Revised (2017) (Draft) Management Program

Southwest Kansas Groundwater Management District Number 3 (GMD3)

2009 E. Spruce Street, Garden City, Kansas 67846 (620)275-7147

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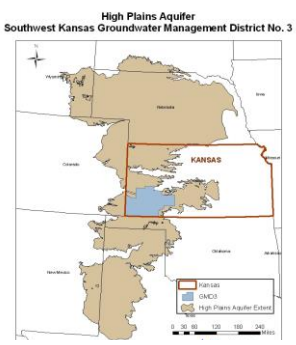

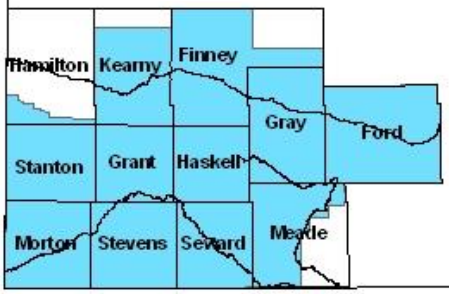

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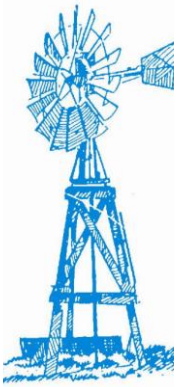

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I. PURPOSE FOR LOCAL GROUNDWATER GOVERNANCE

The local right of groundwater users to determine their destiny (K.S.A.82a-1020). Local groundwater is local water storage that is best governed locally for efficient management, investment and enjoyment of groundwater services. Local governance requires the will to manage and sustain local water inventories with significant assistance from many partners in a manner consistent with the public interest. Water is the key resource for the present and future prosperity of all. There are other resources which may mean the difference between wealth and poverty, such as oil or gas, but none is like water as a fundamental necessity for our existence and nearly all other economic development. Ultimately, all water supply depends on precipitation, storage and transportation. Available groundwater storage at or near water dependent projects has been the predominant benefit for district members that will continue into the future as new ways to use, manage and conserve water are employed. The extent of available future supply depends in large part on the local management program activity implemented today.

Groundwater governance framework. In addition to a written report describing the characteristics of the district and the nature and methods of dealing with groundwater supply problems within the district, the Southwest Kansas Groundwater Management District No. 3 (GMD3) Management Program document is intended to provide a local groundwater governance framework over the conservation and supply services from this critical and declining natural resource. This framework provides a basis for identified formal and informal policy norms and practices locally adopted to manage the district groundwater resources that protect the equities, investments, and resource services dependent upon usable groundwater today and into the future.

Any update of the GMD3 management program document should address inter-disciplinary issues of local groundwater governance, efficient cost effective management, aquifer protection strategy, policy development and resource planning. With aquifer exhaustion and climate-variability issues looming larger each year of the past decade for all dry land agriculture, there has been a steadily-increasing demand for GMD action and leadership to preserve drought protections, agricultural production systems and to extend the groundwater supply. There is a critical role of groundwater storage, access governance and supply replenishment in response to demands for adaptation strategies that address declining groundwater supply. Making progress with groundwater management and protection is a long-term activity with short term institutional and project oriented adaptation effort as a positive feature of local control.

An up-to-date management program document is necessary to aid members, state agencies and other partners and authorities in solving water supply problems with appropriate rules, strategies and cost effective programs. Any revision of a regulatory scheme affecting district members requires consideration of public interest, including the adopted groundwater management program for the district. To the extent proposed rules may adversely affect or require a change in the GMD3 management program for the district other than emergency rules, the process prescribed in state policy (K.S.A.82a-1029) for revising the management program document should be followed. This will assure the proper implementation of the rights and powers delegated to the members of GMD3 who are organized, vote and support GMD3 as intended under state law. The adopted GMD3 management program in turn gives structure and forum to

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consider and set needed regulations, planning and practices governing the present and future district water supply in the public interest.

Local groundwater governance can be difficult for many reasons, including:

1. Groundwater is a shared resource;
2. Groundwater inflows and outflows are difficult to observe and cannot be measured directly;
3. Surface and groundwater are interconnected;
4. Aquifer boundaries and characteristics may be locally unknown or poorly defined;
5. Groundwater management requires specialized model tools;
6. Groundwater conditions can vary on multiple time scales;
7. Groundwater use can pit present needs against future needs; especially in declining aquifers;
8. Diverse local, state and federal interests, institutions and authorities require significant coordination activity to maintain productive partnerships that accomplish the purposes of the groundwater governance in the public interest.

State Groundwater Policy: The Kansas water allocation principle of Prior Appropriation (or "first in time is first in right") has been implemented through the Kansas Water Appropriation Act, whereby ownership of the water is a public good, but the right to use the water is a private right created under a state grant and applying the water to any of a variety of authorized beneficial uses. The Kansas Groundwater Management District Act (GMD Act) (K.S.A.82a-1020 et. seq.) does not specify how GMD's should govern the activities affecting management of local groundwater resources in harmony with private real property rights and state supervision of those rights and other concerns, nor does it provide details on the interplay between federal, state and local actions, except to affirm that effective groundwater management programs are best adopted and developed locally. The GMD Act declares two key concepts of Kansas groundwater policy:

1. "Nothing in this act shall be construed as limiting or affecting any duty or power of the chief engineer granted pursuant to the Kansas water appropriation act."

2. "… preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater insofar as it does not conflict with the basic laws and policies of the state of Kansas."

More recently, Kansans have favored collective conservation initiatives relying on provisions of the GMD Act over strict application of basic water use doctrines in the Water Appropriation Act that contain significant constraints for efficient groundwater management. The interest and latitude to look beyond basic western water doctrines has occurred primarily in the declining and non-replenishing groundwater aquifer areas that comprise the High Plains Aquifer in the district. The doctrine of beneficial use requires water use or else water right owners risk forfeiting the right to use water, which frustrates conservation efforts. Also of concern has been the doctrine of prior appropriation that is the standard by which state officials have a duty to administer water rights. In a declining and non-replenishing aquifer, this means earlier (senior) water rights should be satisfied before later in time (junior) rights can access water. A strict adherence to this duty may constrain collective water conservation efforts, efficient water management and the public interest. So in practice, some variations to the doctrine to overcome water management limitations or other alternatives to the allocation doctrine have been employed locally.

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II. GMD3 MISSION, OBJECTIVES & PRINCIPLES

MISSION: Act on a shared commitment to conserve and develop water supply to grow the social, economic and natural resources well-being for current members and future generations in the public interest.

A water right in Kansas water law refers to the right of a person to capture and use water from a public water source for beneficial use, such as a groundwater aquifer. Doing so creates value and may affect others enjoyment of benefits from the resource. In the district, each of these state granted and user developed real property rights is owned by a member of the district. Members are persons who own a water right or are a groundwater user of at least one acre foot per year, or who own 40 or more contiguous acres of land in the district. Member water rights are real property rights that are part of a traditional "bundle of legal rights" transferred with land from seller to buyer as an appurtenance to the land, or a water right can be separated from land and conveyed by evidence of a separate deed. In 1972, the Kansas legislature provided for the formation of groundwater management districts by groundwater users and owners of real property to collectively manage their groundwater supplies. The GMD Act affirmed the right of locally formed districts organized and operated by the land owners and water users to conduct the local policies, actions, and affairs of groundwater management and advise other jurisdictions in the public interest.

a. Objectives of the legislature for forming GMDs (K.S.A.82a-1020):

1. Proper management of the groundwater resources of the state;
2. Conservation of groundwater resources;
3. Prevention of economic deterioration;
4. Associated endeavors within the state of Kansas through the stabilization of agriculture;
5. To secure for Kansas the benefit of its fertile soils and favorable location with respect to national and world markets

b. Purposes for which GMD3 was organized in 1976:

1. To organize and develop the efforts of the entire Groundwater Management District for the proper management and conservation of its groundwater resources;
2. Provide local input into the use and management of groundwater;
3. Provide for the greatest total social and economic benefits from the development, use and management of groundwater;
4. Support research and education concerning proper water management;
5. Work cooperatively with all federal, state, and local units of government to accomplish the objectives of the district and the Groundwater Management District Act and amendments thereto.

c. GMD3 Management Program Guiding Principles:

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1. Represent all district eligible voters for groundwater management purposes;
2. Promote a culture of conservation;
3. Protect and enhance access to safe and usable water;
4. Pursue the highest value for the groundwater consumed;
5. Develop data and information to support prudent water management decisions;
6. Target management programs to meet local water needs for today and in the future;
7. All water rights granted in the district are real property owned by eligible voters and are to be justly represented and administered.

III. ORGANIZATIONAL HISTORY OF THE DISTRICT

A series of informational meetings were sponsored by the Southwest Kansas Irrigation Association in the fall of 1973 to determine the will of the people relative to the formation of a local groundwater management district, also commonly referred to as a GMD. As a result of these meetings a steering committee was formed to carry out the organization of the district according to procedures provided in the GMD Act. On December 4, 1974, the steering committee filed a declaration of intent, along with a map of the proposed district, with the Chief Engineer of the Division of Water Resources (DWR), Kansas State Board of Agriculture. The Chief Engineer consulted with the steering committee, conducted appropriate geological studies and reviewed input from people in the fringe areas of the district. On August 25, 1975, the Chief Engineer certified the description of the lands proposed to be included in this new taxing subdivision of the State.

The steering committee circulated a petition which was submitted to the Secretary of State for approval. The petition was approved on October 13, 1975 and was followed by an election that was held on February 24, 1976. The election resulted in 1,155 voters in favor and 230 opposed. The Secretary of State was compelled by the election results to issue a Certificate of Incorporation on March 23, 1976. The Certificate of Incorporation has been filed at each county's Register of Deeds Office that is located within the district. An organizational meeting to elect the initial Board of Directors was held in Garden City, Kansas on April 6, 1976. The second Annual Meeting was held March 23, 1977 and now all annual meetings are held on the second Wednesday of March unless appropriately changed with notice.

GMD3 is governed by a 15-member Board of Directors that is elected by a general constituency of the qualified voters present at an annual meeting. Each county is represented on the board by at least one director who resides in that county. Any type of "water user", as defined in K.S.A. 82a-1021(k), may be elected to serve as one of the 12 county positions. In addition to the 12 individual county positions, there are also 3 "at-large" board positions that are designated to represent only a single type of water usage. These "at-large" water use types include Municipal, Surface water, and Industrial water use. GMD3 is financed by an annual land assessment and groundwater user fee that is levied against local landowners and water users. This is accomplished through an annual budgeting process that includes a review of the GMD3 financial status and draft proposed budget for the ensuing year at the annual meeting and at a public

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hearing of the proposed budget to finance the Management Program activities and level of assessments to finance the budget (usually in July).

The GMD3 office is located in Garden City, Kansas. The Board conducts its regular monthly business meetings on the second Wednesday of each month (unless changed for cause) and provides an Annual Meeting for the election of Board Members on the second Wednesday during the month of March. Public hearings are regularly conducted by the board or conducted by others where GMD3 is a participant to allow input on the budget, management programs, and other pertinent activities and represent that public interest in water for the district. A detailed set of bylaws has been adopted by the board and are regularly reviewed and revised as necessary. Each year members of the Board are appointed to serve on at least one sub-committee. Each committee addresses issues on an as-needed or ad hoc basis as directed by the Board. The committees are as follows: Executive; Policy and Legal; Finance; Research and Development; Renewable Supplies; and the Annual Meeting committee. In addition, other ad hoc or grant driven advisory committees may be formed and operated as needed to administer grants or develop local water conservation and economic strategies. One example is the Arkansas River Litigation Funds Advisory Committee, which advises the GMD3 board on expenditures from a Western Water Conservation Projects Fund grant from the legislature and the Kansas Water Office, with annual reports to the legislature.

IV. CHARACTERISTICS OF THE DISTRICT

General Characteristics

The district includes approximately 5,393,229 acres, or approximately 8,425 square miles of land. This includes all of Morton, Stevens, Seward, Stanton, Grant, Haskell, Gray, and Ford Counties as well as parts of Meade, Finney, Kearny, and Hamilton Counties. Land surface elevations range from approximately 3500 feet above sea level (ASL) in the west to less than 2300 feet ASL in the east. The land surface slopes in an east-southeast direction at a gradient ranging from 5 to 20 feet per mile.

In the 12 southwest counties, there are approximately 12,500 established water rights within the district, comprising approximately 30 percent of all Kansas water rights, from which about 2 million acre feet per calendar year is pumped from up to 10,500 non-domestic water wells, comprising nearly half of all groundwater used annually in the state, with a consumptive use that on average exceeds sustainability by more than 800,000 acre feet each year. The most common source of water for district wells is the High Plains Aquifer, which is primarily comprised of the unconsolidated, unconfined Ogallala Formation, older less permeable finer grained Oligocene deposits and unconfined sub-cropping Dakota Aquifer System formations that receive very little recharge. In comparison, less than 100 non-domestic wells are authorized to tap into the confined bedrock Dakota Aquifer System, which is commonly referred to as the “Dakota Aquifer.” The characteristics of these aquifers can vary dramatically throughout the District and recharge areas are located at the sub-crop region under the High Plains Aquifer across the central part of the district and direct recharge source areas are generally west of the district in Colorado.

The quality of the groundwater in the High Plains and Dakota Aquifers is generally fresh, although in some locations the salinity and/or radio-nuclei levels exceed recommended limits or

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maximum contaminant levels (MCLs) for drinking water established by the US Environmental Protection Agency (EPA). The saturated thickness of the High Plains Aquifer ranges from 20 feet to 600 feet within the district. Well capacities range from 20 gallons per minute (gpm) to 3,000 gpm. Historic depletion also varies spatially across the district as documented in the Kansas Geological Survey (KGS) High Plains Aquifer Atlas. A 2010 model of the district indicated that groundwater pumping caused a nearly 30% decrease in aquifer storage from pre-development to 2007, for an average decline of roughly 70 feet. These groundwater declines have created a loss in the groundwater discharging to streams, resulting in lower to no stream flows (2014 Kansas Water Plan). That 2010 model is due to be updated.

There are two river systems that interact with their respective alluvial aquifers and the Ogallala Aquifer, the Arkansas River and the Cimarron River. The Arkansas and Cimarron Rivers are losing streams west to east across the district, meaning that a significant portion of any flow is lost to the underlying High Plains aquifer through gravity induced deep percolation. There are six surface water irrigation ditch systems that have historically diverted water from the Arkansas River between the Colorado-Kansas state line and Garden City. Collectively, these irrigation ditch companies owned by farmer-shareholders control approximately 140,000 acre-feet of senior surface water rights from available Arkansas River flows governed by a federal court decree and an interstate river compact. Surface water rights historically developed below Garden City rarely receive any river flow for use and rely on groundwater. Portions of the headwater of tributaries of the Pawnee River are located in eastern Finney, northeastern Gray, and northern Ford Counties of the district. The alluvial aquifers of these headwaters contain some water locally, but are too small to be a significant water source for the district.

Both the Arkansas River and the Cimarron (including Crooked Creek) river systems are associated with interstate compact agreements that are both state and federal law. The 1949 Colorado and Kansas Arkansas River Compact relates to the waters of the Arkansas River drainage basin primarily above Dodge City and is administered by an interstate administrative agency called the Colorado-Kansas Arkansas River Compact Administration (ARCA). Their website can be found at:

http://www.co-ks-arkansasrivercompactadmin.org/resources.html

The 1966 Kansas and Oklahoma Arkansas River Compact apportions water between the two states as agreed conservation storage or water transfer amounts for each state divided into six major topographic sub-basins tributary to the Arkansas River basin in Oklahoma that together span the entire southern border of Kansas. The Cimarron River sub-basin directly relates to the district as an upstream area. The Kansas – Oklahoma Arkansas River Commission is the interstate administrative agency that operates that compact, and additional information can be found online at:
https://agriculture.ks.gov/divisions-programs/dwr/interstate-rivers-and-compacts/kansas-oklahoma-arkansas-river-compact.

Economy

From the KDA 2016 annual report, agriculture is the largest industry, employer and economic driver in Kansas, accounting for nearly 43 percent of the state's economy and valued at more than $64 billion. More than 229,000 Kansans, or 12 percent of the state's workforce, are

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employed in agriculture. Kansas is among the nation's leaders in beef cattle, sorghum and wheat. At 28.2 million acres, Kansas has the second-most cropland of any state.

GMD3 member farmers and ranchers not only manage the soils for sustainable production systems but they also work to improve management and conservation of district water resources. GMD3 works to provide leadership in developing the efforts of the entire groundwater management district for the proper management and conservation of groundwater resources and to secure for Kansas the benefit of fertile soils and favorable location with respect to national and world markets.

2012 County Farm Facts (most recent data available)

GMD3 COUNTY	# OF FARMS	FARM LAND	CROP ACRES	CROP MRKT VALUE	LVSTK VALUE
				----- $1000 ----	----- $1000 ----
Finney	516	760,110	370,072	140,746	552,781
Ford	664	634,240	286,263	87,004	387,072
Grant	326	337,320	175,725	63,853	513,055
Gray	473	546,118	273,329	109,340	582,042
Hamilton	431	610,864	217,281	51,817	215,208
Haskell	248	398,805	242,130	116,154	602,139
Kearny	337	519,424	187,892	66,321	154,747
Meade	448	602,281	232,429	91,206	103,386
Morton	353	441,926	178,875	42,645	76,500
Seward	342	395,981	188,729	81,688	279,966
Stanton	328	414,184	204,776	76,592	105,158
Stevens	425	503,439	267,698	124,066	108,850
Totals	4,440	6,164,692	2,413,895	1,051,432,000	3,680,904,000

USDA information on farms, crops and livestock in district counties

The district is one of the fastest growing regions for dairy production in the United States with the advantages of open spaces, favorable climate, irrigation for consistent high-quality forage, and abundant groundwater at a safe depth that separates nutrient management activity from the hydrologic cycle. The district is now home to the largest milk drying plant in North America, located in Garden City.

Corn is the most popular irrigated crop in the district according to annual water use reports collected by the Chief Engineer. According to the Kansas Department of Agriculture, the value irrigated corn produced in southwest Kansas was $582.77 million in 2013 and the total economic income generated by that corn was $842 million. The Net Irrigation Requirement (NIR) for corn ranges from 13.7" in Ford County to 15.4" in Morton County; this is in addition to the average precipitation of only 19 inches (K.A.R. 5-5-12, NIR at 50% chance of rainfall; K.A.R. 5-6-12, Average annual precipitation). Corn is the first irrigated crop in the district to be provided a limited irrigation risk management option in the federal crop insurance program of USDA Risk Management Agency. USDA irrigated corn yield average in Kansas 1972-2016 was 165 bushels per acre (average 32 million acres harvested) and non-irrigated average 1972-2016 was 46 bushels per acre (average 557 million acres harvested). If corn acres were all dryland the economic impact would be significant. Some years, dryland production is wiped out by drought without the safety-net of irrigation.

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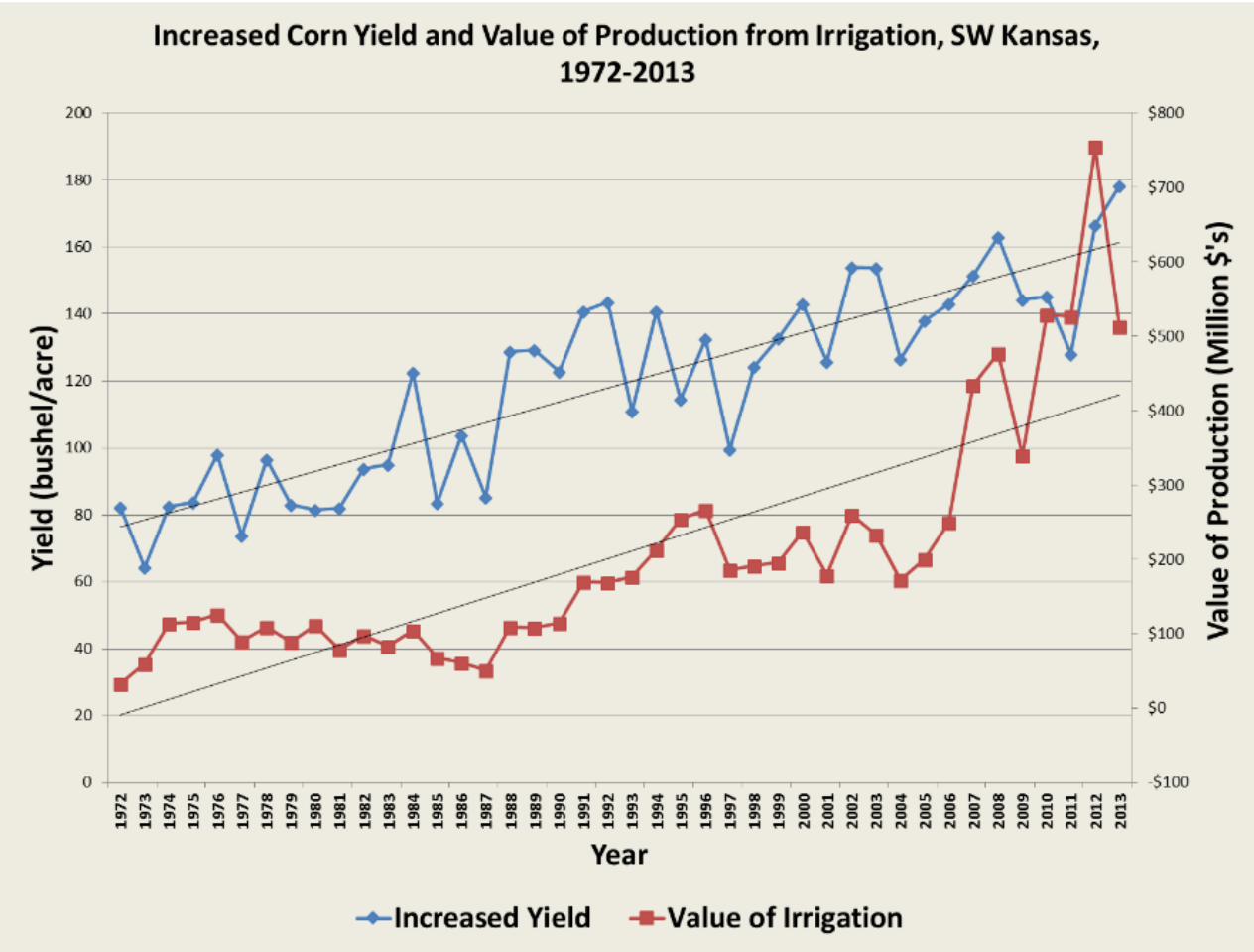
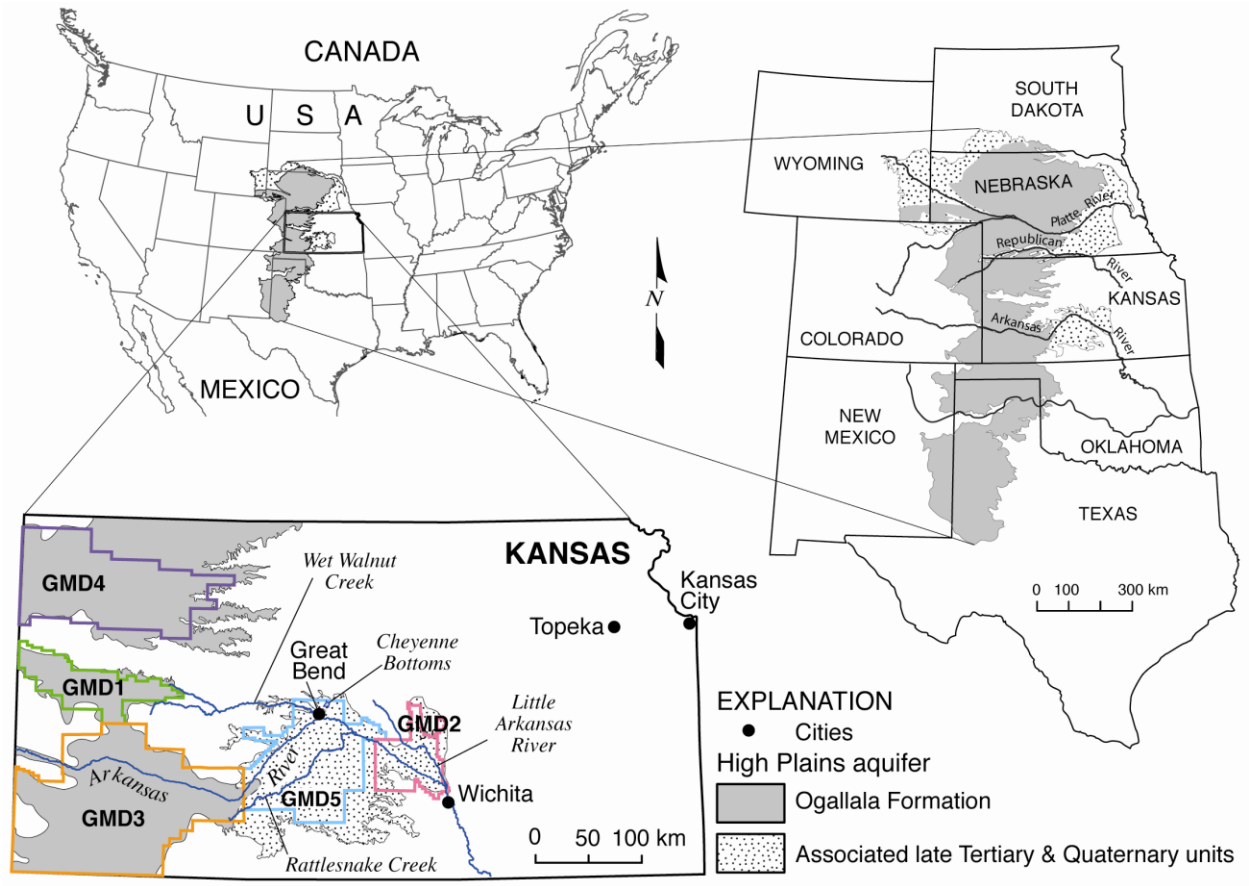


Source: Kansas Department of Agriculture

From a Kansas Department of Agriculture (KDA) presentation to the Governors economic advisory council, Dodge City, 2013, one less irrigated acre in Southwest Kansas will lead to an estimated loss of value to Kansas of $2,200 land resale value and 122.5 bu of corn at $6.78 = $831 and 2 cattle on feed, approximately equal to 1,060 usable pounds of meat or a 2012 wholesale value of $3,080 (assumes an average price of $2.90/lb. of beef). This is a yearly loss of $3,911 per irrigated acre transitioned completely to dryland. There are about 1,500,000 acres authorized for irrigation in GMD3. In district value added from irrigated corn and wheat production is 91% of total crop production for SW KS, $556,532,840 in 2013. Additional production generates income from agricultural producers and input suppliers, and this income circulates through local and state economies, creating a multiplier effect.

Kansas ranked third nationally in numbers of cattle and calves on ranches and in feedyards in 2015 with 6 million head and second in the fed cattle market in 2014 (USDA, 2016). Revenue from cattle production grew more than 36% from 2010 to 2014, with cattle providing $7.75 billion in cash receipts in 2013 (KLA, 2016). Nearly half of the state's agricultural cash receipts in 2013 came from the sale of cattle and calves. Kansas ranked 16th nationally in milk production in 2013; in 2015, milk production was valued at $746 million (USDA, 2016). District animal agriculture provides a significant portion of these state numbers, due to reliability of irrigated grains and forage.



KGS Map of the Ogallala/High Plains aquifer

Ogallala/High Plains Aquifer Characteristics

The Ogallala/High Plains Aquifer consists mainly of a heterogeneous assortment of sand, gravel, silt, and clay of Tertiary and Quaternary age that was deposited by sluggish streams that flowed eastward from the Rocky Mountains. The aquifer sediments overlie an eroded bedrock surface of Permian and Cretaceous age. The Tertiary Ogallala Formation makes up the main part of the aquifer, though we are just now learning about the underlying geologic controls for the semi-confined behavior of the aquifer in the district. The Ogallala Formation is a coarse-grained unit that is highly productive from water-saturated intervals. The oldest part of the Miocene Ogallala Formation in Kansas is ~ 12 million years old. The older Oligocene deposits (a.k.a. White River Group/High Plains Aquifer, 26 million years or older) are finer grained than the Ogallala, not nearly as productive for water and roughly coincide with the area of the thickest Tertiary deposits in SW Kansas. They also coincide with the area of the greatest water-level declines (from KGS). Because of the similarity in composition, the older Tertiary sediments are difficult to distinguish from the younger Quaternary sediments.

The High Plains Aquifer varies widely in type of material, thickness, and layer continuity. Individual beds generally are not continuous and within short distances may grade laterally or vertically into material of different composition. Hydraulic conductivity and specific yield depend on sediment types and vary widely both vertically and laterally. Some layers are cemented and are referred to as mortar beds and caliche. Although the aquifer is generally

unconfined, confined and semi-confined conditions may occur locally. Thick shale layers are present in areas of the High Plains Aquifer, like in Seward and Meade counties.

The thickness of the unconsolidated sediments varies greatly due mostly to the uneven bedrock surface. Saturated thickness ranges more than 300 feet as illustrated in the Kansas High Plains Aquifer Atlas (Kansas Geological Survey 2016). The areas of greatest thickness are found in the southern portions of Stevens, Seward, and Meade Counties.

Regional groundwater flow is generally from west to east at an average rate of about 1 foot per day or less, though locally in some areas a higher rate of groundwater flow can be estimated. Recent water table maps can be found in the Kansas Geological Survey High Plains Aquifer Atlas, at: http://www.kgs.ku.edu/HighPlains/HPA_Atlas/ . Depth to water is variable and exceeds 350 feet in a large portion of Haskell County and in portions of Grant and Stanton counties.

In some areas, such as the Arkansas and Cimarron River corridors, the High Plains Aquifer is hydraulically connected to overlying alluvium. In the case of the Arkansas River corridor, the alluvium is differentiated from the Ogallala/High Plains Aquifer on the basis of the greater permeability of the alluvium and underlying lower permeability zone, which results in differences in water levels between the aquifers. The Ogallala/High Plains Aquifer is also connected to the underlying Lower Cretaceous Dakota Aquifer in some locations.

Bedrock Aquifer Characteristics

The Dakota Bedrock Aquifer system is comprised of Sandstones and shale that typically yield much smaller amounts than the yield of wells in the Ogallala/High Plains Aquifer. The Dakota Aquifer underlies and is in hydraulic connection with the Ogallala/ High Plains Aquifer in much of the southern part of GMD3. Additional Dakota Aquifer information can be found at: http://www.kgs.ku.edu/Dakota/vol3/ofr961a/man02.htm).

In the northern part of the district, low permeability shale and chalk overlie and hydraulically isolate the Dakota Aquifer from the overlying High Plains Aquifer. Some wells in northern Finney County may be completed in geologic voids in the Niobrara Chalk formation and are referred to as crack wells that typically produce a good amount of water until the crack or void is dewatered. For additional geologic information on groundwater formations above the Dakota, see: http://www.kgs.ku.edu/Dakota/vol3/ofr961a/man03.htm

The management program must recognize the change from good hydraulic connection to isolation as for a water rights local source of groundwater supply to be preserved by rule standards that have been adopted for this purpose. Cretaceous age formations may be absent in the southernmost part of the district where Permian bedrock formations directly underlie the High Plains Aquifer. For additional information, see: http://www.kgs.ku.edu/Publications/Bulletins/IRR8/05_deve.html

The deeper Upper Permian red bed formations may contain sandstones with some usable groundwater locally, and may have water quality concerns that require careful monitoring to prevent water usability depletion of fresher supplies. They have not typically provide a usable source for irrigation in the district except in locations where the High Plains Aquifer is thinly saturated, such as in portions of Morton and Stanton Counties.

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Further investigation of the potential uses of Permian age aquifer water for irrigation can be expensive, and some deep geological testing and completion of deep wells for irrigation have occurred as shallower sources become depleted and oil and gas production tests indicate deeper water sources are available. Efforts to evaluate the usability, reliability and feasibility of these potential sources together with newer technologies to treat poor quality water from marginal sources to usable standards are necessary as part of the district development of additional supply.

Kansas regulations require the petroleum industry to protect fresh and usable aquifers from contamination by confirming minimum depths for surface casing in an oil or gas borehole. The surface casing is a pipe that is inserted into the borehole being drilled during oil or gas exploration and sealed by injecting cement under pressure to fill the space between the casing and the borehole. The primary function of the surface casing in the petroleum industry is to prevent saltwater from entering a usable aquifer from lower zones intersected by the borehole. But concern can also exists when old wells established when surface casing depths were short or not fully cemented in from top to bottom may allow usable water from an upper formation to flow uncontrolled to a deeper unusable formation.

Precipitation and Groundwater Replenishment

The climate of southwestern Kansas is semiarid, characterized by moderate precipitation, low humidity and high evaporation. Annual precipitation increases to the east across the district and typically ranges from 16 to 24 inches. Most of the precipitation falls during the growing season, April through September. Drought conditions can yield as little as 4 inches of annual rainfall. Rainfall variability and drought conditions may be overcome using groundwater.

Potential sources of aquifer recharge or replenishment include precipitation, surface water deep percolation (including the Arkansas and Cimarron Rivers and irrigation ditch areas) return flow from irrigation use, lateral groundwater flow, and flow from adjacent aquifers.

Aquifer depletion generally decreases with increased precipitation. However, local replenishment is affected by soil properties, land cover and land use. Regional replenishment estimates are low, typically less than about one inch annually. Recharge may be higher locally, such as beneath river and ditch corridors, irrigated land, and sand dunes. Overall, district aquifers receive a highly deficient supply for aquifer replenishment that is projected to cause billions of dollars in future lost economy. Recent estimates from the Kansas Geological Survey indicate about a million acre feet net consumption occurs annually on average beyond what is returned or replenished through lateral aquifer flow, return flows, and natural groundwater recharge.

Management program support of a Western Kansas Weather Modification program occurred historically each year for counties in the district who elected to participate for rain enhancement and hail suppression. Recently, member counties discontinued participation due in large part to budget restrictions and crop insurance risk management programs addressing potential crop loss, and GMD3 support has been suspended.

Water Use and Water Level/Saturated Thickness Declines

GMD3 has some of the highest-intensity groundwater use areas in Kansas. This water use, combined with low recharge from rainfall, has created large declines in water storage that do not

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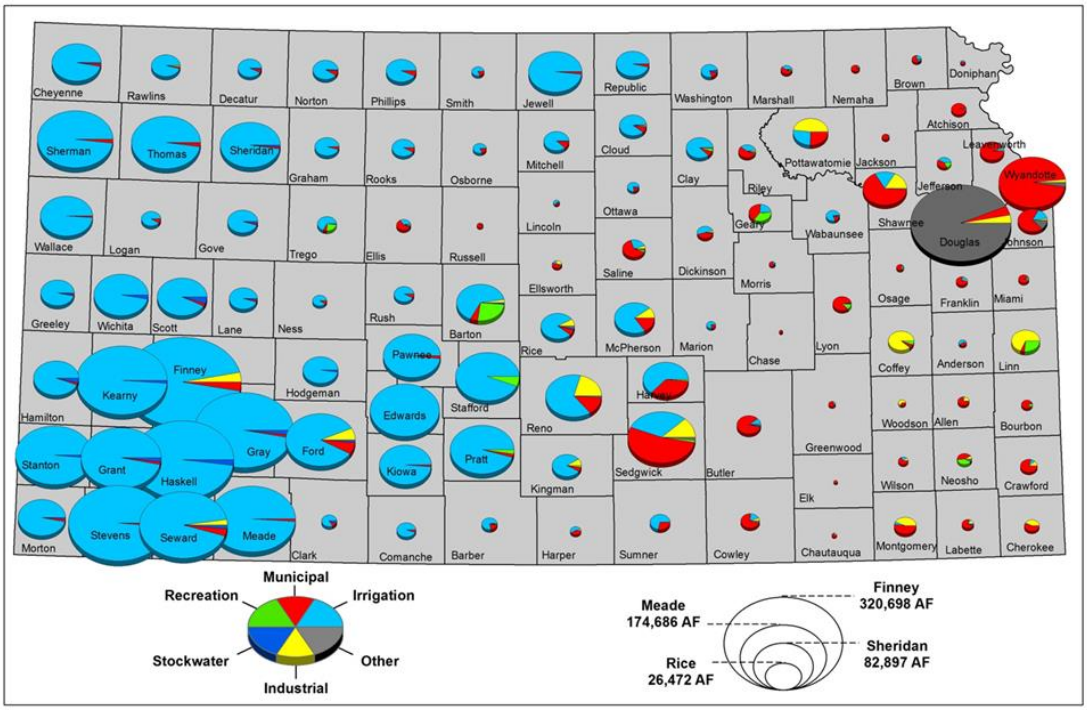
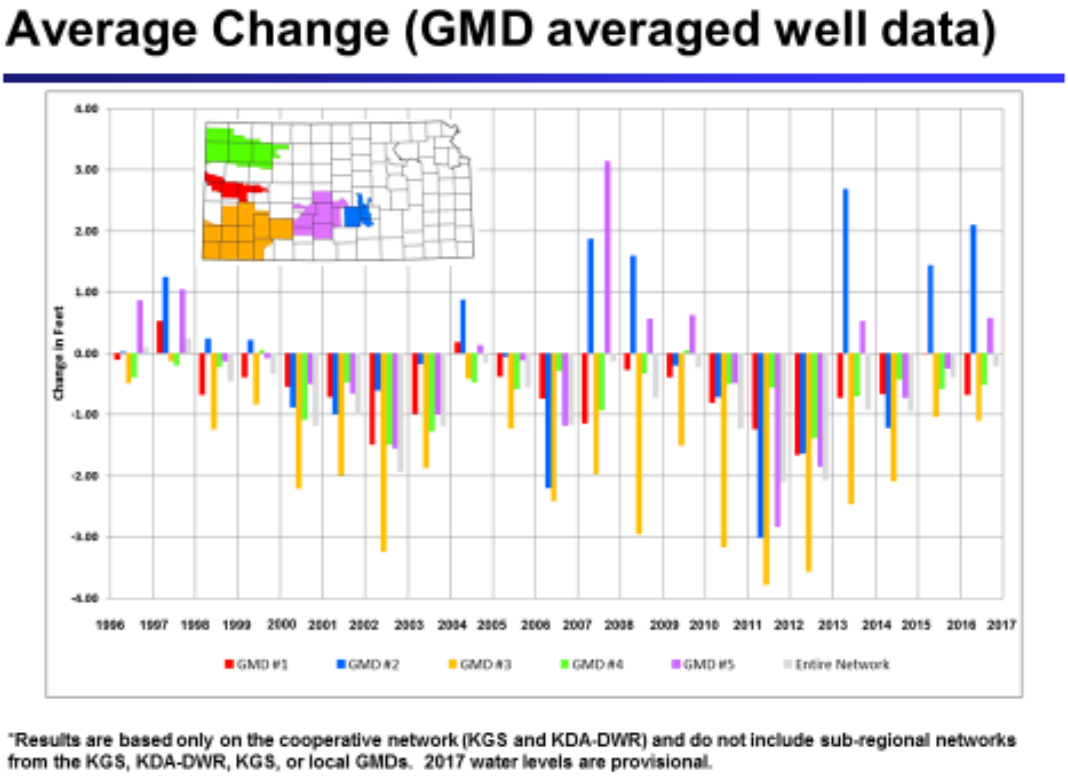
generally recover, but the Ogallala/High Plains Aquifer is still a highly productive water resource for the people within the district.



Average annual reported water use 1995 to 2014 influenced by the precipitation patterns and available groundwater. "Other" use is primarily flow through hydropower. Source: KGS



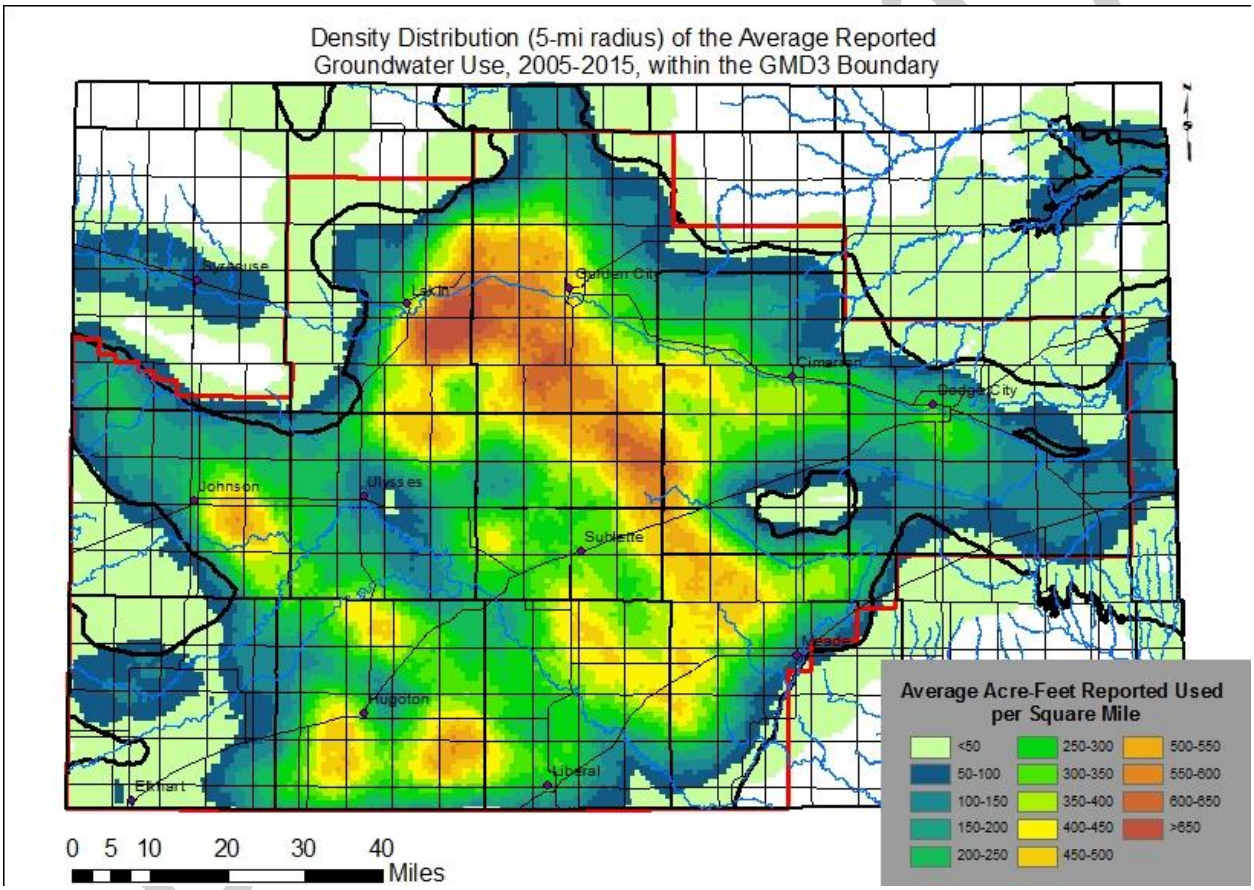
Average annual water level change (ft) of each GMD, 1996 through 2017, KGS

The following maps display the pumping density distribution, the percent loss in saturated thickness, and the remaining saturated thickness of the High Plains Aquifer in Kansas. The most recent GMD3 groundwater model information can be found at the following urls:

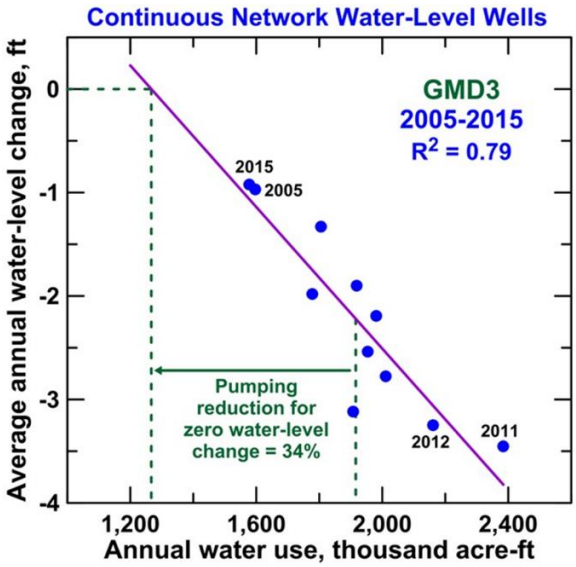
Ground-Water Model for Southwest Kansas Groundwater Management District No. 3: http://www.kgs.ku.edu/Hydro/Publications/2010/OFR10_18/

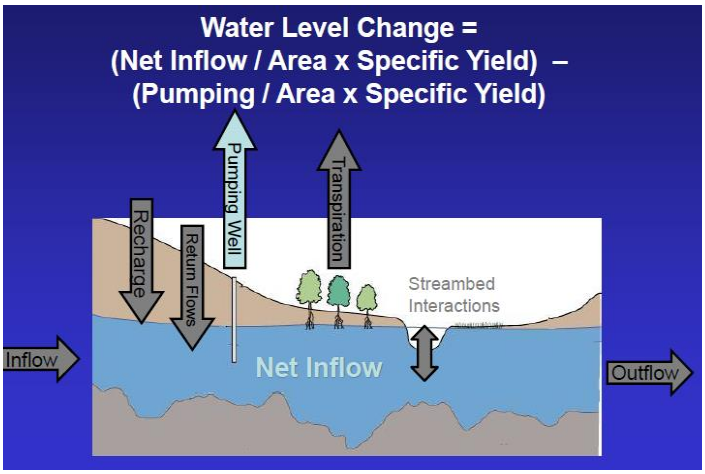
Ground-Water Model for Southwest Kansas Groundwater Management District No. 3: Future Scenarios: http://www.kgs.ku.edu/Hydro/Publications/2012/OFR12_3/

Potential economic impacts of water-use changes in Southwest Kansas: http://www.tandfonline.com/doi/abs/10.1080/19390459.2013.811855



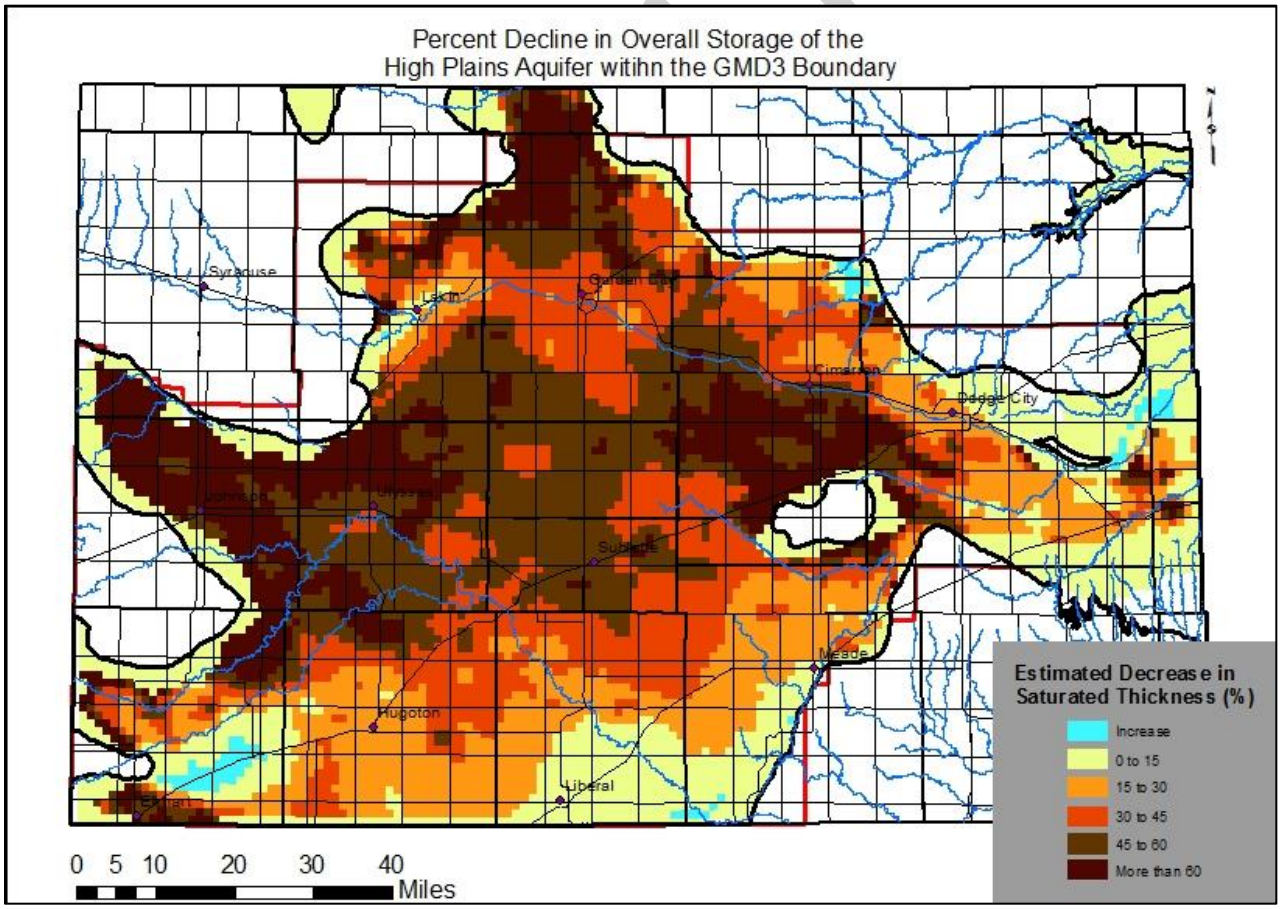
Pumping Density of the High Plains Aquifer in Kansas.
Source: Kansas Geological Survey,
http://www.kgs.ku.edu/HighPlains/HPA_Atlas/Water%20Rights%20and%20Water%20Use/index.html



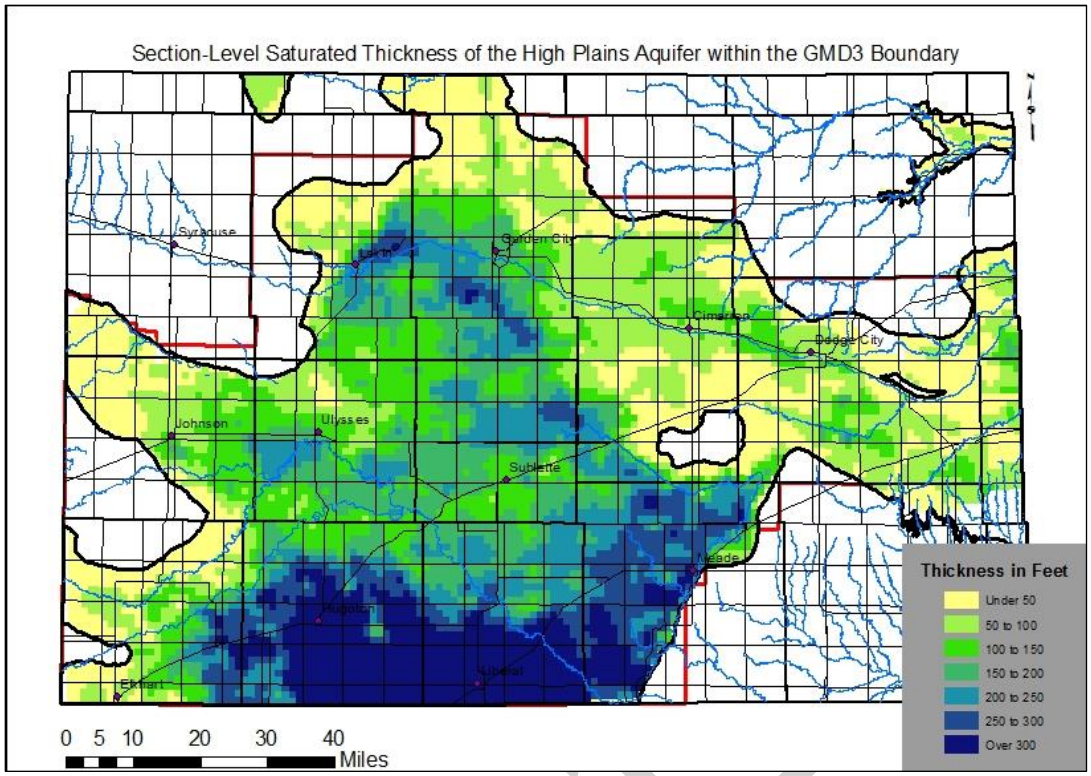


Isolating High Plains Aquifer Change

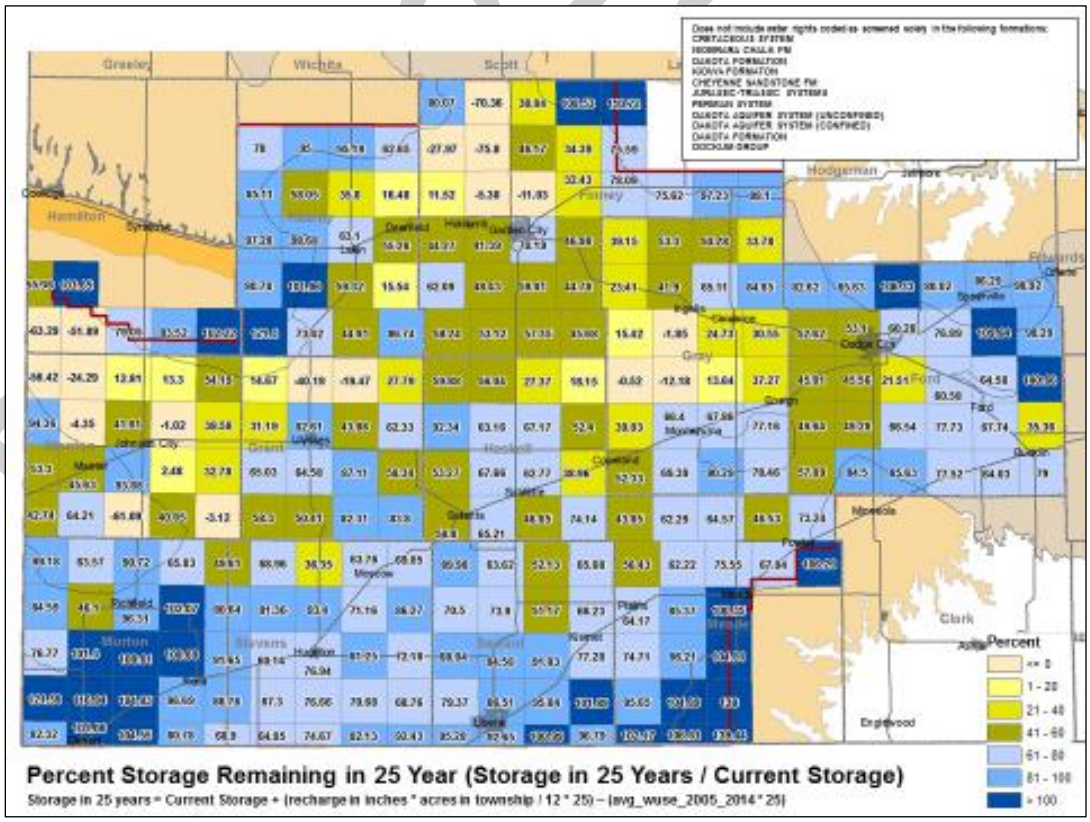
Source: Kansas Geological Survey



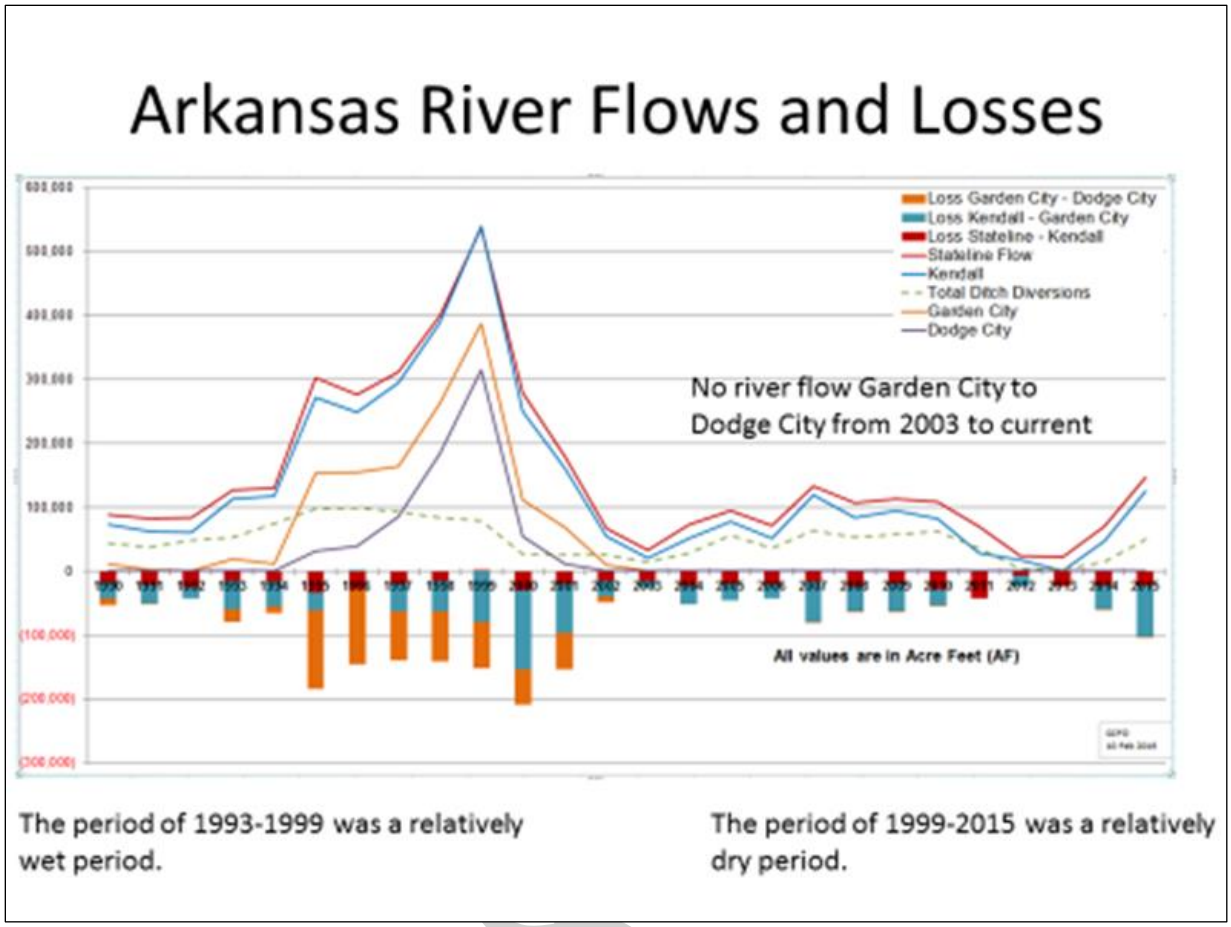
Section level percent decline in storage (since 1950) of the High Plains Aquifer in GMD3.
Source: KGS, http://www.kgs.ku.edu/Publications/pic18/index.html



Saturated Thickness of the Ogallala/High Plains Aquifer, 2015.
Source: KGS, http://www.kgs.ku.edu/Publications/pic18/index.html



2015 percent average saturated thickness projected to remain in 25 years, KGS.
Non-blue townships don't meet the maximum allowable depletion rate of 40% in 25 years.



Arkansas River flow/loss chart. Source: KDA/DWR

V. WATER SUPPLY PROBLEMS & ACTIVITIES

In over 500 monthly meetings, the locally elected volunteer Board of Directors of GMD3 has considered identified district water supply problems and the nature and methods of addressing those supply problems in coordination with partners in groundwater management. Today, many different forms of plans for water use and conservation are proposed or implemented at every level; from a single irrigated field plan, dairy project, public water supply program, and recharge plan, to a district wide action plan or multi-jurisdictional water management activity.

This GMD3 district-wide management program document focuses on selected water supply problems and some activities to address them that will require action plans and measurable goals. Activities that need action plans are identified in blue font and underlined. Existing notable activities are also listed. An action matrix for each problem or program activity will have timelines and measurable goals generated for board use as documents separate from this program document, and posting on the GMD3 website. Any needed local policy, state rule reform, state consent agreement or other instruments of agreement needed to implement elements of the management program will be considered and requested to the appropriate official following the public hearing and final adoption of a new management program by the Board of Directors of GMD3.

Problem 1: Threatened Water-based Economy

All Kansans rely heavily on agriculture-based water use occurring within GMD3 to sustain the local and state economy. Irrigated corn and wheat in SW KS contributes more to the Kansas economy than the Gross Regional Product (GRP) of 82 of Kansas's counties and contributes more jobs than 65 of Kansas's counties. This is due in large part to the available affordable groundwater supply. The development of the Ogallala/High Plains Aquifer has secured a reliable supply of food, fuel, and fiber to world markets. Local irrigated grain and forage supplies and an arid climate have made southwest Kansas an attractive location for livestock and dairy industries. Many Agriculture related industries have located in the district in order to remain in close proximity to the benefits of irrigation, allowing the economy to grow significantly over the past 60 years. So too has the efficient management of project water use grown to produce more economy with less water use. The district economy can be sustained and grow where water flows and is carefully managed by the drop.

Continued district economic growth is dependent upon having a reliable water supply for irrigation use. Significant declines in the Ogallala/High Plains Aquifer threaten the economic future of the people and equity interests within the district. A 2013 report to the governors economic advisory board by the Kansas Department of Agriculture said that transitioning western Kansas irrigated land to dry land costs the economy nearly $4000 per acre per year in lost economic value. So for example, eliminating aquifer depletion through rapid reductions of pumping limits to safe yield levels could force the transition of a majority of irrigated acres to dry land. Though admittedly extreme, such rapid change would cause economic collapse that would not be in the public interest. A more gradual managed conservation approach is required while other options for replenishing supply to a high level of use and sustainably can be developed. Both conservation and new sources are considered critical to provide the future water necessary for the district to maintain its role in the Kansas and national economies.

A study to investigate *The Economic Importance of Water Availability in Kansas* was conducted and released in 2015 by Dr. Tim James and his team at Apparat Analytics, LLC, with assistance from GMD3 and the Kansas Aqueduct Coalition. The study found that in the 50th future year from 2013, the expected annual loss to the Kansas economy due to insufficient water supply may be $18.3 billion, expressed in 2015 dollars. $10.4 billion of this annual Gross State Product loss will be from the district. The GMD3 area used 2,188,548 acre feet of groundwater in base year 2013 and was projected to use 903,726 acre feet in 2062. The projection for the district suggests 10.1% less economy state wide than it would be with sufficient future water supply. There will be 123,961 fewer jobs than would otherwise be available in the district and $5.3 Billion less wages paid that year. Economic values are estimated based on: Reduced availability of water in GMD3 in 2062; Non-substitutability of water to compensate for the loss; and Non-adaptability of producers and consumers. For these reasons, GMD3 will continue work to extend the existing Ogallala/High Plains Aquifer resource to provide time for adaptations in water use to occur and renewable supplies are identified and considered.

The Chief Engineer of the Kansas Department of Agriculture, Division of Water Resources (Chief Engineer) has been statutorily charged to make water available that is in excess of present supply already dedicated to prior water rights, allowing the Ogallala/High Plains Aquifer to be quickly dedicated significantly beyond what can be sustainably supplied. **The historical**

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program for the Ogallala/High Plains Aquifer water supply by GMD3 has been one of controlled decline and distributed demand to manage shared groundwater access for economic growth. The adaptation for more conservation and use flexibility under established water rights and added consideration of models and comments of prior water right owners in each local source of supply will necessitate more agreements between members than what has historically occurred. Such agreements can then be ordered by the state as use conditions between local water rights.

GMD3 initiated management activity in 1976 after significant aquifer development had already occurred and water levels were dropping. The legislature made recorded water rights mandatory June 1, 1978. GMD3 then adopted a revised management program on July 12, 1978 to implement maximum allowable appropriation from potential depletion rates of 40% in 25 years.

GMD3 conducted such water availability calculations and informing the Chief Engineer. The Chief Engineer relied upon GMD3 calculations to grant or deny new groundwater rights in the district. Guided by the district groundwater management program and board action, standards for development and maximum allowable depletion rates were determined by GMD3 in the High Plains Aquifer and enforced by the Chief Engineer. This includes recent GMD3 action to close the High Plains Aquifer to new water rights. The uncertainty of long-term groundwater availability and the economics of pumping groundwater are elements of state policy for evaluating new use liberties (K.S.A. 82a-711). These considerations ask: Will the planned activity have a negative impact on needed present and future supply, existing use dedications, conservation and management goals, potential impairment of prior rights or the public interest? More conservation evaluation process is needed where proposals are shifting paper allotments to chase remaining groundwater pockets and affecting other members' future supply.

Both the conservation of existing aquifer supply and the development of surface water sources to recharge aquifer areas are equally key and necessary elements in solving the significant state economic problem of dwindling water storage in the district. GMD3 will continue to support or provide leadership for water conservation initiatives in coordination with other local, state and federal partners to extend the groundwater supply inventory of the district. Recent examples include:

Conservation Reserve Enhancement Program (**CREP**) working with many partners to retire water rights and transitions irrigated agriculture on soils unsuitable for dryland farming to native grassland;

Agricultural Water Enhancement Program (**AWEP**) with USDA to transition irrigated acres to dryland agriculture (completed);

Regional Conservation Partnership Program (**RCPP**) with USDA which incentivizes adoption of advanced irrigation water management through telemetry technology, remote soil moisture and flowmeter monitoring;

Conservation Innovation Grant (**CIG**) program with USDA that evaluates mobile drip irrigation with the goal of getting it listed for federal implementation assistance;

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System Optimization Review (**SOR**) with DOI-BOR (Reclamation), which evaluated the irrigation ditch systems along the Arkansas River corridor for potential efficiency improvements;

Local Enhanced Management Area (**LEMA**) discussions to consider local mandatory groundwater conservation strategies with corrective controls in priority areas of the district;

Water Conservation Area (**WCA**) considerations to assist members developing reasonable voluntary conservation plans with corrective controls that are consistent with the groundwater management program for consent agreeable plans and an order from the Chief Engineer;

Upper Arkansas River Public Water Supply Alternatives Viability Analysis (**WSA**) with Reclamation to determine preferred projects that assure area public water supply; and

Planning Assistance to States (**PAS**) with US Army Corps of Engineers and Kansas Water Office updated a 1982 Six State High Plains Aquifer Study water transfer element for a recent example of a Kansas aqueduct project to progress planning for such projects.

In response to GMD3 water transportation advocacy, the US Army Corps of Engineers and the Kansas Water Office conducted a Planning Assistance to States (PAS) grant project to update prior feasibility work from a 1982 water transfer study with financial and participation assistance from GMD3. The original 1982 High Plains Study transfer element "B" investigated the feasibility of transferring water from the Missouri River to the High Plains. The results found half again more water available from the Missouri River than in the 1982 study. New information renewed work to investigate large transfers and GMD3 will continue working with partners to evaluate all potential transfer sources that can offer new economic opportunities and restore ecological services across the state. State-wide water leader conversations were captured in an award winning 45 minute documentary supported by GMD3 entitled *Feast And Famine: Securing Kansas Water Needs* that can be viewed online. See: http://kansasaqueductcoalition.com/

The Kansas and Oklahoma Arkansas River basin compact authorizes water transfers from southern Kansas sub-basins, presenting an opportunity to conserve surface water otherwise lost from Kansas each year. Work continues to form an in-state multi-jurisdictional project governance model and to develop multi-interest partnerships across multiple states to organize an investigation of costs and benefits of both in-state transfer options and the consideration for a major water transportation system to manage energy and surface water from eastern sources to western States crossing GMD3.

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Activities for Problem 1: Threatened Water-Based Economy

1. Reduce water level decline rates at least 1% per year in critical management areas and consideration of rule waivers.
2. Develop and file at least one application to appropriate excess surface water otherwise lost to Kansas supply for transport, storage and use across the state, with reasonable future milestones for completion of planning, permitting, construction of diversion works and water transfer infrastructure for aquifer and ecological restoration services for GMD3 and all project partners.
3. Work with the Kansas Water Office, state legislators and other partners to add water transportation to the list of state water planning priorities.
4. Develop a multi-jurisdictional governance framework for water transportation.
5. Work with partners to promote use efficiency through new technologies.
6. Collaborate with members to identify best planning and management practices to meet their water supply needs for a specific time frame.
7. Work with partners to conduct studies and programs that replenish groundwater.
8. Support the development of market based income alternatives to irrigation water use that can preserve project level profitability and sustain funding of government services.

Problem 2: Water Right Impairment

The difficulties of groundwater management and water right administration in depleting and non-renewable local groundwater supply is inherent in Kansas history, especially where water use far exceeds replenishment of groundwater resources in western Kansas. From the first attempt to clarify a consistent Kansas water right doctrine in 1945 through the provision for water rights as changeable real property with tolerance for reasonable economic effects between rights in 1956, dedication of local groundwater management rights in 1972 (K.S.A.82a-1020), and legislative mandate of no use without first obtaining state permission in 1978, all of the benefits and effects of developing the vast High Plains Aquifer have been shared by all in the public interest.

It is well accepted that the KWAA endowed the Chief Engineer with certain statutory duties to grant water rights according to the doctrine of prior appropriation under prescribed considerations. Along with other responsibilities, the Chief Engineer must grant applications for water rights or changes to water rights only if the water is available beyond what is needed to satisfy earlier rights and doing so will not prejudicially and unreasonably affect the public interest. Kansas law provides no ultimate definition of impairment and nothing to protect members against the inevitable uncertainty of future groundwater supply except the right to file a complaint with the Chief Engineer, KDA when it occurs. The law seeks certainty in water rights, but uncertainty is always present across aquifer areas that are declining, and change is inevitable. It is the role of the Hydrogeologist to evaluate the nature of the consequences and to quantify the magnitude of effects. The difference between impairment and no impairment in the district under such an evaluation is often within the margin of error of any general analysis short of direct

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aquifer testing. The risk of uncertainty to property rights in the district from insufficient analysis and review process is carried by the present and future members of GMD3.

GMD3 has set well spacing standards to both minimize unreasonable well to well interaction and the threat of water right impairment, and for distributing the groundwater extraction rate across aquifer areas. This is to avoid excessive local demand loading and decline rates from too many wells concentrated in the remaining productive local sources of supply. Kansas administrative regulation (K.A.R.) 5-23-3 sets minimum well spacing requirements based upon annual authorized quantity. There are many wells that do not meet minimum spacing standards because they were in place before the GMD3 requested rule. The rule also allows users to move their grandfathered well location to areas that do not meet spacing as long as they are improving on current spacing or are within 300 ft of present location. In order to limit well-to-well interaction in depleting aquifer areas and improve the satisfaction of prior rights into the future, the rule exceptions may need to be evaluated to ensure any member concerns as neighboring rights are satisfactorily resolved.

State review of an application/proposal in the district has an upfront impairment evaluation duty that normally occurs under three tenets of reasonable affects:

1) Rules and stakeholder notice (or GMD3 board review and waiver recommendation);
2) Historical consumptive use not increased; and,
3) Aquifer decline rates are accepted. This is dependent on a conclusion that impairment from aquifer decline either must be: (a) one of the natural conditions to which all are subject without compensation, regardless of date of appropriation, or (b) an administrative determination of acceptable conditions for accessing groundwater in the public interest.

Legislative policy for prospective review of water right impairment and public interest should occur under findings of fact considerations identified in K.S.A. 82a-711. For applications from within the district, this includes consideration of the GMD3 management program. These considerations are also useful for member review of proposed project management plans seeking new liberties through a consent agreement with the Chief Engineer. Consent agreements are not applications and therefore carry a higher “no injury” standard on the requesting member under the law. In the absence of alternative supplies, the problem of accepting groundwater depletion for priority rights when granting new well locations or use liberties amounts to a policy of complete consumption and no priority of rights in the administrative review.

The water right impairment problem increases under the absence of sufficient evaluation procedures and lowering water levels. Many users of the district groundwater inventory may physically lose access under the specific terms and conditions of their water right as water levels drop and other users change how they access available groundwater. Members may formally object to new liberties proposed under neighboring water rights or seek an impairment concern remedy by formal complaint of an impaired water right; requesting that the Chief Engineer conduct an investigation if they believe members possessing junior rights are, or will likely be impairing their right to enjoy use of Kansas water. If the Chief Engineer makes an impairment finding, he can order wells under junior rights to be limited or shut off completely. This

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impairment complaint option can create supply uncertainty for equity interests or investments that depend on access to groundwater.

In one example water right impairment case in Haskell County, the court and the Chief Engineer adopted a very conservative definition of water right impairment. The common definition of the word "impair" is "to cause to diminish, as in strength, value, or quality." The American Heritage Dictionary 878 (4th ed.2006). This definition is similar to the definition of impair used by the district court, which looked to Black's Law Dictionary 752 (6th ed.1990) to define "impair" to mean "to weaken, to make worse, to lessen in power, diminish, or relax or otherwise affect in an injurious manner." There is some indication from that Haskell County case that any impairment concern a member may have for potential impacts of new well locations or pumping liberties should be raised in the form of an objection.

Notwithstanding the historical challenge of defining water right impairment, a hydrogeologist must understand natural and induced flow in the local aquifer, determine aquifer properties like T and S, determine aquifer geometry and how much total water is available? An evaluating hydrogeologist should consider "sustainability" issues, determine whether the aquifer is adequately "recharged" or has enough "storage" to support proposed pumping, and determine the change in natural discharge/recharge caused by pumping. This information can be provided for member education and review, and include groundwater decline rate and what may satisfy prior right owners for a future period of demand and analysis.

With the Ogallala/High Plains Aquifer declining and closed to most new appropriations, the uncertainty of future groundwater supply for developing new projects and on-site management options can be addressed using the good Kansas data resources and information provided to members for terms or forbearance agreements between water right owners to manage their aquifer supply. Though not required by law, property right agreements between owners can be facilitated to secure terms of regulatory certainty to secure access to the available future supply and minimize catastrophic disruptions from surprise future impairment actions. GMD3 seeks informed efforts to achieve conservation and satisfactory agreements to the terms and conditions of use for all members by which groundwater can be managed in the public interest.

Activities for Problem 2: Water Right Impairment

1. Seek clarification on the question of prior appropriation as the only basis for state ordered limits on member water rights, unless voluntarily relinquished.
2. Establish process criteria to ensure water right changes or new liberties to divert water will result in satisfied members for a reasonable future period of time.
3. Limit use rule waivers to areas that would not decline in supply by more than 40% in 25 years unless potentially affected prior right owners stipulate terms of agreement.
4. Coordinate with the chief engineer to ensure that each member affected by a request for permission to alter water rights are notified of the chief engineer considerations and management program considerations for their education and evaluation purposes and express any concerns or provide any forbearance agreements for regulatory confidence of review results in the public interest.
5. The exception allowing moves less than 300 ft will be revisited to consider well effects and procedure on how concerns of member water rights can be satisfactorily resolved.

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Problem 3: A Culture of Water Conservation.

Prior Appropriation and Beneficial Use doctrines are fundamental principles upon which all water rights in Kansas are established. These principals of "first in time is first in right" and "the benefit of water is in its use" are important concepts in determining which water rights should be active when water supply is insufficient to satisfy all, but create some disincentive to conserve water when supply is ample. In the district, prior appropriation now only has application in cases of formal complaint proceedings on impaired rights. Beneficial use has been modified to allow for conservation, non-use and/or new flexible use of established rights. The Kansas legislature in 2012 added a provision to the forfeiture law (K.S.A. 82a-718) so that groundwater water right owners in an area closed to new appropriations by order of the Chief Engineer will not lose rights due to nonuse. This "closed area" exception is the basis for the notion that Kansas has done away with the so called "use it or lose it" aspect of the beneficial use doctrine. However, there remain examples throughout rules, statutes, and conservation programs where past use creates future use or program opportunity and past conservation limits it.

Groundwater Conservation. Under the district management program, groundwater conservation includes any action or activity that materially improves the future supply from a declining groundwater source. Groundwater conservation is a source of water for future supply and important conservation activity is occurring in many forms in the district. In addition to the examples referenced in the Problem 1 section on *Threatened Water-based Economy*, there are actions and activities of individual members to conserve and extend the life of their local groundwater supply as a matter of good practice and resource stewardship. Some voluntary water conservation efforts being implemented in the district include:

- No-till farming methods which improve soil moisture retention.
- Crop selection and rotations that require less water than historically needed.
- Improved irrigation system efficiency technology.
- Enrollment in sponsored programs of GMD3, state and the federal government.
- Local conjunctive management of surface water and groundwater.
- Voluntary conservation as no consumptive use of accessible allocated groundwater.
- Reuse of wastewater.

Informal groundwater conservation efforts generally go undocumented and there is little standardized data to quantify the extent of water conservation now occurring. Of the 3.6 million acre feet of annual rights to the declining district groundwater inventories, generally about 45% is not used for various reasons, including voluntary groundwater conservation activity. An unexercised right to enjoy an acre foot or more of groundwater from a declining aquifer supply in the district that is physically and lawfully divertible from an existing operable well has a present conservation value. GMD3 recognizes such conservation, when identified, as a contribution to future district supply. Water right owners or water users with water conservation activities may benefit by documenting them and voluntarily submit annual water conservation reports for their water rights in a manner similar to state water use reports to make their water conservation a matter of record and receive due consideration for contributing to the GMD3 management program in the public interest.

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Minimum conservation standard for rule waivers. GMD3 has set well spacing standards that, among other things distributes the extraction rate geographically across aquifer areas to avoid the concentration of pumping from the more productive aquifer compartments to the detriment of supply to prior right owners. To preserve this purpose and to establish water conservation as a necessary consideration in each application or plan proposal seeking an administrative rule waiver in the district, the GMD3 Board is adopting a minimum conservation standard of reducing local decline rates by one percent per year. This standard will be achieved through state and board review of public interest consideration for members seeking rule waivers, water conservation plans and other programs and partnerships. This can result in a minimum overall reduction in annual decline by 22% in 25 years. This will achieve a minimum 63% reduction in the current rate of decline in 100 years to help an economy reliant on having a future water supply.

Groundwater banking. Groundwater stored in district aquifer pore spaces in areas closed to new appropriations other than domestic use is dedicated to existing property rights and may be identified as use deferred for later use in subsequent years, subject to a consent agreement with the board and the Chief Engineer. Some members see recent water use history governing allocations in conservation programs and are managing their future allocations through more present use accordingly. A deferred groundwater use program may provide a tangible incentive to conserve water that counters the fear of diminishing rights from diminishing use.

New groundwater corrective control tools. Recent legislative policy added two tools that assist GMD3 in the problem of achieving a culture of conservation by providing institutional structure for local groundwater management plans to be ordered and enforced by the Chief Engineer. Such use plans supersede water rights in designated groundwater conservation area. They include "Local Enhanced Management Areas" and "Water Conservation Areas."

Local Enhanced Management Areas. A Local Enhanced Management Area (LEMA) is an administrative tool that empowers local leaders to address local groundwater concerns. Local water right owners and other members of GMD3 can come together to seek ways to reduce the rate of groundwater decline in their region of GMD3. The GMD3 board has the authority to recommend a LEMA to the chief engineer who must consider a LEMA plan for adoption without altering it. A LEMA management plan proposal should be recommended to the GMD3 board by members as a priority Groundwater Management Area to be further managed with infrastructure development and/or corrective controls in the public interest. See: http://kfl2017.weebly.com/

Basic steps for establishing a GMD3 LEMA involve formulation of a plan generally accepted by area members, presentation of the plan to the Board, Board adoption of the plan, Board request for a LEMA to the Chief Engineer, two prescribed public hearings considering the proposed plan, and a decision order of the Chief Engineer imposing or rejecting the LEMA conditions on area water rights in the public interest.

Board LEMA guidance to members. A LEMA plan presented to the board for adoption shall include: 1) A clear groundwater management goal; 2) A basis for the proposed boundaries; 3) Evidence in the record of plan development that multiple alternatives were formulated for setting added groundwater controls on member water rights, including use of the principle of prior appropriation; 4) Reasoning for the use or rejection of each alternative; and, 5) The

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recommended strategy for determining the will of the eligible voters of the district having property rights within the proposed LEMA boundary.

GMD3 staff will support the development of LEMAs by members and will coordinate with other local, state, federal interests, organizations and authorities to consider impacts and assistance for members of a proposed LEMA, including effects on present and future property valuations and economy. Action by the GMD3 board of directors to adopt a LEMA plan and seek implementation is considered an act of local groundwater governance for necessary groundwater management infrastructure and/or corrective controls on water rights owned by district members in the public interest.

Water Conservation Areas. Recent Kansas legislation for the creation of a "Water Conservation Area (WCA)" added policy for voluntarily agreed-to management plans between water users or groups of water users and the state Chief Engineer for groundwater use privileges that originate from, but supersede water right conditions in a designated area. Such consent agreements become an order of the Chief Engineer and are not considered a water right or a permit, though subject to all Kansas water laws and rules. WCAs are intended to implement new aquifer decline corrective controls as a voluntarily requested interest and commitment to groundwater conservation and future supply. The WCA law allows maximum water utilization in exchange for conservation. Members should be aware that any plan and consent agreement ordered for a WCA effectively sets aside their water rights in deference to negotiated terms that should be evaluated carefully for any undesirable effects on their and others water rights. Because of the no injury rule to other rights, protections or stipulations to protect all member groundwater rights up front may be necessary. Because of these concerns, GMD3 has requested rules mandated to implement the WCA law. For more state information on the program, see: http://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/wca

Supplemental wells. Prohibiting the addition of wells to water rights for the purpose of restoring groundwater extraction capacity has been a board concern and a culture of conservation element of the management program in declining groundwater areas. Additional wells or re-allotment of rights that restore extraction capacity require carful evaluations to preserve conservation efforts.

Education. A key response to the problem of obtaining a culture of conservation is awareness of groundwater conditions, review of information and the exchange of member water concerns. Onsite water management tools and benefits will be explored with members, supported by local industry, state and federal partners. More administrative consideration can be provided during proposal review to inform members in their management of water supply and property status.

Activities for Problem 3: Promoting a culture of water conservation.

1. Facilitate and support member development of LEMA proposals in the public interest.
2. Support water right corrective controls to slow decline rates by at least 1% per year.
3. Implement a "Master Irrigator" style of onsite water management and conservation education program with federal partners through USDA and other supporting partners as piloted by the North Texas Groundwater Conservation District.
4. Develop a voluntary program for user documented annual water conservation reporting.
5. Promote and cooperate on water re-use projects.
6. Work with partners to limit use of special permits to preserve local conservation benefits.

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Problem 4: Implementing WCA Maximum Water Utilization Provisions.

WCA voluntary corrective control provisions are an example of local conservation leadership necessary for the success of the groundwater management program. The problem of implementing WCA maximum water utilization provisions in the revised WCA law with sufficient terms and corrective controls to improve on the current rate of groundwater decline creates significant regulatory uncertainty. The member concerns include that greater decline can happen for local wells in rapidly depleted aquifer areas beyond what is already occurring or projected to occur. The maximum groundwater utilization provisions for a plan and WCA order present similar groundwater management concerns as did the maximum aquifer development policies and practices of the state before the GMD Act that resulted in unsustainable rapid groundwater depletion rates. The plan is a private negotiation process without an application process. The authority granted through the WCA management plan order supersedes the participating water rights during the term of the water conservation area and can be further changed by agreement between the participating water right owners and the Chief Engineer outside the regular water right change administrative process. How this activity may adversely affect the water supply of members, to the extent a plan may include exceeding base water right limits on individual wells, raises questions with existing state law for water right applications and a problem of the GMD3 management program.

The Groundwater Management District Act in K.S.A. 82a-1028 provides in part, that GMD3 is a body politic and corporate and has the power to adopt standards and policies relating to the conservation of groundwater within the district, but it has no authority to adopt rules and regulations to implement and enforce those standards and policies except to recommend such rules and regulations necessary to the Chief Engineer or other appropriate state official, who may then adopt the recommended rules and regulations as they deem appropriate.

Every person who owns a water right and uses an acre foot or more of groundwater in the district is a member of GMD3 and subject to the management program, including adopted rules and regulations to implement it. Members who may seek to develop a WCA plan and enter into a consent agreement and order with the chief engineer to establish the WCA must have a plan that is consistent with the district management program in the public interest.

The Water Appropriation Act in K.S.A. 82a-745 creates the WCA tool and provides in part, that any water right owner or group of water right owners in a designated area may enter into a consent agreement and order with the Chief Engineer to establish a water conservation area, and requires the Chief Engineer to adopt rules and regulations to effectuate and administer the provisions of the WCA law. Because of the potential problems in implementing WCA maximum water utilization provisions in harmony with other state laws, and for water rights of eligible voters of GMD3 to be justly represented and fairly administered, the governing board passed board resolution 2017-2 requesting the required rules from the chief engineer.

According to the state information at: http://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/wca , a WCA management plan may describe a plan for conservation and periodic reviews. The consent order of the Chief Engineer can re-allot groundwater authorized by existing water rights by means of adopting the management plan for

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the plan period and may also provide flexibility in the management of pumping as long as the terms and conditions are consistent with other laws of the state. Limitations in the WCA law include that a WCA management plan may allow, in any given calendar year, the water use of an individual water right or rights to exceed the annual authorized quantity of the individual water right or rights participating in the management plan, provided the water use not exceed the total annual authorized aggregate quantity and rate of all the water rights participating in the management plan in any given year. It is still early in the implementation of the new WCA provisions, but there is some question whether this authorized aggregate quantity and rate "limitation" is a legislated right to flexibility or simply a top end limit that may or may not be an advisable provision in a particular local area plan. In the declining aquifer areas of the district that are already over dedicated to prior water rights, the potential variables of new pumping liberties on remaining stronger wells can cause greater uncertainty and dissatisfaction of prior right owner-members and adds administrative burden on the state and the GMD3.

It is state policy that no management plan or multi-year flex account authorized under a WCA shall be allowed to impair any water right. A process to evaluate plan concepts to prevent impairment is needed to implement this prohibition. The impairment standard for review of WCA plans may be much higher than for regular water right applications. This may necessitate extra care, conservative analysis, fact finding and communications prior to any agreement and order establishing a WCA. Based on the K.S.A. 82a-706b no injury standard, the chief engineer may not agree to a WCA plan that may prevent any groundwater from moving to a member of GMD3 having a prior right to use the same groundwater. The level of impairment evaluation or ordered safeguards by the chief engineer should be conservative, and consistent with analysis provided in administrative resolution of complaints prior to consent agreements ordered. This is because the responsible party bearing the burden of future regulatory uncertainty of any WCA plan effects on the supply shifts at the time of the order from the member parties of the agreement to the members owning prior rights. Therefore, the agreements with the Chief Engineer may need to include agreements with neighbors if wells under prior rights may suffer reduced supply. To provide for the real property rights owned by eligible voters of the district to be justly represented and fairly administered, the governing board of GMD3 will work with the Chief Engineer and request the rules and regulations necessary to administer the WCA law as soon as practicable to protect GMD3 members, the groundwater management program and the public interest.

Activities for Problem 4: Implementing WCA Maximum Water Utilization Provisions.

1. Ensure that all neighboring water right holders that may be adversely affected by a plan are notified of each proposed change to aquifer use liberties.
2. Ensure members are provided all chief engineer and management program considerations to give opportunity for members to learn, express concerns and provide any needed stipulations that assure satisfied prior right terms, conditions and consistency with the management program.
3. Seek rules needed to implement WCA law under the GMD3 management program.

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Problem 5: Arkansas River IGUCA (Intensive Groundwater Use Control Area)

GMD3 pursued forming special management areas for corrective controls in 1977 and found a lack of local and state authority. The Board of Directors immediately requested a moratorium on new rights in parts of Kearny and Finney Counties to work on the over allocated water resources problem. Legislative efforts were successful in 1978 to gain corrective controls authority through the Chief Engineer. Present LEMA and WCA policy has since been modeled from GMD IGUCA authority. The Arkansas River IGUCA was requested by the GMD3 board in 1984 to replace the 1977 moratorium. The IGUCA was ultimately formed after significant public process, testimony and recommendations of the board and stakeholders for corrective controls that were ordered by the Chief Engineer in the public interest. The Arkansas River IGUCA area within GMD3 today affectively caries only one remaining restriction not already superseded by districtwide management program and rules; a restriction on relocating wells that may decrease the distance to the river channel by more than ten percent (10%). At least one modification occurred recently without any public process or GMD3 recommendation. To remain consistent with the purposes of the GMD Act, any order, review, revision or administrative update affecting the Arkansas River IGUCA governance in the district should include the public process and a GMD3 recommendation for determining the public interest.

Activities for Problem 5: Arkansas River IGUCA

1. Establish the river channel area as a Critical Aquifer Replenishment Environment through partnerships, signage and controls.
2. Review and evaluate Arkansas River IGUCA provisions for revision or elimination.
3. GMD3 will work with all administrative authorities on IGUCA issues as the originator of the IGUCA request and groundwater governance advising in surface water and groundwater matters of the area.

Problem 6: Upper Arkansas River Corridor Water Management.

The problem of managing water in the upper reach of the Arkansas River corridor in Kansas historically may be in part due to the lack of any delegation by the Kansas legislature to anyone to manage the state owned land along what is officially and legally considered a navigable stream. In the water management side, river diversions, groundwater development and water use efficiency change through time has caused fewer rain runoff flows, river banks to narrow, cottonwoods and tamarix to proliferate up stream where flow and reservoir deliveries maintain river flow year round, and river sediment load to drop as water is diverted for irrigation or percolates below the surface into adjacent aquifers, causing problems all along the riverbed corridor. The river's salinity level increases each year causing problems in crop production and drinking water usability depletion in adjacent aquifers. The riverbed remains dry nearly 100% of the time below Garden City and Finney County; this dry reach of the river is considered in the GMD3 management program as the districts lower Arkansas River corridor. Significant loss of

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aquifer replenishment and floodway management concerns persist with the lower Arkansas River corridor that are not targeted for GMD3 program activities in this document, but may be addressed as significant partner opportunities and new water source developments occur.

As a result of litigation filed in the United States Supreme Court (*Kansas v. Colorado, No. 105 Original*), the State of Kansas received more than $34.7 million in damages awarded from the State of Colorado for actual Kansas losses to crops and fields in parts of the district, including interest on damages. The cash damage award was quantified from the effects of certain Colorado violations of the Arkansas River Compact (Compact, K.S.A. 82a-520). The cash damages paid back the state litigation cost, with the remainder going 1/3 to the Kansas Water Plan and 2/3 to the affected area in southwest Kansas in the form of the Water Conservation Projects Fund (WCPF). Ultimately, to assure a fraction of the WCPF damage funds from Colorado would not be swept and be available for the affected area, the 2008 legislature authorized a grant to be provided through the Kansas Water Office to a GMD3 special fund and grant agreement as the Western Water Conservation Projects Fund (WWCPF). Projects funded in whole or in part by the WWCPF must be in the area impacted by the Arkansas River Compact. Under the provisions of SB 534 and the KWO Grant Agreement, the Arkansas River Litigation Fund Committee was established in 2005 and became the advisory committee to the GMD3 board, who manages the funds, approves projects and expenditures, and makes requests to the Director of the Kansas Water Office for approval as consistent with legislative purposes, in consultation with the Chief Engineer of KDA/Division of Water Resources.

Activities for Problem 6: Upper Arkansas River Corridor Water Management.

1. Work collaboratively with Kansas and Colorado officials to address water usability depletion from poor Arkansas River water quality and the degradation of basin groundwater.
2. Maximize benefits of high river flows for aquifer replenishment, well augmentation and river ecology restoration.
3. Explore water storage options for water importation projects.
4. Address compact compliance verification needs.
5. Maximize general public good from available river flows and river resources.
6. Maximize efficiency of call water delivery to surface water ditch irrigation use.
7. Improve the efficiency and safety of services from the hydrologic system.

Problem 7: Water Quality in the Upper Arkansas River Basin.

The water entering the state of Kansas in the Arkansas River basin is high in contaminants, including sulfate salinity and uranium. In addition to concerns of other contaminants, high radio nuclei levels have a significant effect on water treatment costs to restore water usability. Estimates from the Kansas Geological Survey of the weight of uranium coming into Kansas annually from Colorado via the Arkansas River are concerning.

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Year	Annual uranium load, metric ton/yr	Annual uranium load, ton/yr	Annual uranium load, lbs/yr
2012	1.80	1.98	3,960
2013	1.61	1.78	3,560
2014	3.77	4.15	8,300
2015	6.01	6.63	13,260
2016	7.26	8.01	16,020

Kansas Geological Survey Open-File Report No. 2017-2 January 2017

This water replenishes and contaminates the Ogallala Aquifer through infiltration and deep percolation in the river bed and the irrigation ditch service areas that receive the river water. The saline nature of the water reduces its usability and reduces crop yields. It also greatly increases the operation and maintenance cost of irrigation systems due to its corrosive effects on water diversion works and soil properties. Within GMD3, the cities of Lakin, Deerfield, and Holcomb have experienced a decline in water quality due to infiltration of river water near their city well fields. The City of Lakin recently had to construct a nanofiltration water treatment facility to get within the Environmental Protection Agency's (EPA) maximum contaminant limit (MCL) for uranium. The community must now bear an ongoing water usability depletion cost of millions of dollars. The water extracted from the Deerfield and Holcomb wellfields has been within safe drinking water standards. However, it has been deteriorating and water usability is depleting. Those cities will have to develop a treatment or alternate solution in the future.

GMD3 has worked with the US Department of Interior, Bureau of Reclamation (Reclamation) and Kansas Water Office to develop a study evaluating public water sources in the river basin above Garden City to help plan for the future considering the deteriorating water quality and declining aquifer levels. This study included the cities of Coolidge, Syracuse, Kendall, Lakin, Deerfield, and Holcomb. It identified possible solutions, including construction of new facilities, infrastructure, and collaboration efforts. The Reclamation study identified need for added study and identified local potential options for the future. GMD3 remains committed to monitoring the river water quality and to promoting programs and practices that can address the usability of streamflow and adjoining aquifer degradation to assist affected communities and individuals in mitigating present and future water supply usability depletion.

Activities for Problem 7: Water Quality in the Upper Arkansas River Basin

1. Follow up on the work performed with Reclamation in 2012 to develop a drinking water plan for the population along the poor water quality Arkansas River corridor.
2. Explore the merits of adding the Hamilton County portion of the river basin into the GMD3 management area to provide representation and governance services.
3. Develop Standards on water usability and value losses from declining water quality.
4. Identify usable water sources or technologies that can enhance the usability of poor quality water sources.
5. Conduct further study to define the paleo-river channel aquifer supply.
6. Monitor water quality at Stateline groundwater gages installed with GMD3 help.
7. Monitor and assist, as requested, similar activities and basin concerns in Colorado.

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Problem 8: District Water Quality Protection.

A multi-component groundwater management program should include interventions to address soil, well condition and water quality. Such programs can include regular groundwater monitoring, investigation, education about risks to groundwater, resources to limit water contamination (e.g., tools for appropriate pesticide and fertilizer application, wastewater disposal, and soil tillage), and water allocations and taxes. Backflow prevention is an essential first step in averting manmade contamination of groundwater.

Inadequate well construction standards can be another leading cause of groundwater contamination. During the late 1970s and early 1980s it became apparent that wells being constructed in the Arkansas River alluvial river valleys needed to be built with permanent barriers preventing poor quality river water from reaching the lower High Plains Aquifer. Studies have shown that improperly constructed and/or plugged wells have created conduits allowing river water that is of lessor quality to migrate along the outer wall of the well casing and invade lower aquifer zones. Similar criteria are required to prevent contact between confined and unconfined aquifers.

In addition, the Permian age formations of the lower High Plains Aquifers found in some areas of Meade and Seward counties contain high concentrations of naturally occurring chlorides or other undesirable water constituents. Soon after discovering this concern in the mid-1980s, GMD3 adopted well construction restrictions in a special Groundwater Quality Management Area in parts of both Meade and Seward Counties, as well as rules for testing to limit the movement of the contaminated groundwater into fresh water zones.

Activities for Problem 8: Water Quality Protection
1. Establish water quality management areas and rules as needed to protect water usability from depletion. 2. Collaborate with the KDHE, Kansas Corporation Commission (KCC) and other partners to assure well construction, well maintenance and nutrient management practices that best protect water quality and usability.

Problem 9: Exploration of Deep Permian Aquifer Use.

As the value of water increases and local supplies diminish, some members are losing the ability to access water from the declining Ogallala/High Plains Aquifer and are looking deeper to often semi-brackish quality groundwater aquifer sources to supply their projects. GMD3 has spacing requirements for the confined Dakota Aquifer. More evaluation and policy development is needed for the safe development of other deeper aquifers. There is a benefit to accessing this water, but care needs to be taken to ensure that cleaner shallower water is not contaminated, or that the deeper aquifer water consumption does not produce land subsidence, and that it does not cause impairment of existing property rights. For these reasons, standards should be developed regarding Permian aquifer exploration and development.

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Activities for Problem 9: Exploration of Deep Permian Aquifer Use.
1. Investigate concerns of old oil and gas well short surface casing construction potential for uncontrolled exchange between aquifers of differing water quality that may cause water usability depletion of the High Plains Aquifer. 2. Work to identify quality and quantity concerns in Permian aquifer formations. 3. Review spacing and well construction requirements for developing Permian aquifers. 4. Identify and promote technologies that make poor quality water more usable.

Problem 10: Availability of Energy.

It is critical to have affordable and reliable energy available for water use projects in the District. For example, if energy were to become too costly for irrigation projects, the effect could devastate the economy. Any regulatory plan that may adversely affect future access to affordable energy for use by GMD3 eligible voters should be advised of the effects on the groundwater management program, including: implementation of Clean Water Act, Endangered Species Act, Federal Energy Regulatory Commission actions, Kansas Corporation Commission actions, and SW Power Pool operations. Regulatory plans should be reviewed under the GMD3 groundwater management program for appropriate resource allocating and market planning in the public interest. Information will be provided to members and partners for management program concerns and energy supply. Advocacy will occur for appropriate resource planning in support of meeting energy needs today and for future groundwater management program needs.

Activities for Problem 10: Availability of Energy
1. Advocate for safe, reliable, secure, and affordable energy infrastructure to meet water management and farm profitability needs. 2. Support private efforts and utility cooperative partnerships aimed at assuring an adequate present and future supply of affordable energy. 3. Inform members and partners of unreasonable regulatory schemes affecting affordable energy, needed supply planning, and fair market conditions.

Problem 11: Public Education and Involvement.

In order to achieve the various programs and goals outlined in this document, GMD3 recognizes that public education and support will be required. GMD3 will work with members and partners, local, state and federal interests, institutions and authorities to educate and inform the public how Kansas groundwater matters; raise understanding of district water resources; describe GMD3 program and brand activity; inform on water use, future supply, water conservation, water management, and public interest concerns. It is important to provide education during regular communications between the GMD and their membership, including notice letters regarding water right and water use activities that may affect them.

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Activities for Problem 11: Public Education and Involvement.
1. Host or participate in meetings with local water users and land owners to inform on management program activities, water supply declines and use benefits, future water availability, and groundwater conservation tools and benefits. 2. Create information on video and other media formats for distribution to improve water supply and management awareness and understanding. 3. Use weekly radio interviews to notify the public of district activity. 4. Support members, partners, schools, clubs, and civic groups with presentations or other public information when requested.

Problem 12: Improve On-Site Water Management

On-site water management begins with preventing the waste of water. Soon after becoming incorporated, GMD3 became the primary agency responsible for curtailing waste of water violations, now sharing this activity with DWR. A corrective course of action is normally established on the same day a waste of water complaint is received, if waste is occurring. GMD3 assisted in implementing state mandated water conservation plans and programs to encourage that producers can obtain better management and find opportunity for decreasing water use. GMD3 also became the first groundwater management entity in Kansas to mandate the installation of water flowmeters on all non-domestic wells, effective in 1993. The flowmeter program became fully implemented with all flowmeters installed by 1996. Seeing a need for increased enforcement of flowmeter requirements, the Board of Directors increased flowmeter service inspections by over 200% during 2002 without increasing assessments.

Flowmeter verification test data gathered by GMD3 indicates in total, the installed flowmeters over-record actual groundwater diversion by a percent or two. On-site results can vary significantly depending on many hydraulic and meter maintenance variables. New sensor and data access technologies are providing new conservation and water management opportunities.

Activities for Problem 12: Improve On-Site Water Management
1. Visit and perform an inspection of 25% of all non-domestic flowmeter sites and/or wells within GMD3 each year with appropriate compliance follow-up as needed. 2. Promote on-site technology implementation to encourage active project level management of Tomorrows Aquifer Supply Collaborative (TASC) with neighbors. 3. Perform flowmeter verification tests. 4. Conduct water level and water quality measurements.

Problem 13: Enforcement.

The enforcement problem of local, state and federal permits, water rights administration and sanctions on district members subject to the groundwater management program requires significant communication and coordinating of data. GMD3 has supported or provided leadership while working with partner officials on various initiatives to improve resource data, environmental planning and water right compliance, such as: mandatory flowmeters; flowmeter verification tests; mandated water conservation plan compliance audits; groundwater use monitoring; requesting appropriate sanctions to include future water allotment reductions for

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violations of water right limits; irrigation place of use compliance audits and a memorandum of understanding with the Chief Engineer to provide change compliance monitoring. GMD3 works with members, the Chief Engineer and other officials to enforce groundwater use controls and to ensure appropriate enforcement policies are implemented in a fare manner between members and consistent with the purposes of the management program. GMD3 will work with the appropriate officials for establishing the use of state ordered fines collected from members to be directed or made available to GMD3 for local use in groundwater conservation and economic development purposes.

Activities for Problem 13: Enforcement.

1. Provide GMD3 enforcement assistance to further implement the management program.
2. Ensure an appropriate regulatory environment that is transparent and consistent with management program goals for district water resources.
3. Pursue state consent agreements to direct fines on members to GMD3 to benefit local conservation projects.
4. Represent the GMD3 information properly through effective coordination and communications during enforcement sanctions issued to members.

Problem 14: Public Interest.

The term "public interest" is referenced throughout state and federal law. GMD3 will establish and represent the local public interest elements regarding local groundwater governance implemented through the management program and work with state and federal agencies to ensure that programs and regulations are consistent with the policies, norms and practices that define the public interest as delegated from Congress to Kansas for allocating groundwater and from the Kansas legislature to GMD3 to manage district aquifers for members and for Kansas.

Activities for Problem 14: Public Interest.

1. Represent the district public interest for all present and future member water needs.
2. Follow due process for revising and implementing the management program and the needed administrative rules and guidance to ensure that activity in the district affecting water use, supply and the economy occurs in the best interest of the GMD3 eligible voters and public.
3. Work with local, state and federal interests, institutions, legislators and congressional delegations to educate and convey what is in the public interest regarding water based economy, water supply, water transportation infrastructure and finance needs.

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Problem 15: Funding Issues.

The GMD3 management program is funded primarily by a water user fee per acre foot authorized annually by water rights and a land assessment per acre of land on tracts of 40 or more acres. Infrastructure improvement projects may be funded through issuance and servicing of bonds through a special election process. GMD3 may work on projects that require state or federal government grants or public fund transfers. These projects may include incentive based conservation programs that provide payment to users who conserve water or improve efficiency, studies to help communities and other water users develop future management plans and water transfers. GMD3 actively pursues grants and fund transfers from partners to support projects that implement the management program in the public interest.

Activities for Problem 15: Funding Issues.

1. Work with partners to preserve all forms of water right ownership fees, user fees and compliance fines. assessed against members and water use in the district as consent agreements with appropriate members and state officials in support of funding management program activities in the district.
2. Seek grants from outside sources to supplement GMD3 fees to implement management program activities.
3. Pursue an interstate study partnership of funding sources to develop information on potential large water transfer projects that can benefit the district
4. Develop bond funding alternatives and public private partnership (P3) pathways to accomplish program goals for expensive and ambitious sustainable supply projects, such as for water transfers into the district.
5. Work with state officials to strengthen revolving loan program options for financing water infrastructure construction projects.
6. Investigate the amount of groundwater diverted and exported from the district.

VI. PROGRAMS

a. Groundwater Management Program Elements

1. Working relationships with local, state and federal regulatory agencies;
2. Harmonizing the purposes of the GMD Act with state administration of water rights and groundwater quality;
3. Facilitating planned surface water and groundwater conjunctive use operations;
4. Monitoring of groundwater levels and storage inventory;
5. Mitigating conditions of overdraft;
6. Administering a well construction, abandonment and well plugging program;
7. Development of groundwater replenishment sources;
8. Demonstrating leadership in the construction and operation of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects;
9. Identifying and partnering to manage wellhead protection and recharge areas;

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10. Regulating the migration of contaminated groundwater;
11. Controlling saline water intrusion into fresh groundwater supplies; and,
12. Reviewing water and land use plans and coordinating with water and land use planning agencies to harmonize planning with the management program and assess activities which create a reasonable risk to members and the management program.

To address the 15 water supply problems identified in this management program document and to address other aspects of GMD3 member rights and interests, the following programs are considered important.

b. Water Rights Administration Program

1. **GMD3 will review** all water right applications and considerations of the Chief Engineer for surface and groundwater and any operating plans for consent agreement with the Chief Engineer filed from within its boundaries to insure compliance with the management program and board policies.

2. **GMD3 will recommend** to the Chief Engineer or other appropriate local, state or federal officials any actions, rules or terms and conditions deemed necessary in consideration of the norms, practices and goals of board governance implementing the management program in the public interest.

3. **GMD3 will seek added confidence** for project water supplies against the regulatory uncertainty of impairment complaints in the declining groundwater supply. GMD3 will work with members and the Chief Engineer to address the inevitable uncertainties of water right administration and future supply to achieve a full review and resolution of each proposal or complaint under the guidance of K.S.A. 82a-711, including the management program, using a 25 year prospective evaluation period. The goal will be to see that resource and water right considerations are made available to potentially affected members along with options for a facilitated process of consent agreement recognized in an order of the Chief Engineer. This can occur as needed to secure member water supply, including any needed trigger points, mitigation measures or forbearance agreements that may be negotiated between informed members for added confidence and value in the determination of member real property rights to present and future groundwater supply.

4. **GMD3 will assist in the preparation of applications** for a permit to appropriate water for beneficial use may occur, and other such water-rights related member project planning and paperwork, but it shall be the responsibility of the proposer to review all such information and to submit same to the Chief Engineer as required by law and advised by their own independent legal counsel and/or technical expert.

5. **GMD3 will monitor annual water use** from within the district and work with or assist the Chief Engineer in improving the reporting process and/or correcting any deficiencies found as needed to support implementation of the groundwater management program.

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6. **GMD3 will provide on-site diversion inspection services** to members as installed flowmeters have been required by order of the GMD3 board and adopted by rule of the Chief Engineer since the early 1990s on every non-domestic well in the district to assure measurement services to members and the purposes of the groundwater management program.

7. **GMD3 will consider Water Rights Administration Program Guiding Principles:**

    A. Water supply – Engage members to conserve present water use benefits and support growing the future district usable water supply for the health, safety and welfare of all citizens.

    B. Aquifer supply dedicated to existing water rights – As the Ogallala/High Plains Aquifer has been closed to new water rights, aquifer inventory becomes fully and completely dedicated, except for new domestic use, to existing real property rights owned by district eligible voters.

    C. Drinking water - Safe drinking water is a fundamental necessity of every person and will be considered and managed for future supply by the GMD3 and its partners.

    D. Contribution to future supply - An unexercised right to enjoy an acre foot or more of groundwater from a declining aquifer supply in the district that is physically and lawfully divertible from an existing operable well has a present conservation value that GMD3 can recognize as a contribution to future district supply. Alternatively, available groundwater deferred for later use in a subsequent year by an eligible voter may be considered, subject to a consent agreement with the board and the Chief Engineer.

    E. Communications - Good and effective communications between GMD3, its members and state and federal regulators are necessary for productive partnerships that implement the management program.

    F. Mutual benefits and good will - Encourage all water users and land owners to make decisions, agreements or stipulations affecting their real property water rights that promote mutual benefits and goodwill in the use and conservation of the groundwater supply in the district for a reasonable future period of time.

    G. Water right application evaluations - Administrative review of each application or request for a consent order that may adversely affect the groundwater supply to a well owned by any GMD3 eligible voter should identify and disclose to the eligible voter the evaluations, basis and considerations of the Chief Engineer, rules implementing the public interest and groundwater management program, and what may be needed to satisfy prior rights to the supply today and for a planned future period of time.

    H. Board intervention - The Board may seek to intervene on behalf of all eligible voters if any action or process fails, or threatens to fail, to adequately implement the GMD3 groundwater management program and policies in the public interest.

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8. **GMD3 will have water right consent agreement and rule waiver considerations.**

As local groundwater supply in district managed aquifers decline in the absence of sources to replenish district aquifer pore space infrastructure, the value of usable groundwater will go up. The pressure on water users to seek waivers of rule standards to improve enjoyment of allotted supply will also increase. The Board of GMD3 may include the following considerations in their deliberations and recommendations concerning the management program and standards governing groundwater supply and management of district pore space infrastructure in the public interest.

A. Drinking Water.

Member drinking water supply evaluation and monitoring consensus can be a necessary consideration in any proposal as steps to ensure quality drinking water is available locally for people and animals is recognized as a necessary element of the groundwater management program in the public interest. No modification to historic terms of groundwater use should occur that contributes to unreasonable or unsafe drinking water supply conditions, including deteriorating drinking water quality (Water Usability Depletion).

B. Maximum Allowable Rate of Aquifer Depletion.

For evaluation purposes, the maximum allowable rate of depletion of the High Plains Aquifer supply should not exceed 40% in 25 years as a depletion rate limit in the public interest.

C. Culture of Conservation.

GMD3 member activity promoting present use efficiency while preserving usable groundwater in storage for future supply should receive due consideration for contributing to the GMD3 groundwater management program in the public interest.

Groundwater conservation includes any action or activity that materially improves future groundwater supply from a declining source being used today. Planned or identifiable conservation activity routinely occurs in GMD3 informally, or it can be formally established and enforced in a management plan with corrective controls in a defined groundwater management area (GMA), including an IGUCA, LEMA or WCA.

D. Groundwater Conservation Reporting.

GMD3 members with water conservation activities may voluntarily submit annual water conservation reports for their water rights in a manner similar to state water use reports and receive due consideration for contributing to the GMD3 management program in the public interest.

E. Water Right Priority Contribution.

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GMD3 member owners of senior water right interests who stipulate conditions, provide forbearance agreement or otherwise withhold priority against other users in a local source of supply should be recognized as contributing to the mutual benefits and good will considerations of other members and the GMD3 management program in the public interest.

F. Modifying Historical Terms of Groundwater Use.

Changing terms, limitations or conditions of historically authorized groundwater use caries statutorily prescribed considerations that include groundwater management program considerations. GMD3 members seeking modified terms of use through waiver of change policies or negotiated water management plans and include their neighbors, who have reviewed the considerations of the Chief Engineer required under K.S.A. 82a-711 and K.S.A.82a-706b, and who may have reached agreement on what may be needed to satisfy prior rights for a specified period follow, should be recognized as contributing to the GMD3 management program in the public interest.

G. Economic Use Value.

Managing water as an economic good is an important way of achieving efficient and equitable groundwater use without waste. Plans or proposals that significantly increase aquifer use value without increasing decline rates should be recognized as contributing to the GMD3 management program in the public interest.

H. Alternate Supply Development.

Proposals to conserve High Plains Aquifer water by seeking an economically and technologically feasible lessor quality alternative groundwater source should be recognized as contributing to the GMD3 management program in the public interest.

I. Groundwater Inventory Estimate Improvement.

Information provided by members that improves knowledge of usable supply estimates, including donating geological test well logs and other data, should be recognized as contributing to the GMD3 management program in the public interest.

J. Water Imports.

Where the demand for water within the district far exceeds long term groundwater supply, any member pursuit of additional sources of water to supply water needs or for managed aquifer recharge of groundwater supply should be recognized as a critical part of the long-term strategy for securing water services to the district, the state and the region of the United States in the public interest.

9. **GMD3 will provide collaboration.** GMD3 will endeavor to work cooperatively with members, the Chief Engineer and other state and federal officials, interests, institutions and

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authorities on any water rights or special management plan or program activity which might affect the district members or the management program operations and the public interest.

c. Outreach, Advocacy and Public Education Program

GMD3 is the local groundwater governance to establish the management, conservation and use policies that stabilize and improve agribusiness benefits relative to national and world markets for the welfare of southwest Kansas and for all citizens of Kansas. GMD3 has a basic responsibility to represent and inform members on local, statewide and national issues affecting the interests of property owners and water users (members) of the district.

1. Through pro-active involvement and dedication of resources, GMD3 seeks to shape and influence public policy and legislation affecting local groundwater beneficial use and supply, district member interests, and the operations of the district management program to meet water needs for today and for future generations.
2. GMD3 will continue to enhance and expand partnerships and working relationships with key elected and appointed officials to advance Southwest Kansas perspectives on proposed legislation and regulations affecting existing and potential district water resources at both the state and federal levels.
3. Public support will be required in order to achieve the various program goals outlined in this document. GMD3 will expand its efforts to actively engage the public through website and other social media, including a YouTube channel, with a goal of reaching and engaging younger generations of water users and potential public and private partners. On-site project signage, resource education stations, community public water awareness features and water benefit promotions may be constructed through cooperative leadership assistance from GMD3, with emphasis on the wide dissemination of information.

d. State Water Planning Program

1. GMD3 will work with each of the two Regional Advisory Committees (RAC's), whose respective areas together generally comprise the district, to add value to committee deliberations and recommendations to the state water planning process and will work to further the implementation of the long term legislative goals and objectives for Kansas water in a manner consistent with the district management program. The Regional Goal Action Plans developed through the state Water Authority planning process are advisory to GMD3.
2. GMD3 will work with the Associated Ditches of Kansas, the RACs, the Kansas Aqueduct Coalition and other local, state, federal and legislative partners to achieve a consistent perspective related to appropriate water planning and compact administration risk matters, including restoring dedicated state funding for studies and evaluations necessary to explore and develop multi-purpose water transfers and assure compact administration purposes.
3. GMD3 will work with RAC members across the state to enhance understanding of any differing perspectives of common water supply interests or concerns across Kansas.
4. GMD3 will work with existing interests in basins having significant amounts of minimal or negative value high flow surface water otherwise lost each year from Kansas to set a priority

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on contingency planning and Arkansas River compacts administration risk management in order to secure a high level of supply protection to meet water supply needs across the state serviceable from water development and transportation projects.

e. Interstate Aquifer Management Coordination Program

1. Water supply concerns extend beyond district boundaries at the Stateline. GMD3 will work with other local, state and federal partners to improve water management and pursue opportunities for partnerships in other states. GMD3 has reached out in providing invitations to state officials in Kansas, Colorado and Oklahoma to encourage discussion of interstate aquifer management improvements for the mutual interests in collaborative groundwater management of each multi-jurisdictional aquifer.
2. Now that GMD3 has demonstrated conservation leadership in seeking closure of the Arkansas River Alluvial Aquifer and the High Plains Aquifer across the entire district to additional groundwater appropriations in the public interest, some interstate program coordination is reasonable and important for partnerships that secure and protect new, existing and future supply, identify potential replenishment sources and for developing multi-state initiatives.
3. Board withholding of the right to assess higher groundwater user fees for groundwater exported from the district and state may be considered under established partnerships. Interstate partnerships to secure the quality and quantity of existing and new groundwater replenishment sources should be recognized as contributing to the GMD3 management program in the public interest.

f. Models Improvement Program

Each model of district aquifers and wells, water resources or economy is a work in progress and a critical part of the district groundwater management program. Each is a tool designed to represent a simplified version of reality. The reliability depends on how well the model approximates field conditions.

1. GMD3 will work with state and other partners to apply the appropriate resources to use and improve important analytical and numerical models to elevate the district groundwater knowledge base and improve evaluations and management considerations for GMD3 members and partners. For water rights administration, this may include collaboration with KDA to develop a "BASIC GROUNDWATER HYDROLOGY AND EVALUATION PROCEDURES MANUAL" for GMD3, using examples from the New Mexico Office of the State Engineer.

2. New aquifer information and data provided to GMD3 members and partners, including member testhole contributions and aquifer tests, should be recognized as benefiting model updates and the recalibration of supply and economic models needed for implementing the management program in the public interest.

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g. Investigations and Research Program

GMD3 shall maintain an active interest in the following topics in addition to identified goals in chapter V for the district.

1. ***Managed Aquifer Recharge.*** GMD3 will encourage Managed Aquifer Recharge as a practice to increase the amount and/or quality of water that enters a groundwater reservoir area of the district. Where this is already common practice in hydrocarbon reservoir management, the district will request the use of the lowest usable water quality that is technologically feasible for such purposes.

   Managed Aquifer Recharge to unconfined district aquifer pore spaces will allow for the efficient and conjunctive management of surface water, groundwater and reclaimed water sources. This program initiative can maximize storage capacity of district aquifer pore space, improve management of seasonal surplus water supplies, reduce evaporative losses and reduce depletion draw down levels in targeted areas. Managed Aquifer Recharge projects may include managed natural infiltration areas, infiltration basins, infiltration galleries, vadose zone infiltration wells or aquifer injection wells.

2. ***Water Transfers - Importation*.** Western Kansas and the Great Plains region offers the nation a large food production area which has not yet reached its production potential and is losing established economy as aquifer levels decline. The major limiting factor in preserving and developing this potential is water. Since presently available water supplies are inadequate to fully develop or maintain the area's production potential, water from other areas should be made available if the existing economy is to be preserved or the natural increase of future development is to occur.

   Importation of water from areas of surplus supply seems to be technically feasible if the economic and political aspects of such ventures can be resolved. Some opportunities may exist with pipelines previously used for other purposes and now abandoned are considered as a method of water delivery. Some of the problems are legal in nature and deal with issues such as inter/intra basin transfers. Any significant importation of water for irrigation use will by necessity be a larger scale project and will require the coordination of many water-related entities and authorities to maintain productive partnerships that accomplish the many steps to water transportation and the energy that will be necessary to power water transportation. Other smaller-scale in-state transfers will also take considerable coordination and planning.

   GMD3 shall take a leadership role with partner agencies, organizations and foundations to accomplish the long-range planning and study projects which may become economically feasible under future dollars and which offer potential for the importation of water into southwest Kansas to meet future resource service needs in the district.

3. ***Water Exportation***. The board shall involve itself with any proposed direct exportation of groundwater from the district boundary to any area or location outside the district to insure that all management program purposes are met, and seeking opportunities for mutual benefit and good will to meet the needs for present and future water supply in adjoining areas in the public interest. Exported water use may be assessed a higher user fee.

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4. ***Federal Farm Program***. As we look at the farm bill through the lens of the current farm economy, innovation and technology will remain essential for district farmers and ranchers to continue producing more food and fiber with less water. The federal farm bill research and other programs have a significant influence on the implementation of the GMD3 groundwater management programs for district members and partners.

    A. GMD3 will engage farm bill development and implementation along with industry and national partners to guide national funding and program commitments in support of the district groundwater management program.

    B. GMD3 will partner in the work of USDA Agriculture Research Service Ogallala Aquifer Program whose goal is to sustaining rural prosperity across the Southern High Plains and the district in seeking solutions to problems from declining water availability. See: https://www.ars.usda.gov/research/project?accnNo=429690

    C. Water conservation programs like those enveloped in the EQIP program should incentivize and reward water conservation. Using historic usage only encourages maximizing usage prior to enrollment, which is contrary to the district Groundwater Management Program. Those who are already working to conserve have a larger burden to achieve the same gains. GMD3 will seek the preservation of and participate in farm bill partnerships and programs that demonstrate and encourage use of new water conservation and use efficiency technologies that are revolutionizing groundwater management on the High Plains, such as mobile drip irrigation, new soil moisture probes, and other project level sensor and data communications for project water managers to increase resource and economy sustainability.

    D. Risk management is a key influence of the farm bill on the district groundwater management program. Input and potential partnerships with RMA and others should occur to further develop useful risk management products for limited irrigation policy coverage and supported for farms and regions suffering from limited well yields or areas where intensive water management are called for while not forcing unnecessary irrigation in declining groundwater areas.

5. ***Brackish water use technology and feasibility.*** Brackish water or briny water is water is more saline than fresh water, but not as much as seawater. It may occur in the district in brackish fossil aquifers or in Arkansas River surface water from Colorado or in Cimarron river flows from the district into Oklahoma. Brackish waters are viewed recently as a potential and viable resources to alleviate water scarcity and overcome water budget deficits for some project uses. Kansas law requires consideration of such water sources during permitting where technologically and economically feasible. The evaluation of various desalination technologies will be encouraged as one of many options to conserve and manage district surface and groundwater supply.

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6. ***Local comprehensive and environmental planning support.*** GMD3 participation and outreach support of planning efforts by local authorities and their targeted interests and control over water related economic development and environmental conditions is necessary and desirable to effectively implement the groundwater management program in the public interest. Coordinating with local government resources provides the economical planned benefits of the land and water resources in support of the leadership of local cities, counties and special districts within GMD3 and ensures standards for beneficial environmental conditions for member health, safety and welfare are developed in the public interest.

h. Data Collection Program

1. The data collection needs of GMD3 are expected to be very broad as various plans and programs develop into implementation. Data needs will necessarily range from water quantity and water quality issues, to research and investigation needs, to land ownership records and socio-economic and use value needs as necessary to implement the groundwater management program. This could include at any time additional supply, water use, cropping, soils or well and water flowmeter data needed to support improved supply, water use efficiency, conservation efforts and program compliance.

2. GMD3 will improve data collection software and hardware tools for efficient data collection and information mining and maintain communications with various outside data sources, including: a water well and water flowmeter inventory designed to show the location and status of each non-domestic well; installed water flowmeter type and performance reliability data; map based data concerning area groundwater inventories; water quality information that is available or can be collected; a land ownership and mailing list data base for member communications, and enforcement purposes; a water rights data base including authorized points of diversion, places of use and authorized rates and annual quantities of water; and climate data for the region that is necessary for any irrigation scheduling programs or research.

3. GMD3 will communicate and cooperate with local, state and federal interests of data exchange and cooperation to accomplish the purposes of district groundwater governance in the public interest. Such cooperative efforts with partner organizations can be an efficient use of GMD3 manpower, technical and financial resources available.

i. Water Quality Protection Program

In reference to the problem stated in Chapter V, section 7 & 8, GMD3 shall implement and maintain the following water quality protection activities:

1. ***Existing Pollution Problems.*** Any known pollution problems within the district, or outside of district boundaries that pose a direct threat to groundwater within the district, may be researched and evaluated or re-evaluated by staff. If staff deems it necessary to seek further

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control measures, whether it be in conjunction with other federal, state or local water-related agencies, or as its sole responsibility, staff will then present its recommendations to the board for consideration of appropriate action.

2. ***Potential Pollution Problems.*** The water quality program goal will be to prevent any future degradation of groundwater quality (water usability depletion) by attempting to identify all potential sources of pollution, and address or mitigate these before they create significant water usability depletion of district groundwater inventory.

3. ***Oil and gas industry monitoring***. GMD3 should consider accessing data on oil and gas activity in the district for staff review of information with appropriate state officials to screen for historically improperly constructed or plugged oil and gas wells that threaten loss of usable groundwater supply.

4. ***General monitoring***. GMD3 could also conduct random visual inspections of oil and gas leases, drilling, completion and plugging operations, feedlots, landfills and other waste dumps, storage facilities for fuels and chemicals, chemigation systems, abandoned or improperly maintained wells and any other agricultural or industrial site that staff considers to have the potential to cause groundwater usability depletion.

5. ***Abandoned water supply wells***. GMD3 may consider working with KDHE in their permitting of temporarily abandoned water wells under the Groundwater Exploration and Protection Act and provide any needed assistance to members for the management of wells to protect both well equities, groundwater usability and on-site public safety.

6. ***Groundwater gage network***. GMD3 may set up a network of observation wells in any area that additional water level or water quality data is needed to support program needs.

VII. CONCLUDING DOCUMENT STATEMENT

All activities of GMD3 are conducted with due consideration and appreciation for the diverse local, state and federal interests, institutions and partner interests. The governance of groundwater supply for the district by GMD3 under the rights and powers delegated by the Kansas legislature are fully retained and are implemented in a manner consistent with state and federal law through the elected Board supervision of the adopted Management Program, Board by-laws, Board resolutions, state administrative rules and orders adopted for the district and the actions of the Board to provide guidance and services under practice guidance, contracts or other instruments of cooperative governance and agreements. An understanding of the groundwater governance of the district and public interest should include a review of these and other pertinent laws, rules and governing documents.

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