

EcoKai Environmental, Inc.

June 2, 2025
via email

Ms. Genell Hobbs
General Manager
Kinney County Groundwater Conservation District
503 S. Ann Street
Brackettville, TX 78882

SUBJECT: Evaluation of Desired Future Condition (DFC) for 2024: Las Moras Spring Flow and Well 70-38-902 (Tularosa Well)

Ms. Hobbs,

This memorandum transmits Dr. Hutchison's evaluation of KCGCD's Desired Future Condition (DFC) for both Las Moras Spring Flow and Well 70-38-902 (Tularosa Well). In an effort to maintain consistency and complete a timely evaluation of DFC achievement, the evaluation was prepared as part of a consulting agreement between EcoKai and Dr. Hutchison. EcoKai concurs with the methodology and conclusions presented therein.

If you have questions regarding this information, or if I can be of any additional assistance, please call me on my cellular at (432) 235-0498.

Respectfully

A handwritten signature in blue ink, appearing to read "Jim Burton".

Jim Burton, PE
Principal Environmental Scientist
President / CEO – EcoKai

cc: Dr. Hutchison via email (billhutch@texasgw.com)

Attach: 2024 DFC Evaluation Letter – Dr. William Hutchison

William R. Hutchison, Ph.D., P.E., P.G.

909 Davy St.
Brenham, TX 77833
512-745-0599

billhutch@texasgw.com

May 31, 2025

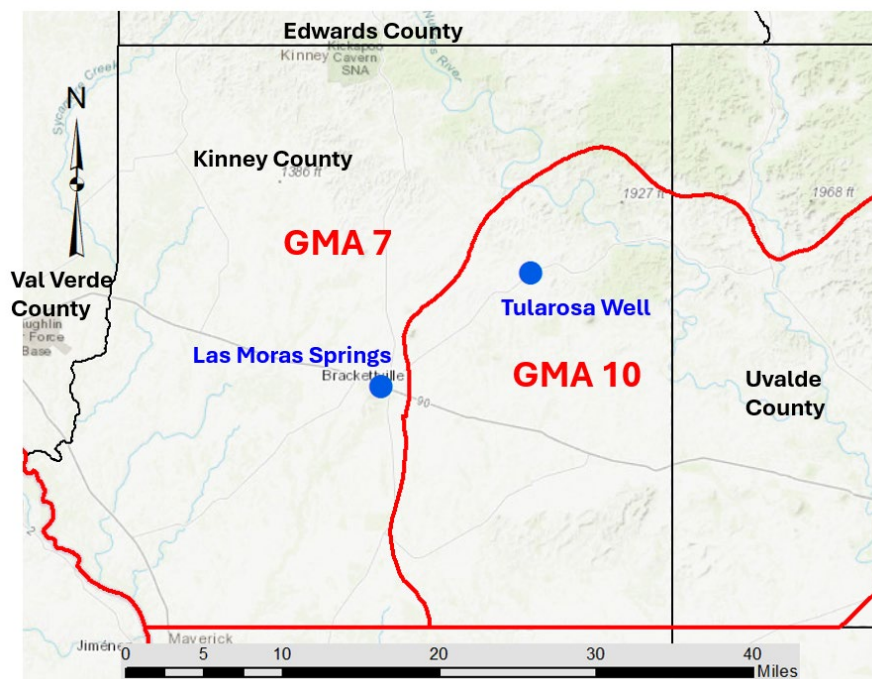
Jim Burton, P.E.
EcoKai Environmental, Inc.
1300 Highland Avenue, Suite 201
Manhattan Beach, CA 90266

Re: Comparisons of Actual Data and Desired Future Conditions for 2024: Las Moras Spring Flow and Well 70-38-902

Dear Mr. Burton:

This letter documents the 2024 comparison of actual data and the desired future conditions (DFCs) for Las Moras Spring Flow in the GMA 7 portion of Kinney County, and Well 70-38-902 (Tularosa Well) in the GMA 10 portion of Kinney County. This comparison follows the methods outlined in the KCGCD Management Plan adopted on January 18, 2023.

A map of Kinney County with the GMA boundaries and the locations of Las Moras Springs and the Tularosa Well is presented below.



Las Moras Spring Flow (GMA 7 Portion of Kinney County)

As stated in Section 5.8.1 of the management plan adopted on January 18, 2023:

The District will assess annually the end-of-year Las Moras spring flow and annual precipitation to evaluate consistency with the desired future condition.

The performance standard is stated as:

Each year, data on annual precipitation from Quad 807 (obtained from TWDB) and end-of-year Las Moras spring flow will be collected. The results will be reported as an agenda item at the first Board meeting after the annual precipitation data are available from TWDB, and final (not provisional) Las Moras Springs flow data are available from the USGS.

The annual precipitation in Quad 807 was obtained from:

<https://waterdatafortexas.org/lake-evaporation-rainfall>

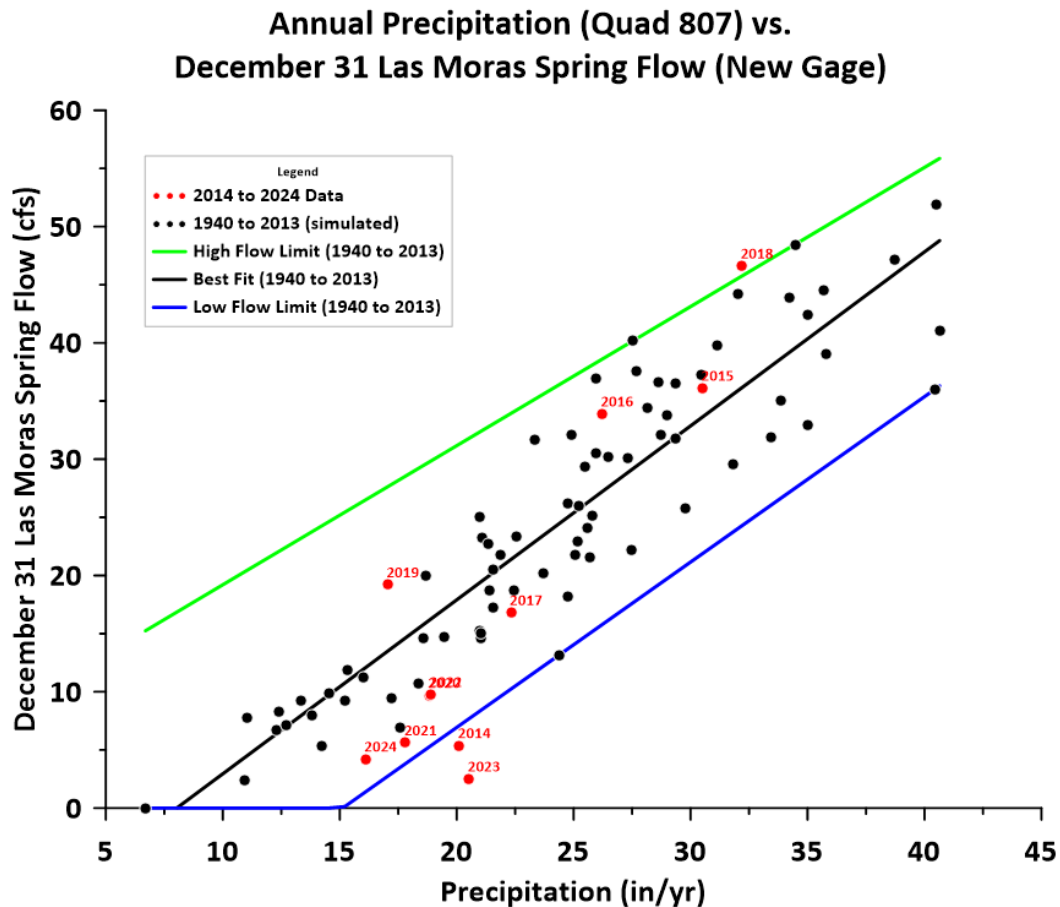
Precipitation in Quad 807 for 2024 was 16.10 inches

Spring flow from Las Moras Spring was obtained from:

<https://waterdata.usgs.gov/monitoring-location/08456310/>

The last measured spring flow on December 31, 2023 was 4.22 cubic feet per second (cfs).

Figure 7 of the management plan was updated with these data and is shown below:



Because of the persistently dry conditions, low spring flow is expected. As noted in the annual report dated June 5, 2024, and as can be seen above, the 2023 data point is outside the high and low bounds which means that the DFC was not achieved in 2023. However, in 2024, lower rainfall and higher spring flow (as compared with 2023) puts the 2024 point inside the bounds. Therefore, by the standard set in the KCGCD Management Plan, the DFC was achieved in 2024.

Well 70-38-902 (GMA 10 Portion of Kinney County)

As stated in Section 5.8.2 of the management plan adopted on January 18, 2023:

The District use the groundwater elevation measured in Well 70-38-902 by the Texas Water Development Board to check consistency with the desired future condition.

The performance standard is stated as:

The measured groundwater elevation in Well 70-38-902 taken at the end of the year and the desired future condition minimum elevation will be reported to the Board at the first meeting of the calendar year when the data are made available by TWDB.

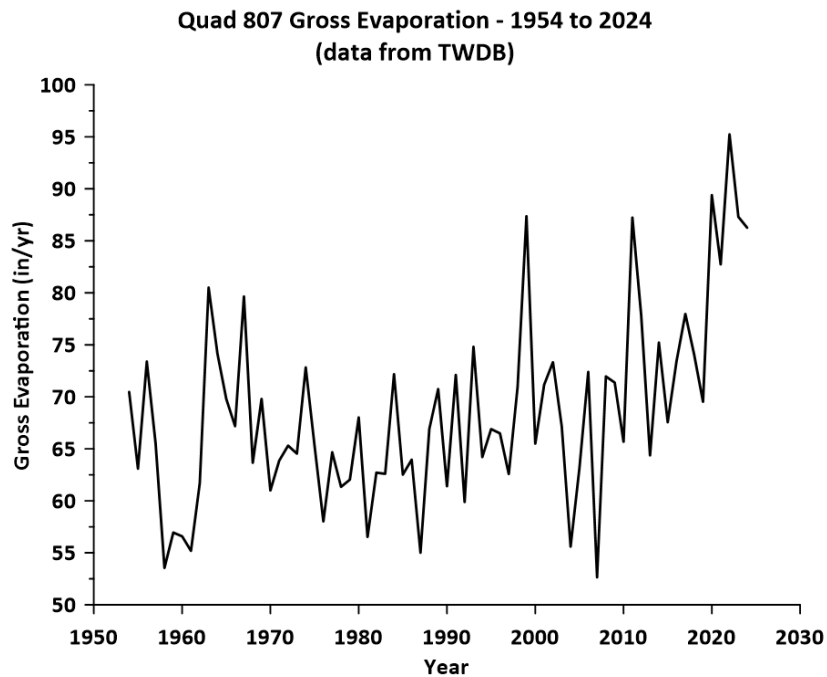
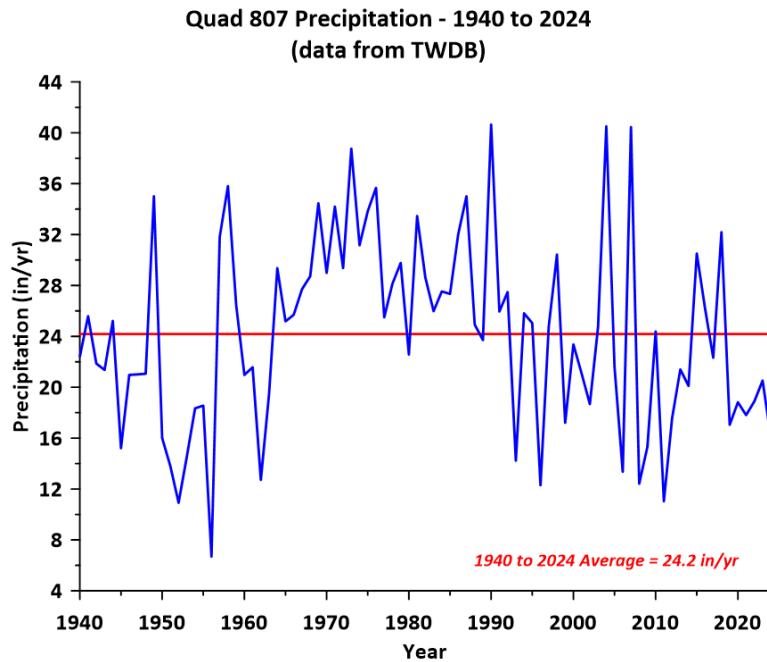
The last measured groundwater depth-to-water reading in 2024 is 189.93 ft. As reported in the management plan, there is a discrepancy in the reported measuring point elevation. TWDB reports a measuring point elevation of 1381.042 ft MSL and 1382 ft MSL in different references. This means the desired future condition expressed as a depth to water in the well is either 197.042 ft or 198 ft. Under the range of measuring point elevations, the measured groundwater elevation is about 7 to 8 feet above the desired future condition, and, therefore, based on the standard set by the KCGCD Management Plan, the GMA 10 DFC was achieved in 2024.

Discussion of Results

In summary, the desired future conditions for the GMA 7 and the GMA 10 portion of Kinney County were achieved in 2024.

As presented in the figures below, precipitation in recent years has continued to be below average, and recent evaporation continues to be higher than most of the historic data. Please note that 2024 represents the sixth consecutive year of below average precipitation.

Evaporation in 2024 (86.26 in/yr) was slightly lower than evaporation in 2023 (87.31 in/yr), which was lower than the historic high evaporation in 2022 (95.24 in/yr). As presented in the figure, evaporation remains high compared to most of the historic data. As noted in the 2023 report, this high evaporation has a direct impact on irrigation demands (higher evaporation rates result in higher irrigation demands and higher groundwater pumping).



Groundwater pumping in Kinney County is primarily for irrigation. Demand for irrigation water is a function of precipitation and evaporation. To better understand the influence of evaporation on pumping, the period 2004 to 2024 was split into two

subperiods: 2004 to 2013 and 2014 to 2024. The summary analysis is presented in the table below:

Parameter	Average for the Time Period	
	2004 to 2013	2014 to 2024
Precipitation (in/yr)	21.80	21.87
Evaporation (in/yr)	68.22	79.88
Pumping (AF/yr)	4,832	6,929
Irrigated Acreage (winter)	1,462	1,193
Irrigated Acreage (summer)	2,345	2,668

Please note that precipitation during the two subperiods are nearly equal. Evaporation from 2014 to 2024 is about 17 percent higher than evaporation from 2004 to 2013. Groundwater pumping from 2014 to 2024 is about 43 percent higher than the groundwater pumping from 2004 to 2013.

Irrigated acreage during the two subperiods shows a mixed result. Winter irrigated acreage is about 18 percent lower in 2014 to 2024 as compared to 2004 to 2013, but summer irrigated acreage is about 14 percent higher from 2014 to 2024 as compared to 2004 to 2013.

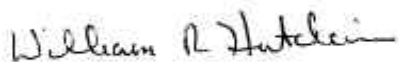
The net result of a decrease in winter irrigated acreage coupled with an increase in summer irrigated acreage would likely result in slightly higher irrigation demands depending on crop type and irrigation practices. However, in simple terms, the increase in annual evaporation is likely a more significant cause of the increased pumping.

Conclusions

The findings of DFC non-achievement in 2023 and achievement of the DFC in 2024 confirms that non-achievement in a single year is not significant. The persistent drought and the high evaporation rates in the last several years are the primary reasons for the observed low spring flow in recent years.

I appreciate the opportunity to assist you with this effort. Please call or email me with any questions.

Sincerely,



William R. Hutchison, Ph.D., P.E., P.G.