a key component in analyzing sediment management scenarios (i.e. sediment bypass at Tuttle Creek reservoir) and impacts to downstream infrastructure and ecological resources. The two-year agreement totals \$186,000, with a projected total amount of \$93,000 to be provided by the KWO as cash match and/or work-in-

kind contribution. Major tasks included as part of this project include development of the sediment transport model, reservoir data collection and sample analysis, and technical workshops.

In addition to the above-mentioned studies and ongoing sediment monitoring, the KWO continues to coordinate with the Kansas Biological Survey (KBS) for new/ updated bathymetric surveys, with surveys of Council Grove Lake and Marion Reservoir planned to be completed in FY2018. The new survey information will be compared to previous bathymetric surveys in order to estimate the total sediment accumulation, update the storage capacity tables, and calculate updated sedimentation rates for each reservoir. In addition to the two surveys, KBS also plans to collect sediment cores on Milford Lake in order to reconstruct historical harmful algal bloom (HAB) events. This information will be utilized to examine links between HAB events and specific changes in the watershed and/or environmental factors.



ADDITIONAL SOURCES OF SUPPLY

***Produced Water Pilot***

Funding for this project was made available through a Bureau of Reclamation Title XVI WaterSMART Grant that was received the end of September of 2017. This particular funding is designed for reusing an industrial by-product for the benefit of fish and wildlife or agricultural purposes. The grant will provide a means to operate the equipment necessary to treat the produced water and also periodic testing of the effluent.

This study has been developed as part of the *Vision for the Future of Water in Kansas* to find additional sources of water. The Red

Hills Regional Goals include a goal of reducing the amount of freshwater used in oil and gas completion operations by four percent annually and to have 10,000 barrels per day of fresh water to be recycled from oil production.



*A collection tank for a disposal well near Hardner, Kansas is the proposed site of the project.*

The pilot test will be utilized to demonstrate the efficiency of the treatment system on produced oilfield water to reduce chloride and boron levels in the produced water to concentrations safe for irri-



ADDITIONAL SOURCES OF SUPPLY

AFT

***Produced Water Pilot Continued:***

gation, cattle watering, or other beneficial uses.

treated water, brine (reject) and sludge, as well as possible policy recommendations.

Mobilization of the equipment would start in the spring of 2018. The final report based on data collection will include: analysis of data collected from input water,

***Lower Republican Activities***

In 2017, the Kansas Water Office (KWO) continued forward with the Republican River Water Conservation Projects-Nebraska Moneys Fund for water improvement projects in the Republican River Basin. In continuation of a signed contract between KBID and the KWO, KBID recently completed the first canal project. As of March 3, 2017, a total of 4.18 miles of open canal were eliminated and converted to 3.52 miles of buried PVC pipe. KBID began the second canal project in the fall of 2017. It is estimated that 2.99 miles of open canal will be eliminated and 2.17 miles of PVC pipe will be installed as its replacement.



To finalize a contract signed in 2016 with Burns & McDonnell, a final report was completed and submitted to KWO on April 28, 2017. The Reservoir Feasibility Study included four already identified multipurpose small reservoirs and contained the results of the geotechnical and water quality analysis, environmental studies, and opinions of probable cost.

Feasibility Study to the model. Results from this contract are estimated to be finished by June 2018.

*4.18 miles of open canal were eliminated & converted to 3.52 miles of PVC pipe. It is estimated to save 894.6 acre-feet of water annually.*

Surface water modeling was also completed with a final report submitted by the KGS on July 28, 2017. This completed simulation of the distribution of water resources under different management alternatives to optimize beneficial use by water rights in the basin. Preliminary results from the report indicate that each reservoir helps to reduce instances of water shortages in the basin. However, potential costs for a new reservoir led the stakeholder group to hold any further work on these sites.

2017 also saw the creation of the Lower Republican Access District Steering Committee, made up of 8 producers who are affected when Minimum Desirable Streamflow (MDS) is administered on the Republican River. The Committee has met three times in 2017 and is working closely with KWO and KDA-DWR to establish an Access District. The District would use water made available from changes made through Republican River Compact (RRC) meetings. The next steps for the Steering Committee are to appoint a District Board and help craft legislation to establish authority for the District.

A new contract with KGS was signed on August 2, 2017 to continue simulating water management scenarios within the basin, along with simulating climate scenarios and adding the fourth reservoir site from the Reservoir





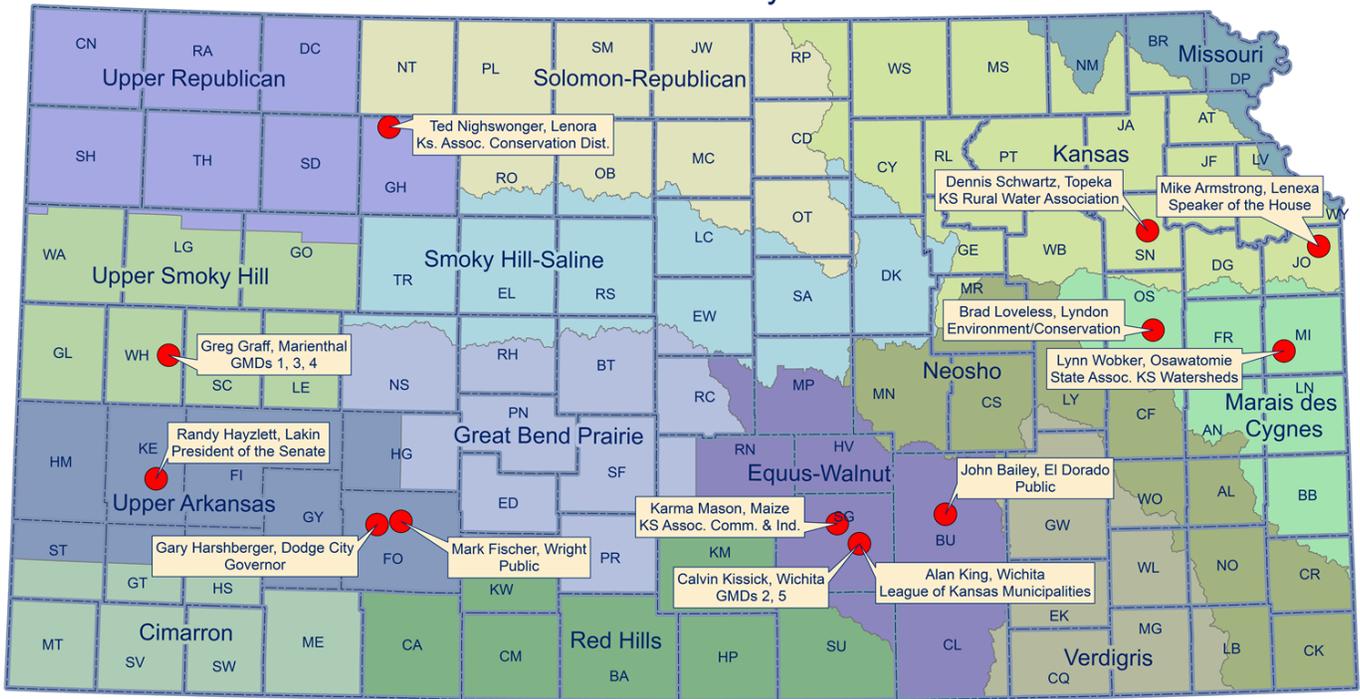
## STATE WATER PLAN FUND REVENUE ESTIMATE

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State Water Plan Resource Estimate	FY 2017 Actuals	FY 2018 Appropriat- ed	FY 2018 w/Carry Forward	FY 2018 Enhance- ment	FY 2019 Appropriated
<b>Beginning Balance</b>	\$ 582,946	\$ 718,547	\$ 718,547	\$ 718,547	\$ 139,503
<b>Adjustments</b>					
Division of Budget—released PY Enc. Not recorded	702,377	-	-	-	-
Release of Prior Year Encumbrance	\$ 549,091	\$ -	\$ -	\$ -	-
Reduced Resources	\$ -	\$ -	\$ -	\$ -	-
Other Service Charges	\$ 28,255	\$ 28,255	\$ 28,255	\$ 28,255	28,255
Transfer to SGF - John Redmond	\$ (916,550)	\$ (1,260,426)	\$ (1,260,426)	\$ (1,260,426)	(1,260,426)
<b>Bond</b>					
<b>Subtotal--Adjustments</b>	<b>\$ 363,174</b>	<b>(1,232,171)</b>	<b>(1,232,171)</b>	<b>(1,232,171)</b>	<b>(1,232,171)</b>
<b>Revenues</b>					
State General Fund Transfer	\$ -	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	-
Economic Development Fund Trans- fer	\$ -	\$ -	\$ -	\$ -	-
Municipal Water Fees	\$ 3,028,509	\$ 3,028,509	\$ 3,028,509	\$ 3,028,509	3,267,271
Clean Drinking Water Fee Fund	\$ 2,724,051	\$ 2,724,051	\$ 2,724,051	\$ 2,724,051	2,820,674
Industrial Water Fees	\$ 973,133	\$ 973,133	\$ 973,133	\$ 973,133	1,120,701
Stock Water Fees	\$ 387,655	\$ 387,655	\$ 387,655	\$ 387,655	464,256
Pesticide Registration Fees	\$ 1,359,410	\$ 1,359,410	\$ 1,359,410	\$ 1,359,410	1,334,523
Fertilizer Registration Fees	\$ 3,491,049	\$ 3,491,049	\$ 3,491,049	\$ 3,491,049	3,568,921
Pollution Fines and Penalties	\$ 152,205	\$ 152,205	\$ 152,205	\$ 152,205	165,000
Sand Royalties	\$ 21,975	\$ 21,975	\$ 21,975	\$ 21,975	45,000
<b>Total Receipts</b>	<b>\$ 12,137,986</b>	<b>13,335,782</b>	<b>13,335,782</b>	<b>13,335,782</b>	<b>12,786,346</b>
<b>Total Available</b>	<b>\$ 13,084,106</b>	<b>12,822,158</b>	<b>\$ 12,822,158</b>	<b>12,822,158</b>	<b>\$ 11,693,678</b>
Less: Expenditures	\$ 12,365,559	\$ 11,434,466	\$ 12,401,343	\$ 12,682,655	\$ 11,579,930
<b>Ending Balance</b>	<b>\$ 718,547</b>	<b>1,387,692</b>	<b>\$ 420,815</b>	<b>139,503</b>	<b>\$ 113,748</b>

Agency/Program	FY 2017 Actuals	FY 2018 Appropriated	FY 2018 w/Carry Forward	FY 2018 Enhance- ment	FY 2019 Appropriated
<b>Department of Health &amp; Environment</b>					
Contamination Remediation	\$ 654,094	\$ 602,824	\$ 637,030	\$ -	\$ 688,301
TMDL Initiatives	\$ 244,062	\$ 216,114	\$ 250,364	\$ -	\$ 276,307
Nonpoint Source Program	\$ 297,768	\$ 238,540	\$ 245,540	\$ -	\$ 298,980
Watershed Restoration & Protection Strategy	\$ 555,884	\$ 555,000	\$ 555,000	\$ -	\$ 555,884
<b>Total - Department of Health &amp; Environ- ment</b>	<b>\$ 1,751,808</b>	<b>\$ 1,612,478</b>	<b>\$ 1,687,933</b>	<b>\$ -</b>	<b>\$ 1,819,472</b>
<b>University of Kansas - Geological Survey</b>	<b>\$ 26,841</b>	<b>\$ 26,841</b>	<b>\$ 26,841</b>	<b>\$ -</b>	<b>\$ 26,841</b>
<b>Department of Agriculture</b>					
Interstate Water Issues	\$ 451,841	\$ 392,413	\$ 430,297	\$ -	\$ 492,000
Subbasin Water Resources Management	\$ 781,007	\$ 407,149	\$ 539,837	\$ -	\$ 610,808
Water Use	\$ 107,488	\$ 64,368	\$ 120,178	\$ -	\$ 72,600
Water Resources Cost Share	\$ 2,041,642	\$ 1,727,387	\$ 1,808,410	\$ -	\$ 1,948,289
Nonpoint Source Pollution Asst.	\$ 1,866,556	\$ 1,502,909	\$ 1,631,018	\$ -	\$ 1,858,350
Aid to Conservation Districts	\$ 2,092,637	\$ 2,000,000	\$ 2,000,000	\$ -	\$ 2,092,637
Watershed Dam Construction	\$ 559,353	\$ 511,076	\$ 528,157	\$ -	\$ 550,000
Water Quality Buffer Initiative	\$ 179,893	\$ 88,662	\$ 265,670	\$ -	\$ 200,000
Riparian & Wetland Program	\$ 158,892	\$ 135,343	\$ 135,546	\$ 281,312	\$ 152,651
Water Supply Restoration Program	\$ -	\$ -	\$ -	\$ -	\$ -
Water Transition Assistance Program/CREP	\$ 178,572	\$ 177,141	\$ 248,255	\$ -	\$ 200,000
<b>Total - Department of Agriculture</b>	<b>\$ 8,417,881</b>	<b>\$ 7,006,448</b>	<b>\$ 7,707,368</b>	<b>\$ 281,312</b>	<b>\$ 8,177,335</b>
<b>Kansas Water Office</b>					
Assessment & Evaluation	\$ 545,732	\$ 500,000	\$ 594,023	\$ -	\$ 450,000
GIS Data Base Development	\$ 112,306	\$ 50,000	\$ 50,000	\$ -	\$ -
MOU-Storage Operations & Maintenance	\$ 302,071	\$ 363,699	\$ 363,699	\$ -	\$ 350,000
Stream Gaging	\$ 431,282	\$ 350,000	\$ 350,000	\$ -	\$ 431,282
Technical Assistance to Water Users	\$ 377,646	\$ 325,000	\$ 421,474	\$ -	\$ 325,000
Kansas Alluvial	\$ -	\$ 100,000	\$ 100,000	\$ -	\$ -
Bathymetric Study	\$ -	\$ 100,000	\$ 100,000	\$ -	\$ -
Streambank Stabilization	\$ 400,000	\$ 1,000,000	\$ 1,000,000	\$ -	\$ -
<b>Total - Kansas Water Office</b>	<b>\$ 2,169,037</b>	<b>\$ 2,788,699</b>	<b>\$ 2,979,196</b>	<b>\$ -</b>	<b>\$ 1,556,282</b>
<b>Total State Water Plan Expenditures</b>	<b>\$ 12,365,559</b>	<b>\$ 11,434,466</b>	<b>\$ 12,401,343</b>	<b>\$ 281,312</b>	<b>\$ 11,579,930</b>

## Kansas Water Authority Members



Kansas Water Office  
August 2017

### Kansas Water Authority Ex Officio Members

- |  |   |  |   |
|--|---|--|---|
| David Barfield<br>Division of Water Resources<br>KS Dept. of Agriculture | John Floros<br>Ag Experiment Station<br>KS State University | Rob Reschke<br>Division of Conservation<br>KS Dept. of Agriculture | Rolfe Mandel<br>KS Geological Survey              |
| Robin Jennison<br>KS Dept. of Wildlife, Parks & Tourism                  | Nick Jordan<br>KS Dept. of Commerce                         | Edward Martinko<br>KS Biological Survey                            | John Mitchell<br>KS Dept. of Health & Environment |
| Jackie McClaskey<br>KS Dept. of Agriculture                              | Tracy Streeter<br>KS Water Office                           | Pat Apple<br>KS Corporation Commission                             |   |

The Kansas Water Authority (KWA) consists of 13 voting members who are appointed by the Governor or Legislative Leadership. State agency directors serve as ex-officio members. KWA is statutorily within and part of the Kansas Water Office (KWO). The KWA is responsible for advising the Governor, Legislature and Director of the KWO on water policy issues and for approving the *Kansas Water Plan*, federal contracts, administration and regulations proposed by the KWO. The KWA provides the leadership to ensure that water policies and programs address the needs of all Kansans.

*Kansans act on a shared commitment to have the water resources necessary to support the state's social, economic and natural resource needs for current and future generations.*

- The Long Term Vision for the Future of Water Supply In Kansas



Kansas Water Office  
900 SW Jackson Street, Ste. 404  
Topeka, Kansas 66612  
785-296-3185  
[www.kwo.org](http://www.kwo.org)



# MEMO



DATE: December 7, 2017  
TO: Kansas Water Authority  
FROM: Tracy Streeter, Earl Lewis, Ginger Harper, & Katie Mitchell  
RE: Legislative Update

900 SW Jackson Street, Suite 404  
Topeka, KS 66612  
Phone: (785) 296-3185  
Fax: (785) 296-0878  
www.kwo.org

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The Kansas Legislature has been busy this fall with their interim and special committee work. It is encouraging that water has been part of this discussion through the Special Committee on Natural Resources and the Legislative Budget Committee. A summary of these actions is below.

## **Budget Process**

As discussed at the August KWA meeting, the Kansas Water Office submitted the request for projects which would be funded by the demand transfer from the State General Fund (SGF) and the Economic Development Initiatives Fund (EDIF) with the agency's budget submittal in September. In November, agency staff presented information in person to Division of Budget staff along with KWA members Gary Harshberger and Karma Mason. An overall budget timeline is attached to this memo.

## **Special Committee on Natural Resources**

The Special Committee on Natural Resources of the Kansas Legislature met twice, October 31<sup>st</sup> and November 13<sup>th</sup>, 2017. This committee consisted of Representative Tom Sloan, Chair; Senator Dan Kerschen, Vice-Chair; Reps. Doug Blex, Ken Rahjes, and Ponka-We Victors; and Sens. Rick Billinger (substitute for Sen. Bud Estes) and Marci Francisco. KWO staff testified at the October 31<sup>st</sup> meeting, and provided follow-up documentation and information on the 13<sup>th</sup>. Testimonies are attached and are posted on the KWO website here: <http://kwo.ks.gov/news-events/legislative-news>

Committee conferees included: Kansas Water Office, Kansas Department of Agriculture, the Water Advocacy Team, the Kansas Livestock Association, the League of Kansas Municipalities, Prof. Burke Griggs (Washburn University), Allyn Lockner, Kansas Geological Survey, Kansas Farm Bureau, Kansas Biological Survey, Kansas Water Resources Institute, Kansas Department of Health and Environment, Prof. Mary Hill (University of Kansas), and Greg Wilson (Water Assurance Districts).

The outcome of this Committee will be published in a forthcoming Committee Report, but can be summarized with the following:

1. The Committee recommends undertaking a comprehensive study regarding Kansas Water Law, as detailed by Burke Griggs, Associate Professor of Law, Washburn University, a conferee to the committee.
2. The Committee is united in its recommendation that the \$8 million in statutory funding (\$6 million SGF/\$2 million EDIF) should be appropriated in the coming fiscal year, and should continue to be appropriated in future years.

## **Legislative Budget Committee**

On November 8, 2017, the Legislative Budget Committee met and was chaired by Rep. Troy Waymaster, Sen. Carolyn McGinn - Vice-Chair, Sen. Rick Billinger, Sen. Laura Kelly, Rep. Erin Davis, Rep. Jim Ward (substitute for Rep. Kathy Wolfe-Moore) and Rep. Steven Johnson. The Committee met to review the Consensus Estimates, Caseload Estimates, School Finance, State General Fund Profile and select agency budget requests. The Kansas Water Office was asked by the committee to give a brief overview of specific supplemental/enhancement request for Fiscal Year 2018 and Fiscal Year 2019, Director Tracy Streeter testified before the Committee. In Tracy's testimony, he provided information on the Kansas Water Authority request for projects to be funded by the SGF and EDIF demand transfers. The Committee did not make any recommendations on any of the information provided to them during the hearings.

## **2018 Legislative Session**

The 2018 Kansas Legislative Session will begin on January 8. As you all know, our next KWA Meeting will be held January 23-24 in Topeka, with the 23<sup>rd</sup> being a full day of Legislative visits. We will be hosting a conference call and GoToMeeting presentation with information on what to discuss mid-January. As always, we appreciate your participation and willingness to meet with the Legislators and pass on the important work being done with water resources across the state.

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*This item is information only. No action required.*

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## Budget Process Flowchart

