

## Barfield, David [KDA]

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**From:** Titus, Kenneth [KDA]  
**Sent:** Thursday, April 4, 2019 5:04 PM  
**To:** Preheim, Lynn; Orrin Feril; dnwfarm@gmail.com  
**Cc:** Barfield, David [KDA]; Beightel, Chris [KDA]  
**Subject:** Informal LEMA Plan Comments  
**Attachments:** 2019-02-21 Quivira NWR LEMA Request to DWR Approved (KT 040419).docx

**Importance:** High

Lynn, Orrin, and Darrell,

Based on the conversation during our recent Stafford meetings, Lynn indicated that it would be helpful to receive some informal feedback on your LEMA plan. I've attached a copy with a number of preliminary comments. As we explained at that time, this should not be considered a formal rejection of your proposed LEMA, but we have taken the time to identify some initial concerns that will need to be addressed during this process. We continue to work with BGW to firm up our understanding of the various hydrological questions that have been discussed and are hopeful that we can provide a more complete review of your LEMA plan in the near future.

As always we are happy to try and answer any questions you may have about this review.

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**Request for Quivira NWR LEMA Submitted to the  
Chief Engineer, Kansas Department of Agriculture – Division of Water Resources**

February 21, 2019

**Overview and Goal Expression**

In an effort to address the Quivira National Wildlife Refuge (“the Refuge”) impairment complaint in Big Bend Groundwater Management District #5 (“the District”), the District Board of Directors proposes the following plan be submitted via the Local Enhanced Management Area (“LEMA”) process per K.S.A. 82a-1041 for an area designated in Attachment 1.

The goal of the LEMA is to provide a satisfactory remedy to the impairment complaint at the Refuge. The LEMA is intended to reduce the hydrologic stress from irrigation operations on the aquifer and the interrelated stream systems, while restoring the supply to prior uses on the stream system. The objectives are to reduce water use in the LEMA area to a degree that will temper the growth of future streamflow losses and to restore the useful supply to diversion points of the Rattlesnake Creek region.

This LEMA shall exist only for the ten-year period beginning January 01, 2020 and ending December 31, 2029. The LEMA shall include all points of diversion within the LEMA boundaries with priority date after August 15, 1957 located in the following sections as indicated by Attachment 1:

**LEMA Boundary**

**Edwards County**

- Township 24 South, Range 16 West, Sections 1-3, 9-16, 20-29, 32-36
- Township 25 South, Range 16 West, Sections 1-36
- Township 25 South, Range 17 West, Sections 13, 20-36
- Township 25 South, Range 18 West, Sections 25, 34-36
- Township 26 South, Range 16 West, Sections 1-36
- Township 26 South, Range 17 West, Sections 1-36
- Township 26 South, Range 18 West, Sections 1-5, 8-17, 19-36

**Kiowa County**

- Township 27 South, Range 16 West, Sections 1-36
- Township 27 South, Range 17 West, Sections 1-36
- Township 27 South, Range 18 West, Sections 1-17, 20-28, 33-36
- Township 28 South, Range 16 West, Sections 1-12, 16-18
- Township 28 South, Range 17 West, Sections 1-18
- Township 28 South, Range 18 West, Sections 1-3, 11-12

**Pawnee County**

- Township 22 South, Range 15 West, Sections 24-26, 34-36
- Township 23 South, Range 15 West, Sections 1-4, 8-17, 19-36
- Township 23 South, Range 16 West, Sections 24-25, 35-36

**Pratt County**

- Township 26 South, Range 13 West, Sections 2-10, 15-22, 28-33
- Township 26 South, Range 14 West, Sections 1-36

**Commented [TK1]:** In order to establish a LEMA, one of the conditions in K.S.A. 82a-1036(a)-(d) must exist in the area to be designated. See for example the GMD4 District-Wide LEMA and SD-6 LEMA proposals on our website, they specifically state their purpose is to reduce groundwater declines.

**Commented [TK2]:** Good that you have a goal statement, but as currently formulated, this will cause us problems. In order to initiate LEMA proceedings, K.S.A. 82a-1041(a)(3) requires that a plan propose goals and corrective controls as authorized under (f) that will meet the stated goals. Unless your overall goal is something measurable, it will be difficult to say if the corrective controls can meet the goal. For example, this could include provide X acre-feet of water to Quivira or to reduce withdrawals to X acre-feet per year, etc.

**Commented [TK3]:** Again, a good goal, but without it being something that can be quantified, it is not really possible to say whether any proposed corrective controls are adequate.

**Commented [TK4]:** What is the rationale for putting an end date when you consider this plan necessary to help solve the impairment? Instead, listing criteria at which the LEMA can be dissolved would be better.

Township 26 South, Range 15 West, Sections 1-36  
Township 27 South, Range 13 West, Sections 5-7  
Township 27 South, Range 14 West, Sections 1-12, 14-21, 29-30  
Township 27 South, Range 15 West, Sections 1-36  
Township 28 South, Range 15 West, Sections 4-7

### Stafford County

Township 21 South, Range 12 West, Sections 28-29, 31-36  
Township 22 South, Range 11 West, Sections 7, 16-21, 28-33  
Township 22 South, Range 12 West, Sections 2-36  
Township 22 South, Range 13 West, Sections 1-2, 6-36  
Township 22 South, Range 14 West, Sections 1-3, 9-36  
Township 23 South, Range 11 West, Sections 4-9, 17-18  
Township 23 South, Range 12 West, Sections 1-35  
Township 23 South, Range 13 West, Sections 1-36  
Township 23 South, Range 14 West, Sections 1-36  
Township 24 South, Range 12 West, Sections 1-24, 26-35  
Township 24 South, Range 13 West, Sections 1-36  
Township 24 South, Range 14 West, Sections 1-36  
Township 24 South, Range 15 West, Sections 1-36  
Township 25 South, Range 12 West, Sections 3-9, 17-19  
Township 25 South, Range 13 West, Sections 1-35  
Township 25 South, Range 14 West, Sections 1-36  
Township 25 South, Range 15 West, Sections 1-36

The LEMA will combine the efforts of several parties to create a holistic approach to stabilizing the use of water in and around the Rattlesnake Creek subbasin. The District is seeking partner agencies at the state and federal levels in addition to working with both public and private organizations to bring all available resources together into a unified plan.

**Commented [TK[5]]:** Just above you say an objective is to reduce water use, not stabilize. Can you clarify the intent of these different statements?

#### 1) Background

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The District has, for the past forty (40) years, striven to fulfill the following mission statement:

*“Big Bend Groundwater Management District #5 was organized through the efforts of concerned citizens to conserve, promote, and manage groundwater resources so that quality and quantity of that resource will be maintained for present and future needs. The Groundwater Management laws (K.S.A. 82a-1020-1035) establish the right of local landowners and water users to determine their own destiny with respect to the use of groundwater within the basic law of the State of Kansas”*

In the years leading up to the establishment of the District, the local landowners made a large investment to construct and operate wells for irrigation, stockwater, industrial and other types of beneficial use. The District’s management programs and subsequent regulations have greatly limited the groundwater development in many areas of the District.

In the District’s first management program approved June 6, 1976, the Board of Directors recognized the unique nature of the local area and implemented guidelines to protect and conserve the Great Bend Prairie aquifer. These included strict monitoring of water use with flow meters,

well spacing requirements, discouragement of waste of water and encouragement of the re-used water sources. In the 1979 district management program, the Board of Directors implemented a safe yield policy and maximum reasonable quantity for irrigation to limit the development even further. The District further solidified the safe yield for the area through the promulgation of K.A.R. 5-25-4 in 1980. By revising K.A.R. 5-25-4 in 1984, the Board of Directors further limited the safe yield policy to 3,000 acre-feet (“AF”) in a two-mile radius. The District formally closed to new appropriations on December 17, 1998 through another revision to K.A.R. 5-25-4. As a result of these management objectives and regulations, the water level declines have been limited. In severely dry years, the District does experience declines in the local Great Bend Prairie aquifer. However, in years of average to above average precipitation, the District recharges quickly.

In 1993, the Rattlesnake Creek Partnership (“Partnership”) was formed to develop and implement solutions to water resource concerns within the subbasin. The Partnership was comprised of the District, Water Protection Association of Central Kansas (“Water PACK”), Kansas Department of Agriculture – Division of Water Resources (“KDA–DWR”), and United States Fish and Wildlife Service (the “Service”). In 2000, the Partnership developed the Rattlesnake Creek Management Program (“program”) following several years of hydrologic study and public outreach. The program utilized new management tools (end gun removal, water banking, streamflow augmentation, multi-year flex accounts, etc.), education outreach programs, and enhanced compliance and enforcement to achieve the established goals. Several of these programs were voluntary/incentive-based tools that were not available at the beginning of the program. In fact, some of the programs did not get significant participation until after 2012. As a result, not every conservation goal outlined in the program was met at the end of the program in 2012.

In 1999, a task force was established to study the viability of water banking in Kansas. The task force determined that water banking could be a powerful incentive-based tool for conservation that would result in water being put to its most economic and beneficial use. However, there was no mechanism in Kansas statutes that would allow the establishment of water banks in Kansas. In 2001, K.S.A. 82a-761 *et seq.* was adopted by the legislature. K.S.A. 82a-765 requires that each chartered water bank will result in a savings of 10 percent or more in the total amount of groundwater consumed for a representative past period. In 2005, the Central Kansas Water Bank Association (“Association”) became the first chartered water bank in the state. While the Association covers the same geographic boundaries, has the same staff, and utilizes the same monitoring network as the District, the Association is governed by a separate board of directors and funded entirely through its own administrative fees. The Association has undergone several changes since its inception in 2005, but still offers the same services to the water users of the region. The Association offers area water users two programs for the flexible use of the water resource. The first program is for the transfer of a portion of the historical water use of a water right(s) to other areas within the same subbasin. The second program allows a portion of unused water to be preserved for future use at the same location. These programs have gained in popularity and give water users added water use flexibility while conserving water.

In 2008, the District, with technical assistance and peer review from the Partnership, contracted with Balleau Groundwater Inc. to develop a high-resolution hydrologic model of the District (Balleau Groundwater, Inc., 2010). This hydrologic model (“BBGMDMOD”) is designed to have seven layers representing unique geologic formations below the ground surface. One of the primary reasons for multiple layers is to be able to track the movement of water between these

layers. This is especially important for the area surrounding the Refuge, where the tracking of poor quality water will be important. BBGMDMOD has been the primary tool utilized by KDA-DWR and other stakeholders to evaluate the effects of groundwater pumping and surface drainage within the subbasin. However, the majority of the work conducted by KDA-DWR to date has been done using an alternative version of the model which flattens the seven layers into a single layer. When evaluating water movement, specifically lower quality water, the seven-layer model is the only option available that can conduct this analysis properly.

On April 8, 2013, the Service officially filed an impairment claim on the Rattlesnake Creek against junior appropriators within the subbasin. The Service alleged that junior appropriators were reducing the flows in the Rattlesnake Creek such that their use prevented the Service from exercising Water Right File No. 7,571. Following this filing, the Chief Engineer and KDA-DWR staff began investigating the hydrologic effects of junior pumping on the subbasin. The District's BBGMDMOD was used to conduct this investigation, in addition to further discussions with Service staff regarding water management at the Refuge. In July 2016, the Chief Engineer published the final report detailing the investigation (Barfield, 2016).

Since 2016, the District has submitted proposals to the Service in an effort to settle the impairment complaint through agreement (Big Bend Groundwater Management District No. 5, 2016) (Big Bend Groundwater Management District No. 5, 2017). These proposals have been declined. The District remains committed to working to resolve the impairment complaint utilizing the most current science, effective tools, and programs available.

In June 2017, the District requested an outline from KDA-DWR regarding the basic requirements for a successful remedy to the impairment complaint at the Refuge. In July 2017, the Chief Engineer and staff described the remedy as an augmentation wellfield capable of supplying 15 cfs to the stream channel and achieving a reduction of the future streamflow depletion as of 2003. With this goal established for an effective remedy, the District board by formal motion in August 2017, determined that a LEMA plan would be the framework for the remedy. The District has worked since 2017 to develop this LEMA plan that is based on the best data available, including BBGMDMOD data, economic impact data and expert hydrology recommendations.

**Commented [TK[6]:** This reference to 2003 is unclear and seems inconsistent with our statements about reducing depletions.

**Commented [TK[7]:** It appears that this plan is intended to implement the water use reductions prescribed by KDA-DWR in 2017. To do that, the allowable withdrawals by time period and geographic area need to be defined, and the means by which these withdrawal limits will be enforced needs to be unequivocally defined.

The plan must contain, and people need to know:  
When will augmentation be available?  
If aug is fully developed:  
    How much can be withdrawn, in what area, over what time period?  
    Who can withdraw it (priority, proximity)?  
If aug is delayed: same questions  
If aug never happens: same questions

## 2) Reduce Hydrologic Stress and Augment Depleted Flows

### a. Hydrologic Stress Factors

The District will work with water right holders and users to enhance the water use efficiency for all types of use within the LEMA boundary including, but not limited to, irrigation, municipal, stockwater, recreation, domestic, and industrial uses. A few dozen pre-1957 priority operators will be excluded from the end gun curtailment program detailed in subsection (i) unless they voluntarily elect to participate.

The reduction in water use in this area will be achieved through the execution of several objectives that include, but are not limited to: 1) permanent retirement of water rights through the expansion of the Conservation Reserve Enhancement Program ("CREP") and the Water Transition Assistance Program ("WTAP"), 2) permanent purchase and retirement of water rights by the District or other third parties, 3) permanent movement of

water from hydrologically sensitive areas to less sensitive areas, 4) temporary water leases through the Association, 5) temporary set aside and rotation programs, 6) enrollment in Water Conservation Areas, 7) removal of invasive tree species (*i.e.*, Russian olive, salt cedar, etc.), or 8) any combination of these programs that have the positive hydrologic effect to the region as confirmed using BBGMDMOD.

The response to the LEMA program will be seen slowly during the LEMA period. It is not practical to measure that response at the Zenith gage, due to the other factors that affect the baseline in the absence of the LEMA program (weather and a myriad of variables in streamflow other than irrigation).

- i. **Irrigation Use:** Consumptive use savings by irrigation use will be achieved by requiring the removal of any nozzle at the end of the center pivot system that has a larger bore diameter than the previous nozzle on the center pivot system, commonly referred to as end guns. Effective December 31, 2019, all these types of end guns will be removed to prevent the wetting of the acres beyond the end of the center pivot system.

District staff has compiled a database of the end guns within the LEMA boundary. These locations are indicated in Attachment 2. As of January 2015, the District determined that there were 1306 end guns installed on center pivot systems within the LEMA boundary. The District has worked hard to estimate the water savings that will result by removing end guns. The District estimates a savings of 14,750 AFY.

Additional management action to reduce consumptive use will also be needed. BBGMDMOD suggests that another 4,000 AFY of water use or its hydrologic equivalent needs to be curtailed in the high impact area around St John (Attachment 1). BBGMDMOD suggests that this reduction amount in water use will lessen the growth of future streamflow losses at Zenith gage. The high impact area is further defined by the sections in the list below:

## High Impact Area

### Pratt County

Township 26 South, Range 14 West, Section 6  
Township 26 South, Range 15 West, Section 1-6

### Stafford County

Township 22 South, Range 11 West, Sections 30-31  
Township 22 South, Range 12 West, Sections 19-20, 25-36  
Township 22 South, Range 13 West, Sections 25-27, 32-36  
Township 23 South, Range 12 West, Sections 1-10, 17-19, 30-31  
Township 23 South, Range 13 West, Sections 1-36  
Township 23 South, Range 14 West, Sections 12-14, 23-28, 32-36  
Township 24 South, Range 13 West, Sections 1-23, 26-34  
Township 24 South, Range 14 West, Sections 1-36  
Township 24 South, Range 15 West, Sections 12-13, 24-26, 35-36  
Township 25 South, Range 13 West, Sections 4-8, 18  
Township 25 South, Range 14 West, Sections 1-24, 26-34

**Commented [TK[8]:** These are good voluntary efforts that can be taken at any time without a LEMA. Please keep in mind that these are not corrective controls that can be ordered by the Chief Engineer, so are not considered part of the LEMA.

**Commented [TK[9]:** As will be noted later, this is a problem because it eliminates one of the ways we would actually measure the effectiveness of any corrective controls. How will the effectiveness be measured? The objective of the pumping reductions is long-term, to slow the on-going growth of depletions. We have used the model to determine what level of pumping reductions will accomplish that goal. While an improved and recalibrated model might adjust the numbers, we have never envisioned nor do we think it practical to "measure a response at Zenith."

**Commented [TK[10]:** This is the only corrective control that you propose, *i.e.*, this is the only thing in your plan that the Chief Engineer can order to be done by water users.

**Commented [TK[11]:** You state on the next page that "the LEMA plan does not have a water use reduction requirement".

**Commented [TK[12]:** Ok, but problematic because no where in this document to you actually require this amount of water to be reduced. It would be appropriate to explain why end guns are being singled out for administration

**Commented [TK[13]:** This needs to be 4,400 AF or equivalent.

**Commented [TK[14]:** Again, confusing because you also consistently say use doesn't need to be reduced.

Township 25 South, Range 15 West, Sections 1-3, 10-15, 21-29, 32-36

The District will hold meetings throughout the LEMA area to showcase how to utilize technology effectively to maximize the economic yield into the future while reducing the water diverted within the LEMA area. Such technologies include, but are not limited to, mobile drip irrigation, soil moisture probes, telemetry monitoring, and variable rate irrigation. The District will work with state and federal agencies to provide attractive cost shares for the implementation of technologies that conserve water. Water technology farms are a good way to showcase these technologies to nearby producers. Through these farms, producers can see how the implementation of new technologies can save water while maintaining or improving the economic viability of the area. Through the LEMA, the District will work to promote the establishment of additional technology farms within the LEMA boundary.

**Commented [TK[15]:** Similar to other comments. You seem to acknowledge that water needs to be reduced but don't actually require it.

The implementation of Water Conservation Areas (“WCA”) will be encouraged to allow water users to achieve water savings specific to their own needs. The WCA statute was established in 2015 to provide a “simple, streamlined and flexible tool that allows any water right owner or group of owners the opportunity to develop a management plan to reduce withdrawals” from the aquifer. The WCA tool will be promoted to allow extra flexibility to water users while conserving the water resource.

Throughout the development of the LEMA plan, the District has explored many options to give due consideration to past conservation. Because the LEMA plan does not have a water use reduction requirement the consideration to water users who have already implemented reductions is not an issue.

**Commented [TK[16]:** You state several places above that water use will be reduced, but this directly contradicts that. This plan prevents a measure of savings through water use and through the actual effect at Zenith, so there is no way to practically measure the effect of any corrective controls and if they actually meet the stated goal. Further, there is nothing in the place the requires water use to be reduced.

- ii. **Municipal Use:** According to the U.S. Geological Survey (Lanning-Rush & Restrepo-Osorio, 2017), the average gallons per capita per day (“gpcd”) for public water suppliers (“PWS”) in Kansas is 138 gpcd over the past five years. There are seven PWS within the LEMA boundary:

**Commented [TK[17]:** If you have misstated what your intent was, then it creates a new problem in that people that have already voluntarily removed their endguns have been using less water and you aren't making any accommodations to support them as required by statute.

Public Water Supplier	GPCD (2011-2015)	UFW (2011-2015)
<b>Belpre</b>	152	21 %
<b>Greensburg</b>	283	11 %
<b>Haviland</b>	152	8 %
<b>Macksville</b>	123	12 %
<b>Mullinville</b>	203	15 %
<b>Stafford</b>	124	12 %
<b>St John</b>	140	20 %

The U.S. Geological Survey study also calculated the percent unaccounted for water (“UFW”) for each PWS. The gpcd and ufw are listed in the chart above.

The Great Bend Prairie Regional Advisory Committee (“the RAC”) has a goal to attain less than 20 percent water loss by 2025 and less than 10 percent water loss by 2045. The District will work with the RAC and each municipality to reduce the gpcd and ufw.

The District's efforts will include educational outreach to schools and public service groups.

- iii. **Stockwater Use:** The District will work with each livestock facility, KDA–DWR, and KLA to improve the efficiency of water delivery where feasible through existing tools available. These tools include the utilization of thermostatically controlled tanks versus continuous flow water tanks and the implementation of water reuse systems. The water savings will be on a case-by-case basis.

Livestock facilities utilizing effluent from the facility's lagoon in accordance with K.A.R. 5-6-14 are exempt from the end gun removal requirement to allow the use of the end gun for that purpose.

- iv. **Recreation Use:** There are water rights within the LEMA area for recreation use. The District intends to work with the holders of these rights to ensure the water is put to beneficial use when appropriate for the area in which the holders are diverting water.

The District will work with state agencies to ensure that existing conservation plans are updated to promote more efficient methods of operations that are specific to the needs of each water right.

- v. **Industrial Use:** There are water rights for industrial use within the LEMA area. These uses will be reviewed to determine where water efficiencies can be gained. The District will encourage the use of lower quality water where feasible as a replacement for fresh water.

b. **Streamflow Augmentation Program**

In 2014, Governor Sam Brownback signed into law revisions to K.S.A. 82a-706b(a)(1) which is specific to the Rattlesnake Creek subbasin to "allow augmentation for the replacement in time, location and quantity of the unlawful diversion, if such replacement is available and offered voluntarily." This legislation was the subject of overwhelming supporting testimony from several groups from across the State, which resulted in unanimous action from the Kansas legislature to approve the bill. The concept of augmentation is to utilize the aquifer underground as a reservoir to supply water to the stream in times of shortage.

Streamflow augmentation will be implemented from a to-be-constructed wellfield designed with a delivery capacity of nominally 15 cubic feet per second ("cfs"), more or less, to the Rattlesnake Creek stream channel. Based on the analysis conducted by Balleau Groundwater Inc. ("BGW"), the intent of augmentation is to provide an additional water source to enhance the unique habitat the Refuge provides for various endangered species. The ability to utilize underground water in times of need further protects the biological integrity, diversity and environmental health of the Refuge. The area surrounding the Refuge has been underdeveloped for large-scale irrigation historically due to the water quality in the upper zones of the aquifer. However, this area does have a quantity of water that can be appropriated in a sustainable manner. The sources supporting the augmentation wellfield have been examined in BBGMDMOD as was done in the impairment analysis.

**Commented [TK18]:** You need carefully consider your approach here. This LEMA is to solve an impairment and therefore if these water rights are junior to Quivira, some form of priority needs to be considered, even if it is a minor cut. This is not like GMD4 where there is no impairment.

**Commented [TK19]:** Just a reminder that the LEMA itself does not order augmentation. Perhaps you would be better served to list augmentation and the other voluntary programs in an appendix to the LEMA, so as to avoid giving the public the impression that the Chief Engineer is authorizing those activities as part of the LEMA. Although it is fine to reference those things in your plan as well....



The augmentation wellfield yield is supported by induced capture of evapotranspiration from adjacent water-logged soils and wetland vegetation, in addition to sources captured from formerly-rejected recharge by making space available in the aquifer. Rattlesnake Creek is to be augmented by waters that are now lost to the atmosphere, bypassed as storm runoff in Peace Creek, or discharged as brackish baseflow to the east. This further supports the concept of augmentation as a remedy for the impairment complaint at the Refuge.

According to the various augmentation studies conducted within this subbasin, there are several key factors that need to be addressed. These include, but are not limited to: wellfield location, wellfield capacity, pumping rate, delivery rate, water quality, delivery frequency, and delivery location. The District has analyzed augmentation for each factor.

i. Location

A wellfield south of the Refuge has been identified as an optimal location for the foreseeable future. The precise locations of this wellfield have not been finalized as further studies will be needed to determine water availability and quality. However, a conceptual augmentation system is shown in Attachment 3. The water table in this area is stable enough to support augmentation. The large-scale development for irrigation and other practices has been limited due to the natural water quality in the area. The water quality in the upper zones of the aquifer is very similar to the water quality already feeding the Little Salt Marsh. The conceptual wellfield is thought to overlie areas that can safely yield higher quantities of freshwater without risk of up-coning poor-quality water. Further site-specific test drilling will be required to ensure proper placement of wells in a way to protect the upper zone of the aquifer from degradation. BBGMOD simulates shallow fresh-water ingress to the wells at a higher rate and volume, dominating and diluting any smaller upward migration from saline sources. Observation wells will be installed to provide additional locations to test water quality and verify water table elevations and eventual trends of water quality. The concept is to use a location in T23S, R11W south of Peace Creek and west of Salt Marsh Road. Wells will be sited with screen lengths and depths to access the yield and quality of water suited to the Refuge requirement as presented, or the range of 3,000 to 9,000  $\mu\text{S}/\text{cm}$  in terms of specific conductance.

ii. Diversion & Delivery Rate

The District will pay the cost to develop, construct, and operate a 15 cfs wellfield south of the Refuge. Based on conversations with the Chief Engineer, KDA–DWR has determined that up to 15 cfs is an appropriate max flow rate/instantaneous capacity. Water will then be delivered directly to the Rattlesnake Creek channel immediately upstream of the Refuge. The discharge released to the stream is intended to make up the diversions required to serve the Refuge water right file # 7571 of 1957 priority date. The end gun program is not expected to fully reverse trends or to provide a complete offset of future streamflow losses; thus, the augmentation wells will serve to deliver flow sufficient to meet the objective for serviceable supply on this reach of Rattlesnake Creek. Water lines will be installed in a manner that will minimize any disturbance to surface lands and utilize already authorized right of ways where possible to get access to the creek channel. This delivery location complies with the statutory requirement of K.S.A. 82a-706b (a)(2) to allow augmentation as a remedy. It is assumed that the Kansas Department of Health and Environment (“KDHE”) will require special permitting approved due to the similarity of ground and

**Commented [TK[20]]:** It seems incorrect to state that this was an agreed upon maximum, especially based on recent conversations. Further, whether it is sufficient for the long term is dependent upon water use reductions, which needs to be reflected here also.

**Commented [TK[21]]:** It might helpful to reflect that end gun removal will extend the life of the augmentation project so that reliable flows are available?

surface-water quality in the area. Kansas Surface Water Quality Standards recognize the chloride content of Rattlesnake Creek above Little Salt Marsh being 1400 mg/l.

iii. **Real-Time Operation**

The hands-on operation of the augmentation wellfield does not hinge on knowing the magnitude of effects from the end gun program. The wellfield will deliver a make-up flow to the stream depending on conditions of streamflow and diversion requirement as observed. Diversion requirements are given by the Refuge and applied with practical considerations in the Chief Engineer's impairment analysis. The peak 15 cfs wellfield has the ability to serve those requirements. Calculations and diversion reports suggest that about one-third of the time augmentation will not be needed, one-third of the time 15 cfs will be needed, and a wellfield release of 5 or 6 cfs will characterize the middle third of days. The Refuge is understood to have operable storage capacity to accommodate at least a week's volume if the deliveries over or under perform by a few cfs for a few days. The District proposes that the delivery rate be set weekly in coordination with Refuge requests and KDA-DWR staff review of conditions on the stream. Rain, high flows or bypass of the Refuge diversions would warrant shut-down of augmentation delivery, then restoration when those conditions pass. The Refuge reports about 25 cfs as the peak month average diversion rate. If that is the current diversion capacity on the Refuge, then augmentation can be shut down at higher flows. The Refuge and District will need to coordinate such factors. As confidence in standard practice is realized, the initial hands-on control of discharge might be handed over from the District to KDA-DWR or Refuge staff.

**Commented [TK[22]:** This whole section might be better as an appendix on operation of augmentation or something along those lines as it doesn't directly relate to the LEMA itself.

**Commented [TK[23]:** As this is somewhat unknown, it should be something like "will be designed to..."

**Commented [TK[24]:** The Service has indicated LSM has a significant habitat function that is stage dependent at times. While the Service can and does release from LSM does to marshes below, it cannot be assumed that storage can be used in this way.

**Commented [TK[25]:** Should be 30 CFS.

**Commented [TK[26]:** Mentioned in previous drafts, but please strike KDA-DWR from this section as the state is not authorized to take over or operate such a project.

iv. **Annual Water Quantity**

The augmentation wellfield will release an adequate volume of suitable groundwater delivered to the creek channel for use by the Refuge to meet the management objectives for maintaining forage and habitat. The water provided will be measured for rate and quality at the point it is placed in the creek channel. The capacity of the wellfield exceeds the amount suggested to relieve the impairment complaint, in most years, of the Service's water right at the Refuge in the Chief Engineer's final impairment report. In the Chief Engineer's final impairment report, the analysis conducted was retroactive and reviewed any impairment that may have occurred prior to the Refuge's claim of impairment in 2013. Based on a prospective analysis by BGW that looks at years after the 2013 claim of impairment, augmentation pumping is sustainable, effective, and does not degrade the quality of water the Refuge requires. The authority for such water will be processed in the same manner as any other water right with KDA-DWR. This evaluation by KDA-DWR will further ensure that there will not be an increase in permitted consumptive use in the area. The new appropriative water right will be considered non-consumptive as the quantity authorized will be combined and limited to the authorized quantity already appropriated under Water Right File No. 7571. In no calendar year will the combined quantity diverted from the augmentation wellfields and the surface diversions at the Refuge exceed 14,632 AF.

**Commented [TK[27]:** Can you explain how the addition of water from the augmentation system does not increase consumptive use?

v. **Water Quality**

The quality of this water would fall within the specified range (3,000 to 9,000  $\mu\text{S}/\text{cm}$ ) presented by the Service. The water quality can be managed based on the requirements of Refuge staff by providing more or less fresh water from redundant capacity of wells with

varying water quality. As stated before, the water quality in the aquifer surrounding the Refuge is analogous to the source of the baseflow water quality utilized in Little Salt Marsh. As a result, the water quality at the Refuge will not be altered in suitability for use through the implementation of the augmentation plan. Coordination with KDHE will be crucial in this process to ensure the water quality of the Rattlesnake Creek stream channel is maintained throughout this project.

vi. Drought

In times of severe drought, as defined by the Palmer Drought Severity Index of -3.0 or less, augmentation will continue to be provided to those water management structures defined in the Service's water conservation plan as amended in 2019.

Augmentation shall not occur in times of bypass flow or times of release from storage in Little Salt Marsh. The augmentation water must be put to a concurrent beneficial use or held in storage for later beneficial use.

**Commented [TK[28]:** Needs clarification to match actual Refuge operations.

c. Hydrologic Effect

Throughout the development of the LEMA plan, the District has consulted with BGW to conduct a thorough analysis of the LEMA plan using BBGMDMOD. Combining the effects of the end gun removal from center pivot systems, streamflow augmentation, water rights retirement and water right transfers, the BGW concluded that the LEMA plan improves the Service's ability to meet its water needs more frequently than before the Refuge was established in the 1950's as shown in Attachment 4.

**Commented [TK[29]:** If you want to include this section, it needs to contain additional data and citations.

3) Central Kansas Water Bank Association

**Commented [TK[30]:** It does not appear that this section adds anything to the LEMA plan. If there is a direct role for the Water Bank in the LEMA, it should be spelled out, otherwise, it is unnecessary in this document.

- a. The District is fortunate to have the only functioning water bank in the state of Kansas. This provides a unique opportunity to allow for additional flexibility in the water use of the area while implementing real water conservation. In the early years (2005-2010), there was little participation in the Association due to restrictive rules, an uninformed public, and confusing methodologies. The Association has addressed these issues through public outreach meetings and amendments to statutes, rules, and policies governing water bank activity. In recent years there have been significant advances in the participation from area water users. It is anticipated that this growth will continue in coming years. The Association is beginning another evaluation as required by statute by an independent panel of experts in water law, economics, geology, and hydrology. The District intends to work with the Association to update the programs to promote the movement of water away from highly sensitive areas within the Rattlesnake Creek subbasin.
- b. The review process will take time to be completed. As a result, it is difficult to estimate the outcome of the review in addition to the timeliness of the updates. The District will work closely with the Association to ensure that the Association programs continue to provide area water users with flexible water conservation options.
- c. The District has partnered with The Nature Conservancy ("TNC") to pursue funding to incentivize the transfers of water out of areas of concern. The intent of this funding is to

provide added financial incentive to water users in priority areas to deposit water into the Association for use outside of these priority areas. By providing financial incentive it is believed that this will further promote these transfers and provide added water conservation for areas of high impact to the stream channel.

#### 4) Violations

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- a. The LEMA order of designation shall serve as initial notice of the creation of the LEMA and its terms and conditions to all water right owners within the LEMA area on its effective date.
- b. Upon the District learning of an alleged violation, District staff will provide KDA–DWR with the information the District believes shows the alleged violation. KDA–DWR shall investigate within 60 days and impose restrictions and fines as described below or allowed by law.
- c. In the event that the District or KDA–DWR determine that a water user is operating a center pivot system with a functional end gun installed without a written exception from the District, KDA–DWR will address these violations as follows:
  - i. operation of the end gun within the first six months of the LEMA plan will result in notification of the offense to the landowner;
  - ii. operation of the end gun following the first six months of the LEMA plan will result in an automatic one-year suspension of the water right and a \$1,000 fine for every day of operation up to a maximum of \$10,000.
- d. KDA–DWR will address violations of the authorized quantities in accordance with K.A.R. 5-14-12, as amended July 14, 2017.
- e. In addition to other authorized enforcement procedures, if the District Board finds by a preponderance of evidence that watering of unauthorized acres, waste of water, meter tampering, removing the meter while pumping, or any other overt act designed to alter the metered quantity as described in K.A.R. 5-14-10 occurred, then the District Board will make a recommendation to the Chief Engineer that a written order be issued which states:
  - i. the nature of the violation;
  - ii. the factual basis for the violation; and
  - iii. that the water right is suspended for 5 years.

**Commented [TK[31]]:** Other LEMAs actually provide notice to each user in the area, such as sending a post card with a link a website with a copy of the Order of Designation.

**Commented [TK[32]]:** If there are written exceptions, there needs to be some criteria spelled out in this plan.

#### 5) Meters

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- a. All water right owners shall be responsible for ensuring their water flow meters are in compliance with state and local law(s). To ensure accurate measurement of water throughout the LEMA, the District and/or KDA–DWR will place a seal on all water flowmeters or measuring chambers in 2020.
- b. In addition to maintaining compliance and reporting water usage annually from each point of diversion, all water right owners shall install and maintain an alternative method of

determining the time that the well is operating. This information must be sufficient to be used to determine operating time in the event of a meter failure. Should the alternative method fail or be determined inaccurate, the well shall be assumed to have pumped its full annual authorized quantity for the year in question. Well owners/operators are encouraged to give the details of the alternative method in advance to District staff in order to ensure that the data is sufficient.

- c. Any water right owner or authorized designee who finds a flow meter that is inoperable or inaccurate shall within three business days contact the District office concerning the matter and provide the following information:
  - i. water right file number;
  - ii. legal description of the well;
  - iii. date the problem was discovered;
  - iv. flow meter model, make, registering units and serial number;
  - v. the meter reading on the date discovered;
  - vi. description of the problem;
  - vii. what alternative method is going to be used to track the quantity of water diverted while the inoperable or inaccurate meter is being repaired/replaced;
  - viii. the projected date that the meter will be repaired or replaced; and
  - ix. any other information requested by the District staff or Board regarding the inoperable or inaccurate flow meter.
- d. Whenever an inoperable or inaccurate meter is repaired or replaced, the owner or authorized designee shall submit form KDA-DWR 1-560 Water Flowmeter Repair/Replacement Report to the District within seven days.
- e. This metering protocol shall be a specific annual review issue and if discovered to be ineffective, specific adjustments shall be recommended to the Chief Engineer by the advisory committee.

#### 6) Advisory Committee

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- a. The LEMA Advisory Committee shall consist of nine (9) members. Seven (7) of the Advisory Committee members shall be appointed and maintained by the District board as follows: five (5) District Board members representing each of the five counties included in the LEMA area; one (1) representative of Water PACK; and one (1) stakeholder from within the LEMA area. The remaining two (2) Advisory Committee members shall be nonvoting members ex officio as follows: one (1) District staff member and one (1) KDA-DWR staff member. One of the Advisory Committee members shall chair the committee, whose direction shall be to further organize and meet annually to consider:
  - i. water use data;
  - ii. water table information;
  - iii. economic data as is available;
  - iv. compliance and enforcement issues;
  - v. any new and preferable enhanced management authorities become available; and

**Commented [TK33]:** Consider adding USFW representative as a non-voting member.

vi. other items deemed pertinent to the advisory committee.

## 7) LEMA Order Reviews

- a. In addition to the annual status reviews per Section 6, the LEMA Advisory Committee shall conduct a formal LEMA Order review no later than 18 months before the ending date of the LEMA Order, which will allow the parties to revisit the terms and evaluate its efficacy after a meaningful period of observation. Review items will focus on economic impacts to the LEMA area and the local public interest. Water level data may be reviewed by the committee.
- b. The committee, in conjunction with KDA-DWR and the District, shall produce a report following the formal review to the Chief Engineer and the District board which contains specific recommendations regarding future LEMA actions. All recommendations shall be supported by reports, data, testimonials, affidavits or other information of record.

**Commented [TK[34]:** 82a-1041(j) requires a public hearing review conducted by the Chief Engineer. How does this review fit into that process? There must be a public hearing review within 7 years (unless you state later within this plan), and it would be more appropriate to submit the Advisory Committee report/recommendations to the CE at the public hearing. In any case, how all these reviews intertwine needs to be clarified.

In summary, this section is confusing regarding what reviews will take place, what standards they are actually reviewing against, and what purpose the reviews serve.

## 8) Corrective Controls

- a. The LEMA Order review identified in Section 7 shall be conducted in a manner to determine if further revisions to the order are necessary at that time. The LEMA Advisory Committee, in conjunction with KDA-DWR and the District, shall review:
  - i. The water use reports and imagery of end gun acres reduced will be examined alongside BBGMDMOD results to determine annual water use in the LEMA area. When evaluating the effects of the amount of water savings achieved, if there is a different distribution of water savings that has the same hydrologic result as demonstrated with the BBGMDMOD and approved by the Chief Engineer, then the program will be considered successful and no modified controls will be necessary.
  - ii. The augmentation wellfield implementation will be reviewed to determine the effect augmentation has on the immediate area surrounding the wellfield. The goal for augmentation implementation is a fully-operational peak 15 cfs wellfield and delivery system to the Rattlesnake Creek stream channel.
- b. If during the LEMA Order review, the capacity of the augmentation wellfield is either insufficient or excessive, the appropriate modifications to the augmentation wellfield will be made to come in line with the hydrologic conditions as determined by BBGMDMOD. These modifications will be based on the most up-to-date modeling available at the time. The District will plan to have BBGMDMOD updated and calibrated six months prior to the review outlined in Section 7 and 8.
- c. Following the LEMA Order review, if the LEMA Advisory Committee, with assistance from KDA-DWR and the District, determines that an augmentation wellfield cannot reasonably satisfy the District's obligations contained herein, the District shall explore additional methods to meet said obligations, including but not limited to the possible retirement of additional water rights. If those attempts are not successful and the District is not able to meet its obligations, then the District shall submit a written request to the

**Commented [TK[35]:** This is an odd title as there are no corrective controls listed here. This entire section lacks clarity, objective criteria, and measurable timelines. It is not possible to read this and understand what exactly will happen during a review or what will trigger an IGUCA.

**Commented [TK[36]:** What does this mean?

**Commented [TK[37]:** You have not set any clear goals about what annual water use should be.

**Commented [TK[38]:** Again, not a corrective control and this can't be ordered by the Chief Engineer. This is also too vague to be measured in any case. It also suggests that there is some metric that has been determined using the model. What is this metric? If it is going to be cited in the corrective controls, it should be part of the goals.

**Commented [TK[39]:** There are no obligations of the district. The only "obligation" is that people within the LEMA remove their endguns.

**Commented [TK[40]:** This is vague and could not be used to hold anyone accountable because there are no goals to meet. There are no timelines or concrete steps to follow and it is unclear what obligations that the district could fail to meet to trigger this provision. What happens if aug. is not built?

Chief Engineer for the formation of an Intensive Groundwater Use Control Area (“IGUCA”).

**Commented [TK[41]:** The Chief Engineer cannot bind a future board of directors to take action. If you want this to be a meaningful part of the plan, then it needs to be phrased such that when these specific criteria or conditions are met, this board is asking the Chief Engineer to initiate IGUCA proceedings.

#### 9) Impairment Complaints

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- a. While this program is being undertaken, the District stakeholders request that any impairment complaint filed in the District while the LEMA plan is in effect, which is based upon either water supply issues or a regional decline impairment cause, be received by the Chief Engineer, and be investigated by the Chief Engineer with consideration to the ongoing LEMA activities.

#### 10) Water Level Monitoring

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- a. The District maintains a routine water level measurement network throughout the Rattlesnake Creek subbasin area. This monitoring will continue throughout the term of the LEMA plan. In addition to the existing network, the District will install observation wells as necessary to monitor the impact of the augmentation wellfield. These measurements will be a part of the existing WIZARD database curated by the Kansas Geological Survey.

#### 11) Water Quality Monitoring

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- a. The District has been monitoring the surface water quality along the Rattlesnake Creek channel for several years. This monitoring will continue throughout the term of the LEMA plan on at least a quarterly basis. The observation wells that will be installed around the augmentation wellfield will be sampled routinely to enhance the understanding of the water quality in this area. Coordination with Kansas Department of Health and Environment will be crucial in this process to ensure the water quality of the Rattlesnake Creek stream channel is maintained throughout this project.

#### 12) Coordination

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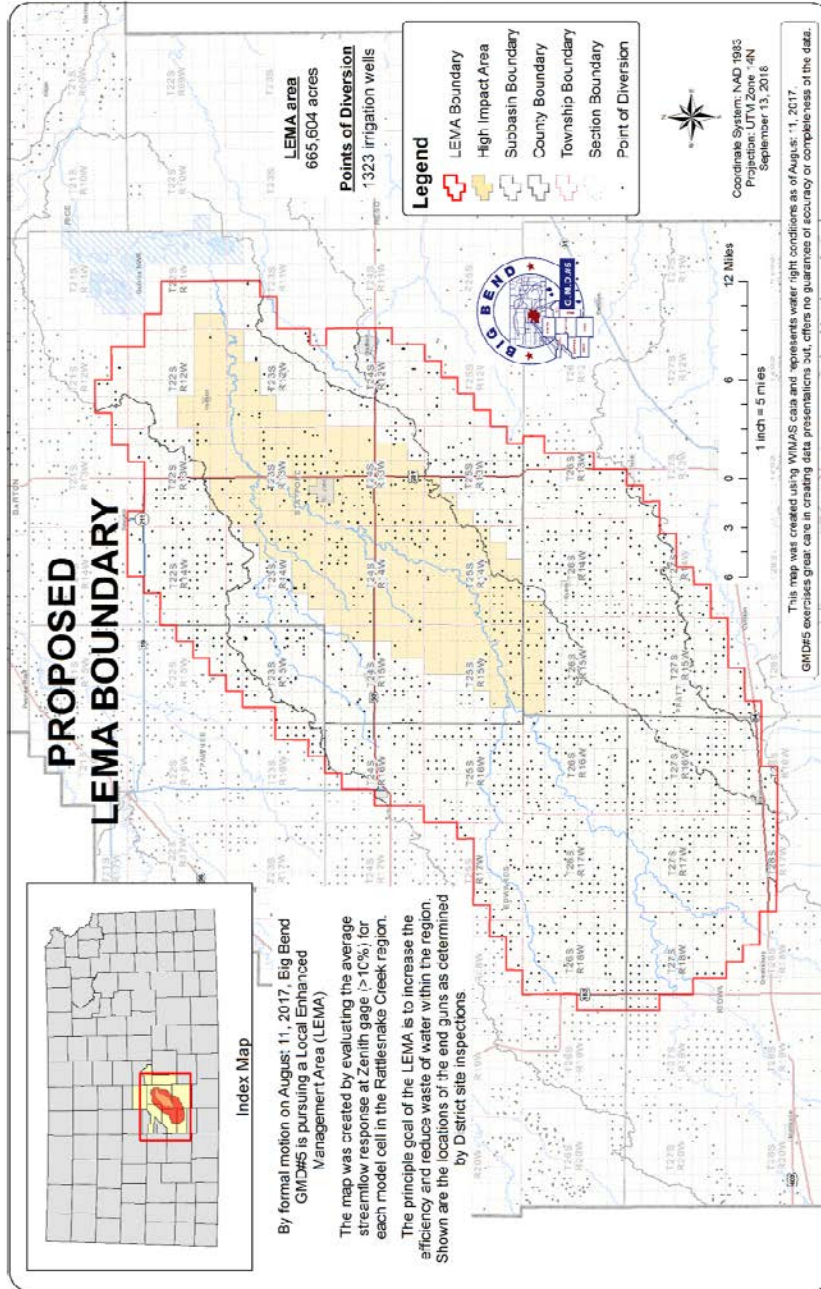
- a. The District stakeholders and the Board of Directors expect reasonable coordination between the Chief Engineer’s office and the District board on at least the following efforts:
  - i. Development of the LEMA Order resulting from the LEMA process;
  - ii. Compliance and enforcement of the LEMA order;
  - iii. Installing and maintaining seals on water flow meters; and
  - iv. Annual reporting of water usage and evaluation of progress toward overall LEMA goals.

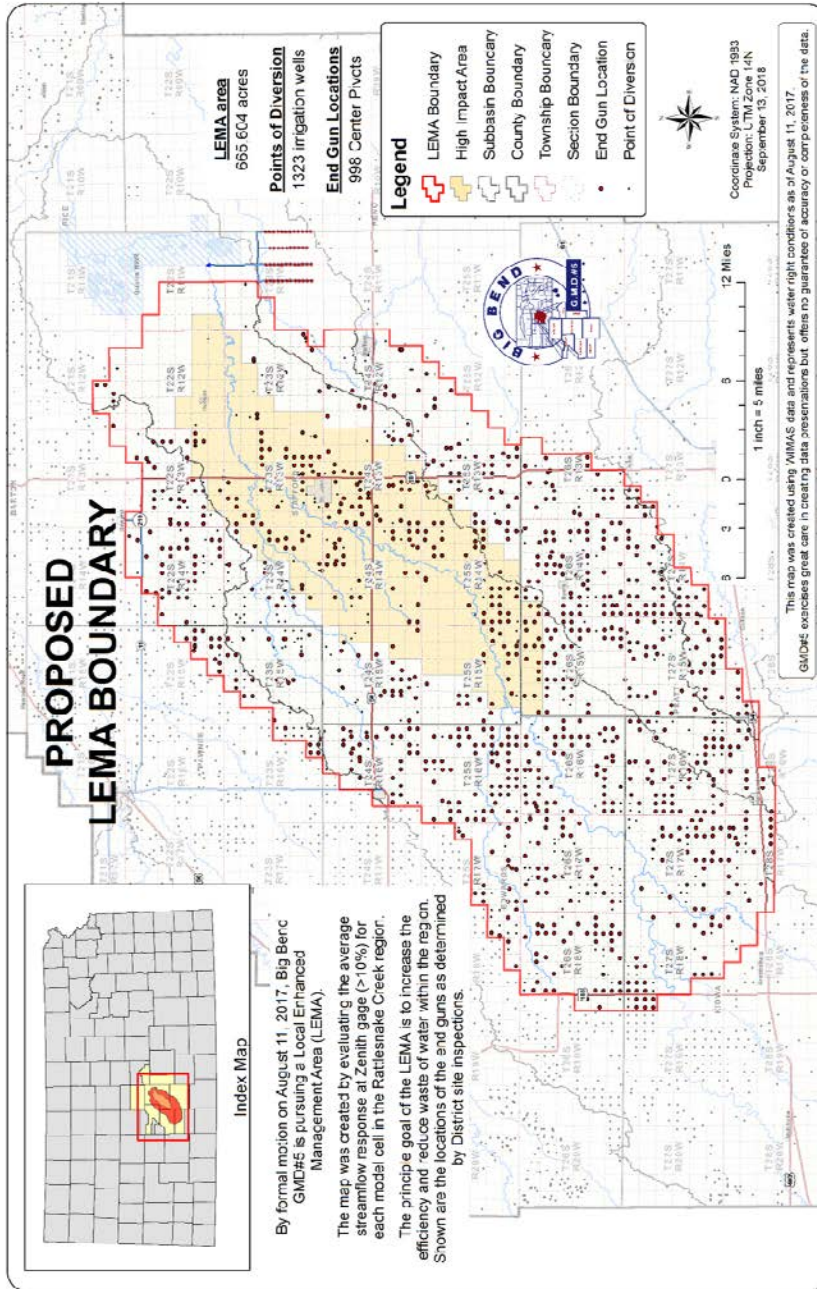
**Commented [TK[42]:** Need something to measure and quantify here.

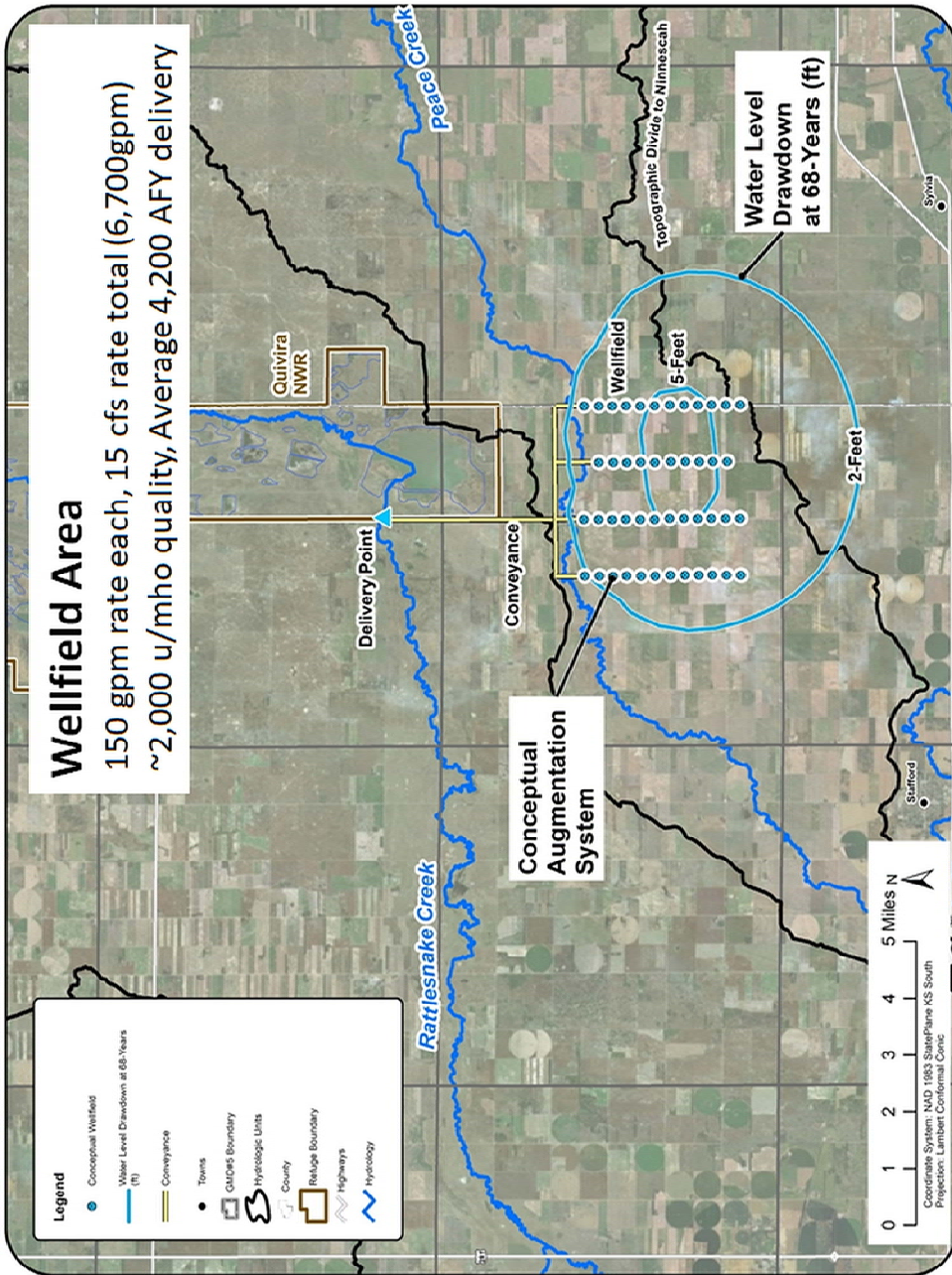
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- Barfield, D. (2016). *Final Report of the Chief Engineer*. Manhattan: Kansas Department of Agriculture - Division of Water Resources.
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- Lanning-Rush, J., & Restrepo-Osorio, D. (2017). *Public-Supply Water Use in Kansas 2015*. U.S. Geological Survey.









Attachment 4

