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August 30, 2017

David Barfield
CC: Jackie McClaskey, Sam Perkins, Alan Crane, Zachary Crane, Robert Neeland, Ronnie Ashworth, Stan Kaiser, Kyle Kaiser, Dawn Schilke, Carlton Bert, Johnny Blackwell, Dean Zook, Jerry Marmie, David Marmie, Larry Carr, Chris Pinkston, Todd Wycoff, Orrin Feril

Dear Mr. Barfield et al.:

We have some concerns about the recently updated “seahorse map” and the subsequently revised Zone A future projections (presumably to be used to update your proposal) that were posted to the “Quivira National Wildlife Refuge Impairment Complaint” website. We have detailed solutions to our concerns that we hope will meet with your and your team’s approval.

As background, I’m a sixth generation farmer in the Arkansas River Basin. I’ve been following the Quivira situation along with my dad, Alan Crane. My dad has been a farmer in Pawnee county all his life. He served on the GMD #5 board and the Kansas Water Authority. He attended all of the Rattlesnake management meetings, the ARK Basin meetings, and the Wet Walnut hearings. He has been dealing with water issues for nearly 40 years, and he is well informed of the complexities involved. He has shared his knowledge with me.

Prior to my coming back to the family farm five years ago, I worked as a research analyst for Nielsen BASES, forecasting sales volumes and writing statistical analyses for Fortune 500 consumer packaged goods companies, for nearly a decade. So I have a decent understanding of research study methodologies, statistical analysis, and reporting conclusions and recommendations.

The Mystery River Drainage Area Should Be Removed from All Proposed Solutions to the Streamflow at Zenith

While the new map may have eliminated the outliers in the original map that showed technically improbable areas impacting Zenith (according to my conversation with GMD 5), it now includes new areas in Zone A that are misrepresented as impacting the stream flow at Zenith. The impact of the water flow in the Mystery River drainage area in the Arkansas River Basin should be revised to 1% or Less and should be removed from any proposed or implemented consequences applied to the new Zone A because **this area does not impact the stream flow at Zenith.**

I. <u>Previous studies by the NRCS and U.S. Geological Survey determined the Mystery River drainage area did not impact the stream flow at Zenith. These studies were adopted and enforced by the DWR Chief Engineer.</u>

   A. Per previous Chief Engineer David Pope's January 13, 1999 letter to John Janssen (GMD 5 Board President at the time), "The water users within the Mystery River drainage areas will be eligible to participate in the incentive based/voluntary management alternatives developed by the Partnership [Rattlesnake/Quivira Partnership] as approved by the Chief Engineer. However, the alternative actions that are currently included in the management program as a method to achieve goals developed by the Partnership if the voluntary measures do not have the desired effect **will no longer be applicable to this area."**

      1. In other words, significant "lengthy" research was conducted by the NRCS and U.S. Geological Survey that was recognized and backed by the DWR Chief Engineer to determine that the Mystery River area has no impact on the Rattlesnake/Quivira issue, and is not to be included in any future consequences related to the Rattlesnake/Quivira Partnership issues. Including the Mystery River area in the proposed solutions would not help accomplish the goal of increasing the stream flow at Zenith.

II. <u>This area was not part of the previous 15 years of discussions and voluntary actions taken by the Rattlesnake Partnership, nor was it included in the Final Report as an area that impaired the Refuge's water right.</u>

   A. The final report that Chief Engineer David Barfield put together concerning the impairment claim for water right No. 7,571 states, "for more than 15 years, the Service worked with the **Rattlesnake Partnership**, seeking to bring about voluntary reductions in the use to improve its supply." Additionally, the report states, "using the modeling results and the Service's operational guide, which lays out the Refuge's seasonal water needs, KDA-DWR **finds that junior**

groundwater pumping in Rattlesnake Creek impaired the Refuge's water right, to varying degrees, in 26 of the 34 years 1974-2007."

1. No one, in all 15 years of trying to come up with a solution, questioned the non-inclusion of the Mystery River drainage area. It was not included because everyone knew and accepted the scientific research that this area did not impact the flow at Zenith. If the Mystery River drainage area DID impact the flow at Zenith, the people in this area would have been involved in the proposed solutions; however, it does not, and they were not.

2. The Chief Engineer concluded that pumping in the Rattlesnake Creek Basin impaired the Refuge's water right. The Mystery River drainage area is in the Arkansas Basin, not the Rattlesnake Creek Basin.

3. To include it now, on the backend, after the fact, is to put consequences on innocent landowners that were purposefully not involved in any discussions or votes regarding solutions in the Rattlesnake/Quivira Partnership.

III. <u>Anecdotal and actual evidence of water depths in the area support the NRCS and U.S. Geological Surveys that the underground water in the Mystery River drainage area does not flow east to Zenith.</u>

A. After farming in the area for 100 years and astutely keeping track of water depths in the area, we know that the underground water in the Mystery River drainage area flows <u>north-northeast</u>. The underground water is laid out in a series of fingers that angle this direction, along Antelope Run and Pickle Creek.

   1. For example, the bottom of the water on both the NW 1/4 of 34-22-15 (the headwater of Antelope Run) and the SW 1/4 27-22-15 near the Macksville road is 52 feet deep. Then, if you go a mile west or east of the Macksville road, the water depth is 89 feet. So, along the Macksville road is one of those underground ridges. We know the water depths all over the Mystery River drainage area. For underground water to run east and impact Zenith, it would have to crest the underground ridges. It's impossible for the water to do that.

B. Additionally, well depths on file are not necessarily representative of water depths. We know that some wells are older and weren't drilled as deep because it was unnecessary, while wells 50 feet away are twice the depth. You can not rely solely on recorded well depths to determine water depth and water flow. You have to live and farm in the area, know the ground, know the wells, *live the land* to get the full picture. Alan and other farmers in the area would be happy to provide interviews or ground tours to better shed light on the layout of the underground water in this area.

IV. <u>There was only one model run to determine the new "seahorse map."</u>

A. From what I understand, only one new model run was made. When this run eliminated the outliers, I am told, it was determined to be good enough. I understand that runs like these take money and time, but when they affect individuals' livelihoods, good enough isn't good enough. I fully recognize that I am not a statistician or privy to all of the modeling and calibrating that has gone into the GMD 5 model to date, but based on what I've read of the posted materials, I have some questions regarding the one new model run.

1. Has the new model run been reviewed by Balleau Groundwater, Inc.?

2. While I understand that the model has been calibrated and a peer review by SSPA determined it to be useful, they also stated that "carefully constructed sensitivity analyses be used…for water management decisions." In my understanding, several "what if" scenarios should be conducted and triangulated before creating recommendations. To that end…

   a) What is your confidence that your one run of 483 sections is representative of the full 3,960 base size they were kriged to? For people base sizes, we apply demographic weights to ensure that the sample is representative of the larger population, but for sections of ground there aren't any weights to apply.

      (1) With respect to that, did you try any additional "what if" scenarios, i.e. selecting a different 483 sections to see what those results would grant you? To me, if the first results weren't satisfactory, and the second results with just a slightly larger base size (because really when you're looking at 3,960 there isn't much difference between 263 and 483) and the removal or one assumption were so different in terms of the widening of Zone A, I would question those results as well. I would run the model several times with several different samples of sections in order to be sure of my results.

      (2) How were the first 263 PLSS sections selected, and how were the additional 220 PLSS sections selected? Can you provide a map of which sections were selected?

      (3) Is it possible to run the model using all sections or quarters in the area versus just a sampling?

      (4) Was any additional smoothing or hand tweaking done to the map output?

3. Simply put, I understand no one is going to be happy with the lines wherever they end up; however, I believe the conclusion that this one new model run is the

true and most accurate map to base recommendations on is premature and presumptive. The model is calibrated but not validated, meaning outside insight is a must in order to attain the most accurate results. I can't think of a single situation in my years at Nielsen when we reported our validated model's direct output without some adjustments based on additional data and analytical expertise. I believe both, multiple runs AND analytical adjustments to include anecdotal evidence and past NRCS and U.S. Geological Survey data are needed to confidently declare which areas impact the streamflow at Zenith, versus relying solely on the model output.

4. At the least, the map needs to be hand-revised to eliminate the Mystery River drainage area from Zone A and all proposed solutions to the stream flow at Zenith.

V. Of note, we are aware of farmers who recently purchased land in the Mystery River drainage area knowing that it was in the Arkansas River Basin and free of any consequences of a Quivira IGUCA. The ground's value is based on these facts. Including this area in any future consequences will significantly, dishonestly diminish the value of the land. This farmer would never invest in Rattlesnake Creek land for this very reason.

Given all of these facts, it is highly inaccurate to include the Mystery River drainage area in any proposals for future consequences to increase the stream flow at Zenith. This area should be removed from the proposed solutions to increase water flow to Zenith as imposing solutions on this area will not help the Service reach its goal.

Proposed Solution for Increasing Stream Flow at Zenith: Shutting off the MDS Wells in the Rattlesnake Creek Basin

While this issue doesn't affect us, as we are in the Mystery River drainage area and Arkansas River Basin, we'd like to propose shutting off the MDS wells in the Rattlesnake as a solution to the stream flow problem at Zenith. In 2013, Alan proposed this solution in a letter to David Barfield, Jim Bagley, and Ken Kopp. His original letter is included in the appendix.

I. The Chief Engineer's final report states, "Unless groundwater pumping operations change significantly in the Rattlesnake Creek Basin, it is reasonable to assume that junior groundwater pumping will prevent the Refuge from exercising its water right regularly in the future."

A. We have hand plotted all of the MDS wells in the Rattlesnake Creek Basin, and they total roughly 17,000 acre feet. The Rattlesnake Partnership's 12 year plan that was created in 2000 had the goal of saving 27,346 acre feet. Shutting off the MDS wells that account for 17,000 acre feet is an immediate way to "significantly change the pumping operations" in the Rattlesnake Creek Basin and would surely positively impact the Service's streamflow and help the Partnership reach their goal.

   1. All of the research suggests that any adjustments to pumping would take at least two years if not decades to realize the effects on stream flow. Shutting off the MDS wells now would immediately start this process while other (potentially unnecessary) measures are being discussed and implemented.

   2. Several future scenarios with 15% and 30% reduction have been run; however, none of those model runs (that are available for viewing online) included an option to just shut off all the MDS wells in the Rattlesnake Creek Basin. The GMD 5 has communicated to me that turning off the MDS wells doesn't make a difference; however, they have (as yet) provided no evidence to back up that claim. Given the amount of acre feet under MDS contracts, I am skeptical that shutting them off would make zero impact.

II. <u>Shutting off the MDS wells is cost effective.</u>

A. There have been several proposals for augmentation for which the GMD 5 has offered to foot the bill. This would come out of taxpayers' pockets. Shutting off the MDS wells does not cost the state or the community anything. While there may be financial impacts to the owners of those wells, those impacts were clearly stated in the MDS contracts and were a risk those owners were willing to take.

III. <u>Shutting off the MDS wells is the law per the agreement that MDS owners signed relating to K.S.A. 82a-703 a, b, and c: Minimum Streamflows Established.</u>

A. There is no need to begin the Socialism experiment of curtailing all water right holders in Zone A or Zone B until the law is followed (all MDS wells are shut off) and that impact is evaluated.

B. There are many farmers who did not drill MDS wells because they didn't want to take the risk that they would be shut off. However, many (including a majority of the GMD 5 board) did take that risk. And now, no one is willing to call their bluff. It is VERY clear from the agreement they signed: if the stream is not flowing they will not be allowed to divert water.

> "I also understand that if this application is approved, there could be times, as determined by the Division of Water Resources, when I would

not be allowed to divert water. I realize that this could affect the economics of my decision to appropriate water."

In other words, there has already been an agreement between the farmers and the DWR for how to increase stream flow. Everyone who signed this form already agreed to have their wells shut off.

IV. <u>There is precedent for shutting off MDS wells in Kansas.</u>

A. The Kansas Department of Agriculture website states that MDS is currently being administered on the "Little Arkansas River above Alta Mills (6 permits or water rights) began August 10, 2017."

Conclusion

We know this is just the beginning, that there will be a LEMA process, and that the state has simply made a proposal regarding curtailment in Zone A; however, we want to bring this Mystery River drainage area issue to your attention now to avoid any future disagreements.

We would ask that you revise your proposed solutions to not include any ground in the Mystery River drainage area as it will unfairly, negatively impact farmers in the area and will not achieve the goal of increasing stream flow at Zenith.

We would also ask that you consider including Minimum Desirable Streamflow administration in your proposals as the quickest, easiest, and cheapest way to increase stream flow at Zenith.

We look forward to working with you.

Sincerely,

Alan Crane and Rachel Crane

APPENDIX

1. **MDS form singed by MDS water right holders**
2. **2013 Letter from Alan Crane to DWR Chief Engineer including the 1999 Letter from Chief Engineer Pope to Mr. Janssen**
3. **Response from DWR to 2013 Letter from Alan Crane to DWR Chief Engineer**
4. **New “Seahorse Map”**

_____
(Date)

Kansas Department of Agriculture
Division of Water Resources
David W. Barfield, Chief Engineer
109 SW 9th Street, 2nd Floor
Topeka, Kansas 66612-1283

Re: Application
File No. _____

Minimum Desirable Streamflow

Dear Sir:

I understand that a Minimum Desirable Streamflow requirement has been established by the legislature for the source of supply to which the above referenced application applies.

I understand that diversion of water pursuant to this application will be subject to regulation any time Minimum Desirable Streamflow requirements are not being met.

I also understand that if this application is approved, there could be times, as determined by the Division of Water Resources, when I would not be allowed to divert water. I realize that this could affect the economics of my decision to appropriate water.

I am aware of the above factors, and with the knowledge thereof, request that the Division of Water Resources proceed with processing and approval, if possible, of the above referenced application.

_____
Signature of Applicant

State of Kansas)
) ss
County of _____)

_____
(Print Applicant's Name)

I hereby certify that the foregoing instrument was signed in my presence and sworn to before me this _____ day of _____, 20_____.

_____
Notary Public

My Commission Expires:

MINIMUM DESIRABLE STREAMFLOW FORM TO BE USED WHEN APPLICABLE WHEN FILING AN APPLICATION FOR PERMIT TO APPROPRIATE WATER FOR BENEFICIAL USE

The Kansas Legislature has established minimum desirable streamflows for the streams listed below. If your proposed diversion of water is going to be from one of these watercourses or adjacent alluvial aquifers, please complete the back side of this page and submit it along with your application for permit to appropriate water.

Arkansas River
Big Blue River
Chapman Creek
Chikaskia River
Cottonwood River
Delaware River
Little Arkansas River
Little Blue River
Marais des Cygnes River
Medicine Lodge River
Mill Creek (Wabaunsee Co. area)
Neosho River
Ninnescah River
North Fork Ninnescah River
Rattlesnake Creek
Republican River
Saline River
Smoky Hill River
Solomon River
South Fork Ninnescah
Spring River
Walnut River
Whitewater River

CRANE FARMS
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Alan Crane

1191 30th Ave.
Larned, KS 67550

620-910-7000
alanuspx@yahoo.com

April 10, 2013

David Barfield
CC: Jim Bagley
CC: Ken Kopp

Dear David, Jim, and Ken:

I'd like to bring two current water issues and their solutions to your attention.

1. Water rights listed in the WIMAS database are incorrect and need to be corrected per previous, documented agreements.

    a. At one time, the boundary for the Rattlesnake basin included the Mystery River drainage area; however, that was incorrect. The excerpt below from a letter (attached) sent by David Pope, Chief Engineer in 1999, to John Janssen, Board President of Groundwater Management District No. 5, states this very fact. David Pope confirmed that the boundary would be changed back to it's original location, so that the Mystery River drainage area was correctly included in the Arkansas River Basin, not the Rattlesnake Basin.

> "This new program and all of the data analysis, work of interested parties and planning that has gone into it, has included the Mystery River drainage area of the Rattlesnake that is now considered part of the middle reach of the Arkansas River Basin."

    b. Per this agreement, the water rights for the land within the Mystery River drainage area were to be changed in the DWR's water rights database to align with the Radium Forum, (see excerpt below from attached letter and see attached map); however they were not. Because of this, the water rights in the DWR's database do not match the information at the local county seats, which *do* correctly reflect the alignment of the Mystery River drainage area in the Arkansas Basin.

> "The water rights within the Mystery River drainage area will be changed from the Rattlesnake Creek Basin to the Arkansas River Basin in the DWR's water rights database."

    c. Specifically, the following wells need to be changed in your database from the Rattlesnake Basin to the Arkansas River Basin to align with the agreement reached in 1999 and the original/current county seat records. There may be others that need to be changed, but the wells listed below are of most concern to me. Please let me know by April 17th either that these wells have been updated or send a timeline of when I can expect them to be updated.

WR FILE NUMBER	PRIORITY DATE	PDIV LOCATION PER KGS WEBSITE (TWP RNG SECT QUAL ID)	SIMPLE LEGAL DESCRIPTION	COUNTY
A 17017 00	24-FEB-1970	22S 15W 36 NCNW 1	NW 1/4 of 22S 15W 36	Pawnee
A 12313 00	17-OCT-1966	22S 15W 26 NESENE 4	NE 1/4 of 22S 15W 26	Pawnee
A 33895 00	06-FEB-1980	22S 14W 19 NCSW 1	SE 1/4 of 22S 14W 19	Stafford
A 31622 00	07-APR-1978	22S 15W 35 NCSE 3	SE 1/4 of 22S 15W 35	Pawnee
A 31830 00	07-JUN-1978	22S 15W 35 NCSE 3	SE 1/4 of 22S 15W 35	Pawnee
A 26104 00	05-MAR-1976	22S 14W 20 NCNE 2	NE 1/4 of 22S 14W 20	Stafford

2. The second issue I'd like to bring to you attention is the agreement signed by all owners of MDS wells with the Department of Water Resources stating that if the Arkansas and Rattlesnake Basin streams didn't flow, their MDS wells could be shut off.

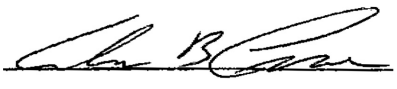
    a. Per the recent GMD #5 Annual Meeting, David stated that the streams are not flowing.

    b. Currently, the majority of the GMD #5 board is made up of MDS right holders who are ignoring the agreement they signed in order to spread the penalty of restricted water usage, due to the river not flowing, across ALL well/water-right holders. However, senior and junior right holders should not be subject to any restrictions until all of the MDS wells (those drilled after April 1984) are shut off first, per the signed agreement. There are close to 100,000 acre feet of MDS wells in the GMD #5. Once these MDS wells have been shut off, if further water usage reduction is needed, the senior rights holders (those with wells created prior to 1978, when the IGUCA rules were written) and junior rights holders (those with wells that were drilled between 1978 and 1984) would be willing to consider a discussion about a reduction in usage.

    c. The solution to the water impairment issues, per the agreement signed, is that all MDS wells should be shut off first before any other steps are taken against senior or junior water rights holders. I sent a letter in 2009 as an example of how to make it work with declining areas. As a side note, the MDS well owners could go to the water bank or buy senior water rights and move the rights to their MDS wells if necessary.

Thank you very much for your time. I would be happy to discuss either of these issues in more detail any time. I look forward to your confirmation of the database changes requested.

Sincerely,



Alan B. Crane

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Alice A. Devine, Secretary of Agriculture

DIVISION OF WATER RESOURCES
David L. Pope, Chief Engineer-Director
901 South Kansas Avenue, 2nd Floor
Topeka, Kansas 66612-1283
(785) 296-3717 . FAX (785) 296-1176

KANSAS DEPARTMENT OF AGRICULTURE

John Janssen
Board President
Groundwater Management District No. 5
125 Main Street
Stafford, Kansas 67578

January 13, 1999

Re: Rattlesnake Creek Basin Boundary

Dear Mr. Janssen,

I am writing in reference to the Rattlesnake Creek basin boundary issue and the Subbasin Program work currently underway. As you know, the topic of the basin boundary has been a point of interest for several government agencies and water right holders in the district for the past couple of years. Recently, the revised Hydrologic Unit Code series 14 (HUC14) basin boundaries were finalized and made available by the Data Access and Support Center at Kansas Geological Survey. This was done after a lengthy process by which the boundaries were reviewed, modified, and finalized by the Natural Resources Conservation Service in cooperation with U.S. Geological Survey. The Division will now adopt the new basin boundaries under the HUC 14 series to use in our administrative procedures. This leaves some question about how the area originally considered part of the Rattlesnake and now as the Mystery River drainage area within the Arkansas River Basin, should be handled.

As you also know, during the time period that the above described work was being completed, the Rattlesnake Subbasin Program and work of the Rattlesnake/Quivira Partnership was underway. It is my understanding that the Partnership will be submitting a new management program for my review in the near future. This new program and all of the data analysis, work of interested parties and planning that has gone into it, has included the Mystery River drainage area of the Rattlesnake that is now considered part of the middle reach of the Arkansas River Basin. Recently, there have been some questions regarding how this issue might be handled. After consideration, I believe it should be handled in the following manner:

1) The water rights within the Mystery River drainage area will be changed from the Rattlesnake Creek Basin to the Arkansas River Basin in the DWR's water rights database. Water right holders will be notified of this change.

2) The water users within the Mystery River drainage area will be eligible to participate in the incentive based/voluntary management alternatives developed by the Partnership as approved by the Chief Engineer. However, the alternative actions that are currently included in the management program as a method to achieve goals developed by the Partnership if the

ary measures do not have the desired effect will no longer be applicable to this area.

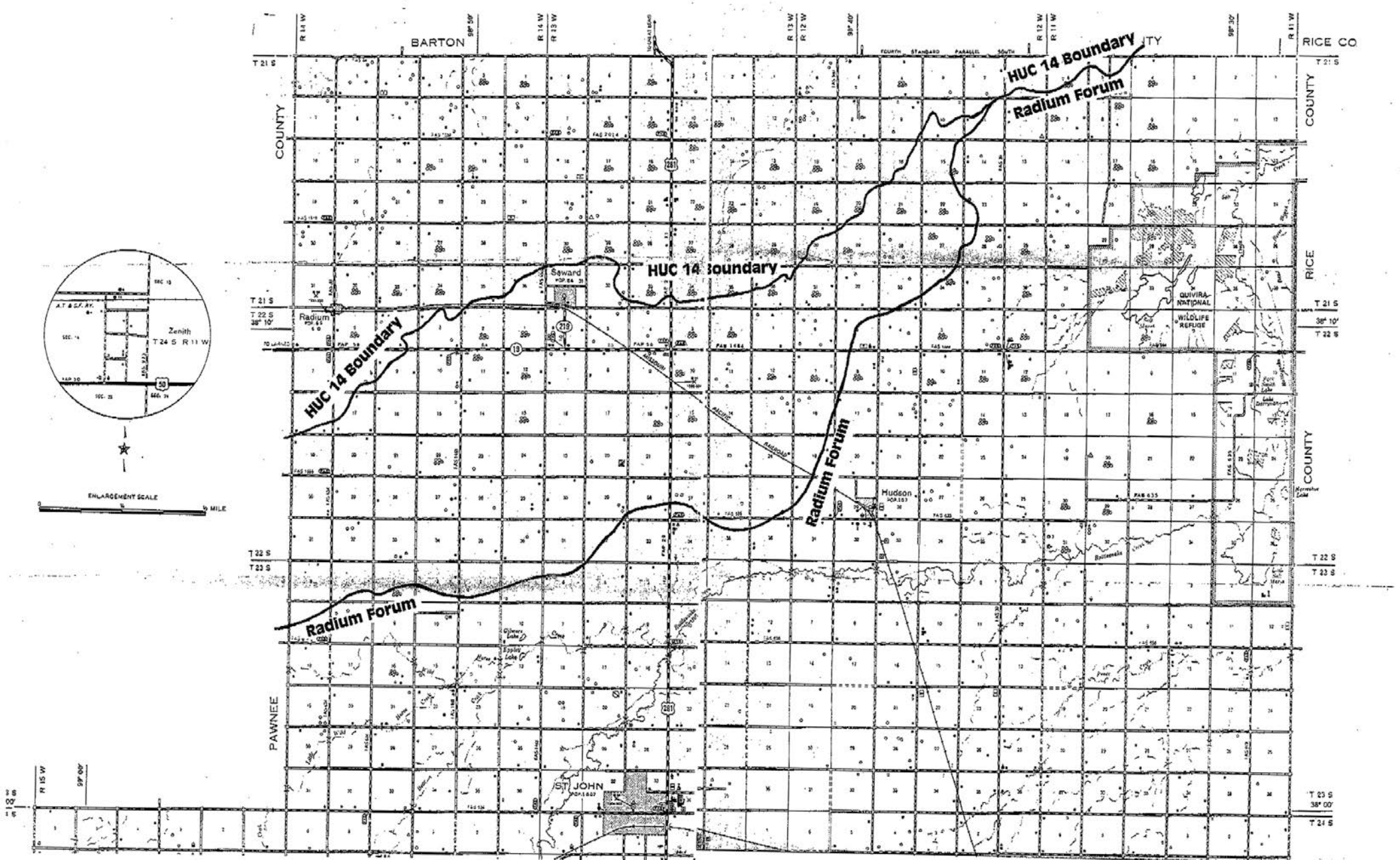
) As the Middle Arkansas Subbasin Program proceeds it will add to its consideration
rea of the Arkansas River Basin and develop new management alternatives as
te to address any groundwater declines that exist.

with the above described actions is to provide a practical and fair approach to handle
cant change in the area of a watershed that is about to finalize and implement a new
nt program which has included the water rights information and water users from this
process. My staff intends to begin notifying water rights holders as early as next
t the change in basin designation according to the water rights database. I hope that
ation is helpful in putting the finishing toucher on the Rattlesnake management
s well as in your work with water right holders. Please do not hesitate to contact me
with questions or concerns about this subject.

Sincerely,

David L. Pope, P.E.
Chief Engineer

ah M. Zarta Gier, Basin Team Project Manager
gley, Acting Program Manager, Water Management Services
Falk, Water Commissioner, Stafford Field Office


HUC 14 Boundary
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T 21 S
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38° 10'
38° 00'

Alan Crane April 12, 2013 at 5:39 PM

Re: WIMAS Database Errors and Water Impairment Issues

To: Bagley, Jim, Barfield, David, Kopp, Kenneth

Thanks so much for your quick response Jim. I checked WIMAS today, and everything looks good. I appreciate your help.

Thanks,
Alan Crane

620-910-7000

From: "Bagley, Jim" <Jim.Bagley@KDA.KS.GOV>
To: Alan Crane <alanuspx@yahoo.com>; "Barfield, David" <David.Barfield@KDA.KS.GOV>; "Kopp, Kenneth" <Kenneth.Kopp@KDA.KS.GOV>
Sent: Thursday, April 11, 2013 8:23 AM
Subject: RE: WIMAS Database Errors and Water Impairment Issues

WRIS was corrected today. The corrections should show up in WIMAS tomorrow.

James O. Bagley, P.E., Section Head
Kansas Department of Agriculture
Water Management Services
Technical Services
(785) 296-6083
Jim.Bagley@kda.ks.gov
www.ksda.gov/dwr

From: Alan Crane [mailto:alanuspx@yahoo.com]
Sent: Wednesday, April 10, 2013 12:58 PM
To: Barfield, David; Bagley, Jim; Kopp, Kenneth
Subject: WIMAS Database Errors and Water Impairment Issues

Hello David, Jim, and Ken -

Please find a letter attached detailing two current water issues and their solutions.
- The first is in regards to errors in the WIMAS database for six wells/water rights.
- The second is my suggested solution to the water impairment issues in the Rattlesnake and Arkansas River Basins.

Please let me know that you received this e-mail, and please notify me when the WIMAS database has been updated. Also feel free to mail or call at any time to further discuss either of these issues.

Thanks very much for your time,

Alan Crane

_____
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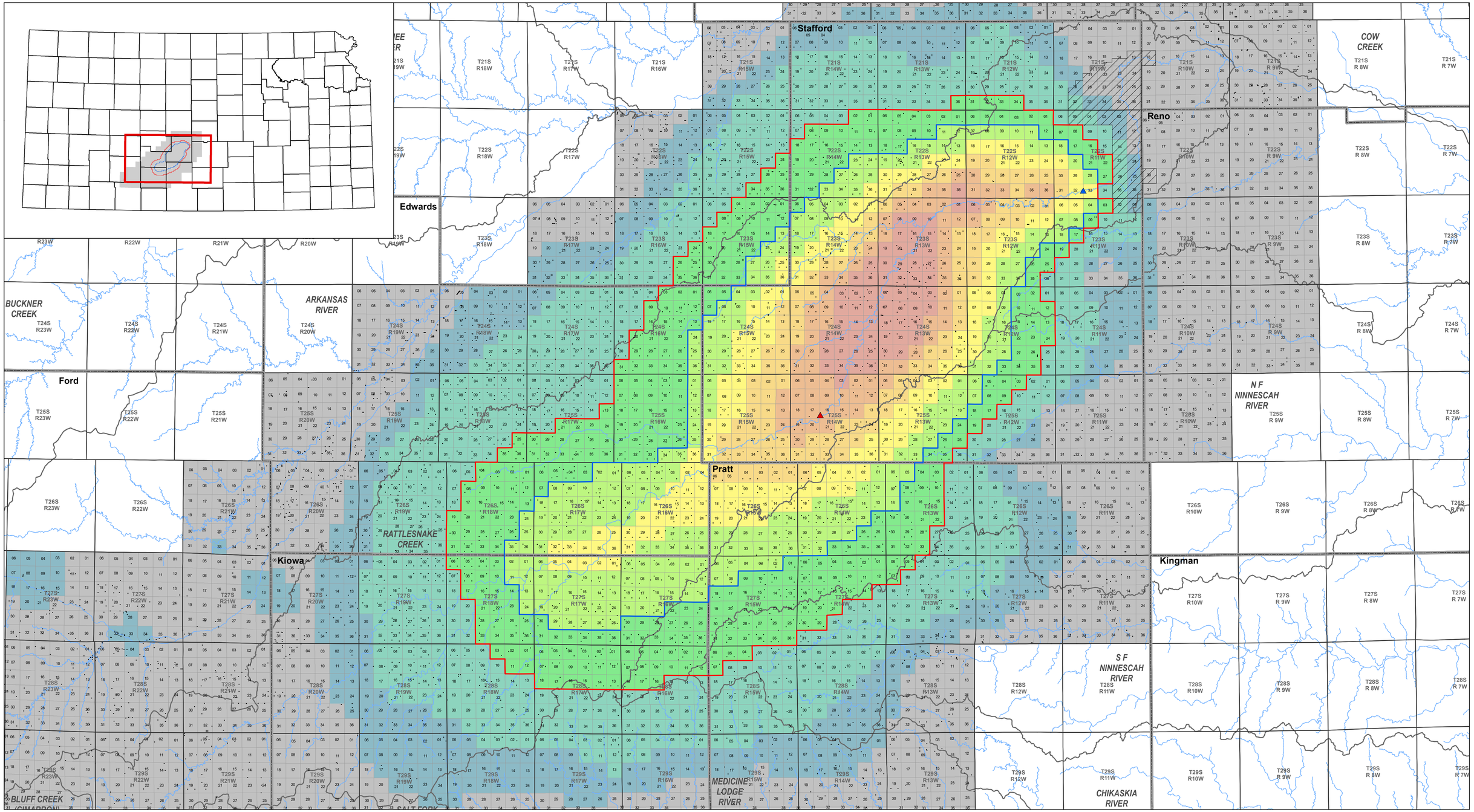
620-910-7000

Rattlesnake Creek Streamflow Response Regions

1998 - 2007 average streamflow response (pct) at Zenith gage evaluated in 110 townships and 483 sections and kriged to 3,960 sections in and near Rattlesnake Creek basin and groundwater points of diversion junior to Quivira



Stream Response (Percent)

- 60.1 - 90.0
- 50.1 - 60.0
- 40.1 - 50.0
- 30.1 - 40.0
- 20.1 - 30.0
- 10.1 - 20.0
- 3.1 - 10.0
- 1.1 - 3.0
- 1.0 or Less

- Zone A
- Zone B
- Quivira

- Zenith Station
- Macksville Station
- Point of Diversion

- Major Streams
- Basins

0 2 4 6 12 18 Miles

N

Disclaimer - Features on this map represent conditions as of the date of the map and are subject to change.

Kansas Department of Agriculture
Division of Water Resources
August 4, 2017