
Revaluation of Burns & McDonnell's R9 Ranch Modeling Results



S.S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

February 1, 2023

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Prepared by:



Steven P. Larson



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REPORT

Section 1

Qualifications

This report was prepared by Steven P. Larson. Mr. Larson is a Principal with S.S. Papadopoulos & Associates, Inc. (SSP&A), a firm that provides consulting services related to environmental and water-resource issues. His area of expertise is hydrology, with emphasis on groundwater hydrology including assessment of soil and groundwater contamination.

Mr. Larson holds a Bachelor of Science in Civil Engineering from the University of Minnesota (1969), and a Master of Science in Civil Engineering, also from the University of Minnesota (1971). He is a member of the National Ground Water Association and the American Institute of Hydrology. He is also certified as a Professional Hydrologist with the American Institute of Hydrology.

Prior to joining SSP&A in 1980, Mr. Larson was employed as a hydrologist with the Water Resources Division of the U.S. Geological Survey (USGS) for almost 9 years. During his tenure with the USGS, he conducted numerous hydrological studies on a variety of groundwater and surface water problems. During his tenure with the USGS, Mr. Larson was responsible for the development and use of groundwater simulation models that were used by other scientists in the USGS.

Mr. Larson has spent the last 40 years with SSP&A conducting and managing projects related to a variety of environmental and water-resource issues. During his tenure at SSP&A, Mr. Larson has been involved in projects covering a wide spectrum of technical, environmental, and legal issues including environmental impact evaluations, evaluations of water-resource development, water-rights permitting and adjudication, remedial investigations at CERCLA and other waste-disposal sites, feasibility studies, engineering evaluations/cost analyses, and remedial action plans.

Mr. Larson has also testified as an expert in numerous legal and administrative forums. These cases have included permit and licensing hearings, water-rights adjudications, arbitration hearings, interstate compact claims, toxic torts, liability claims, various legal actions under CERCLA, property damage claims, and insurance claims.

Mr. Larson has also served as a technical expert in several interstate water disputes. These include: *Kansas v. Colorado*, No. 105, Orig.; *Nebraska v. Wyoming*, No. 108, Orig.; *Kansas v. Nebraska*, No. 126, Orig.; *Montana v. Wyoming*, No. 137, Orig.; *South Carolina v. North Carolina*, No. 138, Orig. and *Mississippi v. Tennessee*; and *Memphis, Light, Gas, & Water Division*, No. 143, Orig. This work has included testimony as an expert in the fields of hydrology, groundwater hydrology, and hydrologic modeling.

Mr. Larson has also served as a consultant and advisor to the State of Kansas on several groundwater modeling studies. These efforts include the cooperative development of a groundwater model by the States of Kansas, Nebraska and Colorado for the Republican River basin that provides input to evaluations of compliance with the Republican River Compact. Mr. Larson has also served on technical committees to review the development of groundwater models for the Rattlesnake Creek basin by the Kansas Geological Survey and for the Arkansas River basin

by Balleau Groundwater, Inc. (BGW) on behalf of Groundwater Management District 5. The latter model is the model used by Burns & McDonnell (BMcD) in their evaluation of the R9 Ranch transfer application.

A copy Mr. Larson's curriculum vitae (CV) is attached to this report.

Section 2

Summary of Evaluation

BMcD, on behalf of the Cities of Hays and Russell, Kansas, submitted reports describing the potential impacts of changing the groundwater use on the R9 Ranch from irrigation to municipal supply (BMcD, 2018a; 2018b). The potential impacts of the change in groundwater use were evaluated using a groundwater flow model developed by Big Bend Groundwater Management District No. 5 (BGW, 2010).

Burns & McDonnell prepared two reports describing their modeling evaluation, an initial report (BMcD, 2018a) and a revised report (BMcD, 2018b). The revised report was prepared to correct technical errors in the initial evaluation that were identified by Balleau Groundwater as part of their review of the BMcD evaluation and by BMcD after further review.

The revised evaluation prepared by BMcD did not address “alternative” approaches to the modeling evaluation offered by BGW or Keller-Bliesner Engineering (BMcD, 2018b). The concerns raised by BGW and Keller-Bliesner included concerns about changes in water budgets caused by the transfer.

When irrigated land is taken out of irrigation, soil moisture conditions become dependent on incident precipitation. More importantly, the lack of irrigation to increase and maintain soil moisture impacts the amount of incident precipitation that can recharge the groundwater. This difference in conditions is reflected in the relationships used in the groundwater model to estimate groundwater recharge associated with incident precipitation. Precipitation on irrigated land will produce greater recharge to groundwater than the same precipitation on non-irrigated land. These different relationships are described in the report by BGW on the development of the groundwater model.

The BMcD projected future scenarios did not account for the reduction in groundwater recharge associated with changing the status of lands on the R9 Ranch from irrigated to non-irrigated. The BGW groundwater model was premised on the concept of increased groundwater recharge from precipitation on irrigated lands. To be consistent with this premise when evaluating a transfer, the groundwater recharge on irrigated land must be reduced when that land is no longer irrigated.

The evaluation in this report reevaluates the projected future scenarios used by BMcD considering that the future condition of no irrigation will result in less groundwater recharge from precipitation on the lands that will be taken out of irrigation because of the proposed transfer. This reevaluation demonstrates that the change in groundwater recharge associated with the proposed transfer will exacerbate the negative impacts to groundwater levels and groundwater users in the area surrounding the R9 ranch.

Section 3

Basis for Evaluation

The groundwater model input files used by BMcD in their revised evaluation were not available to SSP&A. SSP&A was able to obtain the groundwater model input files that BMcD used in their original evaluation. In response to the comments by BGW, BMcD adjusted the groundwater model input files to correct errors that were identified by BGW and by BMcD. The nature of these adjustments was described to a certain extent in documents from BMcD.

Based on these descriptions as well as information prepared by BGW, SSP&A attempted to replicate the adjustments to the groundwater model files made by BMcD. These adjustments included changes to streambed elevations along the Arkansas River and river inflow conditions along the western boundary of the model domain.

The groundwater model changes made by SSP&A to replicate the BMcD revised input files could not be checked directly against model output since SSP&A did not have model output files associated with the BMcD revised calculations. As an alternative check, SSP&A compared results associated with the figures and tables that BMcD included in their revised report. These figures and tables provided a basis for ensuring that the groundwater model files used by SSP&A produced results that were reasonably close to the results shown on the figures and tables in the BMcD revised report.

As an example of these checks, Figures 1 to 3 compare SSP&A results to BMcD results corresponding to Figures 9, 10 and 13 in the revised BMcD report. As shown on Figures 1 and 2, the SSP&A results corresponding to BMcD Scenarios 4 and 5 very closely mimic the BMcD results corresponding to Figures 9 and 10 in the BMcD revised report. Figure 3 shows the correspondence between SSP&A results and BMcD revised results for Scenario 6 shown on Figure 13 of the BMcD revised report. There is a slight displacement in the groundwater level differences but the magnitudes of the differences are very close to one another. This indicates that there are some differences in the input files between SSP&A and BMcD associated with Scenario 6. Scenario 6 was a drought scenario where groundwater recharge conditions during certain years of the model simulation were replaced by conditions during the dry years of the 1930s. Since the magnitudes of the differences between the SSP&A version and the BMcD version for Scenario 6 were relatively small, it was concluded that the SSP&A input files were sufficient to evaluate the effects of reduced ground water recharge on irrigated land that would no longer be irrigated because of the proposed transfer.

The first step in the recalculating the impacts associated with the scenarios used by BMcD was to determine how much reduction in groundwater recharge would occur on the R9 ranch lands associated with the transfer and the consequent change in conditions from irrigated land to non-irrigated land. Figures 32 and 33 in the 2010 BGW report on the development of the GMD5 groundwater model and illustrate the procedures used to calculate monthly groundwater recharge from monthly precipitation. The R9 ranch area lies in recharge zone 9 depicted on Figure 33 in the BGW report. The curves on Figure 32 of the BGW report illustrate two curves for estimating recharge in zone 9, one curve for pre-1970 (non-irrigated) and one curve for post-1970 (irrigated). By comparing the post-1970 curve to the pre-1970 curve for a given amount of groundwater

recharge, SSP&A was able to determine the amount of reduction in recharge that would occur when land conditions change from irrigated to non-irrigated.

The scenarios calculated by BMcD to evaluate impacts of the proposed transfer used historical conditions from 1991 to 2007 to represent potential future conditions. This 17-year period was repeated three times to create a 51-year future simulation period. SSP&A adjusted the recharge input file from BMcD by reducing the amount of groundwater recharge on the lands associated with the R9 ranch using the relative positions of the zone 9 recharge curves on Figure 32 of the BGW report. The adjusted recharge input file was then used in recalculating the potential impacts of the proposed transfer for the various scenarios used by BMcD.

The calculations of potential impacts for the various scenarios considered by BMcD assumed that groundwater recharge for the period from 1991 to 2007 on the R9 ranch would not change because of the proposed transfer. However, the estimated groundwater recharge rates used in the groundwater model were premised on the notion that groundwater recharge from precipitation on irrigated land would be greater than on non-irrigated land for the same amount of precipitation. Groundwater recharge from precipitation for the period from 1991 to 2007 over the area of the R9 ranch was calculated to average about 4,732 acre-feet per year or about 5.1 inches per year. Using the zone 9 recharge curves from BGW, SSP&A calculated that groundwater recharge from precipitation for the period from 1991 to 2007 would only be 2,655 acre-feet per year or about 2.8 inches per year if the land was not irrigated. In other words, groundwater recharge from precipitation on the R9 ranch under the conditions associated with the proposed transfer would only be about 56% of the recharge that was estimated for the historical conditions that existed from 1991 to 2007.

Section 4

Results of SSP&A Evaluation

SSP&A repeated the groundwater model runs corresponding to Scenarios 1 to 6 described by BMcD in their revised report. However, for the scenarios that assumed pumping by the proposed municipal wells (Scenarios 2, 4, 5, and 6), the groundwater recharge was adjusted to reflect the change in land condition from irrigated to non-irrigated as described above.

The reduction in groundwater recharge resulting from the change in land conditions associated with the proposed transfer exacerbates the calculated negative impacts. These exacerbated impacts are illustrated on Figure 4 to 6. Figure 4 shows the difference in groundwater levels over the 51-year simulation period associated with BMcD's Scenario 4. The figure compares the BMcD result (blue and green contours) with the SSP&A result (red contours) where the groundwater recharge on the R9 ranch area was reduced to reflect the change in land condition from irrigated to non-irrigated. The reduction in groundwater levels has increased from generally less than one foot in the BMcD simulation to several feet in the SSP&A simulation. The area of reduced groundwater levels in the SSP&A simulation is also much larger and has the potential to impact many more existing groundwater users than the BMcD result.

Figure 5 shows the difference in groundwater levels over the 51-year simulation associated with BMcD Scenario 5. This figure might appear at first glance to show less impact in the SSP&A simulation than the BMcD simulation, at least in terms of the area of impact. However, the BMcD simulation shows an **increase** in groundwater levels over the simulation period whereas the SSP&A simulation shows a **reduction** in groundwater levels. Note that the BMcD contours (blue and green) are **positive** while the SSP&A contours are **negative**. Thus, when the potential reduction in groundwater recharge on the R9 ranch area is considered, BMcD Scenario 5 results in a negative rather than a positive impact to existing groundwater users.

Results for BMcD Scenario 6 are shown on Figure 6. Scenario 6 is similar to Scenario 5 except that groundwater recharge is reduced for some years during the 51-year simulation period to mimic the potential effects of a drought period like the one that occurred in the 1930's. Figure 7 compares the reduced recharge rates used by SSP&A along with the recharge rate used by BMcD in Scenario 6. Figure 7 also shows the pumping rates from the R9 ranch area that were assumed for Scenario 6. The figure illustrates the increase in pumping that was assumed to occur during the simulated drought period.

In comparing Figure 5 to Figure 6, the impacts in the BMcD simulations (blue and green contours) appear to shrink. However, the BMcD results are an **increase** in groundwater levels and the effects of considering a potential "drought" shown on Figure 6 is a reduction in both the magnitude and extent of the **increased** groundwater levels. In contrast, the SSP&A simulations (red contours) show an increase in both the magnitude and extent of **decreased** groundwater levels associated with BMcD Scenario 6 when potential reductions in groundwater recharge on the R9 ranch are considered.

Section 5

Conclusions

BMcD evaluated the impacts associated with the proposed change from irrigation use to municipal use by simulating several scenarios of potential future pumping and hydrologic conditions within the R9 ranch area. BMcD used the GMD5 groundwater model to estimate the differences in groundwater levels between a scenario of future irrigation use and a scenario of future municipal use within the R9 ranch. However, BMcD failed to consider the reduction in groundwater recharge that would occur when the land within the R9 ranch area was not irrigated in the municipal pumping scenarios.

The reduction in groundwater recharge within the R9 ranch area when land is no longer irrigated was estimated to average about 2,000 acre-feet per year over the 51-year simulation period that BMcD used in their simulations. This reduction in groundwater recharge was calculated using precipitation-recharge curves that formed one of the bases for the GMD5 groundwater model that BMcD used in their evaluation.

The inclusion of a reduction in groundwater recharge in the potential future scenarios of municipal pumping significantly increases the impacts to groundwater levels by five times or more in places near the ranch boundary from those projected in the BMcD evaluations. The areal extent of reduced groundwater levels was also significantly increased from about 15 square miles to over 150 square miles when the reduction in groundwater recharge was appropriately considered in simulations of potential municipal pumping from the R9 ranch area.

Section 6

References

- Balleau Groundwater, Inc. (BGW). 2010. Hydrologic Model of Big Bend Groundwater Management District No. 5. June.
- Burns & McDonnell (BMcD). 2018a. R9 Ranch Modeling Results. February 13.
- Burns & McDonnell (BMcD). 2018b. R9 Ranch Modeling Results - Revision 2. September 24.

FIGURES

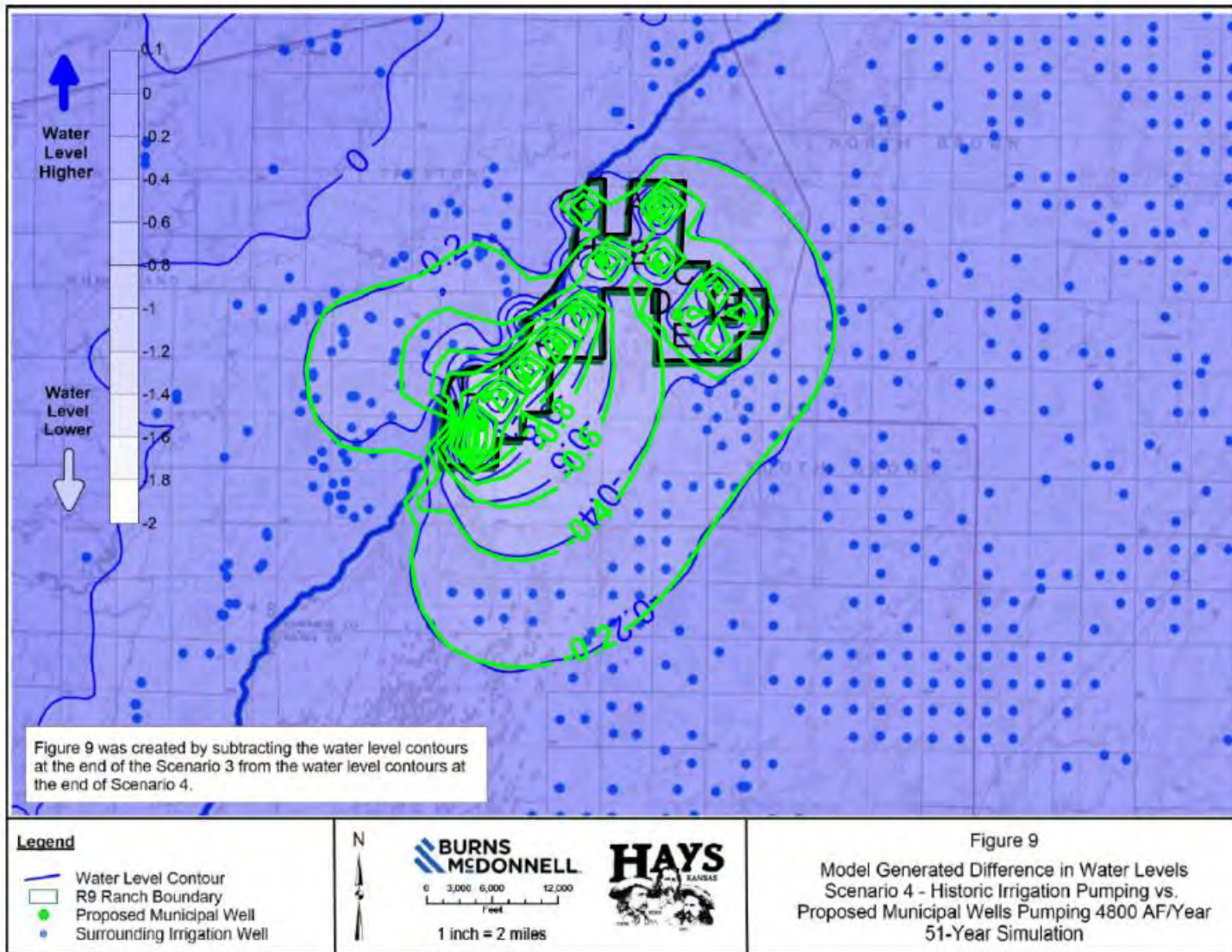


Figure 1: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 4.

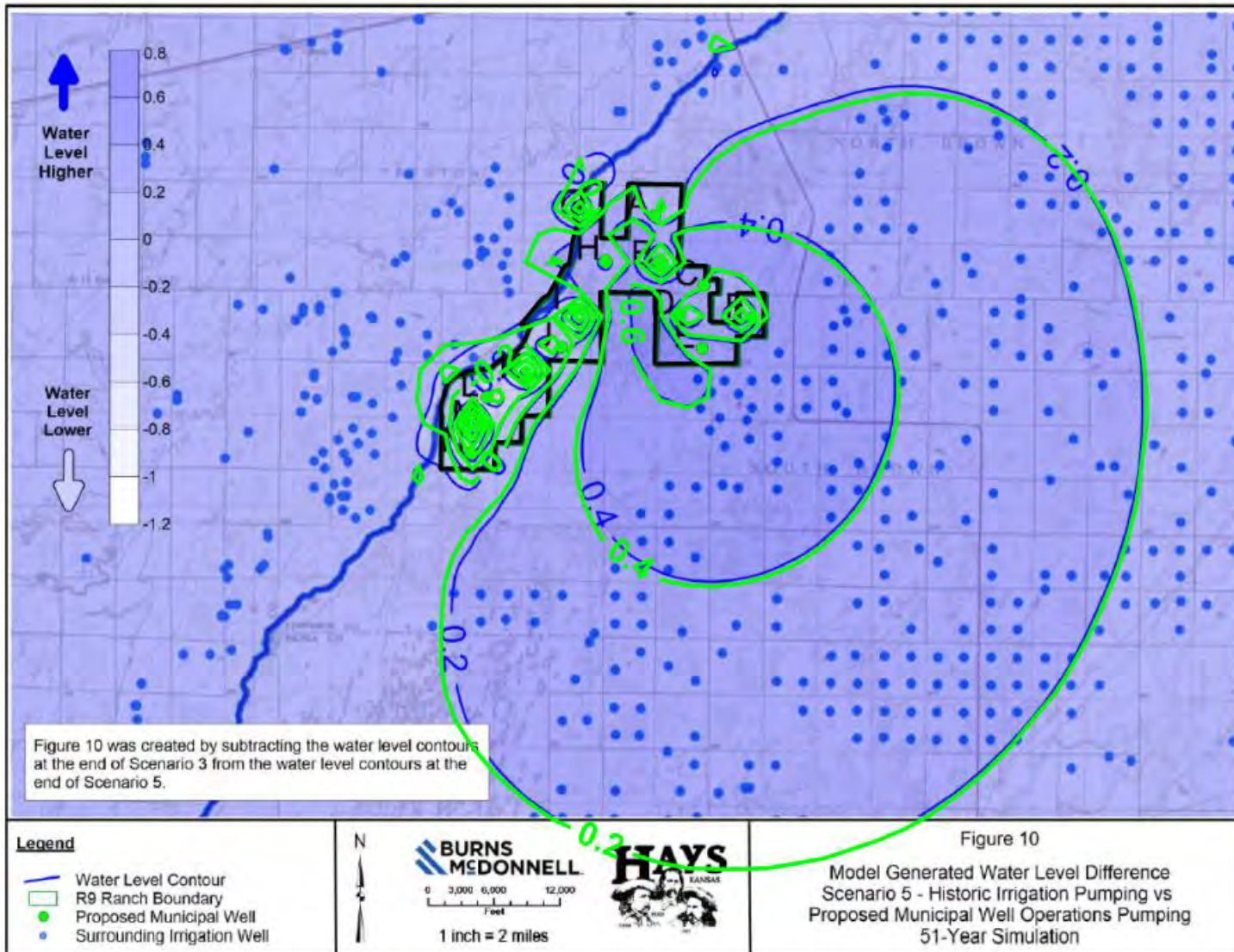


Figure 2: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 5.

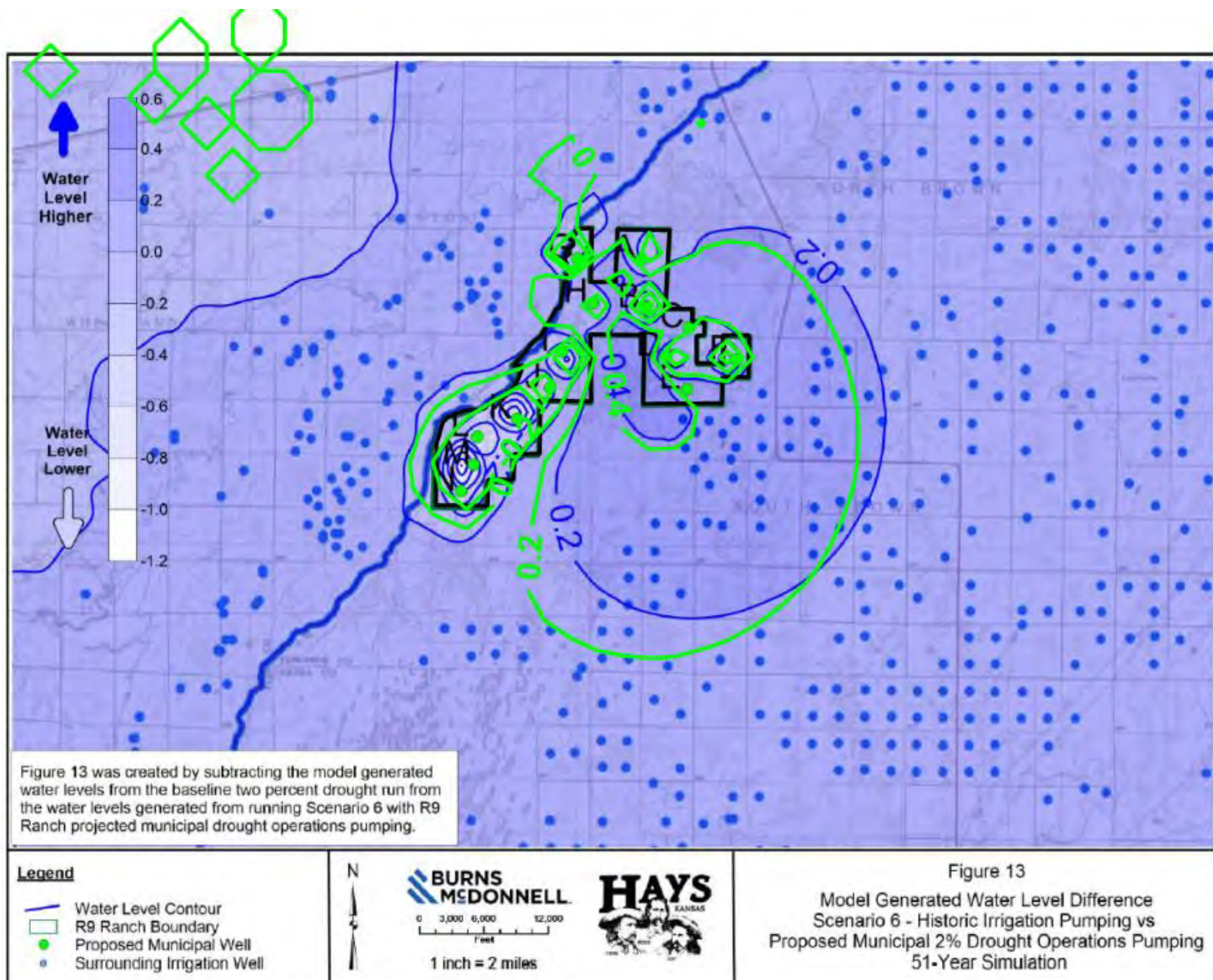


Figure 3: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 6.

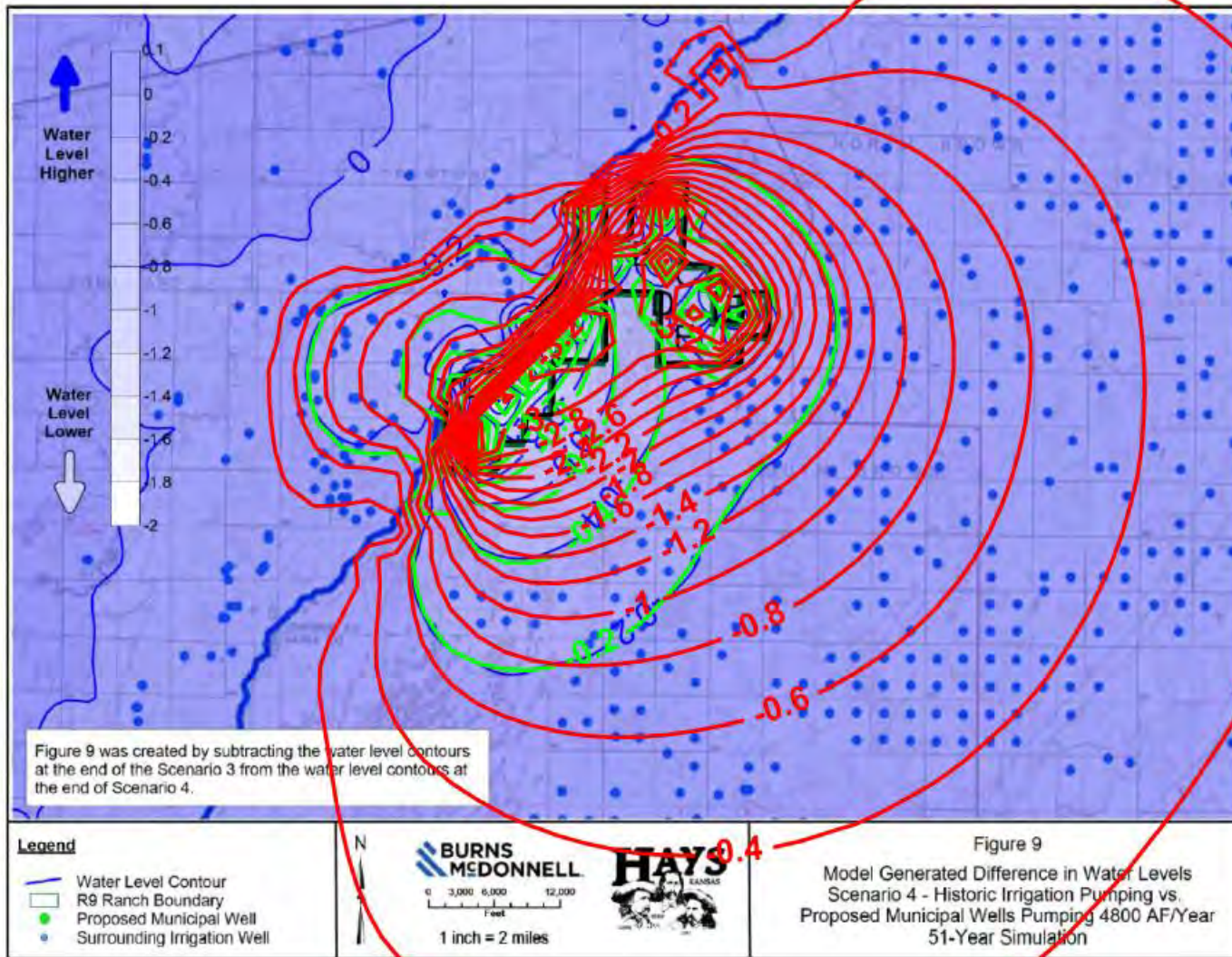


Figure 4: Comparison of SSP&A results using BMcD recharge (green contours) with SSP&A results using reduced groundwater recharge (red contours) for BMcD Scenario 4.

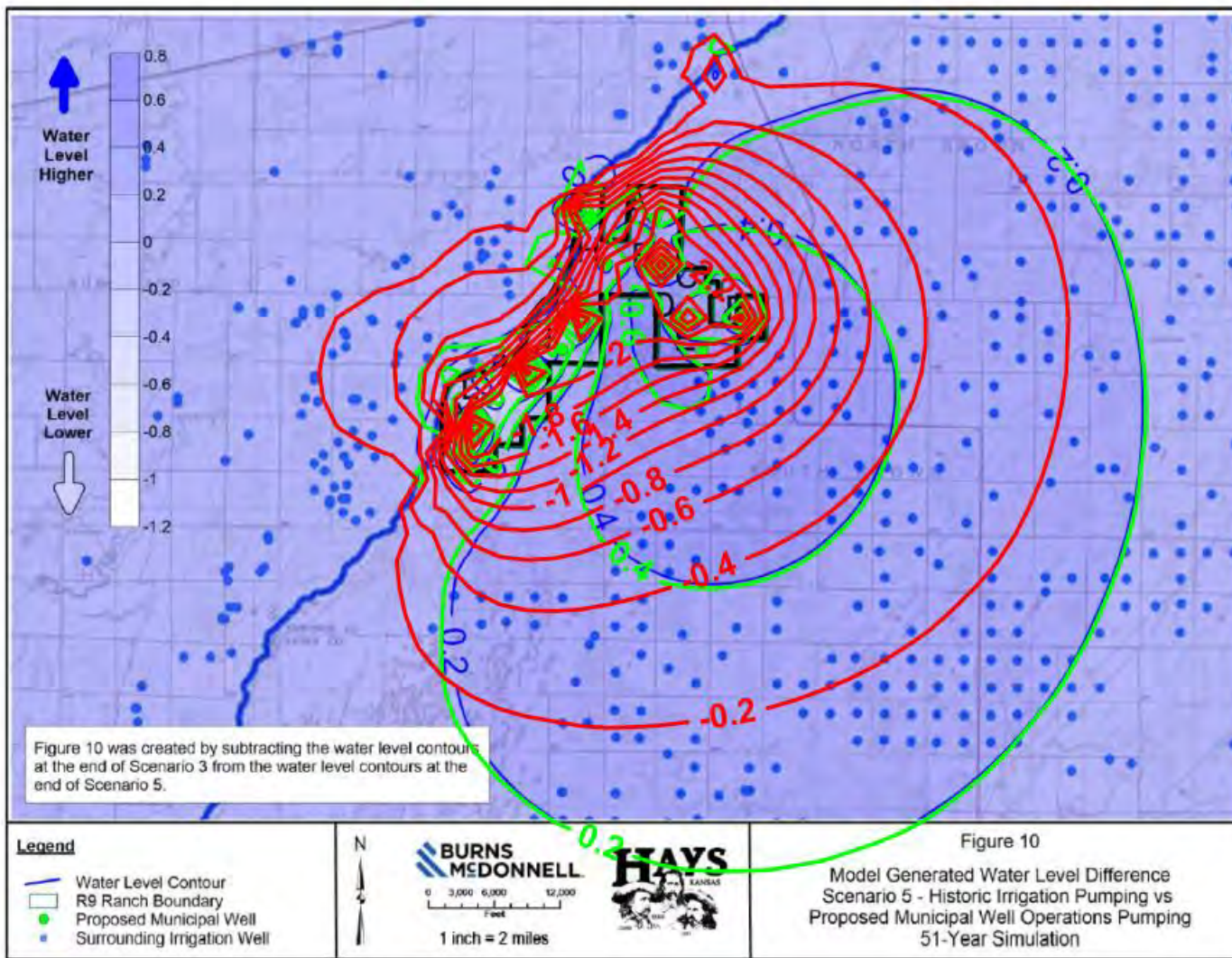


Figure 5: Comparison of SSP&A results using BMcD recharge (green contours) with SSP&A results using reduced groundwater recharge (red contours) for BMcD Scenario 5.

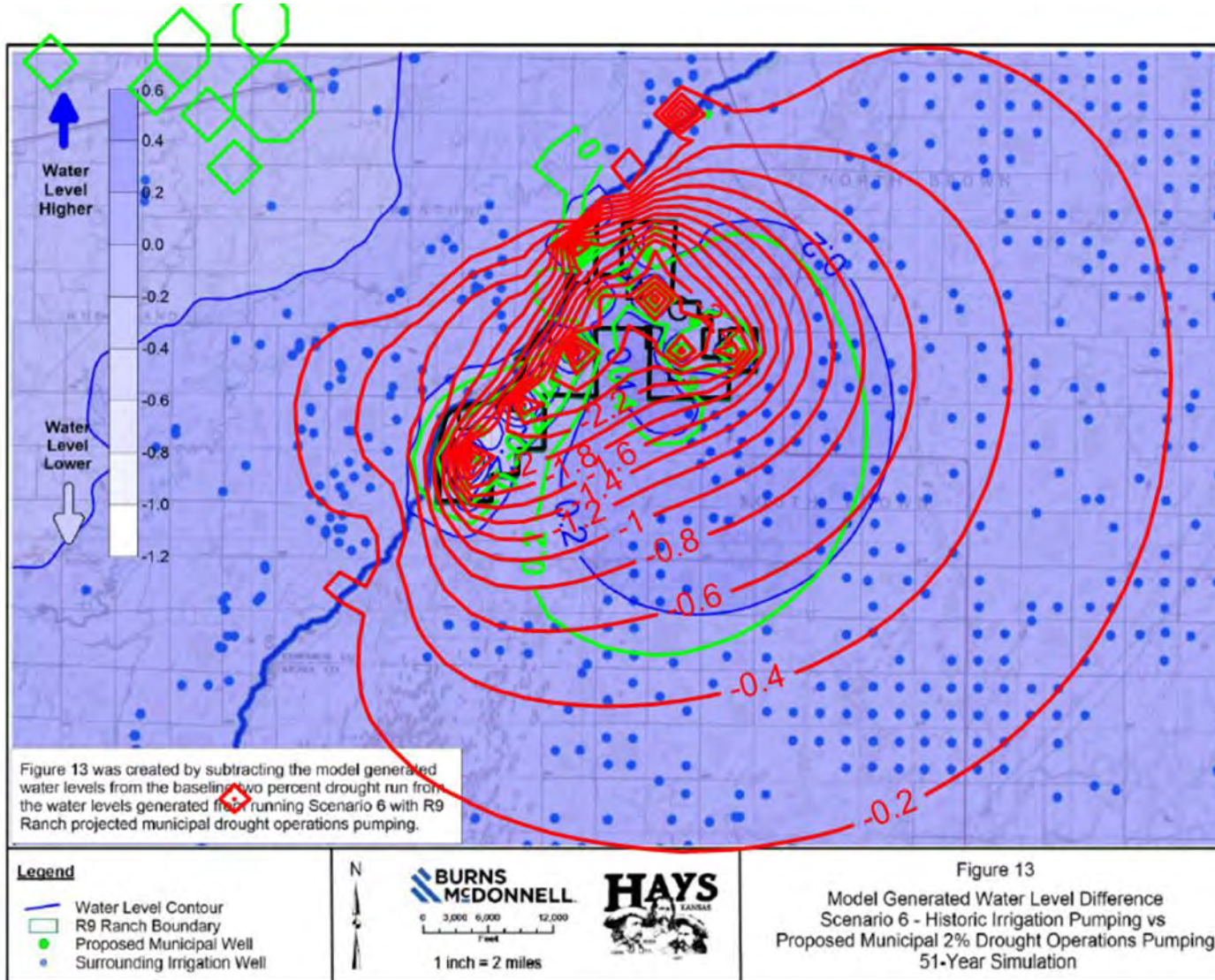


Figure 6: Comparison of SSP&A results using BMcD recharge (green contours) with SSP&A results using reduced groundwater recharge (red contours) for BMcD Scenario 6.

Simulated Recharge and Operation Pumping With Reduced Recharge

— BMcD Scenario 6 Recharge ● SSPA Scenario 6 Reduced Recharge □ Pumping

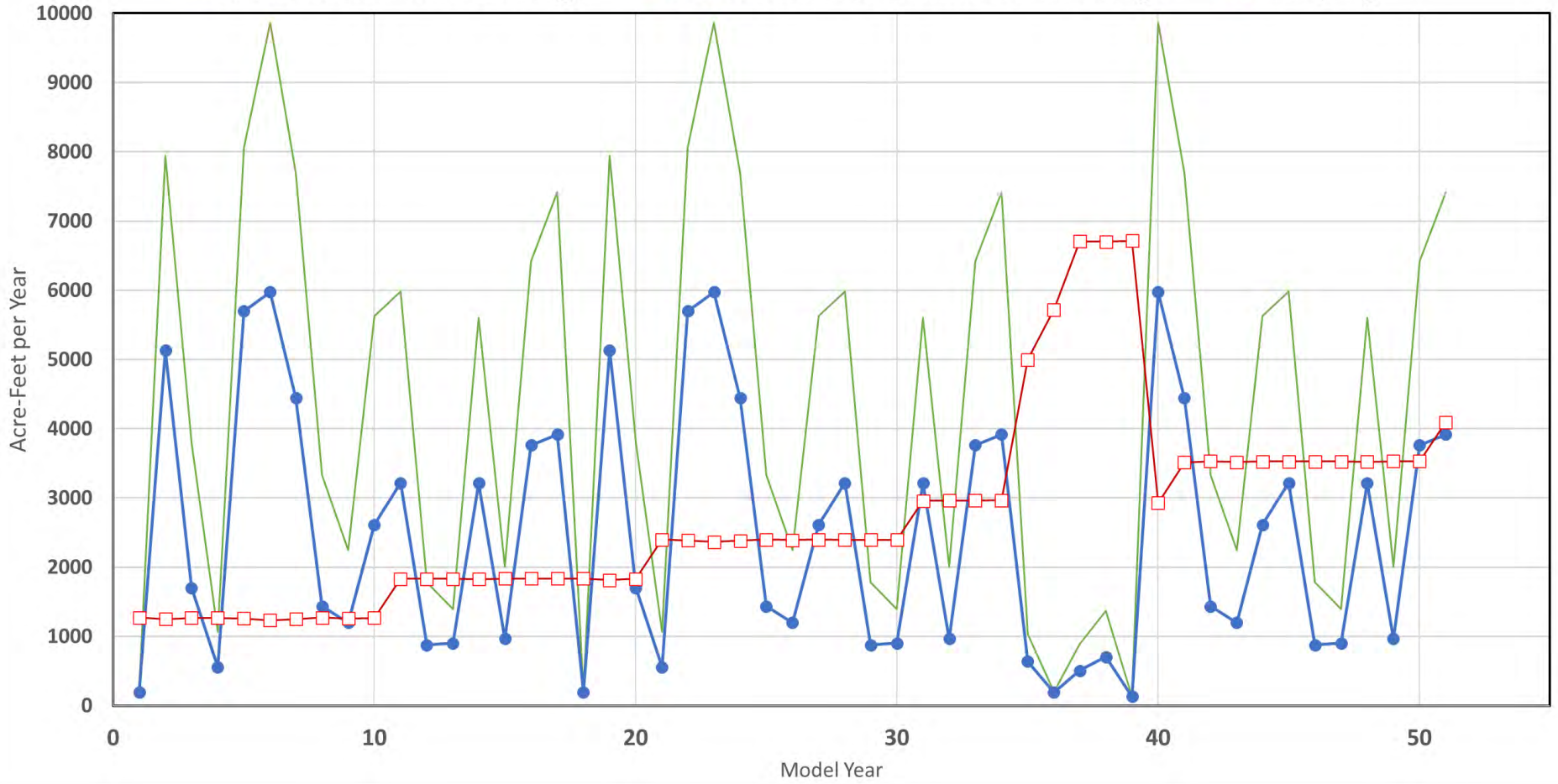


Figure 7: Comparison of SSP&A reduced recharge rates to BMcD recharge rates along with assumed pumping over the simulation period for Scenario 6 (simulated drought period).

ATTACHMENT

STEVEN P. LARSON

Groundwater Hydrologist

AREAS OF EXPERTISE

- Groundwater Hydrology
- Contaminant Fate and Transport
- Site Investigation and Remediation
- Numerical Modeling
- Spatial Interpolation
- Expert Testimony

SUMMARY OF QUALIFICATIONS

Mr. Larson is a recognized authority on numerical simulation models and their application in the analysis of a variety of groundwater problems. He has developed such models for analyzing groundwater flow, mass- and heat-transport in groundwater systems, contaminant migration, recovery of petroleum products from groundwater, saltwater intrusion in coastal aquifers, and thermal energy storage in aquifers. In addition, he has been in the forefront of combining these methods with linear programming techniques to optimize the development of groundwater supplies or the remediation of contaminated groundwater. Mr. Larson has conducted training courses on the use of these models and provided technical support on their application to a variety of hydrologic conditions. He has authored and co-authored publications on the application of aquifer simulation models that are widely used by practicing hydrologists. He has served as an expert witness in numerous judicial forums regarding groundwater issues and the application of simulation models for demonstrating the fate of soil/groundwater contamination and the effect of remediation alternatives.

REPRESENTATIVE EXPERIENCE

S.S. Papadopoulos & Associates, Inc., Rockville, Maryland
As senior principal of the company, Mr. Larson assists in the management of the company and in the conduct and management of projects dealing with a wide variety of environmental and water-resource issues. During his many years at SSP&A, he has been involved in numerous projects covering a wide spectrum of technical, environmental, and legal issues including:

- **Site Evaluations** — Remedial investigations, feasibility studies, engineering evaluation/cost analyses, and remedial action plans at CERCLA and other waste disposal sites including the Stringfellow site in California, the FMC Fridley site in Minnesota, the Chem Dyne site in Ohio, the Conservation Chemical site in Missouri, the Hardage-Criner site in Oklahoma, and the Hastings site in Nebraska.
- **Groundwater Contamination Evaluations, CERCLA and Other Waste-Disposal Sites** — Love Canal, New York; Savannah River Plant, South Carolina; Tucson Airport, Arizona; Ottati & Goss site, New Hampshire; Martin-Marietta site, Colorado; and Western Processing site, Washington State.
- **Environmental Impact Evaluations of the Effects of Water Development**, Wyoming and South Dakota — For proposed coal slurry operations in Wyoming, of in-situ mining for trona minerals in Wyoming, and of groundwater development on the shallow-water-table in South Dakota.

YEARS OF EXPERIENCE: 50+

EDUCATION

MS, Civil Engineering
University of Minnesota, Minneapolis,
1971
BS, Civil Engineering (High Distinction)
University of Minnesota, Minneapolis,
1969

REGISTRATIONS

Professional Hydrologist
93-HGW-1032

PROFESSIONAL HISTORY

S.S. Papadopoulos & Associates, Inc.,
Executive Vice President, 1980 to
present.
U.S. Geological Survey,
Water Resources Division, Reston,
Virginia: Hydrologist, 1975 – 1980
Water Resources Division, St. Paul,
Minnesota: Hydrologist, 1971 – 1975
Water Resources Division, National
Training Center, Denver, Colorado:
Hydrologist, 1971
St. Anthony Falls Hydraulic
Laboratory, Minneapolis, Minnesota:
Research Assistant, 1969 – 1971

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- **Water-Supply Development Evaluations** — Potential impacts of salt-water intrusion on water-supply development, in Oman, Portugal and Florida; and analysis of potential impacts of power-plant cooling water on groundwater and surface water in Wyoming.
- **Evaluations of Permitting, Licensing, and Environmental Issues Associated with Mining** — Coal mining in Wyoming, Montana, and Arizona; copper mining in Montana and Utah; trona mining in Wyoming; and uranium mining in New Mexico.
- **Evaluations of the Effects of Discharge on Groundwater from Chemical-Manufacturing Waste Disposal** — Wyoming, Virginia, and New York.
- **Water-Rights Permitting Evaluations and Adjudication** — New Mexico, Texas, Colorado, Kansas, Wyoming, Nebraska, Arizona, and Idaho.
- **Environmental Audits, Groundwater Monitoring Plans, and Other Environmental Investigations** — Oaks Landfill in Maryland, the FMC Carteret facility in Wyoming, the former IBM facility in Indiana, and the Insilco site in Florida.

SPECIFIC PROJECT EXPERIENCE

- **Montrose Chemical Corporation Superfund Site**, California — Provides technical support to Montrose regarding modeling of groundwater flow and chemical transport. Assists Montrose in conducting evaluations of a groundwater recovery and treatment program that has been developed to provide mitigation of groundwater impacted by monochlorobenzene and other chemicals associated with former manufacturing operations at the site.
- **Osage Road Site**, Oklahoma — Provides technical support to Halliburton regarding investigation and evaluation of groundwater impacted by perchlorate associated with former missile casing cleaning operations that had been conducted at the site. Work has included compilation and mapping of groundwater levels and perchlorate concentrations in groundwater. The work has also included design of an interim groundwater remediation system and evaluations of system performance since its installation.
- **Far-Mar-Co Subsite, Hastings Site**, Nebraska — Supervised the preparation of an engineering evaluation/cost analysis (EE/CA) to support implementation of remediation of groundwater contamination. Worked with regulatory agencies to gain approval of the EE/CA and progress toward design and implementation. Previously, on behalf of Morrison Enterprises, supervised completion of a remedial investigation and a feasibility study involving carbon tetrachloride and ethylene dibromide contamination.
- **Stringfellow Site, near Riverside**, California — Served as the principal technical advisor on groundwater issues to the Pyrite Canyon Group that overviewed investigations and remedial activities sponsored by the responsible parties. Designed and evaluated several investigations and remediation programs. Represented the client as a technical spokesperson in workshops, technical seminars, and meetings with regulatory agencies and other interested parties. Prepared key documents to support the decision-making process toward the final Record of Decision.
- **In the case of *Kansas v. Colorado* before the U.S. Supreme Court** — Served on a team of technical advisors to the State of Kansas in its litigation with Colorado over violations of the Arkansas River Compact. Assisted in obtaining a finding of compact violation regarding the pumping of groundwater from wells along the river valley in Colorado. Continued as a technical expert as the case moved into subsequent phases involving the quantification of depletions of supply, assessments of damage, and future compliance by Colorado.

EXPERT AND FACT WITNESS EXPERIENCE

- Litigation associated with soil and groundwater contamination at CERCLA, RCRA, and other facility sites in California, Kansas, Missouri, Oklahoma, Tennessee, Montana, Florida, Iowa, and Nebraska.

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- Toxic tort, property damage, and liability litigation regarding soil and groundwater contamination at sites or facilities in New York, Tennessee, Texas, Virginia, Ohio, and other states.
- Insurance recovery litigation associated with contamination at a variety of sites or facilities for commercial clients such as General Electric, FMC Corporation, Upjohn, AT&T, Rohr Industries, Beazer East/Koppers, North American Phillips, DOW Chemical, Occidental Chemical, and Southern California Edison. Water-rights permitting litigation and water adjudication including cases in New Mexico, Colorado, and Arizona, as well as interstate river compact disputes involving the states of Kansas, Colorado, Wyoming, Nebraska, South Carolina and Tennessee.

U.S. Geological Survey, Water Resources Division, Reston, Virginia

Originated, planned and conducted research in the development of numerical simulation models and techniques for the analysis of a variety of problems related to groundwater systems. Applied the developed models to actual field situations for verification and further refinement and documented these models in a manner suitable for use by others. Served as coordinator and instructor for training courses on groundwater simulation models and methodologies conducted by the Division and provided primary technical assistance to many groundwater projects conducted by District. Participated in and represented the Survey in national and international meetings. Conducted groundwater studies of national and regional interest and participated in or was detailed to overseas projects conducted or managed by other U.S. agencies and the World Bank.

U.S. Geological Survey, Water Resources Division, St. Paul, Minnesota

Served as Project Chief and participated in studies involving the evaluation of groundwater resources, the assessment of stream-water quality, and the analysis of surface-water/groundwater relationships in various parts of Minnesota.

U.S. Geological Survey, Water Resources Division, National Training Center, Denver

Participated in an extended training program providing in-depth training on both office and field techniques for the collection and the analysis of data and the conduct of surface-water, groundwater, and water-quality studies.

St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minnesota

As a Research Assistant, participated in the development and operation of an urban-runoff model to predict sewer flow distribution for the Minneapolis – St. Paul Sanitary District. Assisted in runoff prediction studies for St. Paul and participated in a project to survey and summarize computer programs used in water resources engineering.

PROFESSIONAL SOCIETIES

National Groundwater Association

American Institute of Hydrology

AWARDS AND HONORS

Civil Servant of the Year, U.S. Geological Survey, 1974

U.S. Geological Survey Incentive Award, 1974

American Society of Civil Engineering Student Award, 1969

PUBLICATIONS AND PRESENTATIONS

Barth, G., S.P. Larson, G. Lewis, and K. Green, 2011. Prediction Uncertainty of Drawdown in the Seven-Rivers Augmentation Well Field. Presentation at the National Groundwater Association (NGWA) Conference 2011. Baltimore, MD. June 2011, 15.

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Groundwater Hydrologist

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TESTIMONY

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**BEFORE THE OFFICE OF ADMINISTRATIVE HEARINGS
STATE OF KANSAS**

IN THE MATTER OF THE APPLICATION OF
THE CITIES OF HAYS, KANSAS
AND RUSSELL, KANSAS FOR APPROVAL TO
TRANSFER WATER FROM EDWARDS
COUNTY PURSUANT TO THE KANSAS
WATER TRANSFER ACT

OAH Case No. 23AG0003 AG

**REPLY MEMORANDUM BY WATER PACK AND EDWARDS
COUNTY, KANSAS TO CITIES' RESPONSE TO MOTION FOR LEAVE
TO FILE FIRST AMENDED JOINT PETITION FOR INTERVENTION**

The Cities of Hays and Russell, Kansas (the “Cities”) filed a response to the motion by the Water Protection Association of Central Kansas (“Water PACK”) and by Edwards County, Kansas (“Movants”) to file an amended petition to intervene in this proceeding. The Movants hereby respectfully submit this Reply to the Cities’ response in opposition to Movants’ motion.

A. INTRODUCTION

The Cities in their response (the “Response”) largely recycle their earlier contentions that Movants, even at this embryonic stage of the proceeding, have not marshalled sufficient facts to ultimately prevail on their objections.¹ The law does not support their argument. The Cities generally offer the incongruous suggestion that entitlement to final relief must be plain from the face of the pleading seeking intervention. If that were the test, all subsequent proceedings would be effectively superfluous, the outcome being determinable from the initial pleading.

¹ “Thus, a petition for intervention in a KAPA proceeding must provide **“facts** demonstrating that the petitioner’s legal rights, duties, privileges, immunities or other legal interests may be substantially affected by the proceeding.” (Emphasis in original). *Cities’ Response* at 10.

Instead, contrary to the contrived test postulated by the Cities, the Kansas Supreme Court has interpreted the strict compliance pleading requirement to mean that the petition must simply provide fair notice of the issues to be raised.

Our conclusion that the district court had subject matter jurisdiction in this case also is consistent with the fair notice purpose of the strict compliance pleading requirement discussed in *Bruch and Kingsley*. See *Kingsley*, 288 Kan. at 406, 204 P.3d 562 (petition for judicial review strictly complies with K.S.A. 77–614[b] when reasons for relief set forth in it give court, agency notice of issues to be raised).

Swank v. Kansas Dep't of Revenue, 294 Kan. 871, 877, 281 P.3d 135, 140 (2012).

As made clear in this reply and in the Movants' motion to file an amended petition to intervene, the Cities and this tribunal have ample notice of the specific issues to be raised. Because that is so, Movants' have standing to intervene.

B. THE IMPORTANCE OF WATER TO THE PARTIES

The availability of water is important to the Cities. It is of equal consequence to the Movants. The discussion of the significance of water to the constituencies on either side of the underlying dispute between the Cities and, particularly, the Water PACK membership is a circuitous black hole in the sense that the case can be argued from either perspective. Whatever the divergence of the parties' views otherwise, it can be agreed that water is undeniably a critical resource from both urban and rural perspectives. But notwithstanding the Cities' pejorative characterization of the Movants' expressed rationale for intervention as a product of a NIMBY² mindset, it is not reasonably debatable that the availability of groundwater is a fundamental and eventually an

² Not In My Backyard. Water PACK does not object to the change in proposed use, but rather to the quantity of water the Cities' have sought to convert, as well as other defects in prior proceedings.

existential concern to Kansas agriculture. A recent report on the value of water in western Kansas by two Kansas State University agricultural economists has concluded that land values in that part of the state are \$3.8 billion greater today than they otherwise would be without access to irrigation.³ Winston Yu, a senior water resources specialist at the World Bank and an adjunct lecturer at the School for Advanced International Studies (SAIS), has stated “[t]here really is no greater existential issue than that of water. If I take a very long civilization perspective on things, it is well known that societies have come and gone based on their ability to manage water. We need water for food, and we need to feed a lot of people.”⁴

C. THE INTERVENOR’S AMENDED PETITION FOR INTERVENTION APPRISES THE TRIBUNAL AND THE CITIES OF THE ISSUES TO BE RAISED

Recall the test for evaluating the strict compliance pleading requirement. “Thus, a petition for judicial review strictly complies with K.S.A. 77–614(b)(6) when the reasons for relief set forth in the petition give the court and the agency notice of the issues that will be raised.” *Kingsley v. Kansas Dep’t of Revenue*, 288 Kan. 390, 406, 204 P.3d 562, 574 (2009). The question of entitlement to intervene is distinct from the question of the ultimate merits of a party’s claims:

³<https://www.ksre.k-state.edu/news/stories/2022/03/agriculture-value-of-water-in-western-kansas.html>. (Last accessed January 13, 2023).

⁴<https://www.jhunewsletter.com/article/2020/10/access-to-water-is-one-of-the-greatest-existential-threats-facing-humanity#:~:text=%E2%80%9CThere%20really%20is,lot%20of%20people.%E2%80%9D> (Last accessed 1.18.2023); see also Lina Eklund and Darcy Thompson, *Differences in Resource Management affects Drought Vulnerability Across the Borders between Iraq, Syria, and Turkey*, 22 *ECOLOGY & SOCIETY* (2007) (“A number of studies have linked the 2011 political protests in Syria and the ensuing civil war to the severe drought that affected the Fertile Crescent region between the years 2007 and 2009.”, available at <https://www.ecologyandsociety.org/vol22/iss4/art9/ES-2017-9179.pdf>).

We stress that in reaching the conclusion that the district court should not have dismissed the case for lack of jurisdiction, we are in no way commenting on the merits of these issues. At some point later in the proceedings, the district court may determine that Kingsley cannot succeed on the particular issues raised in his petition and thus dispose of these claims by way of summary judgment.

Id. at 407.

Here the issues to be raised by the Movants are specifically delineated in the amended petition for intervention, thus satisfying the requisite pleading requirement. The amended petition recites the following:

1. IMPAIRMENT OF WATER RIGHTS

Public records, expert testimony, and a correctly configured GMD5 Model show that the quantity of water the Cities wish to move from the R9 Ranch will impair existing water rights, in part because the conversion of the R9 Ranch to native grasses will reduce aquifer recharge, accelerate depletion of the Arkansas River, and increase net consumptive use when compared with the prior use. K.S.A. 82a-1502(b) (generally proscribing approval, absent other enumerated conditions, of water transfer applications that would have the effect of impairing water reservation rights, vested rights, appropriation rights or prior applications for permits to appropriate water.); *see also White Pine County v. Wilson*, Seventh Judicial District Court of Nevada, Case No. CV-1204049 (March 9, 2020); *American Water Dev., Inc. v. City of Alamosa*, 874 P.2d 352 (Colo. 1994); *cf. Kansas v. Colorado*, 514 U.S. 673, 684-85 (1995).

2. MAINTENANCE OF MINIMUM DESIRABLE STREAMFLOW REQUIREMENTS

The importance of maintaining minimum desirable streamflow requirements within GMD5, the Walnut Creek Intensive Groundwater Use Control Area, and water supplies to the Rattlesnake Creek Basin.

3. DELETERIOUS IMPACTS UPON WATER PACK MEMBERSHIP AND EDWARDS COUNTY

- a. The potentially deleterious impacts upon the economy and dependent government services in the County, which uses property taxes to support local services, including but not limited to the Edwards County Medical Center in Kinsley;
- b. The potentially deleterious effects resulting from the facilities necessary to transfer water from the R9 Ranch to the Cities, as well as other municipalities that the Cities plan to connect into their existing water supply;

- c. The unjustifiable deviations from conservation plans and practices developed and maintained by the Kansas water office pursuant to K.S.A. 74-2608; and
- d. The unjustifiable deviations from GMD5 Rules and the 2018 GMD5 Management Program, as the former requires the use of the GMD5 Model to evaluate changes, while the latter incorporates sustainable yield requirements that would be violated by the Cities’ application as presented. GMD5 Management Plan at 13, 16; see also K.A.R. 5-25-4(c), K.S.A. 82a-1502(c)(1)-(9).

The Cities are free at a later stage of this proceeding to argue that the Movants have failed to offer cognizable evidence and analysis entitling them to relief. That stage is not now. At present, the Movants are entitled to an opportunity to present and explicate their concerns and objections. For purposes of intervention, the Movants are only obliged to provide notice of the issues to be raised. They have done so. The Cities’ objections are untenable.

D. THE CITIES EXPRESSED CONCERNS REGARDING PREJUDICE IN THE EVENT MOVANTS ARE ALLOWED TO INTERVENE IS UNSUPPORTED AND DISINGENUOUS

In predicting prejudicial delay if the Movants’ petition for intervention is granted, and preemptively assigning blame to the Movants, the Cities obfuscate (i) the fact that the R9 Ranch was acquired in 1995 with no effort by the Cities to utilize the water source for decades;⁵ (ii) the fact that the Chief Engineer took years to issue his order; (iii) the fact that the District Court took 17 months to decide the case that is currently on appeal before the Supreme Court; (iv) the fact that, despite the significant size of the district court record and the attendant complexities, Water PACK filed its brief in less than 90 days;⁶

⁵ Attached as Exhibit 1 is the Kansas Department of Agriculture Timeline in relation to the R9 Ranch water transfer process.

⁶ The Supreme Court as a matter of course grants requests for additional time to file briefs – commonly 90 days, sometimes more.

and (v) perhaps most tellingly, the fact that the Cities have requested and been granted additional time to file their initial brief.⁷

This proceeding is functionally linked to the appeal presently pending before the Kansas Supreme Court in which the question of the Cities' proposed change of use of the R9 water rights from irrigation to municipal use under the Kansas Water Appropriation Act ("KWAA") is at issue. Regardless of the outcome of this administrative proceeding, whether the Cities may consummate their plan to appropriate the R9 water for municipal use is dependent upon the outcome of that appeal. The typical and expected pace of the appellate process before the Supreme Court is thus relevant to consideration of the Cities' suppositions regarding delay.

The data that follows was compiled by the Kansas Legislative Research Department.⁸ The data reports upon Kansas Supreme Court cases with published opinions issued January 25, 2013 through January 24, 2014. The recited metric is the lapse from hearing date to a published decision. For the interval surveyed, that period in civil cases was 402.6 days.

<i>Time to Disposition (Hearing Date to Date Opinion Issued)</i>		
	<i>Avg. Time to Disposition</i>	<i>Avg. Time to Disposition – Argued</i>
<i>All Cases</i>	267.4 days (8.9 months), 135 cases	294.3 days (9.8 months), 117 cases
<i>Criminal</i>	211.3 days (7.0 months), 96 cases	235.5 days (7.8 months), 78 cases
<i>Civil</i>	402.6 days (13.4 months), 32 cases	402.6 days (13.4 months), 32 cases

⁷ See attached Exhibit 2.

⁸http://kslegislature.org/li/b2013_14/committees/ctte_s_jud_1/documents/testimony/20140207_15.pdf. (Last accessed January 23, 2023).

The Supreme Court will not set a hearing date in the appeal associated with the KWAA matter until all initial and reply briefs have been filed. Since the Cities have yet to file their opening brief in the appeal the hearing date is, at minimum, months distant with an expected final disposition more than a year thereafter. Given those circumstances, and their idle conjecture about potential delay, the Cities' theoretical concerns are overstated.

E. WATER PACK AS A TRADE ASSOCIATION REPRESENTING DIRECTLY AFFECTED MEMBERS HAS STANDING

The Cities' argument that Water PACK lacks standing is unavailing. The association has standing if any member has standing. "An association has standing to sue on behalf of its members when (1) the members have standing to sue individually; (2) the interests the association seeks to protect are germane to the organization's purpose; and (3) neither the claim asserted nor the relief requested requires participation of individual members." *NEA-Coffeyville v. Unified Sch. Dist. No. 445, Coffeyville, Montgomery Cnty.*, 268 Kan. 384, 384, 996 P.2d 821, 822 (2000).

1. THE CITIES CHARACTERIZE THE KANSAS JUDICIAL REVIEW ACT (KJRA) AS INSTRUCTIVE – UNDER THE KJRA WATER PACK MEMBERS AND WATER PACK CLEARLY HAVE STATUTORY STANDING

The Cities argue, repeatedly, that "the KJRA provisions are not controlling but are instructive."⁹ To the extent that is true, in relation to the question of statutory standing, K.S.A. 77-611 is particularly salient. Water PACK and its members participated and provided written comments in the proceedings initiated by the Chief Engineer. As K.S.A. 77-611 has been interpreted by Kansas courts, that participation imbues them with

⁹ E.g., Cities Response at 12.

standing under the statute. *Board of County Commissioners of Sumner County v. Bremby*, 2008, 189 P.3d 494, 286 Kan. 745 (Interested persons' submission of written comments during a public notice and comment period and all persons' comments made during a public hearing held by an agency both qualify as participation within the meaning of the Kansas Act for Judicial Review standing requirements); *see also, Sierra Club v. Moser*, 298 Kan. 22, 32, 310 P.3d 360, 369 (2013) (Sierra Club's participation in the agency proceedings entitled it to assert statutory standing under K.S.A. 77–611(b) of the KJRA and under K.S.A. 2012 Supp. 65–3008a(b) because the other components of the KAQA's standing requirements were also met).

2. WATER PACK AND ITS MEMBERS HAVE COMMON LAW STANDING

For an association to have common law standing, a three-prong test must be satisfied: “An association has standing to sue on behalf of its members when (1) the members have standing to sue individually; (2) the interests the association seeks to protect are germane to the organization's purpose; and (3) neither the claim asserted nor the relief requested requires participation of individual members.” *Sierra Club v. Moser*, 298 Kan. 22, 33, 310 P.3d 360, 369 (2013).

a. One or More Water Pack Members Is Threatened with Injury

“To meet the first prong, the association must show that it or one of its members has suffered actual or threatened injury—*i.e.*, the association or one of its members must have suffered cognizable injury or have been threatened with an impending, probable injury and the injury or threatened injury must be caused by the complained-of act or omission.”

Id at 33.

Attached as Exhibit 3 is an affidavit graphically depicting, in relation to the R9 Ranch, the relative locations of appurtenant water rights owned or leased by Water PACK members.

Attached as Exhibit 4 is an expert report prepared by Steven P. Larson (the "Report").

In the Report, Mr. Larson concludes as follows:

When irrigated land is taken out of irrigation, soil moisture conditions become dependent on incident precipitation. More importantly, the lack of irrigation to increase and maintain soil moisture impacts the amount of incident precipitation that can recharge the groundwater. This difference in conditions is reflected in the relationships used in the groundwater model to estimate groundwater recharge associated with incident precipitation. Precipitation on irrigated land will produce greater recharge to groundwater than the same precipitation on non-irrigated land. These different relationships are described in the report by BGW on the development of the groundwater model.

The BMcD [the Cities' consultant] projected future scenarios did not account for the reduction in groundwater recharge associated with changing the status of lands on the R9 Ranch from irrigated to nonirrigated. The BGW groundwater model was premised on the concept of increased groundwater recharge from precipitation on irrigated lands. To be consistent with this premise when evaluating a transfer, the groundwater recharge on irrigated land must be reduced when that land is no longer irrigated.

The evaluation in this report reevaluates the projected future scenarios used by BMcD considering that the future condition of no irrigation will result in less groundwater recharge from precipitation on the lands that will be taken out of irrigation because of the proposed transfer. ***This reevaluation demonstrates that the change in groundwater recharge associated with the proposed transfer will exacerbate the negative impacts to groundwater levels and groundwater users in the area surrounding the R9 ranch.*** (Emphasis added).

When juxtaposed with Exhibit 3, Mr. Larson's expert opinion satisfies the first prong of the common law standing requirement in that expected negative impacts to appurtenant groundwater users is a cognizable threat. It also vitiates the Cities' argument that

“Petitioners have provided no facts, have not asserted, and are unlikely to be able to show that any of the following issues will “substantially” affect any Water PACK member or the County in any particularized, personal, or individual way as required by K.S.A. 77-521(a)(2).”¹⁰

The Report may be appropriately considered in relation to the question of standing. “We conclude that a petitioner may rely on the administrative record or may file affidavits or declarations with a court to establish standing of a party seeking judicial review of an agency action. A court, when determining if it has jurisdiction to review an agency action, can consider the affidavits and declarations as evidence of a petitioner's standing.” *Moser*, 298 Kan. at 39.

Mr. Larson is eminently qualified to opine on this matter. His CV includes notable achievements and experience.

- Principal with S.S. Papadopoulos & Associates, Inc. (SSP&A), a firm that provides consulting services related to environmental and water-resource issues. His area of expertise is hydrology, with an emphasis on groundwater hydrology including assessment of soil and groundwater contamination.
- Bachelor of Science in Civil Engineering from the University of Minnesota (1969), and a Master of Science in Civil Engineering, also from the University of Minnesota (1971). Member of the National Ground Water Association and the American Institute of Hydrology. Certification as a Professional Hydrologist with the American Institute of Hydrology.
- Employment as a hydrologist with the Water Resources Division of the U.S. Geological Survey (USGS) for almost 9 years. During his tenure with the USGS, he conducted numerous hydrological studies on a variety of groundwater and surface water problems. During his tenure with the USGS, Mr. Larson was responsible for the development and use of groundwater simulation models that were used by other scientists in the USGS.

¹⁰ Cities Response at 22.

- Decades of experience with SSP&A conducting and managing projects related to a variety of environmental and water-resource issues. During his tenure at SSP&A, Mr. Larson has been involved in projects covering a wide spectrum of technical, environmental, and legal issues including environmental impact evaluations, evaluations of water-resource development, water-rights permitting and adjudication, remedial investigations at CERCLA and other waste-disposal sites, feasibility studies, engineering evaluations/cost analyses, and remedial action plans.
- Experience and testimony as an expert in numerous legal and administrative forums. These cases have included permit and licensing hearings, water-rights adjudications, arbitration hearings, interstate compact claims, toxic torts, liability claims, various legal actions under CERCLA, property damage claims, and insurance claims.
- Service as a technical expert in several interstate water disputes. These include: *Kansas v. Colorado*, No. 105, Orig.; *Nebraska v. Wyoming*, No. 108, Orig.; *Kansas v. Nebraska*, No. 126, Orig.; *Montana v. Wyoming*, No. 137, Orig.; *South Carolina v. North Carolina*, No. 138, Orig. and *Mississippi v. Tennessee*; and *Memphis, Light, Gas, & Water Division*, No. 143, Orig. This work has included testimony as an expert in the fields of hydrology, groundwater hydrology, and hydrologic modeling.
- Service as a consultant and advisor to the State of Kansas on several groundwater modeling studies. These efforts include the cooperative development of a groundwater model by the States of Kansas, Nebraska and Colorado for the Republican River basin that provides input to evaluations of compliance with the Republican River Compact. Mr. Larson has also served on technical committees to review the development of groundwater models for the Rattlesnake Creek basin by the Kansas Geological Survey and for the Arkansas River basin by Balleau Groundwater on behalf of Groundwater Management District 5.

b. The Interests Water PACK Seeks to Protect Are Germane to Its Purpose

In seeking to intervene, Water PACK is acting consistent with its foundational charge.

The Water PACK amended and restated articles of incorporation, attached as Exhibit 5, make that clear. The articles recite these corporate purposes:

- 3.1 to promote, foster, and encourage the business conditions of its members in relation to their use and conservation of water within the State of Kansas, together with any and all matters relating thereto;
- 3.3 to initiate, sponsor, and promote research to determine the quality and quantity of water available for water use, the source of surface and ground water, the rate of

withdrawal, replenishment, or recharge, source of pollution and all other factors pertaining to the available supply of water for appropriation;

- 3.4 to sponsor the formulation of a general water policy which will be for the best interests and will promote the welfare of the majority of the members of the Association;
- 3.5 to take such action as is deemed necessary or advisable to protect the rights and promote the welfare of the members of the Association in all matters which are of mutual interest and benefit to a majority of the members in connection with water use or loss of appropriations;
- 3.6 to sponsor the study of legislation, tax matters, rules and regulations of any duly-constituted authority which may affect the land, equipment, power, rate of withdrawal, appropriation and quality of water resources of the members of the Association;
- 3.7 to initiate, sponsor, and promote research to determine the most profitable crops which can be raised on irrigated land;
- 3.8 to promote the general interest and activities of the members of the Association in the improvement of water use practices for their mutual benefit and welfare and for the development of the most profitable and permanent system of water use;
- 3.10 to obtain and furnish such information and reports to the members of the Association as are deemed helpful or of value to them in connection with water use;

The delineated corporate purposes in the Water PACK articles are unquestionably directly relevant to and aligned with its efforts in this proceeding and are significantly more specific than those considered adequate by the Kansas Supreme Court in *Bd. of Cnty. Commissioners of Sumner Cnty. v. Bremby*, 286 Kan. 745, 763, 189 P.3d 494, 506 (2008) (“Likewise, the petition states that Tri–County is a nonprofit organization “organized for the purpose or preserving and enhancing the quality of life in Harper, Kingman and Sumner counties.” The interests that the association seeks to protect by initiating this action—namely, ensuring that any landfill that is located in Harper County meet environmental standards to protect the groundwater supply and river water—are germane to this purpose.”).

Scrutiny and analysis of the unprecedented transfer of water sought by the Cities could scarcely be more important to Movants and germane to Water PACK's constitutive purpose.

c. The Relief Requested Does Not Require Direct Participation by Individual Members

As to the third prong of the common law standing template, in their amended petition for intervention, Movants articulate their theory and objections as follows: "Public records, expert testimony, and a correctly configured hydrological model show that the quantity of water the Cities wish to move from the R9 Ranch will impair existing water rights, in part because the conversion of the R9 Ranch to native grasses will reduce aquifer recharge and accelerate depletion of the Arkansas River." *Revised Joint Petition for Intervention* ¶ 9. Those overarching systemic objections to the Cities' plans obviate any need for direct participation by Water PACK's members. *Cf. Bremby*, 286 Kan. at 763. ("Finally, the claim asserted by Tri-County — that the KDHE's decision to grant the permit was arbitrary and capricious in that it did not take into account the concerns addressed in the comments, in particular the Terrane and Burns & McDonnell studies — does not require the participation of the individual members.").

F. EDWARDS COUNTY HAS STANDING AND THE CITIES HAVE WAIVED ANY CONTENTION TO THE CONTRARY

To establish a cognizable injury for purposes of establishing standing, a party must show "a personal interest in a court's decision and that he or she personally suffers some actual or threatened injury as a result of the challenged conduct." *Solomon v. State*, 303 Kan. 512, 521, 364 P.3d 536, 543 (2015). Abundant scholarly commentary and reporting support the County's arguments that it is at risk of injury by virtue of the feared or

expected economic impacts associated with an improperly approved inter-basin transfer and, as a direct consequence, inform the question of the County's standing to intervene in this proceeding. See, e.g., the following:

- Charles W. Howe, *The Economic Issues in Interbasin Water Diversions*, PROCEEDINGS OF THE ANNUAL MEETING (WESTERN FARM ECONOMICS ASSOCIATION), Vol. 40 (July 19-21, 1967), at 198.
- INTERBASIN TRANSFERS OF WATER: ECONOMIC ISSUES AND IMPACTS (1ST ed. 1971, Easter & Howe, eds).
- Robert Sanchez, *High + Dry*, 5280, Dec. 2014, available at <https://www.5280.com/high-dry/> (last visited Jan. 25, 2023)
- Ben Ryder Howe, *Wall Street Eyes Billions in the Colorado's Water*, N.Y. TIMES, Jan. 3, 2021, available at <https://www.nytimes.com/2021/01/03/business/colorado-river-water-rights.html>;
- Scott Campbell, et al., *The Economic Impacts of Dry-up on Colorado's Bessemer Ditch*, May 11, 2021, https://innovativeconservationsolutions.com/wp-content/uploads/2022/02/Bessemer-EIA_FINAL_Web.pdf; and
- Bill Golden and Jeff Johnson, *Potential Economic Impacts of Water-Use Changes in Southwest Kansas*, 5 J. OF NAT. RES. POL'Y RES. 129, at 132 (2013) ("When agricultural groundwater use is restricted...crop production will likely be reduced in the near term and producers and local communities will thus incur negative economic impacts").

Moreover, other than a passing reference to the County on page 24 of its Response, the Cities do not present any legal arguments explaining why the County should be prevented from intervening in this proceeding. Consequently, the Cities have abandoned and waived any corresponding right to object to the County's intervention. See *Russell v. May*, 306 Kan. 1058, 1089, 400 P.3d 647 (2017) ("Issues not adequately briefed are deemed waived or abandoned. See *State v. Logsdon*, 304 Kan. 3, 29, 371 P.3d 836 (2016). This includes "point[s] raised only incidentally in a brief but not argued there.").

G. THE CHIEF ENGINEER'S ACTIONS AND CONCLUSIONS ARE IMMATERIAL

The Cities reference the former Chief Engineer's actions and conclusions 42 times in their Response. In a milieu different from the stage of this proceeding, that substantial reliance would be expected given the outcome favoring the Cities in the prior KWAA proceeding administered by the former Chief Engineer. But the question before this tribunal is the procedural issue of whether Movants have standing that renders their participation appropriate and enforceable in a separate proceeding brought under the Water Transfer Act. Not at issue are the substantive merits of the parties' respective legal or analytical arguments. Whether the former Chief Engineer's actions and conclusions in the KWAA proceeding were correct are questions to be decided by the Supreme Court. Here the question is only one of standing and, as to that question, the Chief Engineer has nothing to offer.

H. CONCLUSION

The Cities cite repeatedly the standard for assessing cognizable standing under the KJRA. But as shown herein and in the Movants' amended petition to intervene, standing to intervene in a proceeding governed by the Kansas Administrative Procedure Act is governed by a different and less exacting standard. Under the relevant and appropriate standard, Movants have sufficiently identified the issues they intend to raise before the tribunal and are required to do nothing more. Moreover, standing cannot be viewed as an immutable concept. As observed by Justice Scalia, standing must be judged under a flexible standard depending upon the unique circumstances and the nature of the harm alleged:

There is this much truth to the assertion that “procedural rights” are special: The person who has been accorded a procedural right to protect his concrete interests can assert that right without meeting all the normal standards for redressability and immediacy. Thus, under our case law, one living adjacent to the site for proposed construction of a federally licensed dam has standing to challenge the licensing agency's failure to prepare an environmental impact statement, even though he cannot establish with any certainty that the statement will cause the license to be withheld or altered, and even though the dam will not be completed for many years.

Lujan v. Defs. of Wildlife, 504 U.S. 555, 573, 112 S. Ct. 2130, 2143, 119 L. Ed. 2d 351 (1992).

The Cities’ argument that judicial standing standards are an implacable bar to intervention if conclusive facts are not presented at the outset of an administrative proceeding is inconsistent with Kansas precedent and runs entirely contrary to the principle noted in *Lujan*. The former Chief Engineer’s failure to account for the decrease in groundwater recharge that is predicted by the Report, with the resulting seriously detrimental effect on Movants’ interests, is conceptually related and can be persuasively likened to the circumstances giving rise to standing that were noted by the Court in *Lujan*.

Movants have standing and should be permitted to intervene.

Dated January 28, 2023
Overland Park, Kansas

Respectfully submitted

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CERTIFICATE OF SERVICE

I hereby certify that on January 28, 2023, the foregoing was electronically served to all counsel of record by email as follows:

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/s/ Charles D. Lee

EXHIBIT 1
Kansas Department of Agriculture Timeline

KANSAS DEPARTMENT OF AGRICULTURE
R9 RANCH TIMELINE
EXHIBIT 1

TIMELINE

1995	R9 Ranch and water rights purchased by the City of Hays
2015-06-26	Cities of Hays and Russell (Cities) apply to change R9 Ranch water rights from irrigation to municipal use
2016-01-06	Cities apply to transfer water from R9 Ranch to Hays and Russell
2016-01-21	KDA-DWR letter to the Cities with comments from its review of the change applications
2016-03-08	KDA-DWR letter to the Cities with additional comments from its review of the change applications
2016-03-24	Cities of Hays and Russell meet with KDA-DWR to discuss details of the water right change applications
2016-04-06	KDA-DWR letter to the Cities summarizing 3/24/2016 meeting and next steps
2018-02-16	KDA-DWR post Cities' modeling report
2018-05-07	KDA-DWR transmits draft proposed master order with exhibits to GMD No. 5 for review and posts to its website
2018-05-11	KDA-DWR posts change applications and amendments to its website.
2018-06-21	Public informational meeting to discuss application in Greensburg, Kansas.
Summer 2018	Public input on proposed change applications
2018-08-30	GMD No. 5 comments on change applications
2018-09-14	GMD No. 5 provides supplemental comments on change applications

KANSAS DEPARTMENT OF AGRICULTURE
R9 RANCH TIMELINE
EXHIBIT 1

2018-10-05 Updated modeling report

2019-03-27 Contingent Approval of Change Applications

EXHIBIT 2
Cities' Motion Seeking Additional Time to File Initial Brief

IN THE SUPREME COURT OF THE STATE OF KANSAS

WATER PROTECTION ASSOCIATION OF)
CENTRAL KANSAS,)

Plaintiff/Appellant,)

v.) Case No. 22-125469-S

EARL LEWIS, P.E., THE CHIEF ENGINEER)
OF THE STATE OF KANSAS, DEPARTMENT)
OF AGRICULTURE, DIVISION OF WATER)
RESOURCES, IN HIS OFFICIAL CAPACITY,)

Defendant/Appellee,)

v.)

THE CITY OF HAYS, KANSAS and)
THE CITY OF RUSSELL, KANSAS,)

Intervenors/Appellees.)

_____)

APPELLEES' MOTION FOR EXTENSION OF TIME TO FILE BRIEF

The City of Hays Kansas and the City of Russell, Kansas, by and through the undersigned, hereby move this Court for an order extending the deadline to file their Response to Appellant's opening brief until February 12, 2023.

IN SUPPORT of this motion, Cities state as follows:

1. Pursuant to Kansas Supreme Court Rule 6.01(b) regarding appellate practice, the Cities' opening brief is due on or before January 13, 2023.

2. Due to the press of other matters, counsel for the Cities needs additional time to prepare and file their Response to Appellant's opening brief.

3. The interests of justice will be served by permitting this additional period of time to prepare this brief.

4. No previous extensions have been requested or granted.

5. Counsel has conferred with counsel for the Chief Engineer and for counsel for Water PACK and they do not object to the requested extension.

Therefore, the Cities respectfully request that this Court issue an order extending the deadline for filing the Cities' Response to Appellant's opening brief for 30 days until February 12, 2023.

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I hereby certify that I presented the foregoing to the Clerk of the Court for filing and uploading to the Kansas Courts e-Filing system that will send notice of electronic filing to counsel of record and a courtesy copy by electronic mail to the following:

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David M. Traster, KS #11062

EXHIBIT 3
Janssen Affidavit

**BEFORE THE OFFICE OF ADMINISTRATIVE HEARINGS
STATE OF KANSAS**

In re:

Application of the Cities of Hays, Kansas, and
Russell, Kansas, for Approval to Transfer Water
from Edwards County, Kansas Pursuant to the
Water Transfer Act

OAH Case No. 23AG0003 AG

Pursuant to KSA Chapter 77

AFFIDAVIT

The undersigned affiant, being of lawful age and duly sworn, states under oath as follows:

1. I have personal knowledge of the facts and circumstances forming the basis of this Affidavit.
2. My knowledge of such facts and circumstances is based upon the following:
 - a. my current role as president and director of the Water Protection Association of Central Kansas (“Water PACK”);
 - b. my former role as secretary of Water PACK;
 - c. my review of publicly-available real property records;
 - d. my review of Water PACK’s membership records; and
 - e. my review of the Water Information Management and Analysis System
3. The document attached to this Affidavit as Exhibit A depicts lands owned or leased by members of Water PACK (the “Member Map”).
4. The orange-colored parcels depicted on the Member Map include appurtenant water rights owned or leased by members of Water PACK identified in the public records described in paragraph 2 of this affidavit, as well as Water PACK’s membership records.

I HAVE NOTHING FURTHER TO STATE AT THIS TIME.

Patricia M. Jussier
Affiant

SUBSCRIBED AND SWORN TO before me this 17 day of Jan, 2023.

My Appointment Expires: 2-11-26

Melanie Sue Scott
Notary Public



Exhibit A

Member Map

[attached]

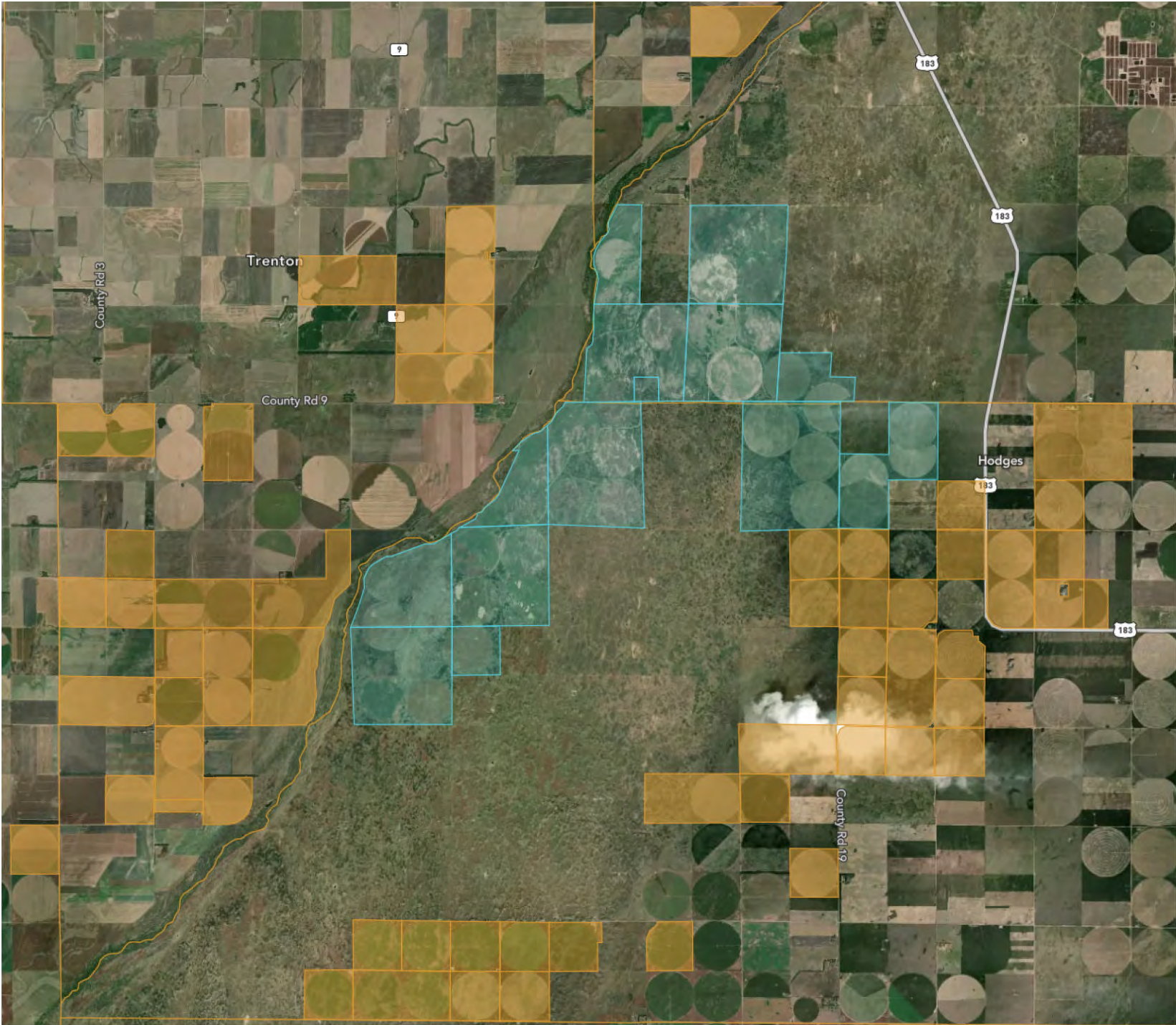


EXHIBIT 4
Larson Expert Report

Revaluation of Burns & McDonnell's R9 Ranch Modeling Results



S.S. PAPANOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

January 27, 2023

1801 Rockville Pike, Suite 220, Rockville, Maryland 20852-1649 • (301) 718-8900

Revaluation of Burns & McDonnell's R9 Ranch Modeling Results

Prepared by:



Steven P. Larson



S.S. PAPADOPULOS & ASSOCIATES, INC.
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Figures

Attachment

List of Figures

- Figure 1 Comparison of SSP&A Results (green contours) with BMcD Results (blue contours) for BMcD Scenario 4
- Figure 2 Comparison of SSP&A Results (green contours) with BMcD Results (blue contours) for BMcD Scenario 5
- Figure 3 Comparison of SSP&A Results (green contours) with BMcD Results (blue contours) for BMcD Scenario 6
- Figure 4 Comparison of SSP&A Results (green contours) with Results for BMcD Scenario 4 with Reduced Groundwater Recharge (red contours)
- Figure 5 Comparison of SSP&A Results (green contours) with Results for BMcD Scenario 5 with Reduced Groundwater Recharge (red contours)
- Figure 6 Comparison of SSP&A Results (green contours) with Results for BMcD Scenario 6 with Reduced Groundwater Recharge (red contours)
- Figure 7 Comparison of SSP&A Reduced Recharge Rates to BMcD Recharge Rates Along with Assumed Pumping Over the Simulation Period for Scenario 6 (simulated drought period)

List of Attachments

- Attachment Curriculum Vitae of Steven P. Larson

REPORT

Section 1

Qualifications

This report was prepared by Steven P. Larson. Mr. Larson is a Principal with S.S. Papanopoulos & Associates, Inc. (SSP&A), a firm that provides consulting services related to environmental and water-resource issues. His area of expertise is hydrology, with emphasis on groundwater hydrology including assessment of soil and groundwater contamination.

Mr. Larson holds a Bachelor of Science in Civil Engineering from the University of Minnesota (1969), and a Master of Science in Civil Engineering, also from the University of Minnesota (1971). He is a member of the National Ground Water Association and the American Institute of Hydrology. He is also certified as a Professional Hydrologist with the American Institute of Hydrology.

Prior to joining SSP&A in 1980, Mr. Larson was employed as a hydrologist with the Water Resources Division of the U.S. Geological Survey (USGS) for almost 9 years. During his tenure with the USGS, he conducted numerous hydrological studies on a variety of groundwater and surface water problems. During his tenure with the USGS, Mr. Larson was responsible for the development and use of groundwater simulation models that were used by other scientists in the USGS.

Mr. Larson has spent the last 40 years with SSP&A conducting and managing projects related to a variety of environmental and water-resource issues. During his tenure at SSP&A, Mr. Larson has been involved in projects covering a wide spectrum of technical, environmental, and legal issues including environmental impact evaluations, evaluations of water-resource development, water-rights permitting and adjudication, remedial investigations at CERCLA and other waste-disposal sites, feasibility studies, engineering evaluations/cost analyses, and remedial action plans.

Mr. Larson has also testified as an expert in numerous legal and administrative forums. These cases have included permit and licensing hearings, water-rights adjudications, arbitration hearings, interstate compact claims, toxic torts, liability claims, various legal actions under CERCLA, property damage claims, and insurance claims.

Mr. Larson has also served as a technical expert in several interstate water disputes. These include: *Kansas v. Colorado*, No. 105, Orig.; *Nebraska v. Wyoming*, No. 108, Orig.; *Kansas v. Nebraska*, No. 126, Orig.; *Montana v. Wyoming*, No. 137, Orig.; *South Carolina v. North Carolina*, No. 138, Orig. and *Mississippi v. Tennessee*; and *Memphis, Light, Gas, & Water Division*, No. 143, Orig. This work has included testimony as an expert in the fields of hydrology, groundwater hydrology, and hydrologic modeling.

Mr. Larson has also served as a consultant and advisor to the State of Kansas on several groundwater modeling studies. These efforts include the cooperative development of a groundwater model by the States of Kansas, Nebraska and Colorado for the Republican River basin that provides input to evaluations of compliance with the Republican River Compact. Mr. Larson has also served on technical committees to review the development of groundwater models for the Rattlesnake Creek basin by the Kansas Geological Survey and for the Arkansas River basin

by Balleau Groundwater, Inc. (BGW) on behalf of Groundwater Management District 5. The latter model is the model used by Burns & McDonnell (BMcD) in their evaluation of the R9 Ranch transfer application.

A copy Mr. Larson's curriculum vitae (CV) is attached to this report.

Section 2

Summary of Evaluation

BMcD, on behalf of the Cities of Hays and Russell, Kansas, submitted reports describing the potential impacts of changing the groundwater use on the R9 Ranch from irrigation to municipal supply (BMcD, 2018a; 2018b). The potential impacts of the change in groundwater use were evaluated using a groundwater flow model developed by Big Bend Groundwater Management District No. 5 (BGW, 2010).

Burns & McDonnell prepared two reports describing their modeling evaluation, an initial report (BMcD, 2018a) and a revised report (BMcD, 2018b). The revised report was prepared to correct technical errors in the initial evaluation that were identified by Balleau Groundwater as part of their review of the BMcD evaluation and by BMcD after further review.

The revised evaluation prepared by BMcD did not address “alternative” approaches to the modeling evaluation offered by BGW or Keller-Bliesner Engineering (BMcD, 2018b). The concerns raised by BGW and Keller-Bliesner included concerns about changes in water budgets caused by the transfer.

When irrigated land is taken out of irrigation, soil moisture conditions become dependent on incident precipitation. More importantly, the lack of irrigation to increase and maintain soil moisture impacts the amount of incident precipitation that can recharge the groundwater. This difference in conditions is reflected in the relationships used in the groundwater model to estimate groundwater recharge associated with incident precipitation. Precipitation on irrigated land will produce greater recharge to groundwater than the same precipitation on non-irrigated land. These different relationships are described in the report by BGW on the development of the groundwater model.

The BMcD projected future scenarios did not account for the reduction in groundwater recharge associated with changing the status of lands on the R9 Ranch from irrigated to non-irrigated. The BGW groundwater model was premised on the concept of increased groundwater recharge from precipitation on irrigated lands. To be consistent with this premise when evaluating a transfer, the groundwater recharge on irrigated land must be reduced when that land is no longer irrigated.

The evaluation in this report reevaluates the projected future scenarios used by BMcD considering that the future condition of no irrigation will result in less groundwater recharge from precipitation on the lands that will be taken out of irrigation because of the proposed transfer. This reevaluation demonstrates that the change in groundwater recharge associated with the proposed transfer will exacerbate the negative impacts to groundwater levels and groundwater users in the area surrounding the R9 ranch.

Section 3

Basis for Evaluation

The groundwater model input files used by BMcD in their revised evaluation were not available to SSP&A. SSP&A was able to obtain the groundwater model input files that BMcD used in their original evaluation. In response to the comments by BGW, BMcD adjusted the groundwater model input files to correct errors that were identified by BGW and by BMcD. The nature of these adjustments was described to a certain extent in documents from BMcD.

Based on these descriptions as well as information prepared by BGW, SSP&A attempted to replicate the adjustments to the groundwater model files made by BMcD. These adjustments included changes to streambed elevations along the Arkansas River and river inflow conditions along the western boundary of the model domain.

The groundwater model changes made by SSP&A to replicate the BMcD revised input files could not be checked directly against model output since SSP&A did not have model output files associated with the BMcD revised calculations. As an alternative check, SSP&A compared results associated with the figures and tables that BMcD included in their revised report. These figures and tables provided a basis for ensuring that the groundwater model files used by SSP&A produced results that were reasonably close to the results shown on the figures and tables in the BMcD revised report.

As an example of these checks, Figures 1 to 3 compare SSP&A results to BMcD results corresponding to Figures 9, 10 and 13 in the revised BMcD report. As shown on Figures 1 and 2, the SSP&A results corresponding to BMcD Scenarios 4 and 5 very closely mimic the BMcD results corresponding to Figures 9 and 10 in the BMcD revised report. Figure 3 shows the correspondence between SSP&A results and BMcD revised results for Scenario 6 shown on Figure 13 of the BMcD revised report. There is a slight displacement in the groundwater level differences but the magnitudes of the differences are very close to one another. This indicates that there are some differences in the input files between SSP&A and BMcD associated with Scenario 6. Scenario 6 was a drought scenario where groundwater recharge conditions during certain years of the model simulation were replaced by conditions during the dry years of the 1930s. Since the magnitudes of the differences between the SSP&A version and the BMcD version for Scenario 6 were relatively small, it was concluded that the SSP&A input files were sufficient to evaluate the effects of reduced ground water recharge on irrigated land that would no longer be irrigated because of the proposed transfer.

The first step in the recalculating the impacts associated with the scenarios used by BMcD was to determine how much reduction in groundwater recharge would occur on the R9 ranch lands associated with the transfer and the consequent change in conditions from irrigated land to non-irrigated land. Figures 32 and 33 in the 2010 BGW report on the development of the GMD5 groundwater model and illustrate the procedures used to calculate monthly groundwater recharge from monthly precipitation. The R9 ranch area lies in recharge zone 9 depicted on Figure 33 in the BGW report. The curves on Figure 32 of the BGW report illustrate two curves for estimating recharge in zone 9, one curve for pre-1970 (non-irrigated) and one curve for post-1970 (irrigated). By comparing the post-1970 curve to the pre-1970 curve for a given amount of groundwater

recharge, SSP&A was able to determine the amount of reduction in recharge that would occur when land conditions change from irrigated to non-irrigated.

The scenarios calculated by BMcD to evaluate impacts of the proposed transfer used historical conditions from 1991 to 2007 to represent potential future conditions. This 17-year period was repeated three times to create a 51-year future simulation period. SSP&A adjusted the recharge input file from BMcD by reducing the amount of groundwater recharge on the lands associated with the R9 ranch using the relative positions of the zone 9 recharge curves on Figure 32 of the BGW report. The adjusted recharge input file was then used in recalculating the potential impacts of the proposed transfer for the various scenarios used by BMcD.

The calculations of potential impacts for the various scenarios considered by BMcD assumed that groundwater recharge for the period from 1991 to 2007 on the R9 ranch would not change because of the proposed transfer. However, the estimated groundwater recharge rates used in the groundwater model were premised on the notion that groundwater recharge from precipitation on irrigated land would be greater than on non-irrigated land for the same amount of precipitation. Groundwater recharge from precipitation for the period from 1991 to 2007 over the area of the R9 ranch was calculated to average about 4,732 acre-feet per year or about 5.1 inches per year. Using the zone 9 recharge curves from BGW, SSP&A calculated that groundwater recharge from precipitation for the period from 1991 to 2007 would only be 2,655 acre-feet per year or about 2.8 inches per year if the land was not irrigated. In other words, groundwater recharge from precipitation on the R9 ranch under the conditions associated with the proposed transfer would only be about 56% of the recharge that was estimated for the historical conditions that existed from 1991 to 2007.

Section 4

Results of SSP&A Evaluation

SSP&A repeated the groundwater model runs corresponding to Scenarios 1 to 6 described by BMcD in their revised report. However, for the scenarios that assumed pumping by the proposed municipal wells (Scenarios 2, 4, 5, and 6), the groundwater recharge was adjusted to reflect the change in land condition from irrigated to non-irrigated as described above.

The reduction in groundwater recharge resulting from the change in land conditions associated with the proposed transfer exacerbates the calculated negative impacts. These exacerbated impacts are illustrated on Figure 4 to 6. Figure 4 shows the difference in groundwater levels over the 51-year simulation period associated with BMcD's Scenario 4. The figure compares the BMcD result (blue and green contours) with the SSP&A result (red contours) where the groundwater recharge on the R9 ranch area was reduced to reflect the change in land condition from irrigated to non-irrigated. The reduction in groundwater levels has increased from generally less than one foot in the BMcD simulation to several feet in the SSP&A simulation. The area of reduced groundwater levels in the SSP&A simulation is also much larger and has the potential to impact many more existing groundwater users than the BMcD result.

Figure 5 shows the difference in groundwater levels over the 51-year simulation associated with BMcD Scenario 5. This figure might appear at first glance to show less impact in the SSP&A simulation than the BMcD simulation, at least in terms of the area of impact. However, the BMcD simulation shows an **increase** in groundwater levels over the simulation period whereas the SSP&A simulation shows a **reduction** in groundwater levels. Note that the BMcD contours (blue and green) are **positive** while the SSP&A contours are **negative**. Thus, when the potential reduction in groundwater recharge on the R9 ranch area is considered, BMcD Scenario 5 results in a negative rather than a positive impact to existing groundwater users.

Results for BMcD Scenario 6 are shown on Figure 6. Scenario 6 is similar to Scenario 5 except that groundwater recharge is reduced for some years during the 51-year simulation period to mimic the potential effects of a drought period like the one that occurred in the 1930's. Figure 7 compares the reduced recharge rates used by SSP&A along with the recharge rate used by BMcD in Scenario 6. Figure 7 also shows the pumping rates from the R9 ranch area that were assumed for Scenario 6. The figure illustrates the increase in pumping that was assumed to occur during the simulated drought period.

In comparing Figure 5 to Figure 6, the impacts in the BMcD simulations (blue and green contours) appear to shrink. However, the BMcD results are an **increase** in groundwater levels and the effects of considering a potential "drought" shown on Figure 6 is a reduction in both the magnitude and extent of the **increased** groundwater levels. In contrast, the SSP&A simulations (red contours) show an increase in both the magnitude and extent of **decreased** groundwater levels associated with BMcD Scenario 6 when potential reductions in groundwater recharge on the R9 ranch are considered.

Section 5

Conclusions

BMcD evaluated the impacts associated with the proposed change from irrigation use to municipal use by simulating several scenarios of potential future pumping and hydrologic conditions within the R9 ranch area. BMcD used the GMD5 groundwater model to estimate the differences in groundwater levels between a scenario of future irrigation use and a scenario of future municipal use within the R9 ranch. However, BMcD failed to consider the reduction in groundwater recharge that would occur when the land within the R9 ranch area was not irrigated in the municipal pumping scenarios.

The reduction in groundwater recharge within the R9 ranch area when land is no longer irrigated was estimated to average about 2,000 acre-feet per over the 51-year simulation period that BMcD used their simulations. This reduction in groundwater recharge was calculated using precipitation-recharge curves that formed one of the bases for the GMD5 groundwater model that BMcD used in their evaluation.

The inclusion of a reduction in groundwater recharge in the potential future scenarios of municipal pumping significantly increases the impacts to groundwater levels by five times or more in places near the ranch boundary from those projected in the BMcD evaluations. The areal extent of reduced groundwater levels was also significantly increased from about 15 square miles to over 150 square miles when the reduction in groundwater recharge was appropriately considered in simulations of potential municipal pumping from the R9 ranch area.

Section 6

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FIGURES

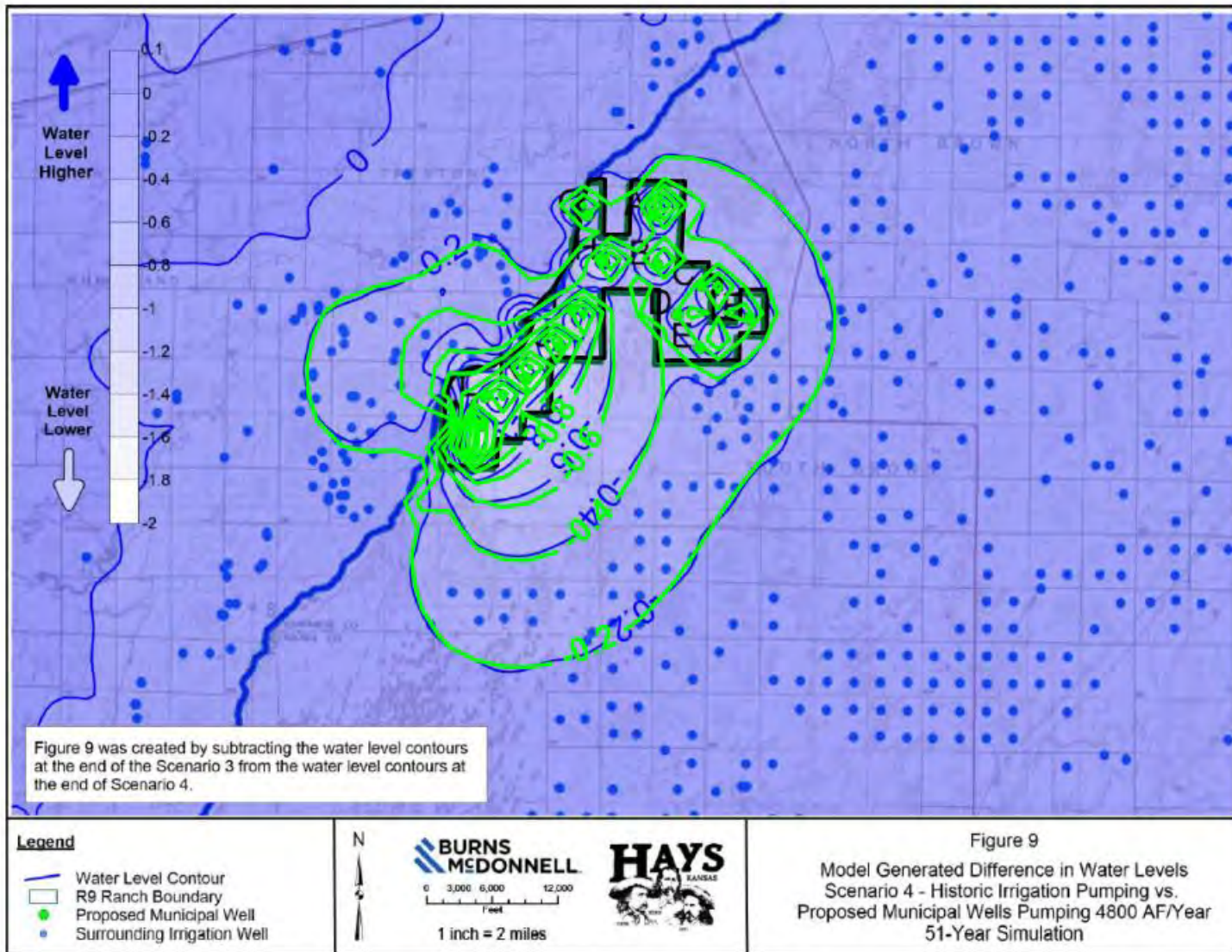


Figure 1: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 4.

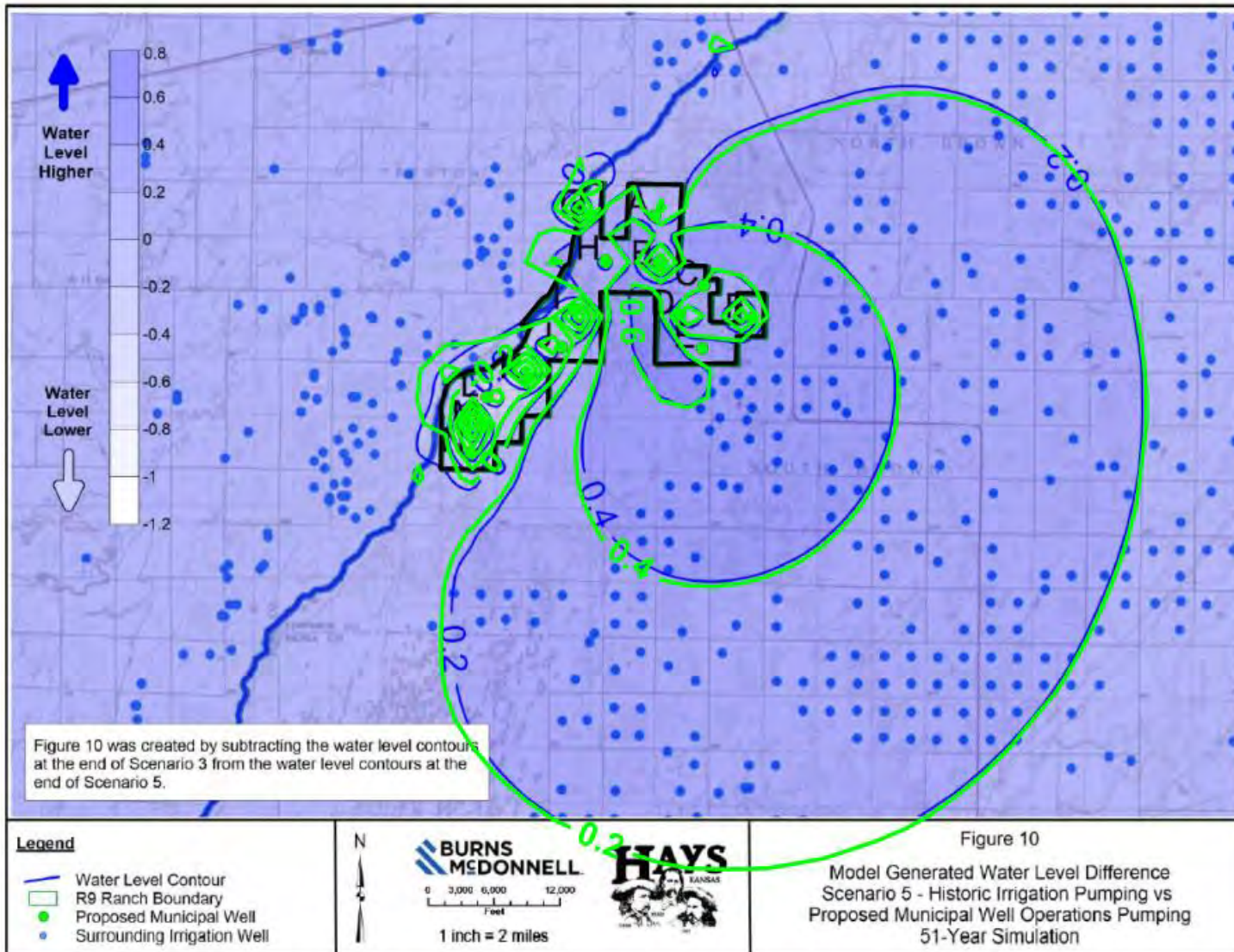


Figure 2: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 5.

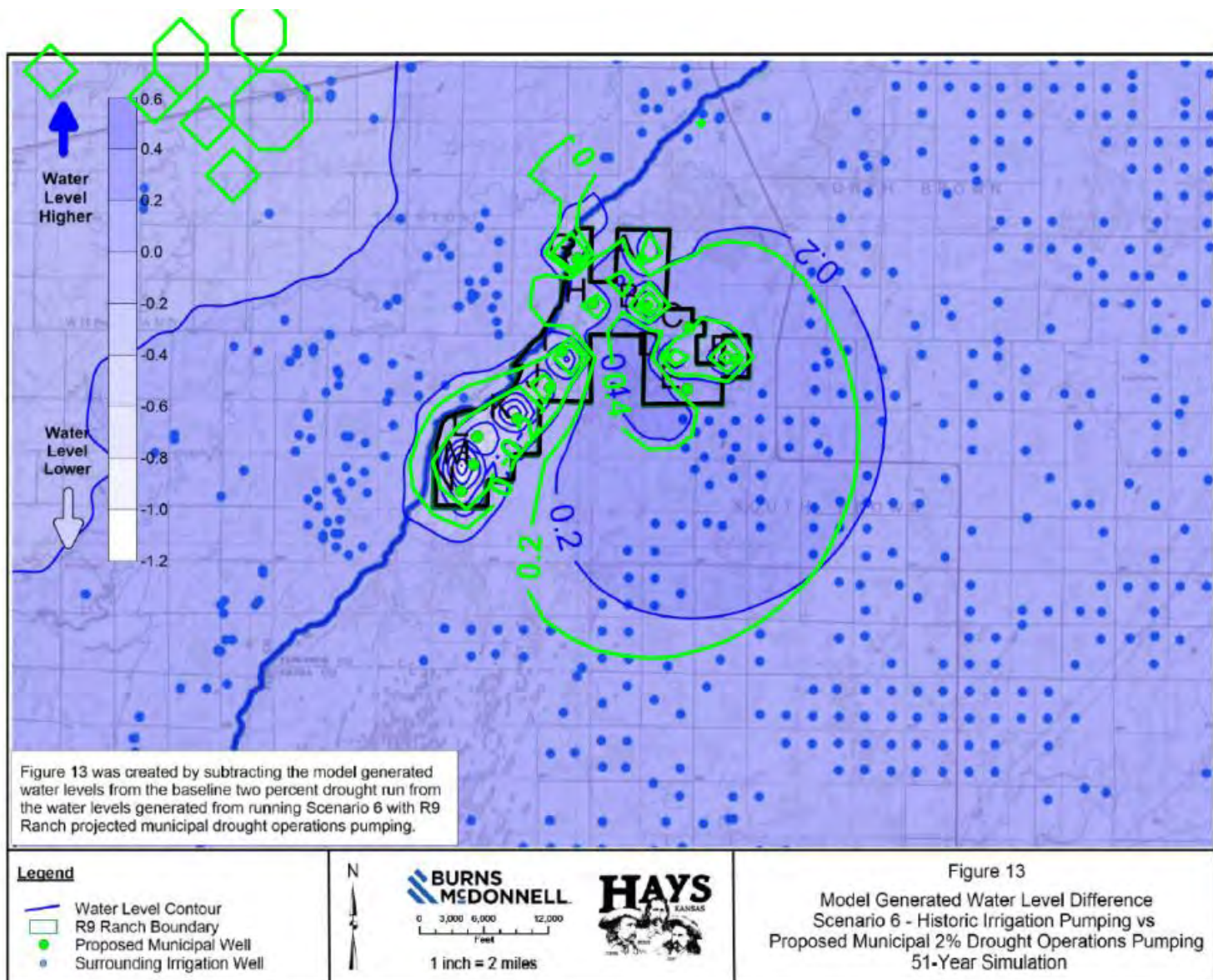


Figure 3: Comparison of SSP&A results (green contours) with BMcD results (blue contours) for BMcD Scenario 6.

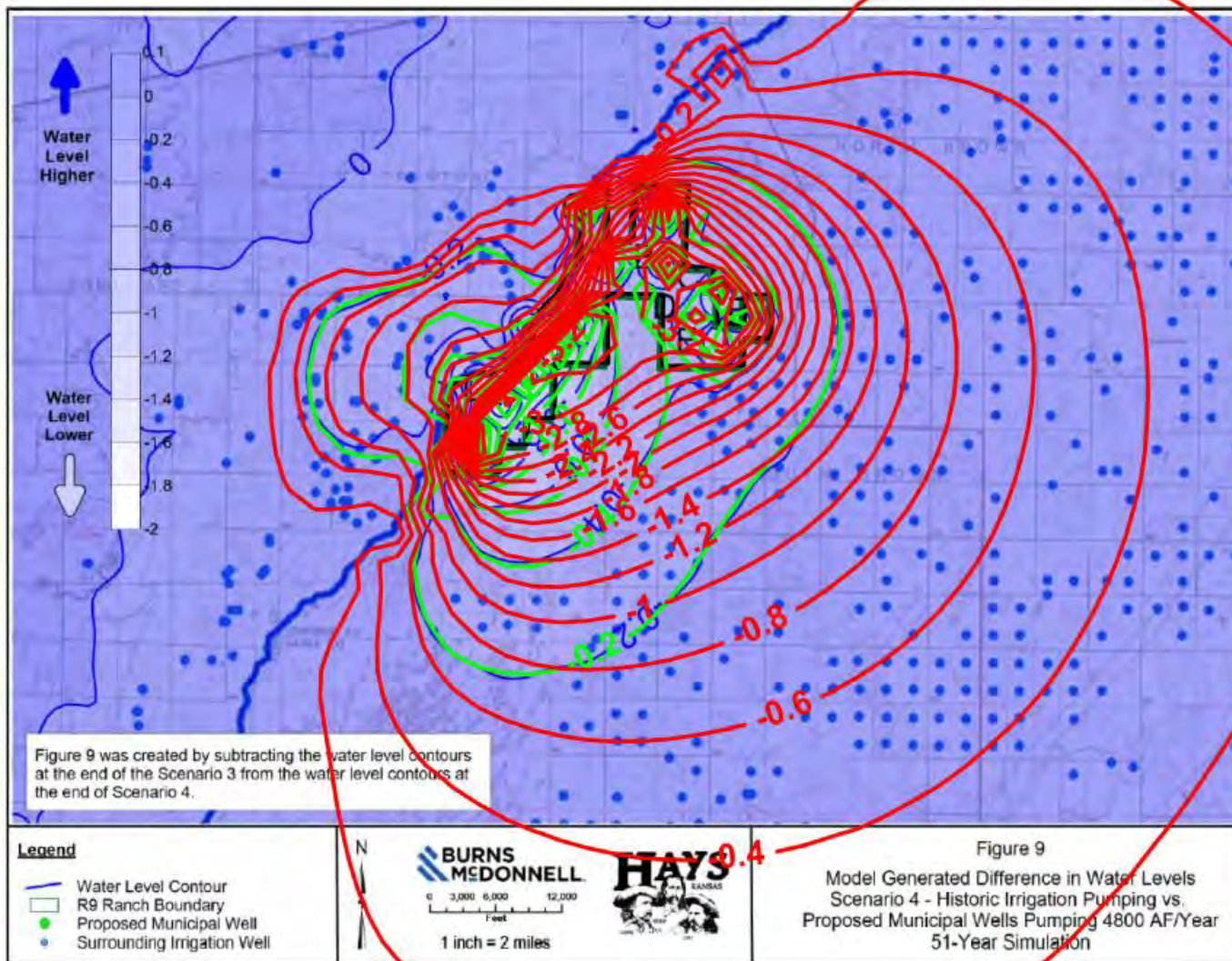


Figure 4: Comparison of SSP&A results (green contours) with results for BMcD Scenario 4 with reduced groundwater recharge (red contours).

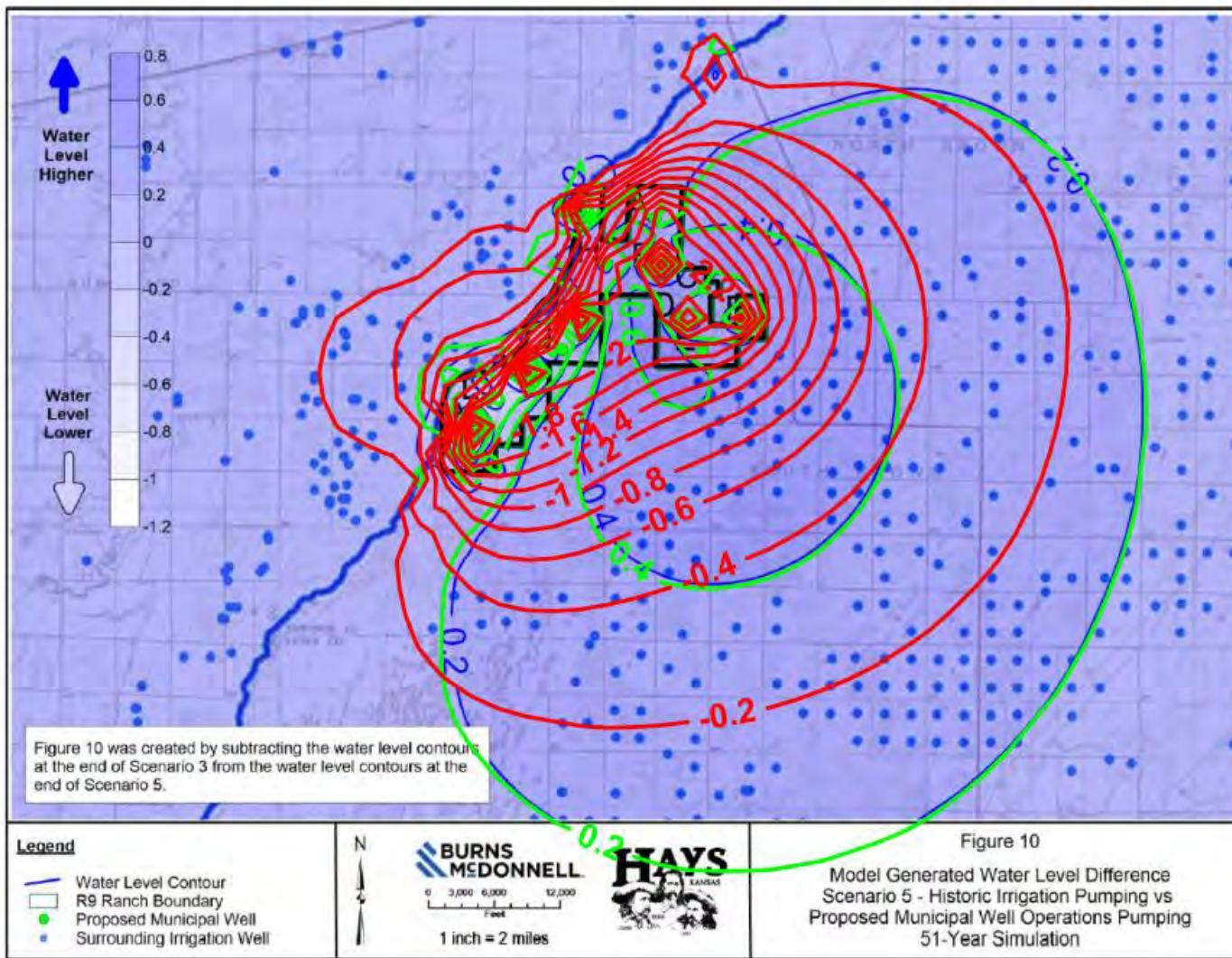


Figure 5: Comparison of SSP&A results (green contours) with results for BMcD Scenario 5 with reduced groundwater recharge (red contours).

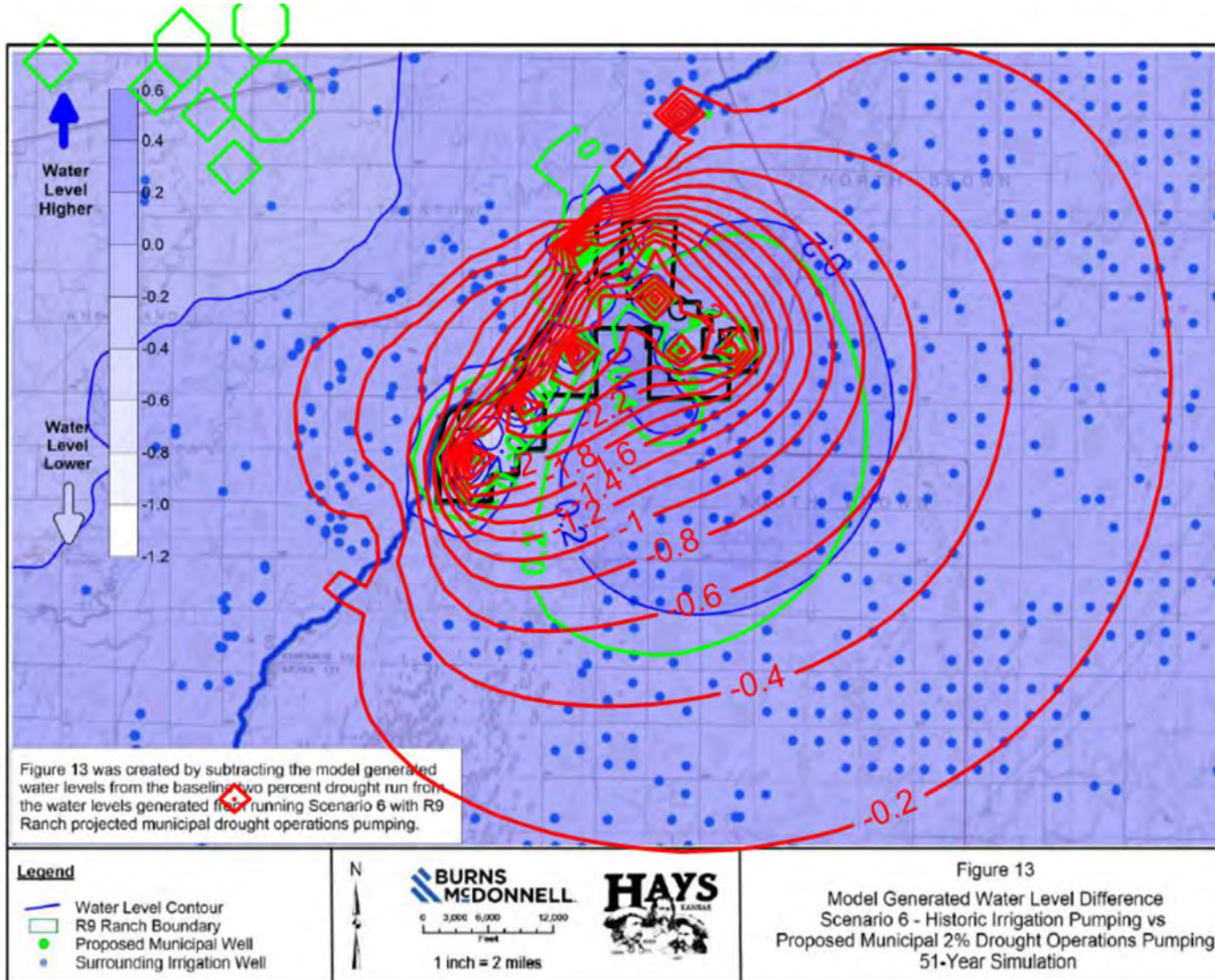


Figure 6: Comparison of SSP&A results (green contours) with results for BMcD Scenario 6 with reduced groundwater recharge (red contours).

Simulated Recharge and Operation Pumping With Reduced Recharge

— BMcD Scenario 6 Recharge ● SSPA Scenario 6 Reduced Recharge □ Pumping

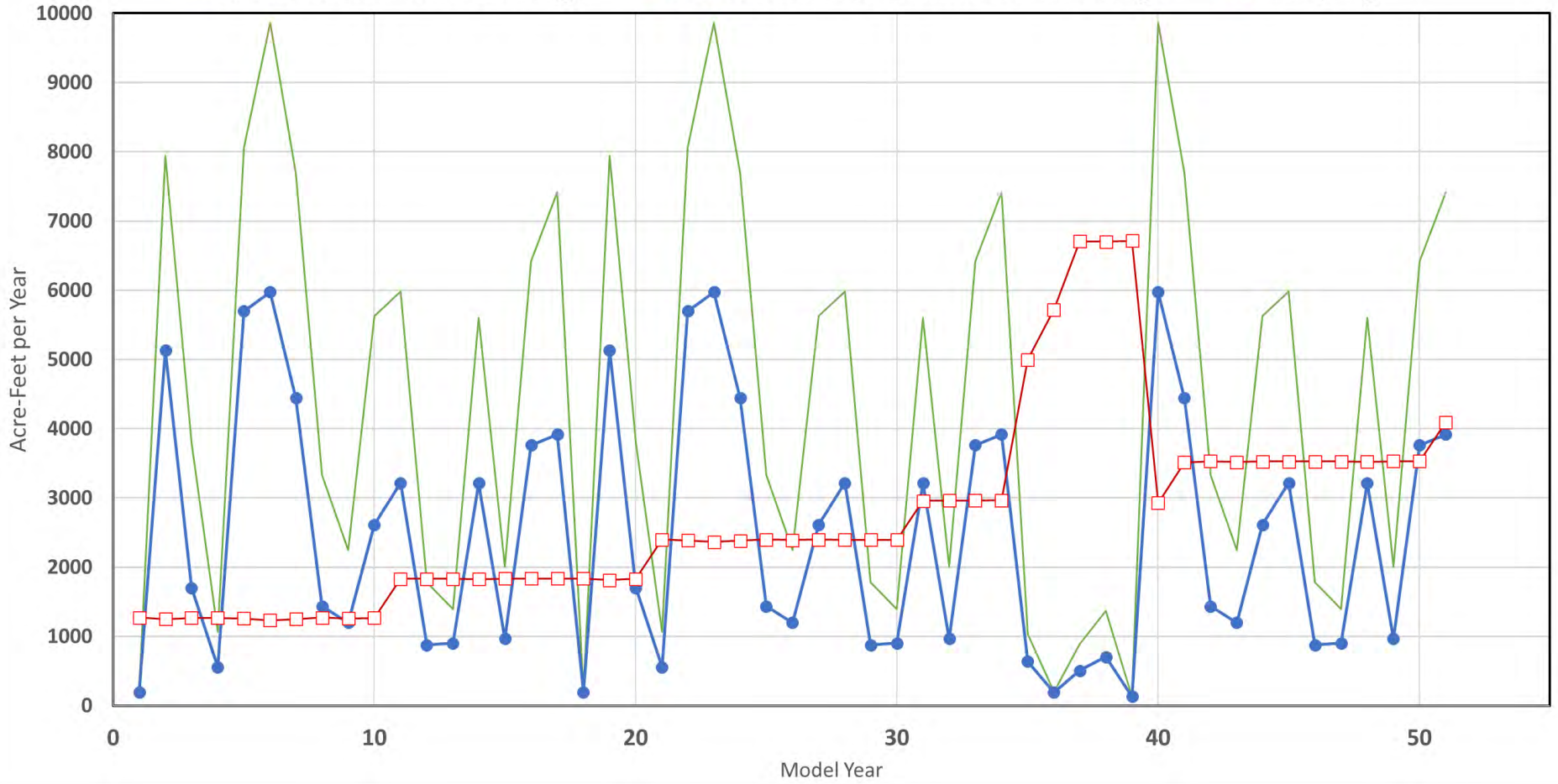


Figure 7: Comparison of SSP&A reduced recharge rates to BMcD recharge rates along with assumed pumping over the simulation period for Scenario 6 (simulated drought period).

ATTACHMENT

STEVEN P. LARSON

Groundwater Hydrologist

AREAS OF EXPERTISE

- Groundwater Hydrology
- Contaminant Fate and Transport
- Site Investigation and Remediation
- Numerical Modeling
- Spatial Interpolation
- Expert Testimony

SUMMARY OF QUALIFICATIONS

Mr. Larson is a recognized authority on numerical simulation models and their application in the analysis of a variety of groundwater problems. He has developed such models for analyzing groundwater flow, mass- and heat-transport in groundwater systems, contaminant migration, recovery of petroleum products from groundwater, saltwater intrusion in coastal aquifers, and thermal energy storage in aquifers. In addition, he has been in the forefront of combining these methods with linear programming techniques to optimize the development of groundwater supplies or the remediation of contaminated groundwater. Mr. Larson has conducted training courses on the use of these models and provided technical support on their application to a variety of hydrologic conditions. He has authored and co-authored publications on the application of aquifer simulation models that are widely used by practicing hydrologists. He has served as an expert witness in numerous judicial forums regarding groundwater issues and the application of simulation models for demonstrating the fate of soil/groundwater contamination and the effect of remediation alternatives.

REPRESENTATIVE EXPERIENCE

S.S. Papadopoulos & Associates, Inc., Rockville, Maryland
As senior principal of the company, Mr. Larson assists in the management of the company and in the conduct and management of projects dealing with a wide variety of environmental and water-resource issues. During his many years at SSP&A, he has been involved in numerous projects covering a wide spectrum of technical, environmental, and legal issues including:

- **Site Evaluations** — Remedial investigations, feasibility studies, engineering evaluation/cost analyses, and remedial action plans at CERCLA and other waste disposal sites including the Stringfellow site in California, the FMC Fridley site in Minnesota, the Chem Dyne site in Ohio, the Conservation Chemical site in Missouri, the Hardage-Criner site in Oklahoma, and the Hastings site in Nebraska.
- **Groundwater Contamination Evaluations, CERCLA and Other Waste-Disposal Sites** — Love Canal, New York; Savannah River Plant, South Carolina; Tucson Airport, Arizona; Ottati & Goss site, New Hampshire; Martin-Marietta site, Colorado; and Western Processing site, Washington State.
- **Environmental Impact Evaluations of the Effects of Water Development**, Wyoming and South Dakota — For proposed coal slurry operations in Wyoming, of in-situ mining for trona minerals in Wyoming, and of groundwater development on the shallow-water-table in South Dakota.

YEARS OF EXPERIENCE: 50+

EDUCATION

- MS**, Civil Engineering
University of Minnesota, Minneapolis, 1971
- BS**, Civil Engineering (High Distinction)
University of Minnesota, Minneapolis, 1969

REGISTRATIONS

- Professional Hydrologist**
93-HGW-1032

PROFESSIONAL HISTORY

- S.S. Papadopoulos & Associates, Inc.**,
Executive Vice President, 1980 to present.
- U.S. Geological Survey**,
Water Resources Division, Reston,
Virginia: Hydrologist, 1975 – 1980
Water Resources Division, St. Paul,
Minnesota: Hydrologist, 1971 – 1975
Water Resources Division, National
Training Center, Denver, Colorado:
Hydrologist, 1971
- St. Anthony Falls Hydraulic
Laboratory**, Minneapolis, Minnesota:
Research Assistant, 1969 – 1971

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- **Water-Supply Development Evaluations** — Potential impacts of salt-water intrusion on water-supply development, in Oman, Portugal and Florida; and analysis of potential impacts of power-plant cooling water on groundwater and surface water in Wyoming.
- **Evaluations of Permitting, Licensing, and Environmental Issues Associated with Mining** — Coal mining in Wyoming, Montana, and Arizona; copper mining in Montana and Utah; trona mining in Wyoming; and uranium mining in New Mexico.
- **Evaluations of the Effects of Discharge on Groundwater from Chemical-Manufacturing Waste Disposal** — Wyoming, Virginia, and New York.
- **Water-Rights Permitting Evaluations and Adjudication** — New Mexico, Texas, Colorado, Kansas, Wyoming, Nebraska, Arizona, and Idaho.
- **Environmental Audits, Groundwater Monitoring Plans, and Other Environmental Investigations** — Oaks Landfill in Maryland, the FMC Carteret facility in Wyoming, the former IBM facility in Indiana, and the Insilco site in Florida.

SPECIFIC PROJECT EXPERIENCE

- **Montrose Chemical Corporation Superfund Site**, California — Provides technical support to Montrose regarding modeling of groundwater flow and chemical transport. Assists Montrose in conducting evaluations of a groundwater recovery and treatment program that has been developed to provide mitigation of groundwater impacted by monochlorobenzene and other chemicals associated with former manufacturing operations at the site.
- **Osage Road Site**, Oklahoma — Provides technical support to Halliburton regarding investigation and evaluation of groundwater impacted by perchlorate associated with former missile casing cleaning operations that had been conducted at the site. Work has included compilation and mapping of groundwater levels and perchlorate concentrations in groundwater. The work has also included design of an interim groundwater remediation system and evaluations of system performance since its installation.
- **Far-Mar-Co Subsite, Hastings Site**, Nebraska — Supervised the preparation of an engineering evaluation/cost analysis (EE/CA) to support implementation of remediation of groundwater contamination. Worked with regulatory agencies to gain approval of the EE/CA and progress toward design and implementation. Previously, on behalf of Morrison Enterprises, supervised completion of a remedial investigation and a feasibility study involving carbon tetrachloride and ethylene dibromide contamination.
- **Stringfellow Site, near Riverside**, California — Served as the principal technical advisor on groundwater issues to the Pyrite Canyon Group that overviewed investigations and remedial activities sponsored by the responsible parties. Designed and evaluated several investigations and remediation programs. Represented the client as a technical spokesperson in workshops, technical seminars, and meetings with regulatory agencies and other interested parties. Prepared key documents to support the decision-making process toward the final Record of Decision.
- **In the case of *Kansas v. Colorado* before the U.S. Supreme Court** — Served on a team of technical advisors to the State of Kansas in its litigation with Colorado over violations of the Arkansas River Compact. Assisted in obtaining a finding of compact violation regarding the pumping of groundwater from wells along the river valley in Colorado. Continued as a technical expert as the case moved into subsequent phases involving the quantification of depletions of supply, assessments of damage, and future compliance by Colorado.

EXPERT AND FACT WITNESS EXPERIENCE

- Litigation associated with soil and groundwater contamination at CERCLA, RCRA, and other facility sites in California, Kansas, Missouri, Oklahoma, Tennessee, Montana, Florida, Iowa, and Nebraska.

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- Toxic tort, property damage, and liability litigation regarding soil and groundwater contamination at sites or facilities in New York, Tennessee, Texas, Virginia, Ohio, and other states.
- Insurance recovery litigation associated with contamination at a variety of sites or facilities for commercial clients such as General Electric, FMC Corporation, Upjohn, AT&T, Rohr Industries, Beazer East/Koppers, North American Phillips, DOW Chemical, Occidental Chemical, and Southern California Edison. Water-rights permitting litigation and water adjudication including cases in New Mexico, Colorado, and Arizona, as well as interstate river compact disputes involving the states of Kansas, Colorado, Wyoming, Nebraska, South Carolina and Tennessee.

U.S. Geological Survey, Water Resources Division, Reston, Virginia

Originated, planned and conducted research in the development of numerical simulation models and techniques for the analysis of a variety of problems related to groundwater systems. Applied the developed models to actual field situations for verification and further refinement and documented these models in a manner suitable for use by others. Served as coordinator and instructor for training courses on groundwater simulation models and methodologies conducted by the Division and provided primary technical assistance to many groundwater projects conducted by District. Participated in and represented the Survey in national and international meetings. Conducted groundwater studies of national and regional interest and participated in or was detailed to overseas projects conducted or managed by other U.S. agencies and the World Bank.

U.S. Geological Survey, Water Resources Division, St. Paul, Minnesota

Served as Project Chief and participated in studies involving the evaluation of groundwater resources, the assessment of stream-water quality, and the analysis of surface-water/groundwater relationships in various parts of Minnesota.

U.S. Geological Survey, Water Resources Division, National Training Center, Denver

Participated in an extended training program providing in-depth training on both office and field techniques for the collection and the analysis of data and the conduct of surface-water, groundwater, and water-quality studies.

St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minnesota

As a Research Assistant, participated in the development and operation of an urban-runoff model to predict sewer flow distribution for the Minneapolis – St. Paul Sanitary District. Assisted in runoff prediction studies for St. Paul and participated in a project to survey and summarize computer programs used in water resources engineering.

PROFESSIONAL SOCIETIES

National Groundwater Association

American Institute of Hydrology

AWARDS AND HONORS

Civil Servant of the Year, U.S. Geological Survey, 1974

U.S. Geological Survey Incentive Award, 1974

American Society of Civil Engineering Student Award, 1969

PUBLICATIONS AND PRESENTATIONS

Barth, G., S.P. Larson, G. Lewis, and K. Green, 2011. Prediction Uncertainty of Drawdown in the Seven-Rivers Augmentation Well Field. Presentation at the National Groundwater Association (NGWA) Conference 2011. Baltimore, MD. June 2011, 15.

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- Papadopoulos, S.S., and S.P. Larson, 2007. The Drawdown Distribution in and Around a Well Pumping from a Two-Region Aquifer. Presentation at the 119th Annual Meeting of the Geological Society of America, Denver, CO, October 27-31, 2007. *in Abstracts and Programs*, v. 39, no. 6. p. 189. Geological Society of America, Boulder, CO.
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DEPOSITION AND TESTIMONY EXPERIENCE

DEPOSITIONS

- 2022 Lazy S Ranch Properties, LLC vs. Valero Terminating and Distribution Company, et al. U.S. District Court for the Eastern District of Oklahoma. Case No. CIV-19-425-RAW. September 30.

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- 2020 Orange County Water District vs. Sabic Innovative Plastics US, LLC, et al. Case No. 30-2008-00078246-CU-TT-CXC. December 7.
- 2020 Michele Baker et al. vs Saint-Gobain Performance Plastics Co. and Honeywell International Inc. et al. December 1.
- 2018 James Blocker and Jami Blocker, et al. vs. ConocoPhillips Company. U.S. District Court for the Western District of Oklahoma. Case No. CIV-17-248-D. July 10.
- 2017 Mississippi vs. Tennessee, City of Memphis and Memphis Light, Gas, & Water Division. U.S. Supreme Court. No. 143, Orig. September 19.
- 2017 Albin Family Revocable Living Trust, et al. vs. Halliburton Energy Services, Inc. U.S. District Court for the Western District of Oklahoma. Case No. CIV-16-910-M. July 25.
- 2015 In the Matter of the Application by the City of Gallup for Permit to Appropriate Ground Water within the Gallup Underground Water Basin of New Mexico. Before the New Mexico State Engineer. Hearing No. 99-003. March 11.
- 2015 Mitchell McCormick, et al. vs. Halliburton Company, et al. U.S. District Court for the Western District of Oklahoma. Case No. 11-CV-01272-M. January 15.
- 2014 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. January 30. (*Arbitration*)
- 2013 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. August 5. (*Arbitration*)
- 2013 Mitchell McCormick, et al. vs. Halliburton Company, et al. U.S. District Court for the Western District of Oklahoma. July 30.
- 2013 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. July 24. (*Arbitration*)
- 2013 Montana vs. Wyoming and North Dakota. Supreme Court of the United States. No. 137, Original. July 16.
- 2013 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. June 11.
- 2013 State of New Mexico ex rel. State Engineer vs Kerr-McGee Corporation et al., State of New Mexico, County of Cibola, Thirteenth Judicial District Court, No. CB-83-190-CV & CB-83-220-CV (Consolidated). April 9 - 11.
- 2013 Montana vs. Wyoming and North Dakota. Supreme Court of the United States. No. 137, Original. February 12.
- 2013 Orange County vs. Sabic Innovative Plastics US, LLC., et al. Superior Court of the State of California for the County of Orange. Case No. 30-2008-00078246-CU-TT-CXC. January 29.
- 2012 State of New Mexico ex rel. State Engineer vs Kerr-McGee Corporation et al., State of New Mexico, County of Cibola, Thirteenth Judicial District Court, No. CB-83-190-CV & CB-83-220-CV (Consolidated). October 10-12.
- 2012 Orange County Water District vs Northrop Corporation, et al., Superior Court of the State of California in and for the County of Orange, No. 04CC00715. July 11 and August 1.
- 2012 Atlantic Richfield vs State of California, et al., Superior Court of the State of California, County of Los Angeles, Central District. No. BC 380474. June 21-22.
- 2012 Michael O. Thomas and Patricia Thomas vs ConocoPhillips, Inc. et al., In the Circuit Court in and for Escambia County, Florida, Case No. 2008 CA 001381. June 12.
- 2012 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. April 9.
- 2012 Ron Block, et al. vs. Daniel and Mary Lou Helix, et al. Superior Court of California, County of Contra Costa. No. CIVMSC05-01725. March 27.
- 2012 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. February 15.
- 2011 OneBeacon America Insurance Company vs. Narragansett Electric Company. Volume I. Commonwealth of Massachusetts, Suffolk County Superior Court. 05-3086-BLS-I. November 15.

STEVEN P. LARSON

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- 2010 Kansas vs. Nebraska and Colorado. U.S. Supreme Court. No. 126, Orig. June 29.
- 2010 OneBeacon America Insurance Company vs. Narragansett Electric Company. Volume I. Commonwealth of Massachusetts, Suffolk County Superior Court. 05-3086-BLS-I. March 3.
- 2009 Morrison Enterprises and the City of Hastings, Nebraska vs Dravo Corporation. U.S. District Court for the District of Nebraska. No. 4:08-CV-3142 (Confidential section). July 23.
- 2009 State of Oklahoma vs. Tyson Foods et al. U.S. District Court for the Northern District of Oklahoma. 05-cv-349-TCK-SAJ. April 10.
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- 2009 Timm Adams et al. vs. United States of America et al. U.S. District Court for the District of Idaho. CIV 03-0049-E-BLW. January 16.
- 2008 Gloria Ned et al. vs. Union Pacific Railroad. 14th Judicial District Court, Parish of Calcasieu, State of Louisiana. 2003-001100 (Consolidated Cases). August 15.
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- 2005 Rodney Montello et al. vs. Alcoa Inc. et al. vs. Whittaker Corporation. United States District Court for the Southern District of Texas, Victoria Division. C.A. No. V-02-84. December 19.
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Application Nos. B-1003-AA into B-87-B-S through B-87-B-S-6 and 1605 and B-979 into B-87-B-S through B-87-B-S-6 (February 1985).
- 1982 County Board of Appeals, Montgomery County, Maryland. Case No. S-836. October.
- 1982 Woodrow Sterling et al. vs. Velsicol Chemical Corporation. U.S. District Court, Western District of Tennessee, Eastern Division. July.

EXHIBIT 5
Water PACK Amended and Restated Articles of Incorporation

1539
Do Not
Staple



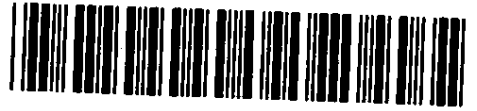
**KANSAS SECRETARY OF STATE
Business Entity Certificate
of Amendment**

Memorial Hall, 1st Floor
120 S.W. 10th Avenue
Topeka, KS 66612-1594

(785) 296-4564
kssos@sos.ks.gov
https://sos.kansas.gov

3258 01
053 059
\$20.00

FILED BY KS SOS
02-19-2020
4 04:19:02 PM
FILE#: 1760248



05552235

1. Business entity ID/file number:

Not Federal Employer ID Number (FEIN).

1760248

2. Name of business entity:

Must match name on record with Secretary of State.

Water Protection Assn. of Central Kansas

3a. Indicate the type of document to be amended:

- Kansas For-Profit Articles of Incorporation (fee \$35)
- Kansas Not-for-Profit Articles of Incorporation (fee \$20)
- Kansas Limited Liability Company Articles of Organization (fee \$35)
- Kansas Limited Partnership Certificate (fee \$35)
- Kansas Limited Liability Partnership Statement of Qualification (fee \$35)
- General Partnership Statement of Partnership Authority (fee \$35) (Skip to Question 4.)
- Foreign Entity Application for Registration (fee \$35 for-profit; \$20 not-for-profit)

3b. The document indicated above is amended as follows:

(If additional space is needed please provide an attachment.)

The name of the entity is changed to "Water Protection Association of Central Kansas" and the Articles of Incorporation are amended and restated in the form of the attachment.

4. For general partnerships only — Identify the statement to be amended and indicate the amendment to be made:

5. Effective date:

<input checked="" type="checkbox"/> Upon filing with the Kansas Secretary of State	<input type="checkbox"/> Future effective date: (Cannot be later than 90 days after the date this certificate is filed.)	Month	Day	Year
--	---	-------	-----	------

6. Signature(s): Sign in the appropriate section below according to the type of business entity for which the amendment is being filed.

For Kansas corporations, limited liability companies and limited liability partnerships, general partnerships, and all foreign covered entities:
(See below for required signature.)*

I declare under penalty of perjury under the laws of the state of Kansas that the foregoing is true and correct.

Signature	Name of Signer (Printed or Typed)
/s/ Kent Moore	Kent Moore, President

***Kansas entities:** Requires the signature of an authorized officer of a corporation, authorized person of a limited liability company or limited liability partnership, or a partner of a general partnership.
***Foreign covered entities:** Requires the signature of an officer, director, authorized person or partner with authority according to the organic documents of the entity in its home state.

For Kansas limited partnerships only:
(See below for required signature(s).)**

I declare under penalty of perjury under the laws of the state of Kansas that the foregoing is true and correct.

Signature of General Partner	Name of Signer (Printed or Typed)
Signature of new General Partner (if amendment adds a new general partner)	Name of Signer (Printed or Typed)

****Kansas limited partnerships:** Requires the signature of at least one general partner and by each other general partner who is designated in the certificate of amendment as a new general partner.

KANSAS SECRETARY OF STATE
NON-CERTIFIED WEB COPY
1/25/2023 7:38:28 AM

**1st AMENDED AND RESTATED
ARTICLES OF INCORPORATION OF
THE WATER PROTECTION ASSOCIATION OF CENTRAL KANSAS**

- 1 NAME.** The name of this corporation is the Water Protection Association of Central Kansas (the **Association or Water PACK**).
- 2 DURATION.** The period of duration of the Association is perpetual.
- 3 PURPOSES.** The Association is organized for the purpose of promoting such common interests of its members as may qualify it as exempt from Federal income tax under Section 501(c)(6) of the Internal Revenue Code of 1986, or the corresponding provision of any subsequent Federal tax laws (together, the **Code**), all in accordance with the provisions of the Code, and within such limits:
 - 3.1** to promote, foster, and encourage the business conditions of its members in relation to their use and conservation of water within the State of Kansas, together with any and all matters relating thereto;
 - 3.2** to attempt to influence legislation germane to the common business interests of the Association's members;
 - 3.3** to initiate, sponsor, and promote research to determine the quality and quantity of water available for water use, the source of surface and ground water, the rate of withdrawal, replenishment, or recharge, source of pollution and all other factors pertaining to the available supply of water for appropriation;
 - 3.4** to sponsor the formulation of a general water policy which will be for the best interests and will promote the welfare of the majority of the members of the Association;
 - 3.5** to take such action as is deemed necessary or advisable to protect the rights and promote the welfare of the members of the Association in all matters which are of mutual interest and benefit to a majority of the members in connection with water use or loss of appropriations;
 - 3.6** to sponsor the study of legislation, tax matters, rules and regulations of any duly-constituted authority which may affect the land, equipment, power, rate of withdrawal, appropriation and quality of water resources of the members of the Association;
 - 3.7** to initiate, sponsor, and promote research to determine the most profitable crops which can be raised on irrigated land;
 - 3.8** to promote the general interest and activities of the members of the Association in the improvement of water use practices for their mutual benefit and welfare and for the development of the most profitable and permanent system of water use;
 - 3.9** to assist its members in obtaining the most satisfactory and economical fuel or electrical power at reasonable rates;
 - 3.10** to obtain and furnish such information and reports to the members of the Association as are deemed helpful or of value to them in connection with water use;

- 3.11 to take such steps as are proper and necessary in order to promote better relations and secure proper advantages from regulatory and other agencies, and by these means to attain wider recognition of the fact that the activities of its members are of primary importance to the domestic economy of the nation and of the State of Kansas;
- 3.12 to work with allied groups, organizations, and governmental bodies regarding the interests of its members, together with any constituent bodies thereof;
- 3.13 to take all other appropriate action in furtherance of such purposes; and
- 3.14 consistent with the above, to exercise all powers available to nonprofit corporations incorporated pursuant to the laws of the State of Kansas.

4 STOCK. The Association shall not have authority to issue capital stock.

5 MANAGEMENT.

- 5.1 BYLAWS. Except as otherwise provided by law or these Articles, the internal affairs of the Association shall be regulated and determined as provided in its bylaws, as amended, restated, or amended and restated.
 - 5.2 MEMBERS. The Association shall have classes of members who shall have such rights, powers, and obligations as set forth in the bylaws. The liability of members to the Association for monetary damages or for breach of fiduciary duty shall be limited to the fullest extent permitted by law.
 - 5.3 DIRECTORS. The affairs of the Association shall be managed by a Board of Directors. The number of Directors, not less than three, and the manner of choosing Directors, shall be as set forth in the bylaws from time to time. The liability of Directors to the Association for monetary damages or for breach of fiduciary duty shall be limited to the fullest extent permitted by law.
 - 5.4 PROPERTY. The private property of the Officers and Directors of the Association shall not be subject to payment of corporate debts to any extent whatever.
- 6 RESTRICTIONS. At all times and under all circumstances, and notwithstanding merger, consolidation, reorganization, termination, dissolution, or winding up of the Association, voluntary or involuntary or by the operation of law, or upon amendment of these articles:
- 6.1 The Association has not and shall not have or exercise any power or authority either expressly, by interpretation, or by law, nor shall it directly or indirectly engage in any activity, that would prevent it from qualifying as an entity described in Section 501(c)(6) of the Code.
 - 6.2 No part of the net earnings of the Association has nor shall inure to the benefit of, or be distributable to, any private individual, including but not limited to its directors, officers, employees, independent contractors, or other persons; except that the Association shall be authorized and empowered to pay reasonable compensation for services rendered to the Association and to make payments and distributions to further the purposes in Section 3 above.
 - 6.3 The Association shall not participate or intervene in (including the publishing or distribution of statements) any political campaign on behalf of or in opposition to any candidate for public office.

- 6.4 The Association shall not carry on propaganda or otherwise attempt to influence legislation to an extent that would disqualify it under Section 501(c)(6).
- 6.5 Upon dissolution of the Association, all of its assets and property of every nature and description remaining after the payment of all liabilities and obligations of the Association (but not including assets held by the Association upon condition requiring return, transfer, or conveyance, which condition occurs from the dissolution) shall be paid over and transferred to one or more organizations which engage in activities substantially similar to those of the corporation and which are then qualified for exemption from Federal income taxes as organizations described in Sections 501(c)(3) or (c)(6) of the Code.
- 7 AMENDMENTS. These articles may be altered or amended by a vote of two-thirds (2/3) of the members present, voting, and entitled to vote at any annual meeting of the Association or at any special meeting called for such purpose.
- 8 ORIGINAL DATE OF INCORPORATION. The Association was originally incorporated on Nov. 1, 1990.
- 9 MANNER OF ADOPTION. These 1st amended and restated articles of incorporation were proposed by the directors and adopted by the members in accordance with the provisions of K.S.A. § 17-6605.

KANSAS SECRETARY OF STATE
NON-CERTIFIED WEB COPY
1/25/2023 7:38:28 AM

From: [Micah Schwalb](#)
To: [OAH](#); [Hutton, Ronda \[KDA\]](#)
Cc: [Chuck Lee](#); [Myndee Lee](#); [Kramer, Stephanie \[KDA\]](#); [Julie Voss](#)
Subject: OAH Case No. 23AG0003 AG
Date: Thursday, February 2, 2023 5:08:36 PM
Attachments: [Larson Report \(2023_02-01\).pdf](#)
[Reply to Cities' Response to Motion to File Amended Petition for Intervention.pdf](#)

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To whomsoever it may concern:

This email concerns OAH Case No. 23AG0003 AG. The attached report supersedes Exhibit 4 to the Reply Memorandum by Water PACK and Edwards County, Kansas, to Cities' Response to Motion for Leave to File 1st Amended Petition for Intervention emailed January 1, 2023, which Reply is also attached. Please forward the enclosed correspondence to ALJ/Presiding Officer Spurgin. My contact information is set forth below.

Be well,
-Micah

MICAH SCHWALB, ESQ.
LEE SCHWALB
720-773-0970 (o)
720-773-4697 (d)
counselforgrowth.com

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Be well,
-Micah

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