

State of the Resource & Regional Goal Action Plan Implementation Report

August 2018

Equus - Walnut Regional Planning Area



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Executive Summary

The Kansas State of the Resource & Regional Goal Action Plan Implementation Report is intended to provide a background of the regional issues and record activities and progress toward regional goals and the *Long-Term Vision for the Future of Water Supply in Kansas (The Vision)* objectives utilizing the most up to date data available at the time of report development.

The Equus-Walnut Regional Planning Area includes all of Equus Beds Groundwater Management District #2, as well as portions of the Lower Arkansas drainage area and the entire Walnut River basin. Preservation of both surface water and groundwater resources is a primary objective of the Equus-Walnut Regional Advisory Committee (RAC). Action plans developed by the RAC to benefit regional water resources include sustainable use of the Equus Beds Aquifer, long term water supply planning by public water suppliers within the region, watershed conservation practice implementation to reduce rates of sedimentation for regional water supply reservoirs, and groundwater contamination remediation.

Surface and groundwater resources within the Equus-Walnut Region benefited from higher than normal precipitation in 2016. Groundwater level measurements from the Kansas Geological Survey (KGS) at the beginning of 2017 showed a roughly 1.9 foot increase for average groundwater levels within the Equus-Walnut Region. Likewise, both Cheney and El Dorado lakes remained at or above top of conservation pool levels from the beginning of 2016 through mid-Summer 2017. From this point through the end of 2017, these two water supply reservoirs remained below top of conservation pool elevation.

From a groundwater resource management standpoint, several actions took place in 2017. KGS completed a sustainability assessment for Equus Beds Groundwater Management District No.2 (GMD2) in January 2017. This project used an approach that was recently developed at the KGS for assessing the prospects for groundwater sustainability in Kansas. The objective of the approach is to calculate Q_{stable} , the average annual pumping that would produce stable aerielly averaged water levels over a given area.

Data from sustainability assessments currently being utilized by the KGS in the update and expansion of existing model coverage of portions of GMD2 to now cover the entire GMD.

The City of Wichita also began to initiate a public outreach process on proposed water permit regulations impacting how credits are currently accumulated during Aquifer Storage & Recovery (ASR) project operations diverting high flows from the Little Arkansas River.

Watershed implementation continued to move forward in areas where Watershed Restoration and Protection Strategy (WRAPS) project are present. The majority of the estimated nutrient and sediment load reductions associated with this work took place within the Little Arkansas River, El Dorado Lake and Cheney Lake watersheds.

Water Use Trends

Groundwater is the primary source of water within this region, accounting for approximately 76% of the total reported water usage over the last 10 years. Groundwater sources within the region are the Equus Beds Aquifer and alluvial deposits along major streams. Irrigation is the primary use for groundwater sources within the region while municipal water use is the primary use for surface water sources. Annual reported water use for the region fluctuates based on climate conditions present, with higher water use resulting from periods of hot and dry weather during the growing season and lower water use taking place during periods of cooler and/or wetter weather (Figure 2).

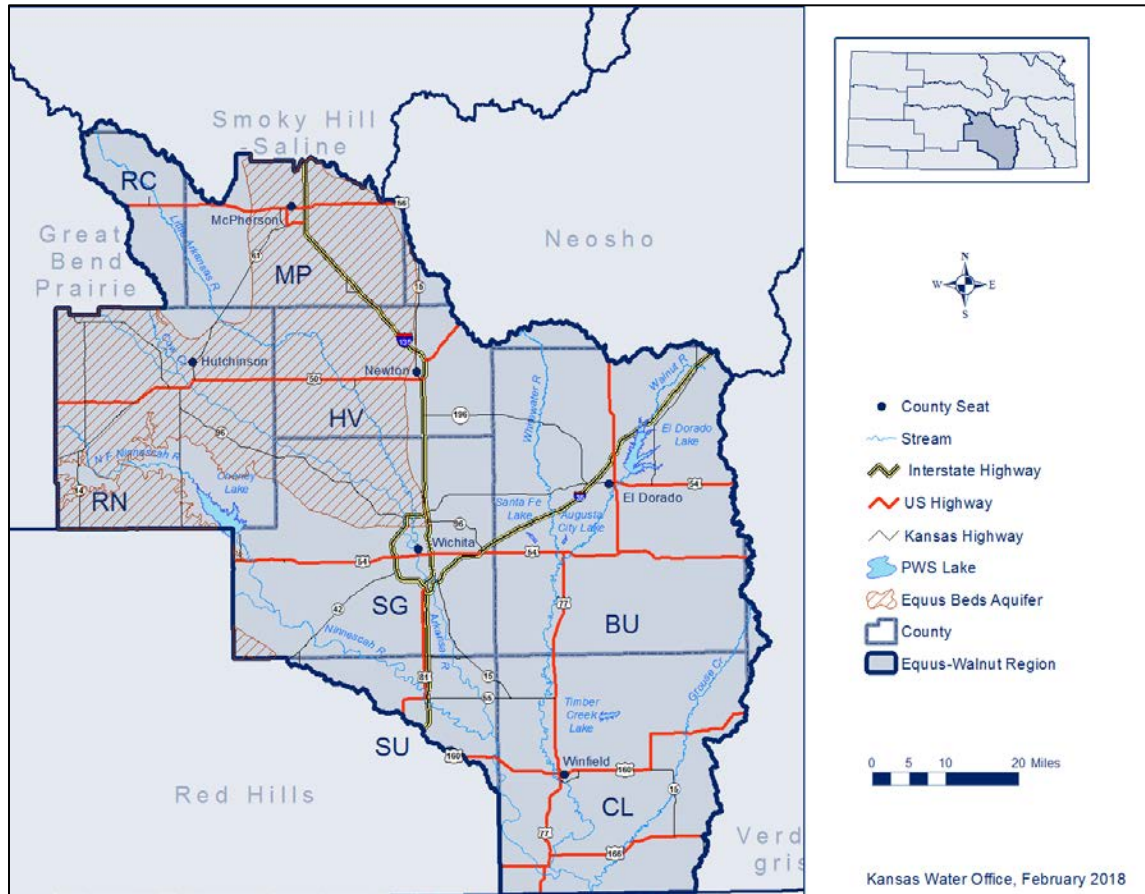


Figure 1: Equus-Walnut Regional Planning Area

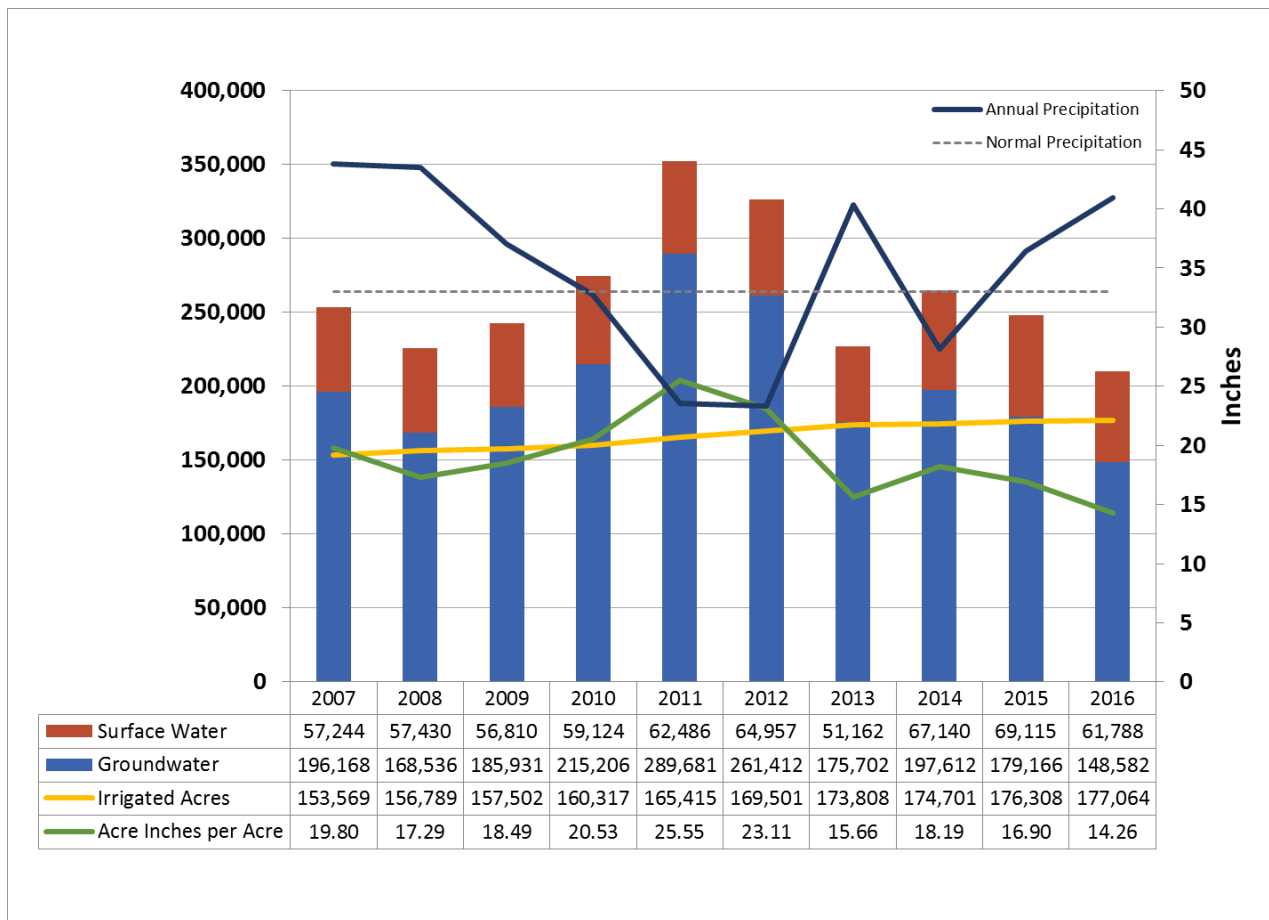


Figure 2: Surface water and groundwater use for years 2007- 2016 within the Equus-Walnut Region, with annual precipitation, irrigated acres, and acre inches per acre displayed

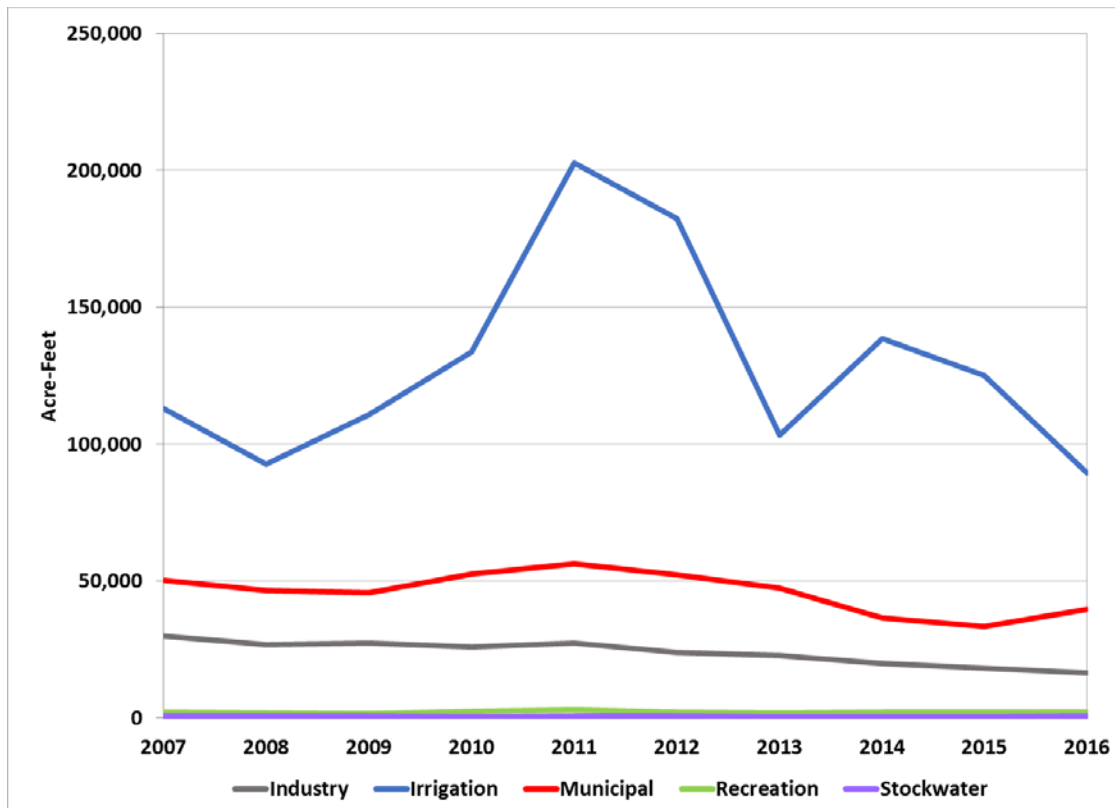


Figure 3: Annual reported water use by type from groundwater sources, Equus-Walnut Region

Water Resource Conditions

Groundwater

The Equus Beds Aquifer, which represents the farthest east portion of the Ogallala-High Plains Aquifer in Kansas, is the principal groundwater source within the Equus-Walnut Region. Other aquifers present within the region include the Dakota, along with alluvial aquifers along and near major tributaries within the region.

The KGS and the Kansas Department of Agriculture-Division of Water Resources (KDA-DWR) measure water levels in about 1,400 wells in central and western Kansas, including over 70 of which are within the Equus-Walnut Region and GMD2. From 2007 through 2016, these water level measurements showed that average groundwater levels increased 5 times (2007, 2008, 2013, 2015, and 2016), decreased 4 times (2010, 2011, 2012, and 2014), and remained unchanged once (2009) (Table 1). On a smaller scale, there are localized areas of groundwater level increases or declines within the Equus Beds Aquifer.

Table 1: Annual average groundwater level changes for High Plains Aquifer region

Region	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	10 Year Change	Average Annual Change (2007-16)
Cimarron	-2.37	-2.90	-1.65	-2.52	-3.93	-3.63	-1.72	-1.90	-0.91	-1.29	-22.81	-2.28
Equus-Walnut	1.87	1.56	0.00	-0.80	-2.96	-1.48	2.44	-1.21	1.38	1.94	2.74	0.27
Great Bend Prairie	3.11	0.59	0.70	-0.46	-2.88	-1.89	0.55	-0.68	-0.26	0.51	-0.69	-0.07
Upper Arkansas	-1.47	-2.29	-1.28	-2.97	-2.64	-2.82	-2.40	-1.85	-0.70	-0.45	-18.86	-1.89
Upper Republican	-0.69	-0.20	0.18	-0.39	-0.42	-1.40	-0.64	-0.39	-0.53	-0.29	-4.77	-0.48
Upper Smoky Hill	-0.87	-0.41	-0.22	-0.52	-1.01	-1.41	-0.63	-0.44	-0.13	-0.32	-5.96	-0.60
ENTIRE HIGH PLAINS AQUIFER REGION	-0.09	-0.60	-0.24	-1.08	-1.93	-1.98	-0.65	-0.93	-0.39	-0.12	-8.00	-0.80
Increase = ■ Decrease = ■ Unchanged = ■												

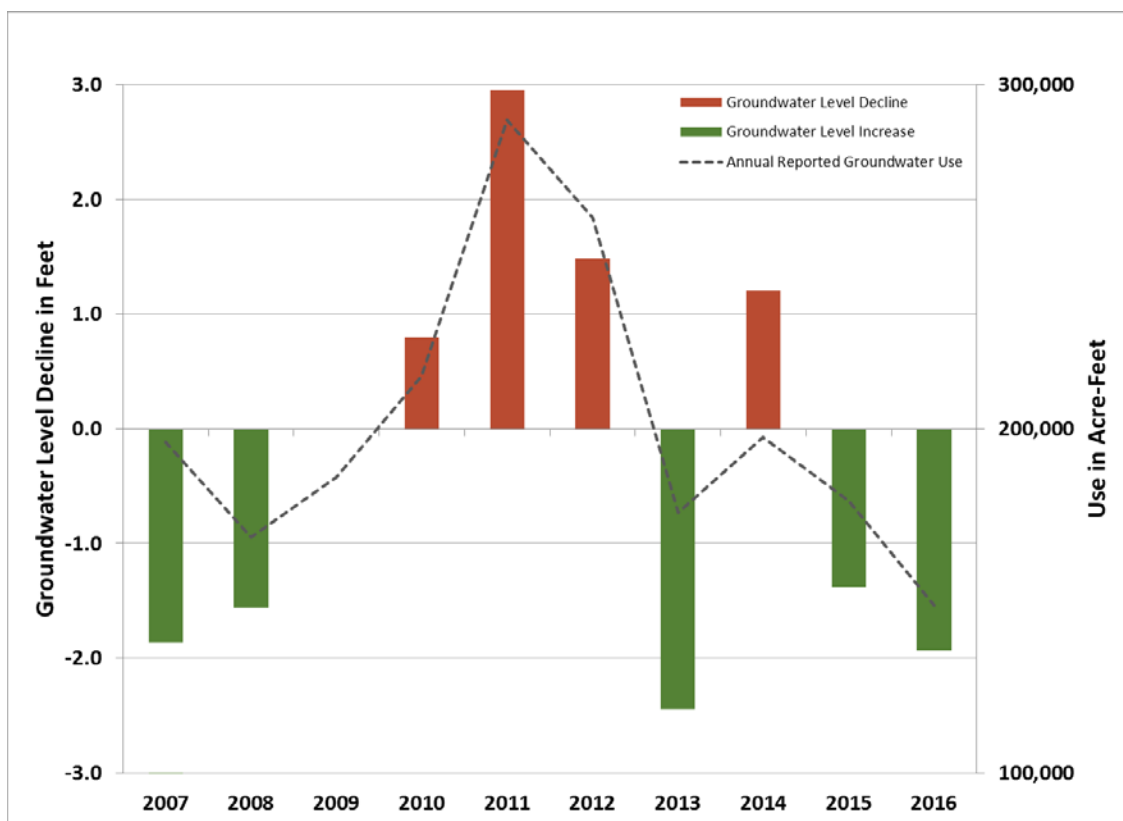


Figure 4: Yearly groundwater level change and groundwater use within the Equus-Walnut Region

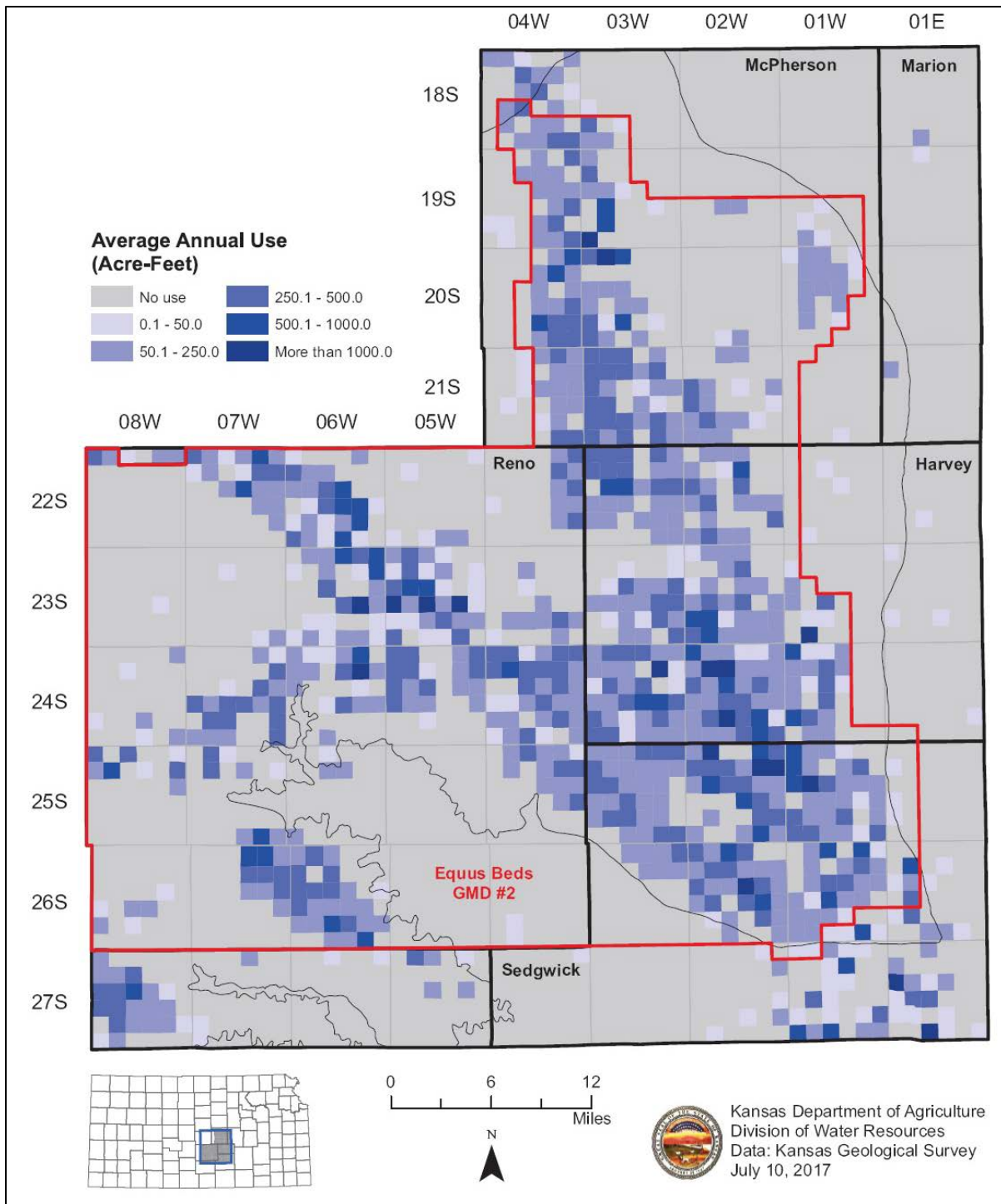


Figure 5: 2011-2015 average groundwater use by section in/around GMD2 area

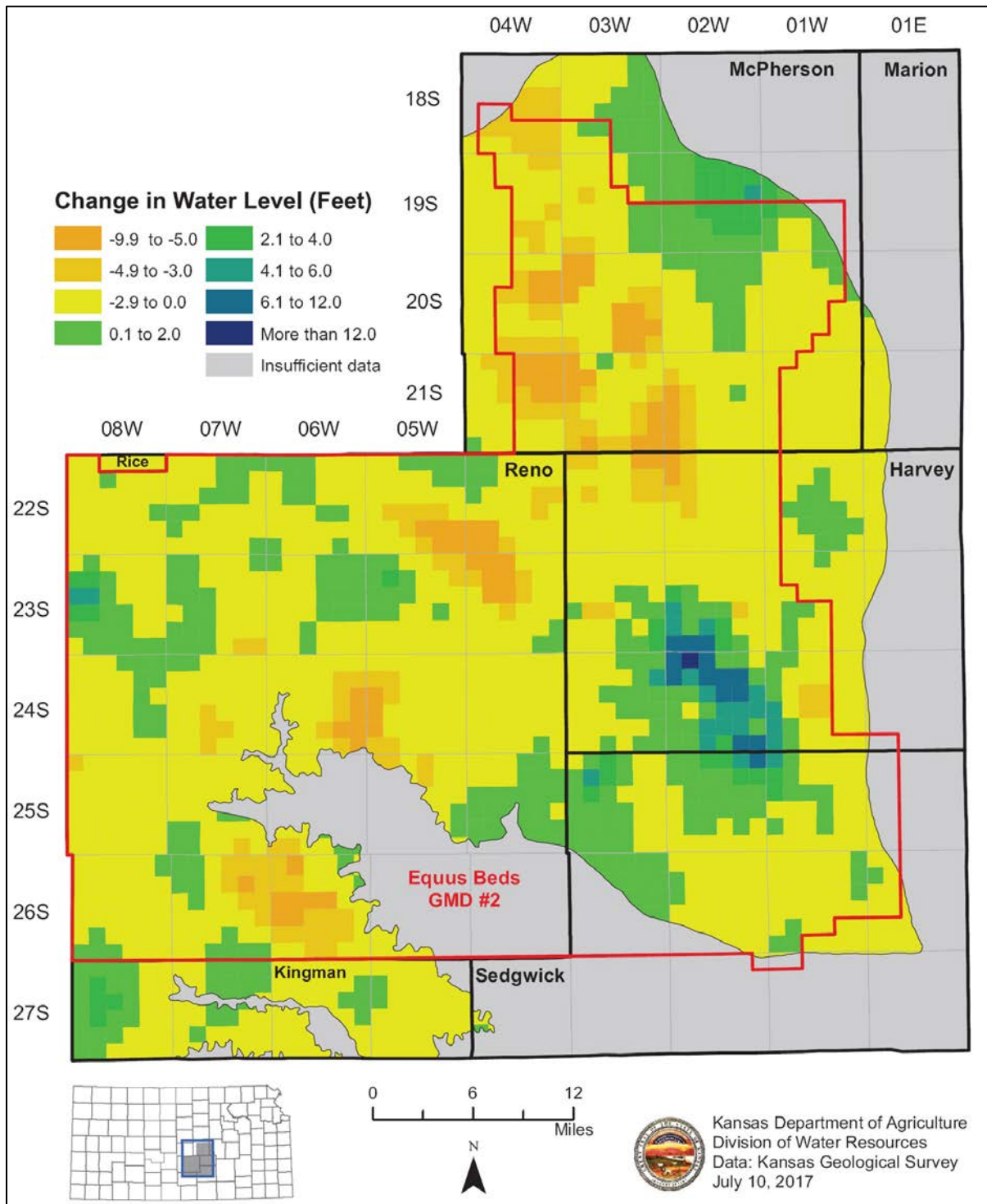


Figure 6: 20-year change (1994-96 avg. conditions to 2014-16 avg. conditions) in groundwater levels in/around GMD2

Surface Water

Major rivers and streams within the Equus-Walnut Region include the Arkansas, Little Arkansas, North Fork Ninnescah, Ninnescah, Whitewater, and Walnut Rivers. Two federal reservoirs are also located within the region: Cheney Reservoir on the North Fork Ninnescah River and El Dorado Lake on the Walnut River.

Reservoirs within the Equus-Walnut Region serve as an important source of water supply and provide flood protection benefits. Storage capacity for reservoirs within the region is being diminished over time due to soil erosion from upland and stream channel sources eventually being deposited in the nearest downstream reservoir. For long-term water supply planning purposes, it is important to know how much capacity has been lost due to reservoir sedimentation, as well as the estimated rate at which sedimentation is taking place. Estimated capacity loss, as well as sedimentation rate, as determined from the most recent bathymetric surveys has been calculated for Augusta City Lake, Santa Fe Lake, El Dorado Lake, Winfield City Lake, and Cheney Reservoir within the Equus-Walnut Region (Table 2). Bathymetric survey reports can be downloaded for each of these reservoirs through the reservoir interactive map on the [KWO](#) website.

Table 2: Equus-Walnut Region reservoir sedimentation information

Reservoir	Year Built	Last Bathymetric Survey	Original Capacity (AF)	Estimated Current Capacity (AF)	Estimated Capacity Loss	Estimated Sedimentation Rate (AF/yr)
Augusta City Lake	1930	2010	2,092	1,837	12%	3
Santa Fe Lake	1927	2010	1,600	1,201	25%	4
El Dorado Lake	1981	2010	163,942	151,029	8%	349
Winfield City Lake	1970	2007	19,812	18,468	7%	28
Cheney Reservoir	1965	2010	167,074	156,103	7%	207

Cheney Reservoir and El Dorado Lake serve as major water supply sources within the Equus-Walnut Region. The City of Wichita draws approximately 60% of its daily water supply from Cheney Reservoir, but this number can fluctuate on an annual basis based on available water supply within Cheney, as well as the Equus Beds Aquifer. From 2016 through mid-July 2017, Cheney Reservoir was near or above top of Conservation Pool (elevation 1421.6 ft). From mid-July through the end of 2017, dryer than normal conditions decreased inflows into Cheney Reservoir on the North Fork Ninnescah River. Reservoir water levels reflect these decreased flows with water levels dipping below top of Conservation Pool towards the tail end of this evaluation period (Figure 7).

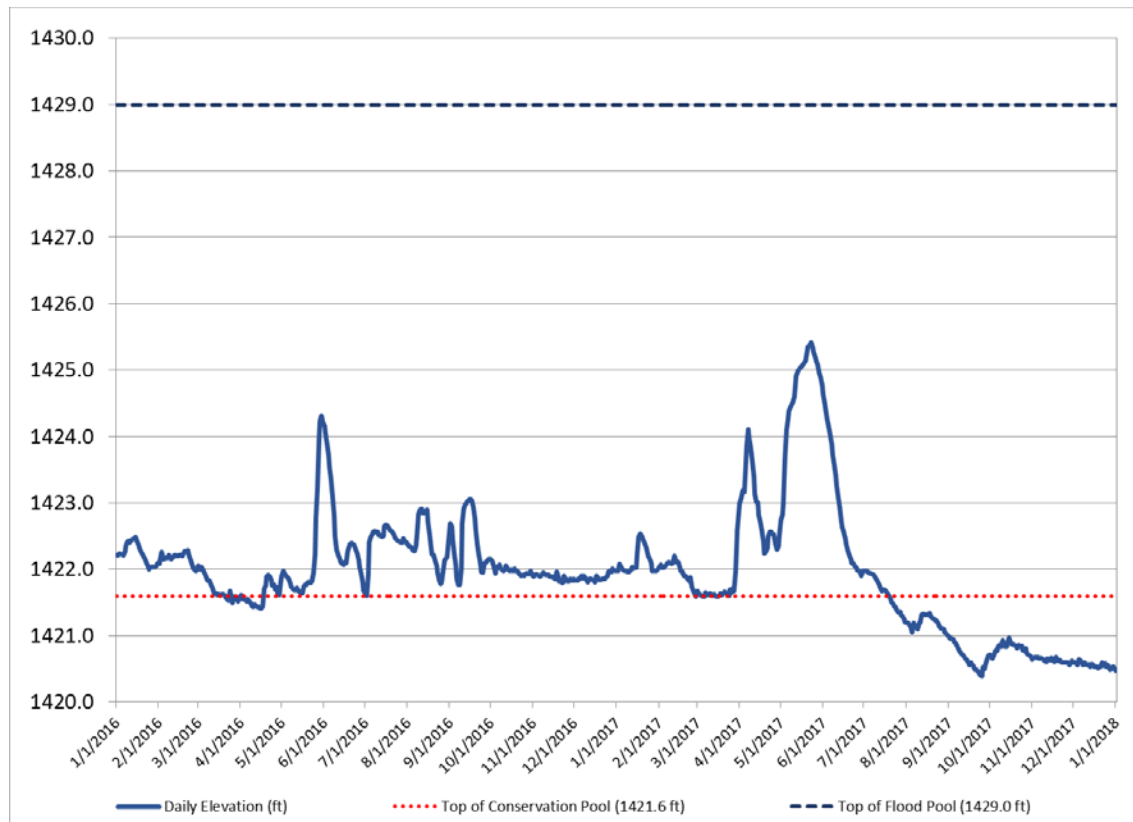


Figure 7: Cheney Reservoir 2016 and 2017 reservoir water level information (Source: U.S. Army Corps of Engineers)

El Dorado Lake is a primary water supply source for the City of El Dorado with enough capacity to allow the City of El Dorado to draw approximately 23 million gallons per day during a 50-year drought. From May 2016 through August 2017, El Dorado Lake was near or above top of Conservation Pool (elevation 1339.0 ft). From August through the end of 2017, dryer than normal conditions decreased inflows into El Dorado Lake along the Walnut River and other tributaries. Like at Cheney, reservoir water levels at El Dorado Lake reflect these decreased flows with water levels dipping below top of Conservation Pool towards the tail end of this evaluation period (Figure 8).

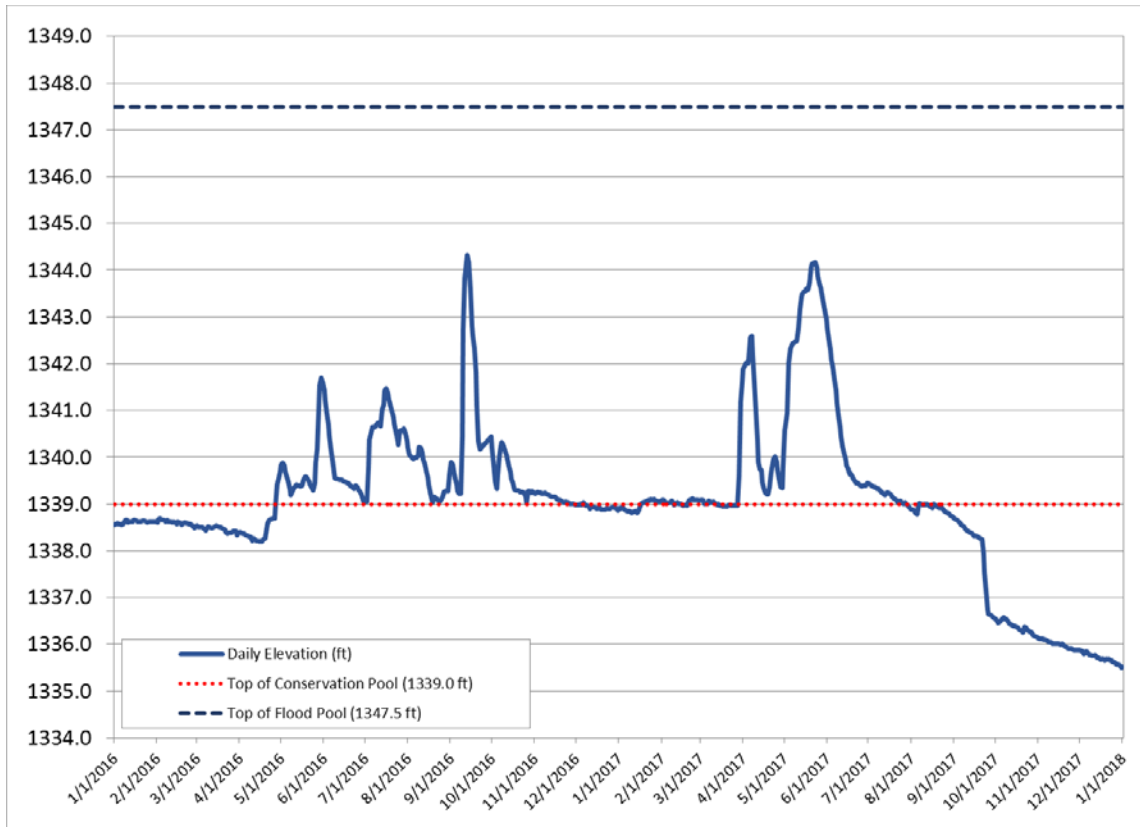


Figure 8: El Dorado Lake 2016 & 2017 reservoir water level information (Source: U.S. Army Corps of Engineers)

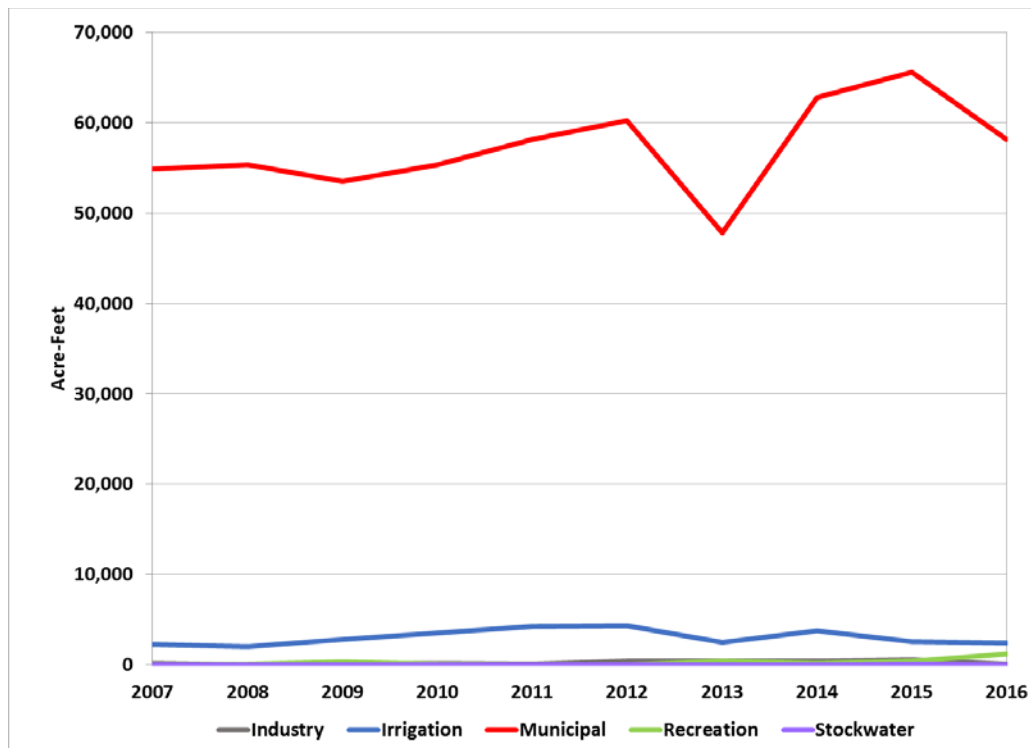


Figure 9: Annual surface water use by type of use

Aquifer Storage and Recovery

The City of Wichita Aquifer Storage and Recovery (ASR) project is just one water supply project being employed within the region to help preserve the Equus Beds Aquifer. Water is diverted from the Little Arkansas River when flow in the river exceeds base flow and then artificially recharging water into the Equus Beds through injection wells and recharge basins. This water is treated to drinking water standards prior to recharge back into the Equus Beds. Through October 2017, approximately 93 million gallons of water from the Little Arkansas River had been recharged back to the Equus Beds through the ASR project (Table 3). Recharge through the ASR in 2017 was impacted by historically high groundwater levels within the Equus Beds, with not enough space available for recharge efforts to be viable for extended periods of time.

For the majority of the period from 2016 through August 2017, flows at the Little Arkansas River gage near Valley Center exceeded the 30 cubic feet-second minimum flow criteria for water to be withdrawn from the river and utilized for ASR purposes (Figure 10). From late summer 2017 through the end of year, flows were near or slightly below this minimum criterion.

Table 3: Wichita ASR recharge volumes, [2007-2017](#)

Gallons of Water Recharged Through Recharge Basins and Wells during phase 1 and phase 2													
Month	January	February	March	April	May	June	July	August	September	October	November	December	Sum
2006	---	---	---	---	---	---	---	---	0	0	0	0	0MG
2007	0	0	36,670,000	34,700,000	69,010,000	64,386,000	82,828,300	36,488,600	7,838,100	18,587,500	0	18,265,700	369MG
2008	23,359,000	27,007,300	51,928,000	58,824,500	48,955,400	39,416,800	11,567,800	0	20,992,000	36,516,200	23,400	331,900	319MG
2009	0	0	13,260,000	58,939,000	40,924,768	20,697,584	17,524,712	0	10,908,752	0	7,779,880	0	170MG
2010	16,313,272	18,463,752	23,344,784	0	0	15,759,624	15,500,928	6,974,656	0	0	6,616,144	0	103MG
2011	0	0	0	0	0	0	0	0	0	0	0	0	0MG
2012	0	8,065,325	21,995,272	2,115,756	0	5,189,744	0	0	0	0	0	0	37MG
2013	0	0	0	1,862,500	31,018,000	62,115,550	28,759,244	192,089,255	49,327,000	0	329,225	0	366MG
2014	0	0	0	470,425	39,982,175	119,807,854	62,375,891	0	51,978,655	13,586,932	6,587,365	15,311,590	310MG
2015	0	0	0	16,261,596	113,762,679	204,547,762	63,616,900	158,353,508	0	0	389,312	19,138,651	576MG
2016	0	0	0	22,226,150	177,922,475	194,182,850	158,770,175	175,378,430	214,620,313	43,230,046	0	0	986MG
2017	0	0	17,832,099	73,378,094	0	0	1,707,899	0	0	0	0	0	93MG
Cumulative Total													3329MG
Monthly Sums	40MG	54MG	165MG	269MG	522MG	726MG	443MG	569MG	356MG	112MG	22MG	53MG	

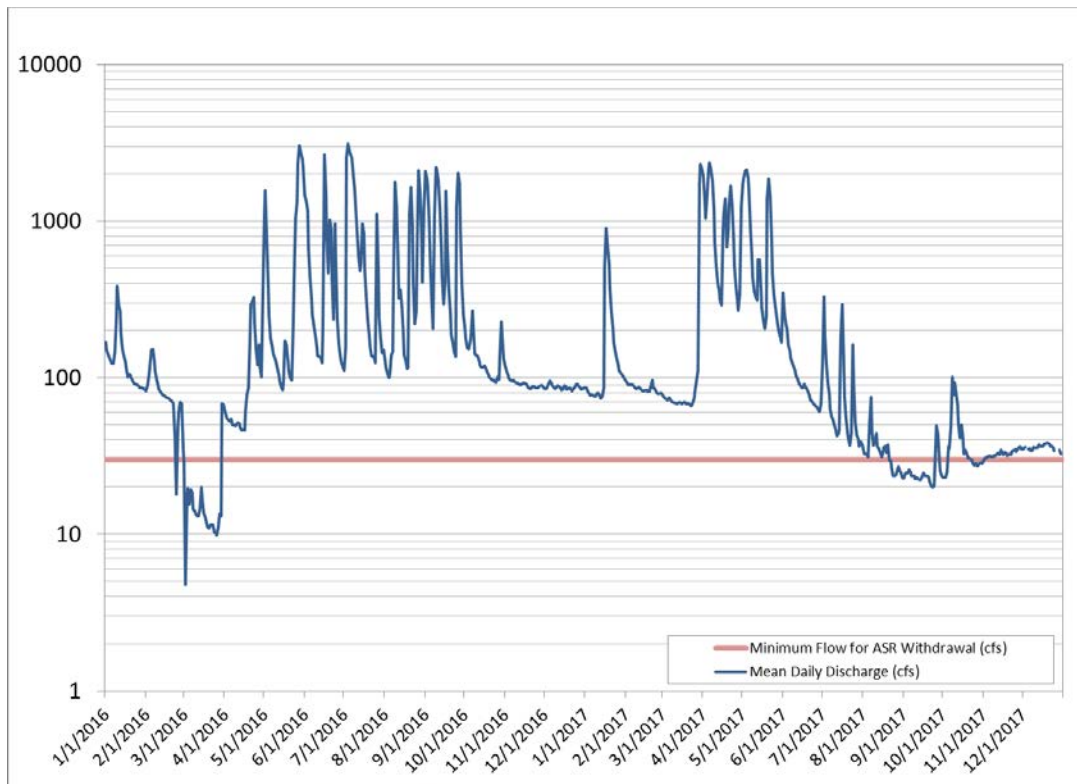


Figure 10: Little Arkansas River near Valley Center, KS, streamflow data (Source: USGS)

Water Quality

Surface Water

All of the counties within the region have adopted and are enforcing sanitary codes that can help manage bacteria and nutrient inputs into surface and groundwater. All conservation districts in the region have adopted nonpoint source pollution management plans.

The Clean Water Act requires states to conduct Total Maximum Daily Load (TMDL) studies and develop TMDLs for water bodies identified on the state's List of Impaired Waters (Section 303(d) List). TMDLs are quantitative objectives and strategies needed to achieve the state's surface water quality standards. In the Equus-Walnut Region, TMDLs have been developed to address dissolved oxygen; eutrophication; fecal bacteria; nitrates total phosphorus; and total suspended solids.

Twelve new impairments were added to the 2016 Section 303(d) list that were not in place in 2014, including total phosphorus impairments on the Walnut and Whitewater Rivers, as well as a total suspended solids on the Little Arkansas River. Table 4 provides an overview of the impaired waters within the Equus-Walnut Regional Planning Area. Additional information on TMDLs and the Section 303(d) list of impaired waters can be found through [Kansas Department of Health and Environment \(KDHE\)](https://www.kdhe.ks.gov/).

Table 4: KDHE 2016 303(d) list of impaired waters summary, Equus-Walnut Regional Planning Area

Equus-Walnut Region 2016 303(d) List Summary	
Total Number of Impaired Waters	69
Impaired Lakes	31
Most Common Impairments	
Eutrophication	30
Biology	23
Total Phosphorus	21
Chloride	14
Total Suspended Solids	10

Sedimentation

Sedimentation is a major issue in the eastern regions of the state and creates many challenges to managing reservoir water supplies. As reservoirs age, they accumulate sediment, reducing the reservoir's capacity to hold water supply for municipal and industrial customers. The reservoirs in this region are all affected by sedimentation and loss of storage capacity is a concern.

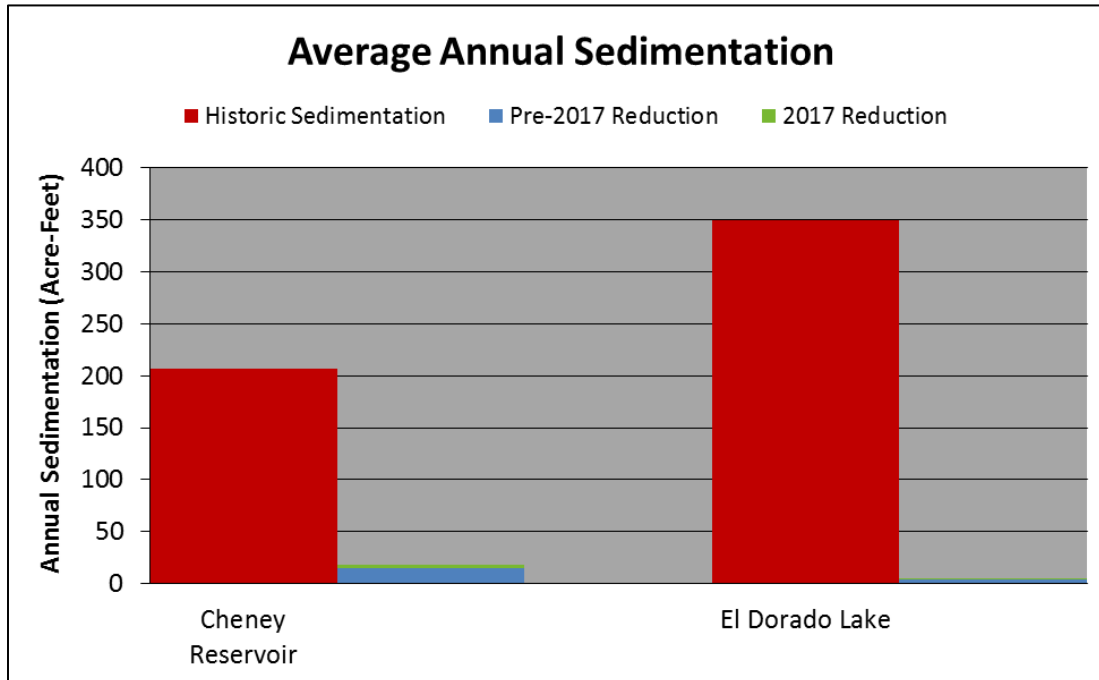


Figure 11: Average annual sedimentation in Equus-Walnut Region reservoirs

Figure 11 shows the average annual sedimentation, estimated using the change in conservation storage between bathymetric surveys, compared to the estimated sediment load reduction due to Best

Management Practice (BMP) and stream stabilization project implementation in the watersheds above federal reservoirs in the Equus-Walnut region.

The estimated annual reductions compare total implementation prior to 2017 (beginning in 2012) to reduction in 2017. The results show that El Dorado Lake has the highest historical sedimentation rate of about 350 acre-feet per year. All sediment reduction has been achieved through BMP implementation.

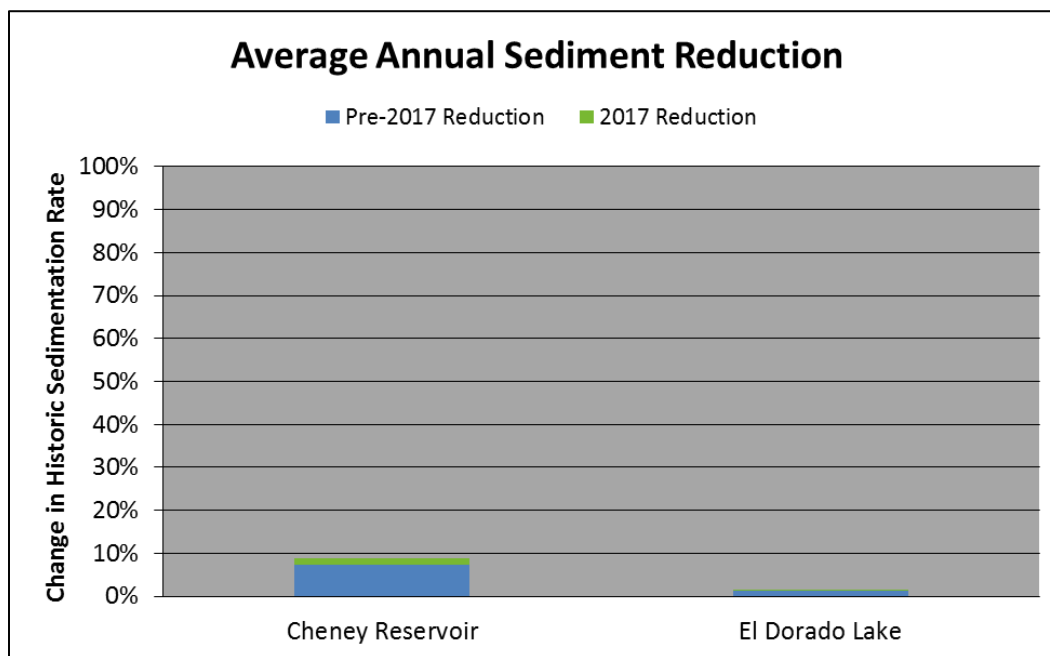


Figure 12: Average annual sediment reduction in Equus-Walnut Region reservoirs

Figure 12 shows the change in reservoir sedimentation from the implementation of load reduction practices. Results show the most significant reduction in the Cheney Reservoir watershed. However, the estimated load reduction from implemented practices for both lakes only accounts for a small fraction of the total historical sedimentation.

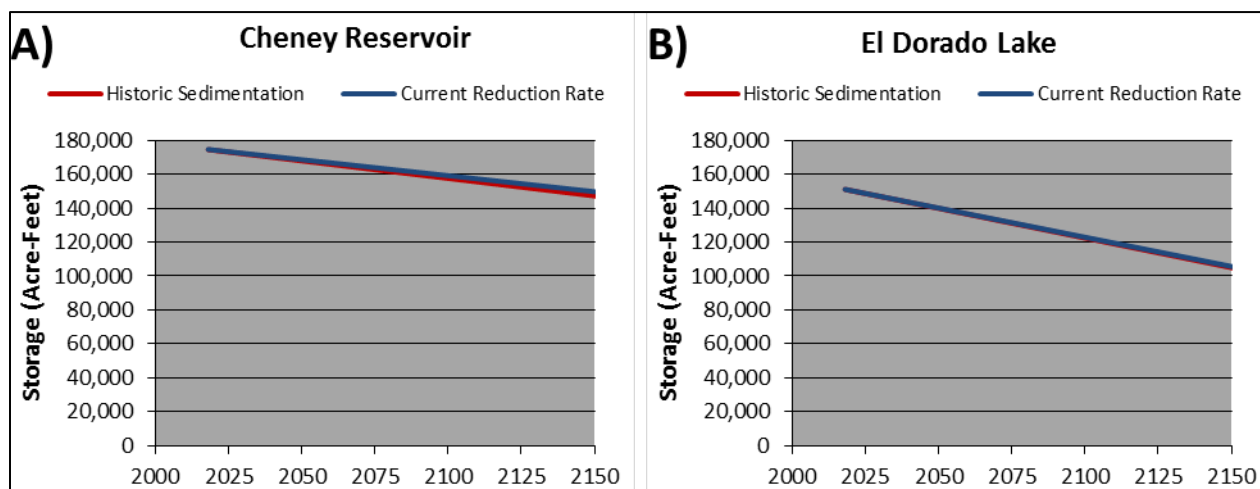


Figure 13: Reservoir capacity at conservation pool for Equus-Walnut Region reservoirs

There is a very small difference between the historic sedimentation and the estimated current rates with the projected sedimentation over time in Figure 13. This illustrates the inadequacy of current sediment control practices to achieve sustainable sedimentation rates.

Groundwater

Overall, the quality of groundwater resources within the region is suitable for the majority of potential uses. The main exception to this is contamination from natural, as well as human-induced, sources within the region. Natural areas of high chlorides exist within the region along the Arkansas River from Reno County and into the City of Wichita. Groundwater contamination from oil field brine impacts the aquifer around Burrton in western Harvey County, where areas of high chloride groundwater are migrating towards the City of Wichita's Equus Beds Well Field.

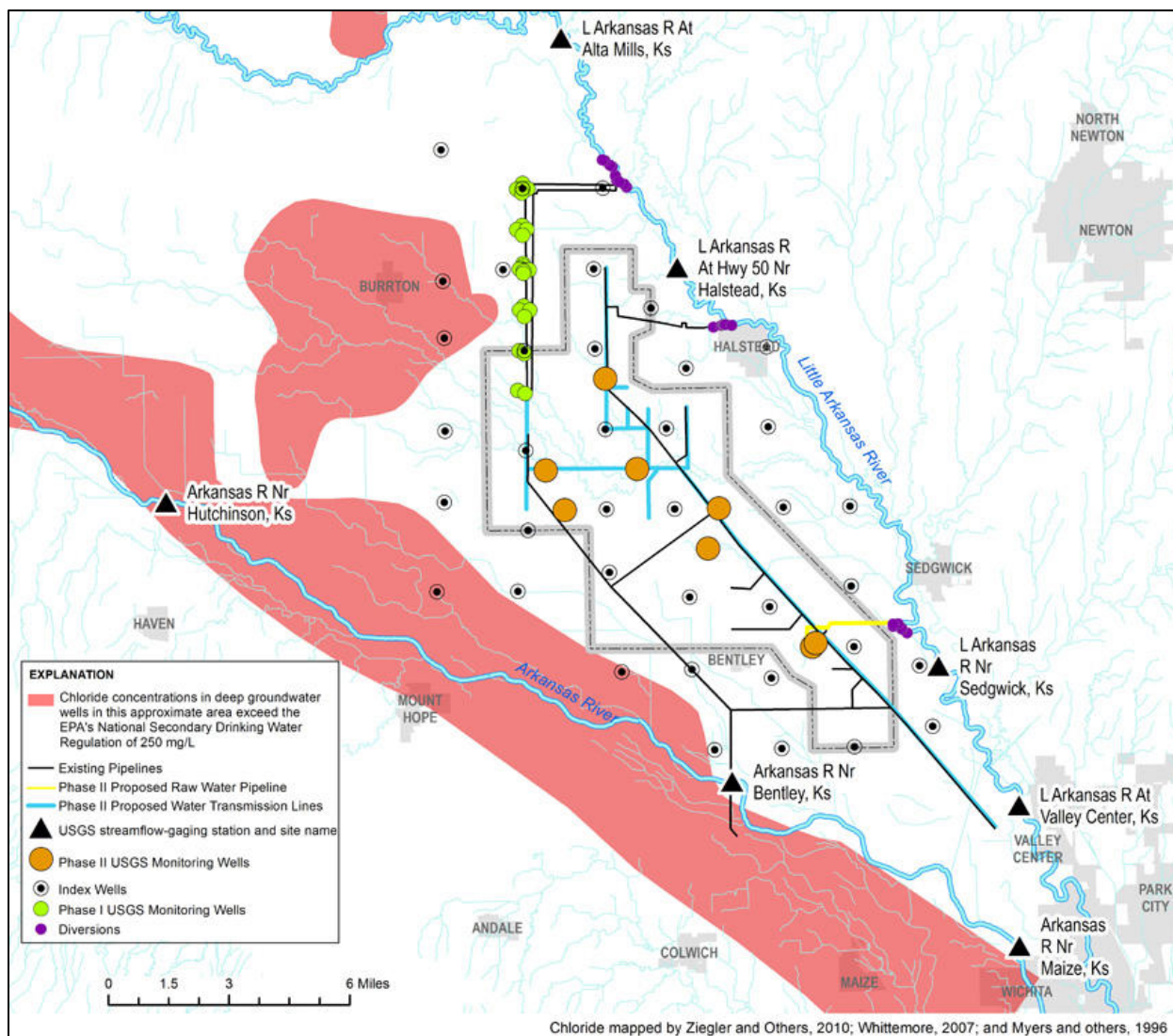


Figure 14: Areas of chloride concentrations exceeding 250 mg/L near Wichita well field

Implementation Progress

Surface Water

Conservation practice implementation is a key action to protect water supply storage and improve water quality in surface water within the Equus-Walnut Region. These conservation practices can be individual practices or a combination that have been determined to be the most effective and practicable (including technological, economic, and institutional considerations) means of controlling non-point sources of pollution at levels compatible with resource and economic goals. A number of agencies partner within the Equus-Walnut Region assist producers with conservation practice implementation, including the Natural Resource Conservation Service (NRCS), the Kansas Department of Agriculture–Division of Conservation (KDA-DOC), and the local county conservation districts, as well as KDHE and the active Watershed Restoration and Protection Strategy (WRAPS) projects within the region (Figure 15).

The conservation practices implemented through the above mentioned partners are compiled on an annual basis by KDHE, with load reduction estimates from these efforts being calculated and reported to the Environmental Protection Agency (EPA) to show progress made within Kansas to reduce nutrient and sediment runoff from non-point sources of pollution. These annual load reduction estimates can then be compared to load reduction targets identified within WRAPS watershed plans to evaluate annual watershed plan implementation progress in relation to overall watershed plan goal targets (Table 6).

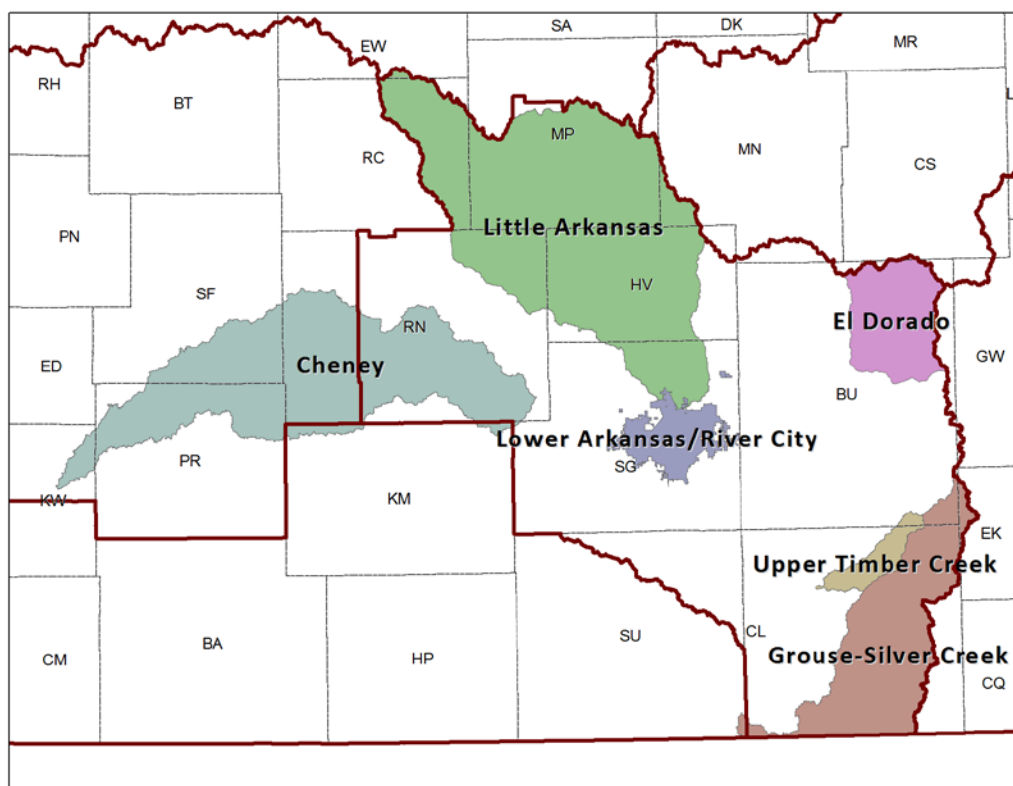


Figure 15: WRAPS projects within Equus-Walnut Region

Table 6: Watershed load reduction estimates and WRAPS watershed plan implementation progress summary

Watershed	Load Reduction Information	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons/yr)
Cheney Lake	2017 Reported Load Reductions	2,756	1,457	474
	WRAPS Watershed Plan Reduction Target	N/A	103,501	226,500
	Reduction Target Achieved	N/A	1.4%	0.2%
El Dorado Lake	2017 Reported Load Reductions	4,197	2,324	373
	WRAPS Watershed Plan Reduction Target	N/A	60,994	95,767
	Reduction Target Achieved	N/A	3.8%	0.4%
Grouse Creek	2017 Reported Load Reductions	234	79	80
	WRAPS Watershed Plan Reduction Target	N/A	1,279 lbs/90 day runoff period	414 t/90 day runoff period
	Reduction Target Achieved	N/A	N/A	N/A
Silver Creek	2017 Reported Load Reductions	158	79	80
	WRAPS Watershed Plan Reduction Target	N/A	324	38
	Reduction Target Achieved	N/A	24.4%	211.6%
Little Arkansas	2017 Reported Load Reductions	9,668	5,092	3,139
	WRAPS Watershed Plan Reduction Target	N/A	267,837	74,616
	Reduction Target Achieved	N/A	1.9%	4.2%
Cowskin Creek	2017 Reported Load Reductions	1,364	712	565
	WRAPS Watershed Plan Reduction Target	54,670	54,663	2,990
	Reduction Target Achieved	2.5%	1.3%	18.9%
Upper Timber Creek	2017 Reported Load Reductions	1,164	582	549
	WRAPS Watershed Plan Reduction Target	N/A	2,348	656
	Reduction Target Achieved	N/A	24.8%	83.7%

For Federal FY2015 through FY2017, NRCS has compiled information summarizing conservation practice implementation efforts through their Environmental Quality Incentives Program (EQIP) and National Water Quality Initiative (NWQI) for surface water resources within the Equus-Walnut Region. There were a total of 53 contracts with a total obligation of nearly \$1.4 million benefiting over 7,600 acres within the region (Table 7). Over this same time period, the top five conservation practices contracted included cover crops, residue and tillage management, brush management, prescribed grazing, and terraces.

Table 7: NRCS contract program summary for Equus-Walnut Region for surface water resources, FFY2015-17

FY2015 thru FY2017 EQIP and RCPP Contracts by Fund Code - Surface Water			
Fund Code	# of Contracts	Contract Acres	Contract Obligation
National Water Quality Initiative -Emma Creek Watershed	1	525	\$ 60,000
EQIP - Water Quality	52	7,090	\$ 1,333,148
TOTAL	53	7,615	\$ 1,393,148

Groundwater

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 that was recently developed at KGS for assessing the prospects for sustainability in the High Plains Aquifer in Kansas.

The objective of the approach is to calculate Q_{stable} , the average annual pumping that would produce stable annually-averaged water levels over a given area. Q_{stable} is a function of net inflow, which comprises recharge from the land surface, subsurface inflow from adjacent areas, water drawn into the aquifer from surface water sources by pumping, inflow from artificial recharge projects, and any additional pumping-induced inflows into the aquifer, minus discharge to streams, evapotranspiration, and subsurface outflow to adjacent areas. It is calculated using the average annual water-level change and annual reported water use for an area as described within [KGS Open File Report \(OFR\) 2017-3](#). This information was then used to calculate the average sustainability percentage for each township within GMD 2 (Figure 16).

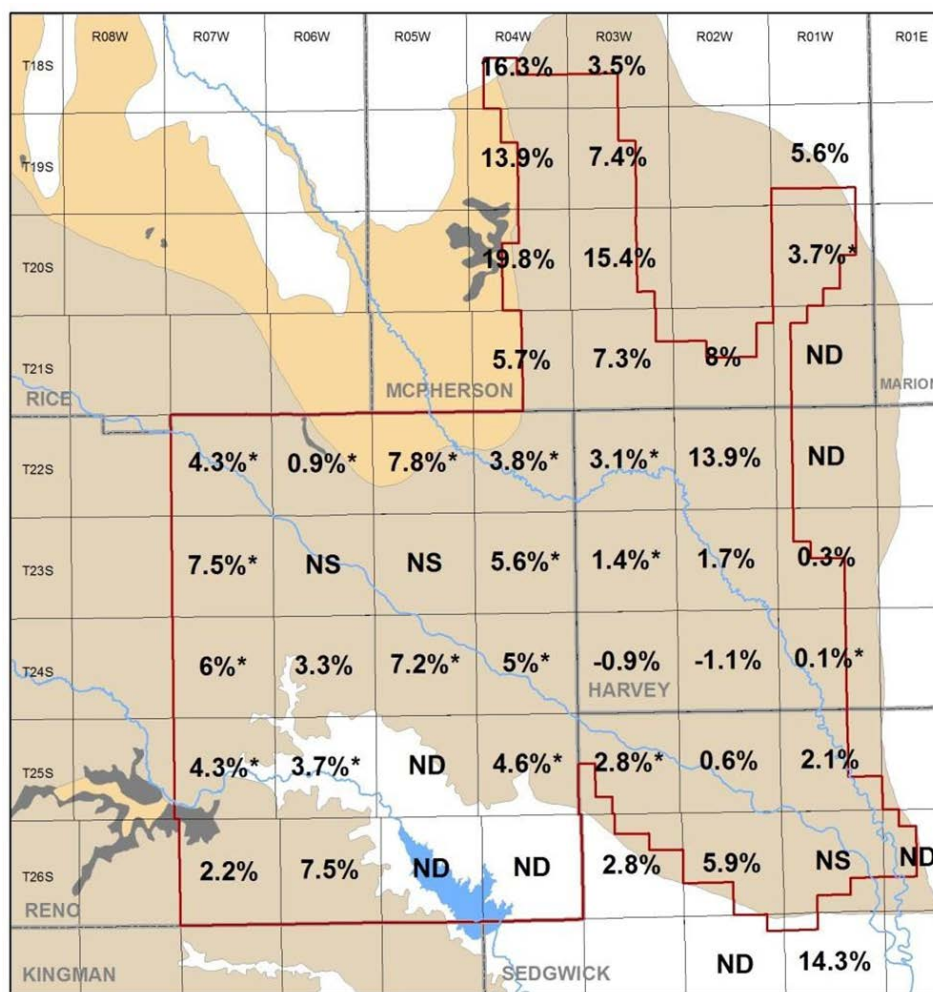


Figure 16: Average sustainability percentage for parts of townships within GMD2, KGS Sustainability Assessment

For Federal FY2015 through FY2017, NRCS has compiled information summarizing conservation practice implementation efforts through their Environmental Quality Incentives Program (EQIP) and National Water Quality Initiative (NWQI) for groundwater resources within the Equus-Walnut Region. There were a total of 10 contracts with a total obligation of nearly \$680,000 benefiting over 1,000 acres within the region (Table 8).

Table 8: NRCS contract program summary for Equus-Walnut Region for groundwater resources, FFY2015-17

FY2015 thru FY2017 EQIP and RCPP Contracts by Fund Code - Groundwater			
Fund Code	# of Contracts	Contract Acres	Contract Obligation
EQIP - Ogallala Aquifer Initiative	2	132	\$ 82,545
EQIP - Water Quantity	8	901	\$ 595,433
TOTAL	10	1,033	\$ 677,978

Implementation Needs

Surface Water

Conservation practice implementation now and into the future continues to be necessary to reduce nutrient and sediment runoff impacting the surface waters of the Equus-Walnut Region. Annual implementation progress made on the six WRAPS watershed plans within the region can be compared to the remaining needs identified within these same plans to quantify the overall financial need to fully implement watershed plans covering these areas (Table 9). These figures include costs associated with conservation practice implementation, as well as technical assistance needs to help landowners implement conservation practices. Overall, the total remaining need to fully implement WRAPS watershed plans for the region is \$95 million.

Table 9: WRAPS watershed plan remaining funding needs

Watershed	Livestock and Cropland Conservation Practice Needs	Streambank Stabilization Needs	Technical Assistance Needs	Total Watershed Plan Implementation Needs
Cheney	\$ 16,915,276.40		\$ 3,521,965.16	\$ 20,437,241.56
Grouse Silver Creek	\$ 675,769.44	\$ 72,840.00	\$ 63,709.80	\$ 812,319.24
Little Ark	\$ 30,893,958.20	\$ 181,253.00	\$ 8,596,882.50	\$ 39,672,093.70
Upper Timber	\$ 104,870.40		\$ 84,946.40	\$ 189,816.80
Upper Walnut Eldorado	\$ 2,637,007.96	\$ 3,480,093.00	\$ 272,663.16	\$ 6,389,764.12
Lower Ark	\$ 13,599,054.72	\$ 11,954,250.00	\$ 2,102,400.00	\$ 27,655,704.72
Total	\$ 64,825,937.12	\$ 15,688,436.00	\$ 14,642,567.02	\$ 95,156,940.14

Regional Goals & Action Plan Progress

While *the Vision* provides a framework for the management of the State's water supply overall, Regional Goals identify and address issues at the local level. In 2015, Regional Goal Leadership Teams were developed for each of the 14 regional planning areas which were comprised of local water users along with input from area stakeholders to help develop regional water supply goals. These goals were adopted by the KWA in August of 2015 and at that same time members for the 14 Regional Advisory Committees (RAC) were appointed. The first task for the newly formed RACs was to develop action plans to correspond with the regional goals. The Equus-Walnut RAC completed action plans for their regional goals in fall of 2016. Information included within this section highlights recent progress made on regional goal action plan implementation.

Regional Goal #1	Goal Theme	Annual Progress			
		2017	2018	2019	2020
Achieve and maintain sustainable balance of groundwater withdrawals with annual recharge in the Equus Beds Aquifer by 2020. Ensure safe yield and recharge rate calculations in the Equus Beds Aquifer are accurate through a district wide integrated groundwater and surface water model by 2018.	Groundwater Sustainability			--	--
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: <ul style="list-style-type: none"> The Kansas Geological Survey (KGS) completed a sustainability assessment for Equus Beds Groundwater Management District No.2 (GMD2) in January 2017. This project used an approach that was recently developed at the KGS for assessing the prospects for groundwater sustainability in Kansas. The objective of the approach is to calculate Qstable, the average annual pumping that would produce stable aerielly averaged water levels over a given area. KGS open file report 2017-3 provides additional information on this recently completed assessment Data from sustainability assessment currently being utilized by KGS in the update and expansion of existing model coverage of portions of GMD2 to now cover the entire GMD City of Wichita initiated public outreach process on proposed water permit regulations impacting how credits are currently accumulated during Aquifer Storage & Recovery (ASR) project operations diverting high flows from the Little Arkansas River. Additional information is available online at the City of Wichita website 					
Next Step(s): Utilize data from KGS sustainability assessment to evaluate new safe yield calculations for region. Use framework from updated and expanded model to conduct chloride transport simulations.					

Regional Goal #2	Goal Theme	Annual Progress			
		2017	2018	2019	2020

Each public water supplier in the region will develop a long term water supply plan and review every five years to meet their individual forecasted needs. Water suppliers should consider alternative uses of non-potable water and existing water supplies before developing any new water supply projects.	Long Term Public Water Supply Planning			--	--
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: KDHE completed the Technical, Financial and Managerial (TFM) Survey of water suppliers statewide and provided update on survey to RAC.					
Next Step(s): RAC to work with water suppliers within region to encourage participation in future TFMs, along with the development of long term water supply plans.					

Regional Goal #3 & 4	Goal Theme	Annual Progress			
		2017	2018	2019	2020
Implement and maintain watershed protection activities to maintain regional reservoir storage capacity for an additional 100 years beyond the design life, and maintain or reduce the rate of sedimentation and nutrient loading through the encouragement of BMPs on 50% of the high priority acres in the watershed above water supply reservoirs. Ensure practices are sustained and maintained for the long-term and priorities are reassessed every five years.	Reservoir Water Supply and Sedimentation			--	--
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: Conservation practice implementation through existing local, state and federal programs produced estimated nutrient and sediment load reductions across the Equus-Walnut Regional Planning Area (Table 6).					
Next Step(s): Promote establishment of the water quality-related water technology farm within the Equus-Walnut Regional Planning Area to evaluate the effectiveness of conservation practices and their ability to reduce sediment and nutrient runoff at the field scale.					

Regional Goal #5	Goal Theme	Annual Progress			
		2017	2018	2019	2020
Allocate necessary resources (\$1-5 million) within five years to identify and prioritize current contamination issues impacting	Groundwater Contamination			--	--

the Equus Beds Aquifer and develop a plan to manage and mitigate the contamination. Review existing studies and emerging technologies to develop a new conceptual plan with estimated costs. Begin implementation of the plan within 10 years of completing the study.					
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: <ul style="list-style-type: none"> • 2017 Joint RAC Lower Quality Water Summit held in Hutchinson to discuss lower quality water-related issues with Great Bend Prairie, Red Hills and Smoky Hill-Saline RACs • Legislature approves \$50,000 in FY2019 budget enhancement request which would be utilized for a potential Equus Beds chloride plume remediation planning efforts. 					
Next Step(s): GMD2 to lead effort to develop an inventory of known contamination sites within the Equus Beds Aquifer. Secure funding/financing to support chloride plume remediation project. Also, continue to work to identify potential remediation projects.					

Regional Goal #6	Goal Theme	Annual Progress			
		2017	2018	2019	2020
While focused on the preservation of our water resources agricultural water users will double the value of irrigation-based production over the next 50 years. Coordinate with public/private research and development programs to develop and promote less water and nutrient intensive crops. Provide incentives for operators to implement irrigation efficiency improvements immediately. Increase efforts to implement water conserving agricultural production practices utilizing no-till methods, cover cropping systems and a rangeland cedar tree management program.	Irrigation Water Use Efficiency			--	--
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: Two Water Technology Farms planned and developed for the 2018 growing season.					
Next Step(s): <ul style="list-style-type: none"> • Continue to develop and support Water Technology Farms which evaluate less water intensive crops as well as management systems to improve water quality • Coordinate and support public/private research and development • Workshops and field days in advance of annual burn season for improved rangeland management 					

Regional Goal #7	Goal Theme	Annual Progress
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		2017	2018	2019	2020
Encourage municipal, commercial, and industrial users of water to increase the efficiency of net water use by reducing the volume of water used per unit of measure by 5% per decade. Provide incentives for users to implement water efficiency improvements.	Water Use Efficiency			--	--
Progress Legend	Not Started	In Progress	Delayed	Cannot Complete	Complete
2018 Update: Message and information will look to be delivered through existing workshops and conferences at this time.					
Next Step(s): <ul style="list-style-type: none"> The RAC will discuss the regional vs. statewide nature of this goal. If this discussion supports pursuing the goal on a regional basis that will dictate a significantly different approach to outreach than if it becomes statewide in scope 					

References

“Map of Real-Time Streamflow Compared to Historical Streamflow for the Day of the Year (Kansas).” *USGS WaterWatch – Streamflow Conditions*, waterwatch.usgs.gov/?m=real&r=ks.

“Monthly Precipitation Maps.” *Kansas Office of the State Climatologist · Kansas Drought*, climate.k-state.edu/precip/county/.