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STEPHANIE OSLER HASTINGS (State Bar No. 186716)  
MACKENZIE W. CARLSON (State Bar No. 323850)  
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Attorneys for Plaintiff  
GOLDEN STATE WATER COMPANY

**FILED**  
SUPERIOR COURT OF CALIFORNIA  
COUNTY OF RIVERSIDE

MAY 21 2024

J. Alvarez

SUPERIOR COURT OF THE STATE OF CALIFORNIA  
FOR THE COUNTY OF RIVERSIDE

Coordination Proceeding Special Title  
(Cal. Rules of Court, rule 3.550)

MOJAVE BASIN AREA WATER CASES

CITY OF BARSTOW, et al.,

Plaintiff,

v.

CITY OF ADELANTO, et al.,

Defendant.

JCCP NO.: 5265  
Lead Case No. CIV 208568

Assigned for All Purposes to the  
Honorable Harold W. Hopp, Dept. 1

**DECLARATION OF STEPHANIE  
OSLER HASTINGS IN SUPPORT OF  
GOLDEN STATE WATER  
COMPANY'S OPPOSITION TO  
MOJAVE WATER AGENCY'S  
MOTION TO ADJUST FREE  
PRODUCTION ALLOWANCE FOR  
WATER YEAR 2024-2025**

[Filed concurrently with Golden State  
Water Company's Opposition; to Mojave  
Water Agency's Motion to Adjust Free  
Production Allowance for Water Year  
2024-2025; Declarations of Robert H.  
Abrams and Toby B. Moore, and Notice  
of Lodging]

Date: June 4, 2024  
Time: 8:30 am  
Dept.: 1

1 I, Stephanie Osler Hastings, declare:

2 1. I am an attorney duly admitted to practice before all the courts of this State and am  
3 a shareholder in the law firm of Brownstein Hyatt Farber Schreck, LLP (“**Brownstein**”), counsel  
4 of record for Golden State Water Company (“**GSWC**”) in the above-captioned matter. Except as  
5 otherwise stated, I have personal knowledge of the following facts, and, if called upon to testify  
6 thereto, I could and would competently do so.

7 2. I am providing this declaration in support of GSWC’s Opposition to Mojave Water  
8 Agency’s Motion to Adjust Free Production Allowance for Water Year 2024–2025 (the “**Motion**”).

9 3. I am the attorney with primary responsibility for representing GSWC in this action.  
10 I am personally familiar with Brownstein’s files and records regarding this action, all of which  
11 Brownstein keeps in the ordinary course of Brownstein’s business. I am also personally familiar  
12 with the proceedings in this action and the documents, filings, and records filed and submitted with  
13 the Court or exchanged among the parties in this action, as well as the correspondence and  
14 memoranda exchanged between Brownstein, on behalf of GSWC, and the Mojave Basin Area  
15 Watermaster (“**Watermaster**”).

16 4. In September 2022, the Court tasked the Watermaster with updating the Production  
17 Safe Yield (“**PSY**”) for all Subareas of the Basin Area under the Judgment in this action.<sup>1</sup> A true  
18 and correct copy of this Court’s Order dated September 16, 2022 requiring this update is attached  
19 hereto as **Exhibit A**.

20 5. On February 27, 2024, on behalf of GSWC, I submitted a comment letter to the  
21 Watermaster regarding its evaluation and update of the PSY for each Subarea of the Basin Area.  
22 Attached to that February 27, 2024 letter is a February 23, 2024 memorandum from Anthony  
23 Brown and Robert H. Abrams, aquilogic, Inc. (“**aquilogic**”), to Stephanie Hastings, Brownstein,  
24 titled: “Progress Report and Mojave Basin Area Transition Zone Water Budget” (“**aquilogic**  
25 **Memorandum**”). A true and correct copy of that February 27, 2024 letter and attached aquilogic  
26 Memorandum, together with the transmittal email, is attached hereto as **Exhibit B**.

27  
28 <sup>1</sup> All capitalized terms not defined here have the same meaning as set forth in the Judgment.

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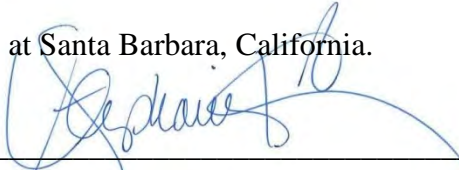
6. On February 28, 2024, on behalf of GSWC, I submitted a *revised* comment letter to the Watermaster regarding its evaluation and update of the PSY for each Subarea of the Basin Area. Attached to that February 28, 2024 letter is a copy of the aquilologic Memorandum. A true and correct copy of that February 28, 2024 letter and attached aquilologic Memorandum, together with the transmittal email, is attached hereto as **Exhibit C**. The February 28, 2024 letter revised and superseded the February 27, 2024 comment letter.

7. A true and correct copy of a redline comparison of GSWC’s February 27, 2024 comment letter (Exhibit B) and February 28, 2024 *revised* comment letter (Exhibit C) is attached hereto as **Exhibit D**. The aquilologic Memorandum attached to both of letters is the same.

8. On March 27, 2024, on behalf of GSWC, I submitted further comments to the Watermaster regarding the PSY update. A true and correct copy of that March 27, 2024 letter, together with the transmittal email, is attached hereto as **Exhibit E**.

9. On April 12, 2024, the Watermaster Engineer responded to my February 28, 2024 comment letter in its Memorandum from Robert Wagner, et. al. to Lee McElhaney. (See Motion, Exh. D.)

I declare, under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct. Executed on May 21, 2024 at Santa Barbara, California.

  
\_\_\_\_\_  
STEPHANIE OSLER HASTINGS

# **EXHIBIT A**

SUPERIOR COURT OF THE STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

**FILED**  
 SUPERIOR COURT OF CALIFORNIA  
 COUNTY OF RIVERSIDE

CASE TITLE: City of Barstow v. City of Adelanto

Department 1

CASE NO.: CIV208568

SEP 16 2022

DATE: September 16, 2022

*L. Howell*

PROCEEDING: Order (1) Discharging Order to Show Cause Why the FPA of Alto Should Not Be Reduced by Another 4.5% of BAP, (2) Reducing the FPA in Alto by Another 0.1% of BAP, and (3) Directing the Watermaster to Re-Evaluate PSY for the Entire Basin

**Background:**

In its order filed 6-3-22, the Court reduced the FPA in the Alto Subarea from 55% to 54.5, a reduction of 0.5%. In addition, the Court ordered all interested parties “to appear on August 25, 2022, at 1:30 P.M. in Department 1 and show cause, if any exists, why the Free Production Allowance for Alto should not be reduced by another 4.5% for Water Year 2022-2023.” That return date was later continued to September 16 2022.

Responses to the that OSC were filed by the Watermaster (on 6-28-22), the California Department of Fish and Wildlife (on 8-4-22), Mitsubishi Cement Corporation (on 8-4-22), the Silver Lakes Association (on 8-5-22), and the CalPortland Company (on 9-6-22). In addition, the Watermaster filed a reply to the DF&W’s response (on 8-5-22). After considering the arguments raised in those responses, the Court issued a tentative ruling substantially the same as this order. No oral arguments, objections, or opposition was offered at the hearing on the OSC.

**Order:**

Accordingly, the Court rules as follows:

The order to show cause is discharged.

The free production allowance for all producers in the Alto Subarea is reduced by an additional 0.1 percent, for a total reduction of 0.6 percent, to 54.4 percent of BAP for Water Year 2022-2023.

The Watermaster shall re-evaluate the PSY for each of the five subareas in the basin. If possible, that new formulation shall be the foundation of the recommendations for adjustments to FPA for the Water Year 2023-2024. If that re-evaluation cannot be completed soon enough to be used for that purpose, it shall be completed as soon as possible and the Court’s approval shall be sought as soon as possible thereafter.

**Analysis:**

There Is No Procedural Impediment to a Reduction of FPA Below PSY

The judgment requires the Watermaster to make annual recommendations to the court to adjust FPA “if needed.” (§ 24(o).) In determining whether an adjustment is needed, the

Watermaster must “be guided by the factors set forth in Exhibit ‘C’ . . . .” (§ 24(o).) The scope of those factors is broad. They include “all pertinent hydrologic data and estimates,” changes in storage, changes in the factors listed in Table C-1, and the factors listed in § 2.a of Exhibit H. (Exhibit C, ¶ A.)

Beyond necessity, there are only two restrictions on placed on the Watermaster when deciding upon its recommendations to the Court. First, paragraph 24(o) provides that the Watermaster cannot recommend a reduction in FPA for a Subarea in an amount that would “exceed five percent of the aggregate Base Annual Production of that Subarea.” Second, paragraph 2.a. of Exhibit H provides that the Watermaster must “compare the Free Production Allowance with the estimated Production Safe Yield. In the event the Free Production Allowance exceeds the estimated Production Safe Yield by five percent or more, Watermaster shall recommend a reduction of the Free Production Allowance equal to a full five percent of the aggregate Subarea Base Annual Production.”

The restrictions placed upon the Court when ruling on those recommendations are few. If the Watermaster recommends a change, the Court must “conduct a hearing, after notice given by Watermaster according to paragraph 36, upon Watermaster’s recommendations and may order such changes in Subarea Free Production Allowance.” (*Ibid.*)

However, the judgment contemplates annual recommendations to the Court by the Watermaster. (§ 24(o).) So do the Watermaster’s own rules. (Rule 15.) Moreover, those rules require the Watermaster to give notice of its preliminary recommendation, conduct a public hearing concerning that preliminary recommendation, and then make a final recommendation to the Court, all by prescribed dates. The Watermaster did not, in either its preliminary or final recommendation, recommend that the FPA for Alto be reduced below PSY. Indeed, it did not recommend any reduction for Alto whatsoever. Because it did not recommend a reduction by the prescribed deadlines, and because therefore no notice was given of any such potential reduction, the Watermaster asserts that the Court cannot reduce the FPA below PSY at this procedural juncture.

Two premises appear to underlie that conclusion. One is that, unless the Watermaster first makes a recommendation concerning a subarea’s FPA, the Court cannot adjust the FPA. The Court agrees. (§ 24(o).)

The second premise appears to be that, when considering what adjustment should be made, the Court is somehow limited by the Watermaster’s recommendation. Specifically, the Watermaster opines: “Subsection (o) does not authorize a reduction in FPA where, as here, the Watermaster has not recommended a further reduction in FPA.” (Reply to DF&W, p. 2.) With that premise, the Court does not agree.

The Court’s role is not simply to approve or veto the Watermaster’s recommendation. To the contrary, the judgment provides that “[t]he Court’s review shall be de novo and the Watermaster[’s] decision or action shall have no evidentiary weight in such proceeding.” (§ 36(d).) In other words, the Court is not bound by the recommendation of the Watermaster as to

what changes are or are not necessary. Instead, the Court is charged with drawing its own conclusions from the evidence, which may differ from the Watermaster's conclusions.

In short, while the Court cannot act until the Watermaster has submitted its recommendations, and while the Court must conduct a noticed hearing on those recommendations, the Court thereafter can make whatever adjustment is called for by the Court's interpretation of the evidence, limited only by the 5%-per-annum maximum reduction.

The Court has implicitly applied that interpretation of the judgment repeatedly when ruling on the last four annual adjustment motions, regarding both Alto and other subareas.

- In 2019, the Watermaster recommended that the FPA for agricultural producers in Alto remain at 80%. The Court instead reduced it to 75%. In the same motion, the Watermaster recommended that the FPA for both Centro and Este remain at 80%. The Court rejected those recommendations and reduced both to 75%.
- In 2020, the Watermaster recommended that the FPA for agricultural producers in Alto be reduced to 70%. The Court instead reduced it to 65%. At the same time, the Watermaster recommended that Oeste be reduced to 70%. Instead, the Court reduced it to 65%, and abolished the differential rampdowns between agricultural producers and M&I producers in Oeste.
- In 2021, contrary to the recommendation of the Watermaster regarding Alto, the Court eliminated the differential between agricultural producers and M&I producers, and imposed a reduction to 55%. In the same order, the Court rejected the recommendation that Baja be reduced to 20%, and instead reduced it to 22.5%.
- In 2022, the Watermaster recommended that Baja stay at 22.5%. Instead, the Court reduced its FPA to 20%.

Thus, over the last four water years, the Court has sometimes adopted the Watermaster's recommendations, sometimes imposed a lesser reduction than recommended, and sometimes imposed a greater reduction. Occasionally, it also restructured the rampdowns by eliminating pre-existing differentials between different types of users, without any recommendation by the Watermaster to do so. Were the Watermaster's interpretation of the judgment correct, then the Court acted beyond its authority every time that its order varied from the Watermaster's recommendation. Neither the Watermaster nor any other party has ever questioned the Court's authority to order reductions in the FPA that differ from what the Watermaster has recommended. That silence is an implicit acknowledgement that the Court is not limited by the nature of the Watermaster's recommendation, or by the extent of the recommended reduction, but only by whether the Watermaster has made a recommendation regarding that subarea's FPA for the Court to consider.

Here, the Watermaster recommended that no adjustment be made to the FPA for Alto. The issue of whether any adjustment of Alto's FPA was needed was thereby put on the table for decision. Notice was given of the Watermaster's annual adjustment motion. After the hearing on that motion on 6-2-22, the Court determined that it would hold an additional hearing on 8-25-22

concerning the specific issue of whether Alto's FPA should be reduced below PSY. (Order of 6-3-22.) That hearing was ultimately continued to 9-16-22, and notice of that continuance was given. That is more than sufficient to satisfy the notice requirement in paragraph 36, which does not prescribe any minimum period of notice at all.

The procedural prerequisites of a recommendation and notice having been satisfied, the Court may decide at this time whether Alto's FPA should be reduced to a level below the currently estimated PSY.

#### Substantive Restrictions on the Reduction of FPA Below PSY

The Court agrees with Mitsubishi that the judgment does not contemplate reductions in FPA below PSY. Although the judgment does not expressly state such a limitation, the underlying theme of the physical solution is that the parties have the right to produce water for beneficial use up to FPA so long as that level of production is sustainable. As the judgment puts it: "A fundamental premise of the Physical Solution is that all Parties will be allowed, subject to this Judgment, to Produce sufficient water to meet their reasonable beneficial use requirements. To the extent that Production by a Producer in any Subarea exceeds such Producer's share of the Free Production Allowance of that Subarea, Watermaster will provide Replacement water to replace such excess Production according to the methods set forth herein." (Judgment, ¶V(A)(22).) The "sustainable" level of production is the PSY. Thus, the parties have the right to produce without charge up to the PSY. The language of the statement of decision confirms that there is no power to rampdown FPA below PSY.

#### Re-Evaluating PSY

PSY is defined as "[t]he highest average Annual Amount of water that can be produced from a Subarea: (1) over a sequence of years that is representative of long-term average annual natural water supply to the Subarea net of long-term average annual natural outflow from the Subarea, (2) under given patterns of Production, applied water, return flows and Consumptive Use, and (3) without resulting in a long-term net reduction of groundwater in storage in the Subarea." (Judgment, ¶II(A)(4)(aa).)

Over the last three years, Alto's FPA has been reduced to just above PSY. Nevertheless, the storage levels have continued to drop, just as they have been for the last 10 years. If FPA is reduced to PSY, but groundwater storage is still declining notwithstanding the purchase and supply of replacement water, it's logical to question whether the PSY calculations are founded on correct assumptions.

For instance, the present calculation of PSY has been based on a 60-year study of flows from 1930 to 1990. The Court questions whether a 60-year period in the middle of the 20<sup>th</sup> century is still an appropriately representative period from which to measure the long-term averages specified in the definition of PSY, especially given the 32 years that have passed since 1990 and the climatic disruptions that we have been experiencing during that time.

If that is not the most representative period, should a different period be defined? Mr. Wagner has stated that, if the judgment were being negotiated today, it would be more prudent to select "a shorter, drier planning period (hydrologic base period) for local supply . . . , resulting in a



lower estimated Production Safe Yield and consequently lower annual Free Production Allowance.” (Wagner Decl., p. 6, ll. 18-21.) Is the Watermaster bound to rely upon what appears at this point in time to be a less-than-prudent period?

The Court acknowledges that the Watermaster re-evaluated PST three years ago. However, in his 2019 declaration, Mr. Wagner suggests that the changes were largely driven by changes in consumptive use, and did not consider changes in supply. At the time he stated:

Periodic updates to PSY are necessary to capture changes in land use that may occur over time. Irrigation patterns, cropping, general land uses, consumptive use of water and patterns of return flow for example affect PSY. **The long-term average annual supply is generally based on the period 1930-31 to 1989-90.** The PSY update is focused on changes in consumptive uses from those reported by Webb [Albert. A. Webb and Associates]. The consumptive use is evaluated annually by the Watermaster Engineer and reported in Chapter 3 of the annual report....

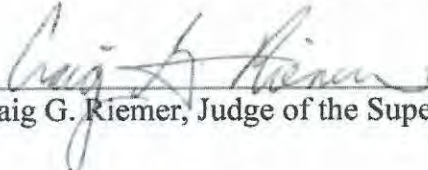
The current PSY estimate includes long-term water supply as specified in the Judgment, consumptive uses for 2017-2018, phreatophyte use as indicated in the Judgment, Subarea subsurface obligations and surface obligations....

(2019 Wagner declaration, p. 3, ll. 5-17, emphasis added.) Thus, the 2019 re-evaluation appears to re-evaluate all of the relevant factors except for supply. Why, with an additional and more recent 30 years of data, should the PSY calculation continue to rely upon the prior 60-year period for defining the long-term average? At the very least, should not the past 32 years of data be added to the original 60 years?

For all these reasons, the Court declines to order rampdown of FPA below PSY. Instead, the Court will order FPA to equal to PSY, by reducing FPA by an additional 0.1 percent to 54.4%, and shall order the Watermaster to re-evaluate PSY in all subareas as part of its annual motion in June of 2023.

#### SERVICE

Counsel for the Watermaster shall serve copies of this order on all parties by mail forthwith, and shall file a proof of service within seven days of the date of mailing.

  
\_\_\_\_\_  
Craig G. Riemer, Judge of the Superior Court

# **EXHIBIT B**

## **Eldridge, Melissa**

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**From:** Eldridge, Melissa  
**Sent:** Tuesday, February 27, 2024 10:08 AM  
**To:** Watermaster@mojavewater.org  
**Cc:** Leland P. McElhaney; rcwagner@wbecorp.com; Hastings, Stephanie; Carlson, Mack  
**Subject:** Agenda Item 7 - Comments on Watermaster's Production Safe Yield Update  
**Attachments:** 2024.02.27 Agenda Item 7 - Comments on Watermaster's PSY Update.pdf

On behalf of Golden State Water Company (GSWC), attached are comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield for each Subarea of the Basin. Please distribute the attached to the Board in advance of the Wednesday meeting

***Melissa A. Eldridge***

Legal Practice Assistant

**Brownstein Hyatt Farber Schreck, LLP**

1021 Anacapa Street, 2nd Floor

Santa Barbara, CA 93101

805.882.1482 tel

[MEldridge@bhfs.com](mailto:MEldridge@bhfs.com)

***Brownstein - we're all in.***

February 27, 2024

Stephanie Osler Hastings  
Attorney at Law  
805.882.1415 direct  
shastings@bhfs.com

**VIA EMAIL TO: WATERMASTER@MOJAVEWATER.ORG**

Board of Directors  
Mojave Basin Area Watermaster  
Mojave Water Agency  
13846 Conference Center Drive  
Apple Valley, CA 92307-4377

**RE: Agenda Item 7 - Comments on Watermaster's Production Safe Yield Update**

Dear Board of Directors:

On behalf of Golden State Water Company (GSWC), we submit the following comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield (or PSY) for each Subarea of the Basin. We request that the Watermaster review our comments and consider the attached technical analysis by aquilogic, Inc. (aquilogic) as the Watermaster continues to refine its update of the PSY for each Subarea—specifically Watermaster's estimate of flow across the Transition Zone—and issues its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24 required by the Mojave Basin Judgment.

**Statement of Interest**

GSWC, formerly Southern California Water Company and a party to the Judgment, is a division of American States Water Company, a "Class A" utility regulated by the California Public Utilities Commission, provides water service to approximately 260,000 customers throughout California. GSWC's Mountain Desert District operates water systems within three of the Mojave Basin Subareas—Alto, Este, and Centro—and provides water service to 15,275 water service connections and a population of approximately 50,400 in and around the cities and communities of Barstow, Apple Valley, and Lucerne Valley. GSWC has adjudicated Base Annual Production<sup>1</sup> rights of 1,940 acre-feet per year (AFY) in the Alto Subarea, 178 AFY in the Este Subarea, and 14,407 AFY in the Centro Subarea. Groundwater produced from 29 wells located in these Subareas provides GSWC's sole source of supply for its Mountain Desert District customers. Accordingly, GSWC has a significant interest in implementation of the Judgment and management of the Basin, and in particular the sustainability of those Subareas in which GSWC operates—especially in the Centro Subarea.

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<sup>1</sup> All capitalized terms not defined herein have the same meaning as set forth in the Judgment.

### **Importance of the Accuracy of the Calculation of PSY**

The accuracy of the PSY for each Subarea is critical to implement the Physical Solution imposed by the Judgment. Based on the PSY, Watermaster adjusts the Free Production Allowance (or FPA) for each Subarea. Given the importance of the calculation of PSY and FPA under the Judgment and its corresponding effects on Producers' rights, the Watermaster has the obligation to use the best available records and data, and install, operate, and maintain measurement devices to monitor streamflow and groundwater levels.<sup>2</sup>

### **Water Levels in the Centro Subarea Continue to Decline**

Since entry of the Judgment in 1996, water levels in the Centro Subarea have remained the same or continued to decline, despite Centro Subarea Producers reducing pumping consistent with the FPAs and Alta Subarea Producers purportedly meeting their Minimum Subarea Obligations, as Watermaster has reported in its Annual Reports.<sup>3</sup> Falling water levels became particularly pronounced beginning in late 2017 near the City of Barstow and Lenwood and Hodge Recharge Sites resulting in water quality impacts to GSWC's Bradshaw Wellfield which consists of eleven active production wells. At the same time, nitrate levels in four of the production wells increased to levels exceeding the Nitrate MCL of 10 mg/l. GSWC was forced to take these wells out of service and to construct a \$5 million dollar nitrate treatment facility to treat and contain the nitrate impacted supply. The on-going operation and maintenance cost of the nitrate system is on the order of \$2 million per year. Nitrate impacts are continuing to expand to additional wells at the Bradshaw Wellfield and expansion of the newly constructed treatment facility may be necessary.

### **Concern with Accuracy of Watermaster's Estimate of Flow Across the Transition Zone and the Resulting Impact on Watermaster's Calculation of PSY**

GSWC has reviewed the Watermaster Engineer's presentation to the Watermaster Board on January 24, 2024 and also the memorandum from Robert C. Wagner regarding the Transition Zone Water Balance memorandum, dated February 28, 2024, and recently posted to the Watermaster website. GSWC is concerned that the Watermaster's calculation of PSY and FPA do not accurately reflect observed conditions in the Centro subarea and that further study is required to ensure adequate and sustainable supplies to GSWC's Barstow System. The accuracy of the Watermaster's calculation of flow

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<sup>2</sup> Judgment, ¶¶ 24(e), (w), see also Judgment, Ex. G, ¶ 2(b), 6 (requiring installation of monitoring wells in the Transition Zone and at Subarea boundaries).

<sup>3</sup> See, e.g., Watermaster, 2021-2022 Twenty-ninth Annual Report, p. 28, Fig. 3-15 (May 1, 2023) available at [https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122\\_Revised.pdf](https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122_Revised.pdf) (acknowledging some seasonal variability in water levels but noting continuing decline in water levels for at least the past 10 years).

across the Transition Zone is of critical importance to the Watermaster's calculation of the PSY and FPAs for each Subarea.<sup>4</sup>

### **GSWC Commissioned an Independent Analysis of Flow Across the Transition Zone**

In anticipation of the Watermaster's update of the PSY, GSWC asked aquilogic to analyze inflows into the Centro Subarea from the Transition Zone. Aquilogic's analysis, presented in the enclosed memorandum dated February 23, 2024 and titled "Progress Report and Mojave Basin Transition Zone Water Budget" (hereafter, "aquilogic memorandum") concludes that surface water inflow into the Centro Subarea is overestimated because the Watermaster's assumption that all inflows into the Transition Zone at the Lower Narrows gage are equal to inflows into the Centro Subarea is likely incorrect.

The aquilogic memorandum describes the available stream gages along the Mojave River in the vicinity of the Transition Zone. It identifies that Lower Narrows gage provides a long-term dataset at the upstream boundary of the Transition Zone (adjacent to the Alto Subarea), but no similar long-term downstream gage exists at the Transition Zone boundary with the Centro Subarea.<sup>5</sup> Aquilogic, however, identifies that the Wild Crossing gage historically existed near the Centro Subarea and Transition Zone boundary between March 1966 through October 1970.<sup>6</sup> The Wild Crossing gage provides the best available data that show the potential change in surface flows in the Mojave River across the Transition Zone by comparing flow rates at the Lower Narrows and Wild Crossing gages.<sup>7</sup> Based on the data available, surface water flows at the Wild Crossing gage, when operational, were significantly lower than those at the Lower Narrows gage, suggesting that the Mojave River recharges groundwater in the Transition Zone rather than flowing into the Centro Subarea, as Watermaster assumes.<sup>8</sup>

Further, aquilogic identified that the average annual net recharge within the Transition Zone between Water Year 1966-1970 was approximately 59,500 AFY.<sup>9</sup> When compared to the Judgment's estimate of 2,000 AFY of Subsurface Flow between the Transition Zone and the Centro Subarea, it is unclear without

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<sup>4</sup> The Judgment requires that the Watermaster rely on pertinent hydrologic data and estimates, including the factors and criteria identified in Exhibits C and H of the Judgment, to calculate the PSY and FPAs. (See Judgment, ¶¶ 2(a), 24(o), (w), Exes. C & H.) For example, Exhibit C to the Judgment explains the process to establish the Base Flow and Storm Flow in the Mojave River at the Lower Narrows (Transition Zone boundary with the Alto Subarea) to estimate inflows into the Centro Subarea that inform the calculation of PSY and FPA. (See Judgment, Ex. C, ¶ B(1).)

<sup>5</sup> The aquilogic memorandum identifies that closest gages to the Centro Subarea and Transition Zone boundary are the Barstow gage and the recently established Hodge/Hinkley gage, which are more than eight miles from the boundary and have significant limitations due to the width of the river channel at these locations. (aquilogic memorandum, p. 2.)

<sup>6</sup> *Id.* at p. 2.

<sup>7</sup> *Id.* at p. 3.

<sup>8</sup> See *id.* at p. 3, Fig. 2.

<sup>9</sup> See *id.* at pp. 3-4, Fig. 3.

additional analysis what happens to this additional recharge.<sup>10</sup> Based on available well information, the aquilologic memorandum finds that it is reasonable to conclude that groundwater pumping within the Transition Zone, along with environmental uses, remove the additional recharge from the Transition Zone.<sup>11</sup> Given this evidence of stream losses in the Transition Zone, surface water inflow into the Centro Subarea cannot equal stream discharge measured at the Lower Narrows gage.<sup>12</sup>

The aquilologic memorandum further analysis to estimate the PSY and FPA for the Centro Subarea more accurately, including:

- preparation of a more detailed Transition Zone water budget based on U.S. Geological Survey modeling and other data sources;<sup>13</sup>
- expansion of the model domain used for the PSY to include all of the Transition Zone, Centro and Baja Subareas; and
- preparation of a written draft report for stakeholder review and comment prior to submission to the court.<sup>14</sup>

Given the impacts of falling water levels in the Centro Subarea on GSWC operations and facilities, coupled with aquilologic's analysis and recommendations presented in the attached memorandum, GSWC believes additional analysis of flow across the Transition Zone is warranted to support implementation of the Judgment.

### **GSWC Request for Further Analysis of the Transition Zone as Part of the PSY Update**

GSWC respectfully requests that the Watermaster consider these comments and the aquilologic memorandum before completing its update of PSY for each Subarea and before issuing its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24. In addition, should the recommended analysis show the need for additional subsurface and surface monitoring to evaluate hydrogeologic conditions with the Transition Zone, especially at the Centro Subarea boundary, GSWC asks Watermaster to commit to install, operate, and maintain appropriate monitoring equipment to address data gaps.

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<sup>10</sup> *Id.* at p. 4; Judgment, Ex. G, ¶ 1(e).

<sup>11</sup> aquilologic memorandum, p. 5.

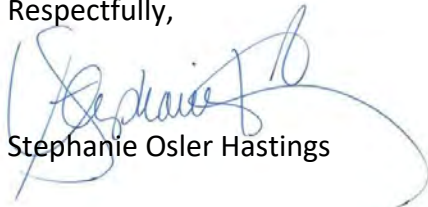
<sup>12</sup> The aquilologic memorandum also notes that 15,095 AF of treated wastewater was discharged in the Transition Zone downstream of the Lower Narrows gage in Water Year 2022, suggesting that Watermaster's assumptions for the Transition Zone require further review based on current conditions as well. (aquilologic memorandum, p. 5.)

<sup>13</sup> See *id.* at pp. 6-7.

<sup>14</sup> The February 28, 2024 Watermaster memorandum does not appear to include the recommended analyses.

Thank you for your consideration of these comments. GSWC appreciates the Watermaster's commitment to further evaluate Basin conditions as required by and as necessary to implement the Judgment effectively.

Respectfully,

A handwritten signature in blue ink, appearing to read "Stephanie Osler Hastings", is written over a large, light blue circular scribble.

Stephanie Osler Hastings

cc: Leland McElhaney, Brunick, McElhaney & Kennedy  
Robert Wagner, Watermaster Engineer

Attached: aquilogic, Inc. memorandum, dated February 23, 2024



## MEMORANDUM

To: Stephanie Hastings, Shareholder, Brownstein, Farber, Hyatt, Schreck, LLP  
From: Anthony Brown, Principal-in-Charge, aquilogic, Inc.  
Robert H. Abrams, Ph.D., P.G., CHg., Senior Principal Consultant, aquilogic, Inc.  
Date: February 23, 2024  
**Subject: Progress Report and Mojave Basin Transition Zone Water Budget**  
Project No.: 018-10

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Aquilogic, Inc. (**aquilogic**) has prepared this memorandum for two purposes. First, the memorandum documents preliminary work performed for the Golden State Water Company in the Mojave Basin pertaining to water outflow from the Transition Zone, which represents inflow to the Centro Subarea (**Figure 1**). Preliminary work indicates this outflow may be overestimated by the Mojave Basin Watermaster (Watermaster). Consequently, inflow to the Centro Subarea may also be overestimated. Second, the memorandum outlines an approach to provide further assessment of this outflow/inflow, to be supported by data and analyses.

The Mojave Basin is subject to a Stipulated Judgment (Judgment) of water rights.<sup>1</sup> The Judgment stipulates that Alto Subarea Producers have an obligation to deliver 23,000 acre-feet per year (AFY) of Subsurface Flow<sup>2</sup> and Base Flow<sup>3</sup> to the Transition Zone. Watermaster appears to assume that surface water inflow to the Transition Zone provides the basis for estimating surface water inflow to the Centro Subarea.<sup>4</sup> However, there is no direct evidence to support this assumption. In fact, there is direct evidence that this assumption may be incorrect.

## BACKGROUND

The Transition Zone is defined in the Judgment as part of the Alto Subarea. Watermaster assumes that the Alto Subarea Producers' obligation to the Transition Zone is satisfied by inflow to the Transition Zone from upstream portions of the Alto Subarea.<sup>5</sup> This inflow is comprised of Subsurface Flow and Base Flow. The obligation to the Transition Zone appears to be considered by Watermaster to also satisfy an obligation to the Centro Subarea. For example, the first annual report notes, "[s]uch discharge records are used in the calculations of compliance by Alto

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<sup>1</sup> Riverside (1996). Judgment after Trial, Mojave Basin Area Adjudication. City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568. January 10.

<sup>2</sup> Subsurface Flow is defined in the Judgment as, "Groundwater which flows beneath the earth's surface."

<sup>3</sup> Base Flow is defined in the Judgment as, "That portion of the total surface flow measured Annually at Lower Narrows which remains after subtracting Storm Flow."

<sup>4</sup> After accounting for estimated gains/losses in the Transition Zone, such as sewage treatment plant outfall and estimated consumptive use, as stated or implied in multiple annual reports.

<sup>5</sup> Watermaster (1995). First annual report of the Mojave Basin Area Watermaster, 1993-1994, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. February 28.

*Subarea Producers with their obligation to the Centro Subarea.*<sup>6</sup> Subsequent annual reports contain similar statements.

The Judgment specifies that 2,000 AFY of the Alto Producers' obligation to the Transition Zone is satisfied by Subsurface Flow. Watermaster assumes that groundwater inflow to the Centro Subarea from the Transition Zone is also 2,000 AFY.<sup>7,8</sup> Therefore, Watermaster appears to assume that 21,000 AFY of the obligation to the Centro Subarea must be satisfied by Base Flow from the Transition Zone.

Watermaster states that the change of groundwater storage in the Transition Zone is zero because water levels in key piezometers near both the upstream and downstream boundaries of the Transition Zone are relatively constant.<sup>9</sup> Because of this, Watermaster assumes Mojave River discharge measured at the Lower Narrows gage, adjusted by an estimated Transition Zone water balance, is essentially equivalent to Mojave River discharge entering the Centro Subarea<sup>10</sup> (**Figure 1**). However, there is no active stream gage at the upstream boundary of the Centro Subarea. Therefore, Watermaster's assumption regarding inflow to the Centro Subarea cannot be evaluated directly.

## STREAM DISCHARGE

There are no stream gages in most of the Transition Zone. However, there is one long-term gage (i.e., water year [WY] 1931 to present) located at the upstream boundary of the Transition Zone (Lower Narrows gage) (**Figure 1**). Another long-term stream gage is located near the Centro Subarea-Baja Subarea boundary (Barstow gage). A stream gage has recently been re-established approximately eight miles downstream of the Transition Zone-Centro Subarea boundary (Hodge/Hinkley gage).

The Hodge/Hinkley and Barstow gages measure discharge across an ephemeral Mojave River channel that can be over 0.25 miles wide. Discharge is generally limited at these gages to Storm Flow (i.e., very little, if any, Base Flow is measured by these gages).<sup>11</sup> The wide channel leads to uncertainty in the stream discharge measurements from these gages because Storm Flows may

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<sup>6</sup> Watermaster (1995). First annual report of the Mojave Basin Area Watermaster, 1993-1994, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. February 28.

<sup>7</sup> As stated or implied in multiple annual reports.

<sup>8</sup> However, it should be noted that the cross-sectional area for groundwater flow between the Transition Zone and the Centro Subarea potentially expands and contracts with varying volumes of Transition Zone recharge, which may increase or decrease the assumed 2,000 AFY of Subsurface Flow. Studies to understand the geometry of this potentially dynamic cross-sectional area are warranted but have not yet been undertaken by Watermaster.

<sup>9</sup> As stated or implied in multiple annual reports

<sup>10</sup> The Lower Narrows gage is located at the upstream boundary of the Transition Zone.

<sup>11</sup> Storm Flow is defined in the Judgment as *"That portion of the total surface flow originating from precipitation and runoff without having first percolated to Groundwater storage in the zone of saturation and passing a particular point of reckoning, as determined annually by the Watermaster."*

not always fill the entire width of the channel or may flow in parts of the channel away from the gage. Nevertheless, discharge measurements from these gages are the best available data.

From WY 1931 through WY 2023, Mojave River discharge at the Lower Narrows gage averaged 46,100 AFY. Discharge decreased by an average of 341 AFY over that period. From WY 1994 through WY 2023, Mojave River discharge at the Lower Narrows gage averaged 28,300 AFY. The decrease in average annual discharge over this period increased to 521 AFY.

As noted, there is no active stream gage at or adjacent to the Centro Subarea's upstream boundary. However, there was such a gage from March 1966 through WY 1970: the Wild Crossing gage (**Figure 1**).

## DATA ANALYSIS

The Wild Crossing gage was discontinued because of unstable controls and changing stage-discharge relations that did not allow for acceptable discharge records.<sup>12</sup> However, stream discharge measured at the Wild Crossing gage is the best data available that can show the potential change in discharge between the upstream boundary of the Transition Zone and the upstream boundary of the Centro Subarea, despite its shortcomings and relatively short period of record. It should be noted that the Hodge/Hinkley gage was also discontinued two different times since 1932 because of unstable controls and changing stage-discharge relations. However, it was reestablished in 2022, which suggests high-quality data can be gathered at gage locations previously deemed problematic.

## Stream Recharge to Groundwater

**Figure 2** shows the annual discharge at the Lower Narrows gage, the Wild Crossing gage, and the Barstow gage for the period WY 1966 through WY 1970.<sup>13</sup> For the purposes of this analysis, net stream recharge to groundwater is approximated as the difference in discharge between successive gages.<sup>14</sup> Discharge at the Wild Crossing gage was lower than discharge at the Lower Narrows gage every year during this period. WY 1969 is particularly striking because annual stream discharge at the Wild Crossing gage (156,000 AF) was 135,000 AF lower than discharge at the Lower Narrows gage (291,000 AF), a decrease of approximately 46 percent.<sup>15</sup>

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<sup>12</sup> Lines, G.C. (1996). Ground-water and surface-water relations along the Mojave River, Southern California: U.S. Geological Survey Water-Resources Investigations Report 95-4189, 43 p.

<sup>13</sup> The Wild Crossing gage was not active until March 1, 1966, thus may underestimate the annual discharge for WY 1966.

<sup>14</sup> This is a reasonable approximation, even though it ignores Base Flow and evapotranspiration, because most of the flow measured at the Wild Crossing gage and the Barstow gage are from episodic storm events. However, evapotranspiration along the stream course may require further evaluation.

<sup>15</sup> WY 1969 represents the largest amount of discharge on record for the Lower Narrows, Wild Crossing, and Barstow gages.

The consistent pattern of lower stream discharge at the Wild Crossing gage compared to the Lower Narrows gage during this period indicates that stream discharge at the Lower Narrows gage was more likely than not significantly greater than stream discharge entering the Centro Subarea. Furthermore, the consistent pattern indicates that significant net stream recharge to groundwater from the Mojave River likely occurred in the Transition Zone.

**Figure 3** shows that the average annual stream discharge for WY 1966-1970 decreased substantially between the Lower Narrows and Wild Crossing gages (i.e., by approximately 51,500 AFY). The total average annual net stream recharge between the Lower Narrows gage and the Barstow gage for the WY 1966-1970 period was approximately 59,500 AFY (**Figure 3**). Thus, 86 percent of the total net stream recharge between the Lower Narrows and Barstow gages occurred between the Lower Narrows gage and the Wild Crossing gage, i.e., in the Transition Zone (**Figure 3**). Net stream recharge between the Wild Crossing gage and the Barstow gage (i.e., the Centro Subarea) represents only 14 percent of the total net stream recharge between the Lower Narrows and Barstow gages.

As noted, net stream recharge in the Transition Zone averaged approximately 51,500 AFY for WY 1966-1970. Also as noted, the Judgment specifies that Subsurface Flow into the Centro Subarea from the Transition Zone is 2,000 AFY. Thus, the fate of the Transition Zone net stream recharge is unclear without further analysis, which is discussed below.

## Groundwater Extractions

Groundwater extraction data were obtained for 1951-1973 and WY 1994-2022 from the Mojave Water Agency (MWA).<sup>16</sup> Data were analyzed for 1966-1970 and WY 1994-2022 to determine annual groundwater extractions in the Transition Zone. Data from the earlier period were scanned from hard copy and digitized. Data from the later period were provided digitally.

**Figures 4** and **5** show the wells for which extractions were reported for the 1966-1970 and WY 1994-2022 periods, respectively. Groundwater extractions were compared to stream recharge to assess if extractions may account for the fate of the Transition Zone stream recharge.

The upper panel of **Figure 6** compares the annual stream recharge in the Transition Zone to the annual reported groundwater extractions. As noted, the WY 1969 stream discharge and recharge were anomalously high. They are statistical outliers, which may cause the average value of stream recharge for WY 1966-1970 to be skewed high when compared to average groundwater extractions, which typically do not have extreme changes year to year.

Rather than comparing average values for this period, the median values of annual stream recharge (33,234 AFY) and annual groundwater extractions (30,287 AFY) for the 1966-1970 period were compared. The median values suggest that most of the Mojave River net stream

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<sup>16</sup> Jeff Ruesch, Mojave Water Agency, email communications, July 2023.

recharge to groundwater in the Transition Zone during the 1966-1970 period was extracted by the approximately 260 wells completed in the Transition Zone at that time (**Figures 4 and 6**).

Transition Zone groundwater extractions in the 1966-1970 period may have facilitated higher net stream recharge by sufficiently changing the hydraulic gradient between the River and groundwater enough to induce stream recharge. This could occur even while water levels in key piezometers remain relatively constant. If so, the water-level data may appear to show that the change in groundwater storage in the Transition Zone is zero, when in fact the groundwater flow system is highly dynamic and may include significant net stream recharge.

The lower panel of **Figure 6** shows groundwater extractions in the Transition Zone for the 1966-1970 and WY 1994-2022 periods. The median value for 1966-1970 was 30,287 AFY. The median value for WY 1994-2022 was 11,522 AFY. This is a significant decrease in pumping, likely due to implementation of the Judgment. This decrease may suggest that recent and current net stream recharge in the Transition Zone is minimal compared to the WY 1966-1970 period.

However, a reasonable hypothesis is that significant net stream recharge continued to occur proportionately in the Transition Zone in the recent past and is currently occurring. The analysis described above suggests that groundwater extractions, on average, may remove an equivalent volume of net stream recharge from the Transition Zone. If so, surface water inflow to the Centro Subarea may be overestimated when based on the adjusted stream discharge measured at the Lower Narrows gage, because there may be unaccounted stream losses in the Transition Zone.

Additionally, the occurrence of Transition Zone stream losses and the effect of groundwater extractions and phreatophytes on streamflow losses and stream discharge in the Mojave Basin has been noted in previous reports prepared by others.<sup>17,18</sup> Furthermore, it should be noted that 15,095 AF of treated wastewater was discharged to the Transition Zone downstream of the Lower Narrows stream gage during WY 2022.<sup>19</sup>

## **OUTLINE OF PROPOSED WORK TO FURTHER EVALUATE THE TRANSITION ZONE WATER BUDGET**

Watermaster was directed by the Court in 2022 to re-evaluate the Production Safe Yield (PSY) for each Subarea. **Aquilologic** believes a rigorous reevaluation must include a detailed

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<sup>17</sup> Stamos, C.L., Martin, P., Nishikawa, T., and Cox, B.F. (2001). Simulation of ground-water flow in the Mojave River Basin, California. U.S. Geologic Survey Water-Resources Investigations Report 01-4002 Version 1.1.

<sup>18</sup> Todd Engineers (2013). Final report: Conceptual hydrogeologic model and assessment of water supply and demand for the Centro and Baja Management Subareas, Mojave River Groundwater Basin. Prepared by Todd Engineers and Kennedy/Jenks Consultants for the Mojave Water Agency. July.

<sup>19</sup> Watermaster (2023). Twenty-ninth annual report of the Mojave Basin Area Watermaster, water year 2021-2022, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. May 1.

redetermination of the Transition Zone water budget. Material presented to date by Watermaster does not appear to have included a redetermined Transition Zone water budget.<sup>20</sup>

The analyses performed to date by **aquilogic** and others suggest that groundwater flow dynamics and the Transition Zone water budget are complex. The analyses provide a foundation for deeper evaluation of the Transition Zone water budget and its evolution through time. For example, the **aquilogic** analyses reported here can form components of an overall water budget evaluation. The objective of such an evaluation would be to provide an in-depth analysis of the volume of water that flows into the Centro Subarea annually.

A complete water budget would include all inflows, outflows, and the change of groundwater storage over time. Previous work by others can be leveraged to support development of a complete water budget. For example, the Judgment specifies that 2,000 AFY of groundwater flows into the Centro Subarea from the Transition Zone. This flow rate was specified before in-depth modeling was conducted by the U.S. Geological Survey (USGS) or MWA. A deeper analysis may reveal that this specified flow rate is too low or too high.

Groundwater flow into the Centro Subarea occurs in the Mojave River alluvium, in deeper horizons across the Helendale Fault, and other areas along the Transition Zone-Centro Subarea boundary (**Figure 1**). This flow rate is difficult to assess without using a groundwater flow model. A groundwater model can be used to contribute to a complete water budget evaluation by calculating the transient change in groundwater storage and groundwater flow rates that cannot otherwise be determined due to lack of data in key locations. **Aquilogic** strongly recommends that the current Mojave Basin groundwater flow model used by Watermaster be updated to include the entire basin, as soon as possible. In its current form, it is premature to use the model for any analyses involving the Transition Zone.

The water budget for the Transition Zone should be developed with sufficient detail and rigor to at least meet Sustainable Groundwater Management Act (SGMA) regulations for historic and current water budgets. A preliminary list of tasks to be performed includes, but may not be limited to, the following:

- Compile and review available previous work by others on groundwater flow and water budgets in the Alto and Centro Subareas, including the Transition Zone
- Evaluate the usefulness of the USGS Basin Characterization Model (BCM)<sup>21</sup> and the Parameter-elevation Regressions on Independent Slopes Model (PRISM)<sup>22</sup> dataset for application to the Transition Zone water budget

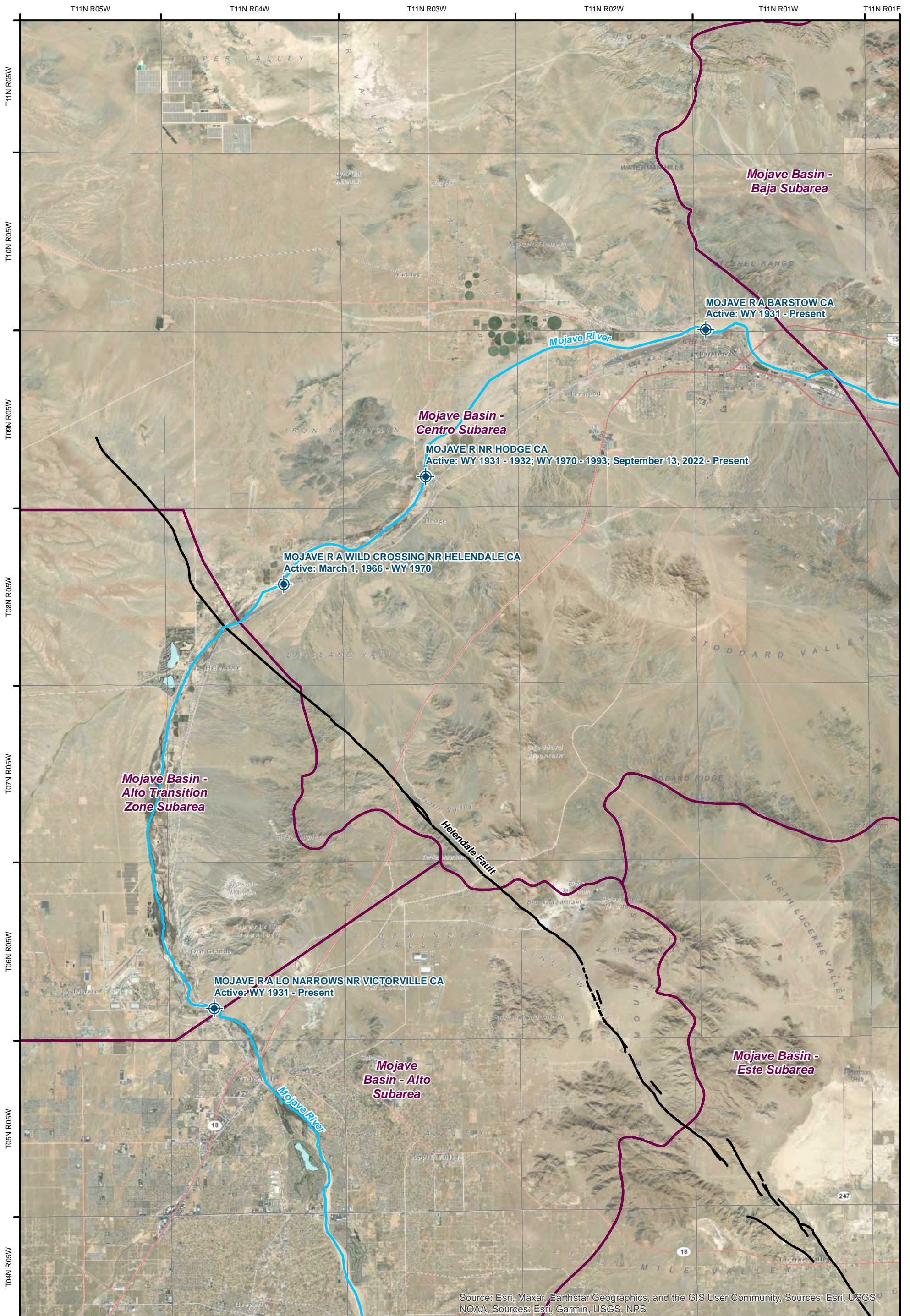
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
<sup>20</sup> Watermaster (2024). Groundwater Model and Production Safe Yield Update. Watermaster presentation prepared by Wagner and Bonsignore, Consulting Civil Engineers. Mojave Water Agency / Watermaster Board Meeting, January 24, 2024.

<sup>21</sup> [https://ca.water.usgs.gov/projects/reg\\_hydro/basin-characterization-model.html](https://ca.water.usgs.gov/projects/reg_hydro/basin-characterization-model.html)

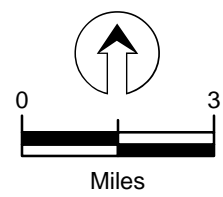
<sup>22</sup> <https://prism.oregonstate.edu/>


- Evaluate groundwater levels in the Transition Zone from WY 1931-present, with particular focus on the WY 1966-1970 and WY 1994-2022 periods to support the analyses described above
  - Estimate evapotranspiration by standard methods, including the use of satellite and areal images, and compare with previous studies
  - Compile all available water level data for the Transition Zone
  - Evaluate the water level data in terms of changes in well hydrographs and spatial water-level distributions over time
  - Determine if groundwater levels increased, decreased, or remained the same during the WY 1966-1970 period
- Use the USGS model and the updated MWA model (if and when available) to further evaluate the WY 1966-1970 period
  - Update the USGS model as needed, including groundwater extractions and potentially extending the model in time
  - Evaluate Transition Zone changes in groundwater storage, stream recharge, effects of evapotranspiration, groundwater extractions, and surface and groundwater flow into the Centro Subarea
- Critically evaluate results and available previous work to determine the best estimate of the Transition Zone water budget
- Identify data gaps and limitations in the analyses
- Effectively communicate the results to stakeholders
- Thoroughly document the analyses and prepare both draft and final reports



-  Stream Gages
-  Helendale Fault
-  Mojave River
-  Adjudicated Areas
-  Township/Range

**Notes:**  
All locations approximate.  
WY: Water Year

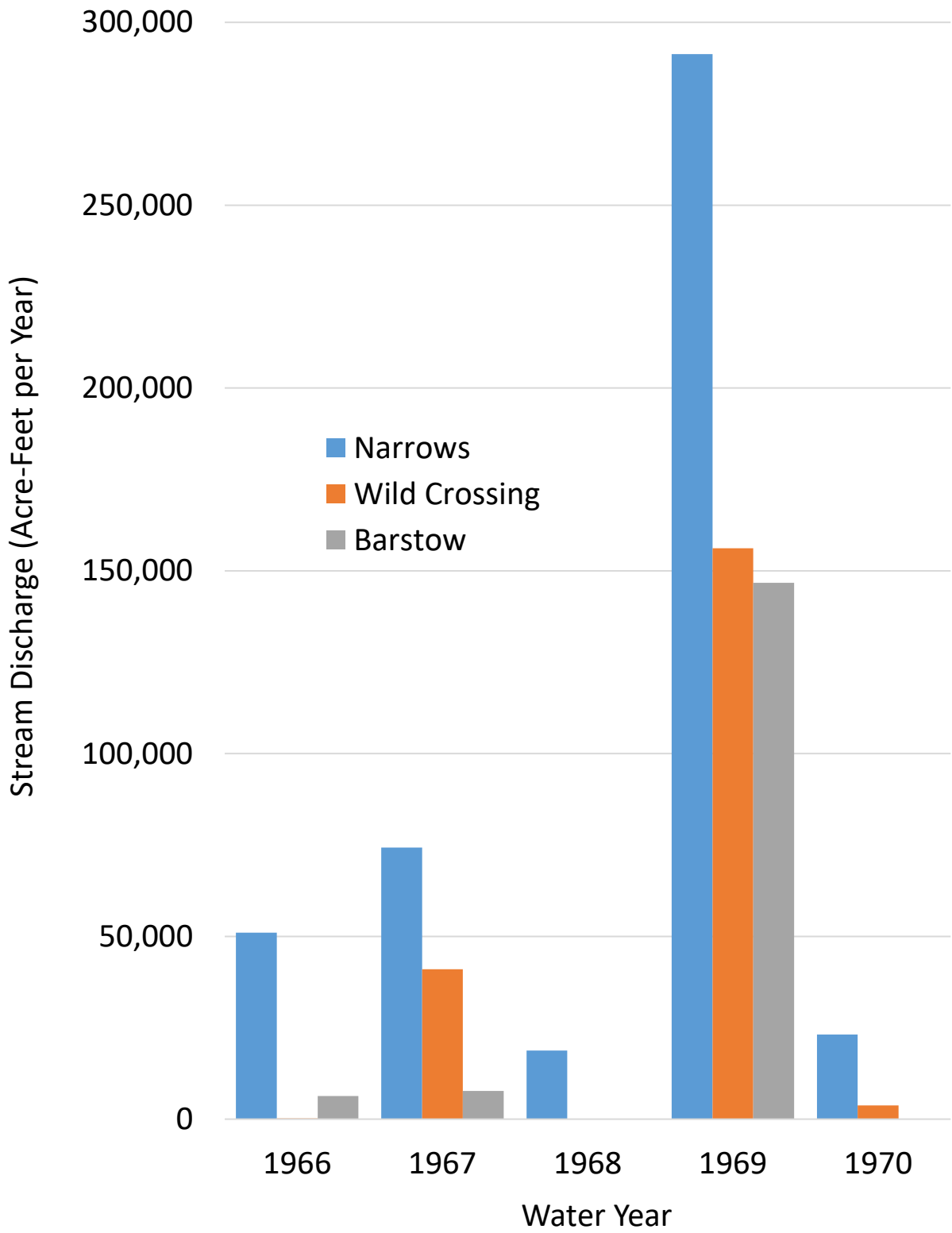


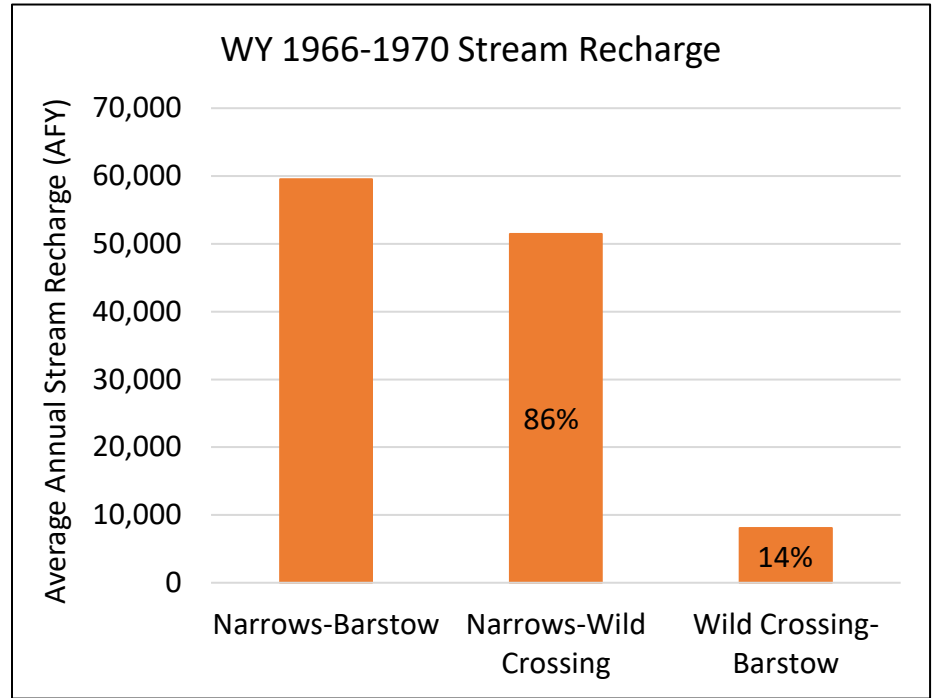
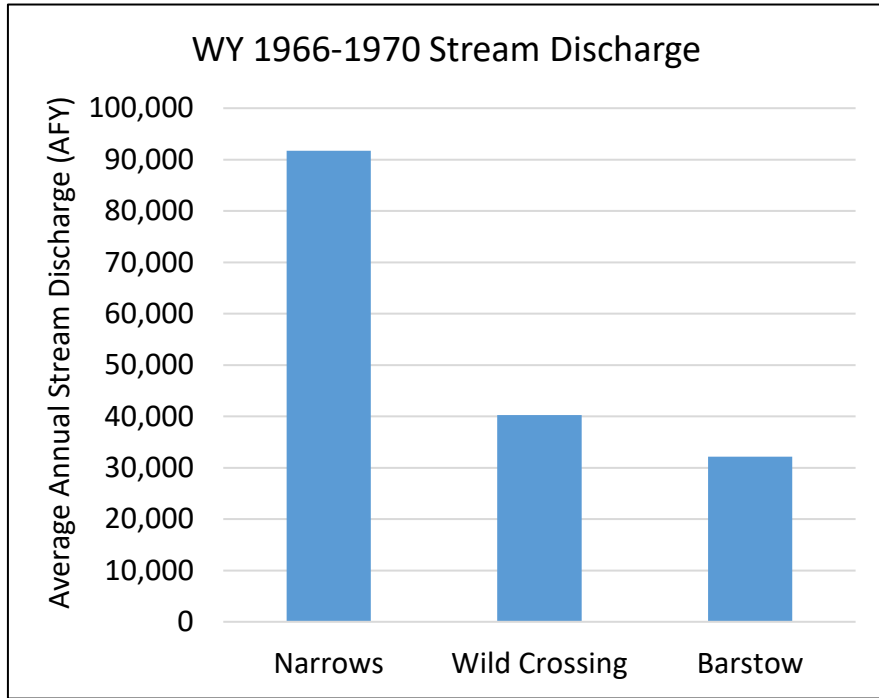
 aquilogic, Inc. BHFS - GSWC Mojave

**Key Features in the Mojave Basin**

|                  |                   |                 |
|------------------|-------------------|-----------------|
| Date: 10/18/2023 | Project #: 018-10 | <b>Figure 1</b> |
|------------------|-------------------|-----------------|







AFY: Acre-Feet per Year  
 WY: Water Year



BHFS- GSWC Mojave

### Stream Discharge and Recharge

Date: 2/23/2024

Project #: 018-10

Figure 3

T08N R05W

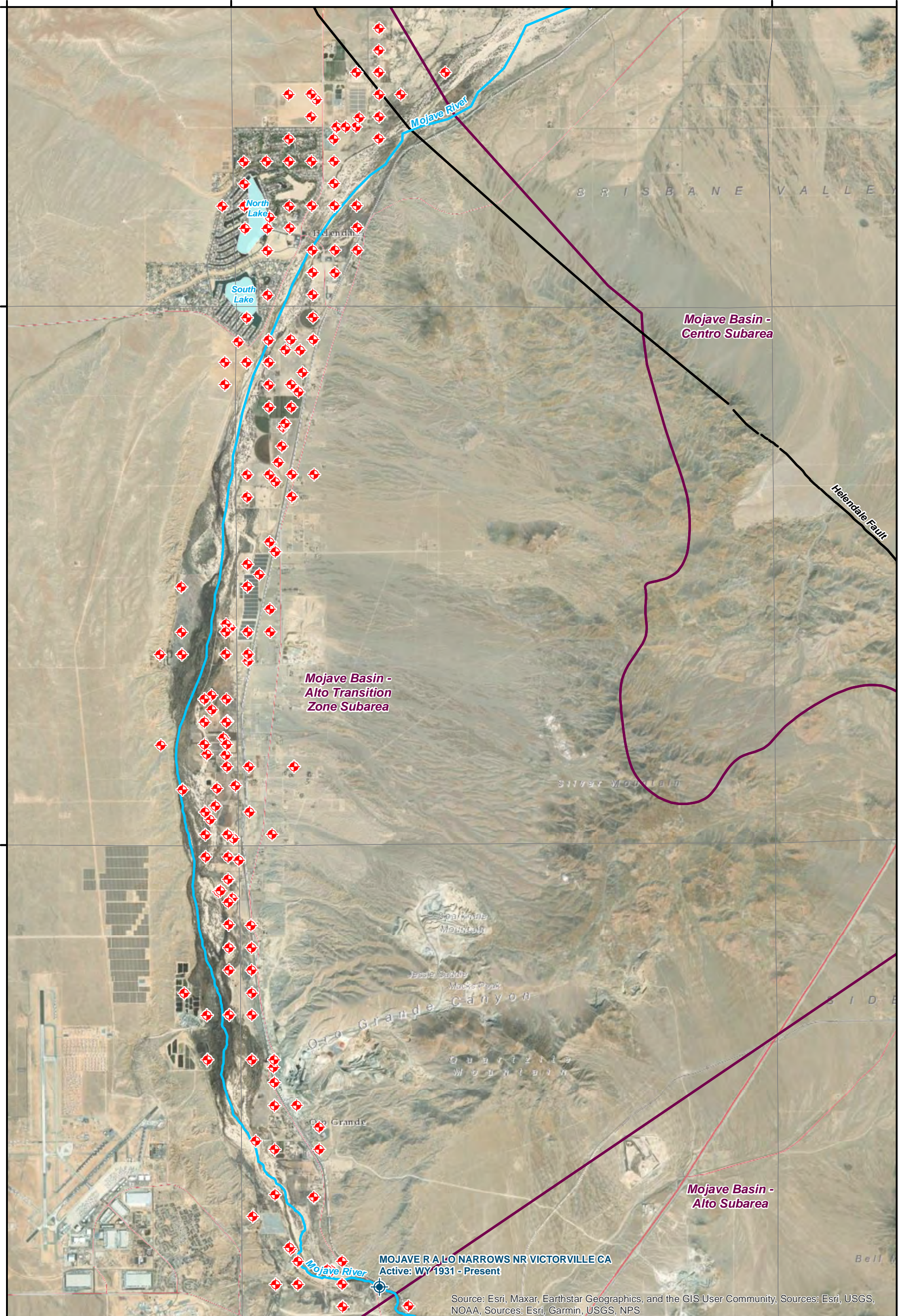
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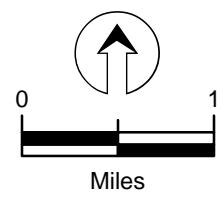


MOJAVE R & LO NARROWS NR VICTORVILLE CA  
 Active: WY 1931 - Present

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

◆ Production Well Locations     Adjudicated Areas  
● Stream Gages                       Township/Range  
 Helendale Fault  
 Mojave River

**Notes:**  
 All locations approximate.



a **aquilogic**, Inc. BHFS - GSWC Mojave  
**Transition Zone Production Wells**  
**1966-1970**  
 Date: 10/18/2023    Project #: 018-10    **Figure 4**

T08N R05W

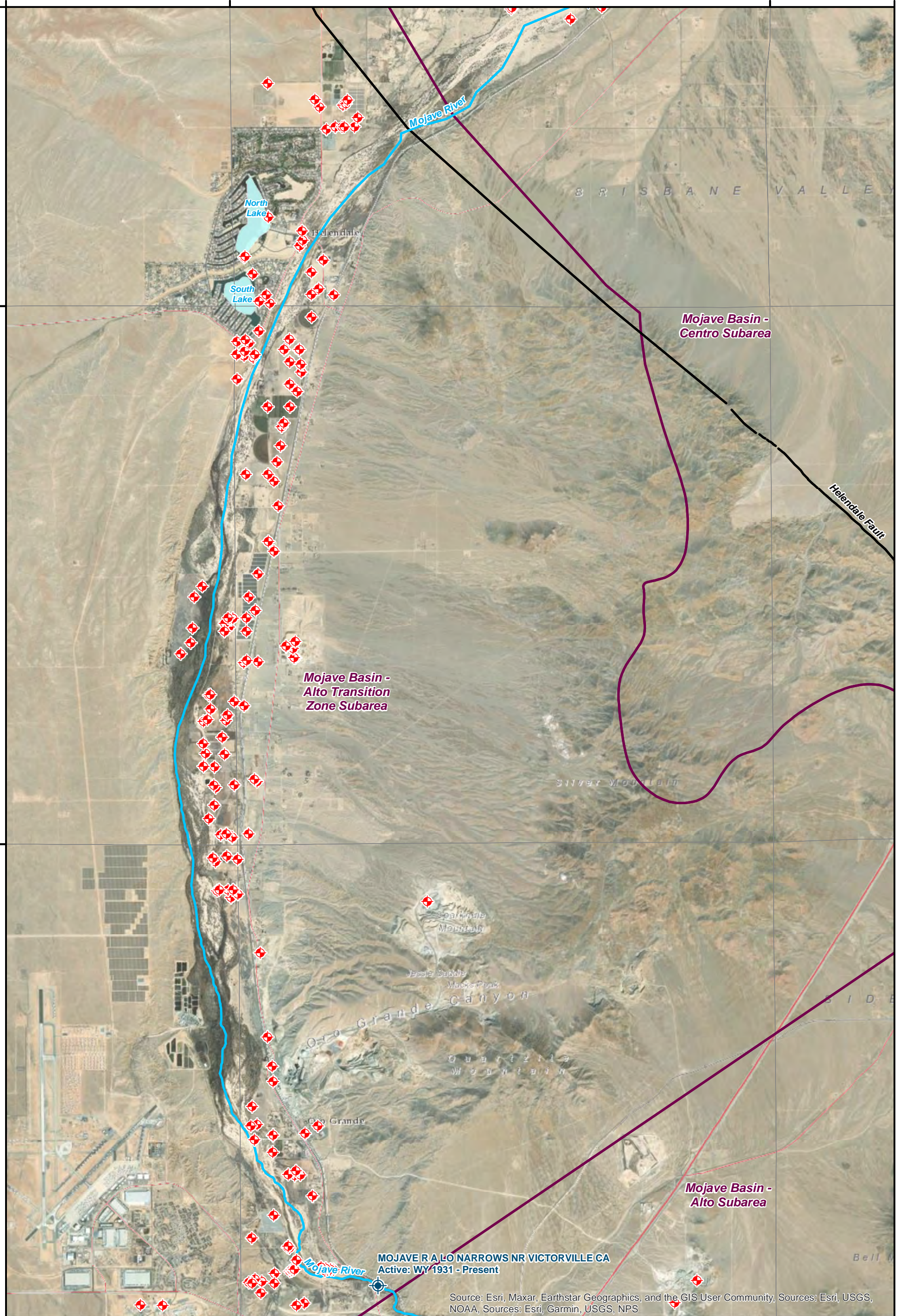
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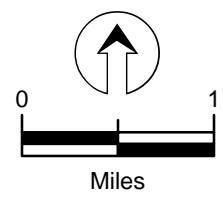


MOJAVE R & LO NARROWS NR VICTORVILLE CA  
 Active: WY 1931 - Present

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

- ◆ Production Well Locations
- Stream Gages
- Helendale Fault
- Mojave River
- Adjudicated Areas
- Township/Range

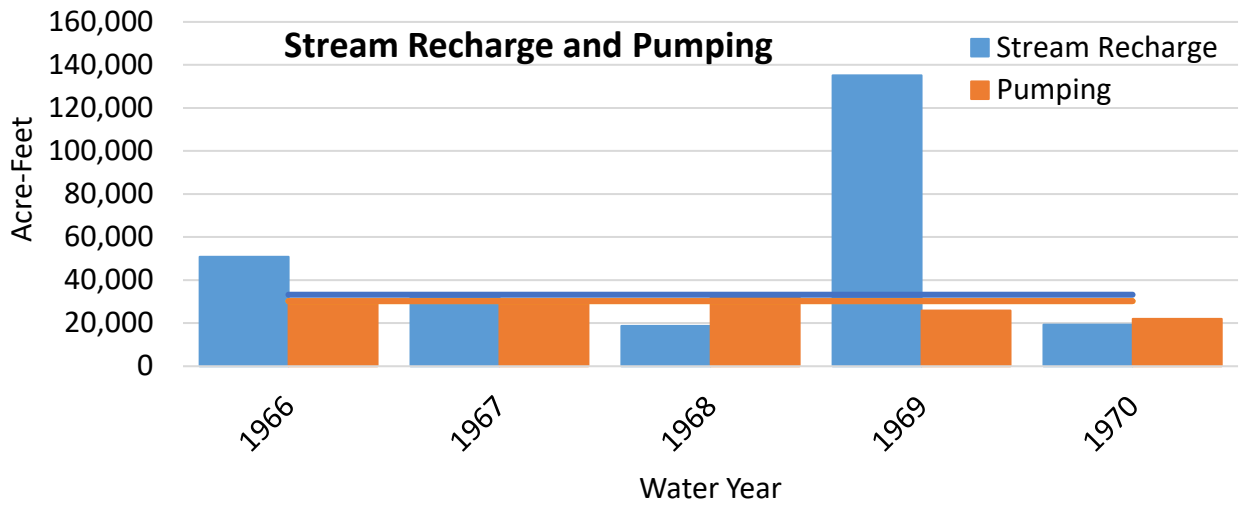
**Notes:**  
 All locations approximate.  
 WY: Water Year



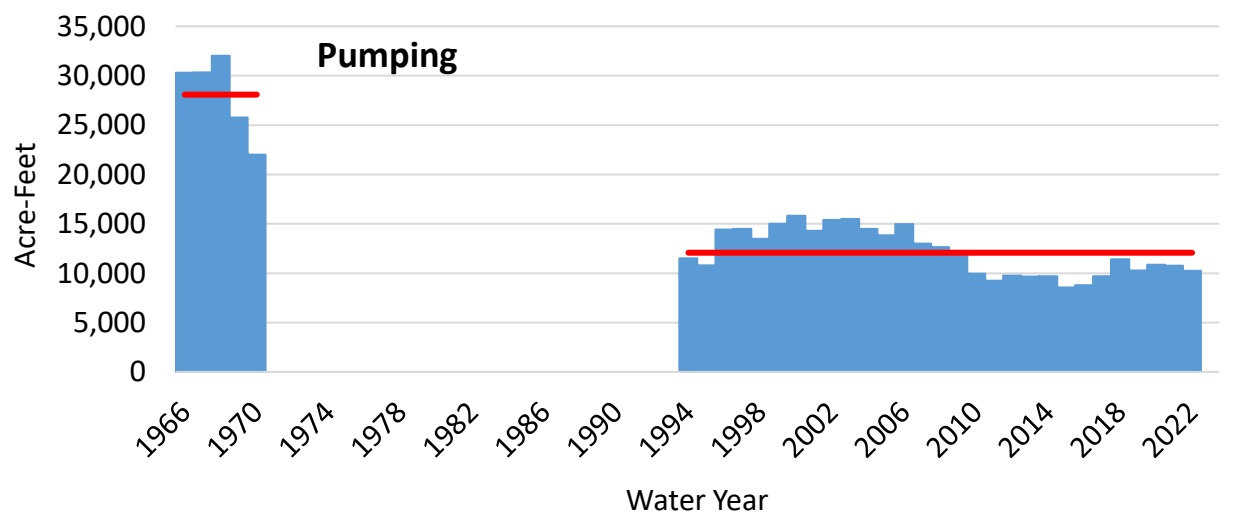
aquilogic, Inc. BHFS - GSWC Mojave

### Transition Zone Production Wells WY 1994 - 2022

|                  |                   |                 |
|------------------|-------------------|-----------------|
| Date: 10/18/2023 | Project #: 018-10 | <b>Figure 5</b> |
|------------------|-------------------|-----------------|



1966-1970  
 Median Stream Recharge = 33,234 AFY  
 1966-1970  
 Median Pumping = 30,287 AFY



1966-1970  
 Median = 30,287 AFY

1994-2022  
 Median = 11,522 AFY

# **EXHIBIT C**

## **Eldridge, Melissa**

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**From:** Eldridge, Melissa <MEldridge@bhfs.com>

**Sent:** Wednesday, February 28, 2024 10:00 AM

**To:** Watermaster@mojavewater.org

**Cc:** Leland P. McElhaney <lmcelhaney@bmklawplc.com>; rcwagner@wbecorp.com; Hastings, Stephanie <SHastings@bhfs.com>; Carlson, Mack <mcarlson@bhfs.com>

**Subject:** Agenda Item 7 - Revised Comments on Watermaster's Production Safe Yield Update

On behalf of Golden State Water Company (GSWC), attached are revised comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield for each Subarea of the Basin. Please disregard the prior letter.

***Melissa A. Eldridge***

Legal Practice Assistant

**Brownstein Hyatt Farber Schreck, LLP**

1021 Anacapa Street, 2nd Floor

Santa Barbara, CA 93101

805.882.1482 tel

[MEldridge@bhfs.com](mailto:MEldridge@bhfs.com)

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***Brownstein - we're all in.***

February 28, 2024

Stephanie Osler Hastings  
Attorney at Law  
805.882.1415 direct  
shastings@bhfs.com

**VIA EMAIL TO: WATERMASTER@MOJAVEWATER.ORG**

Board of Directors  
Mojave Basin Area Watermaster  
Mojave Water Agency  
13846 Conference Center Drive  
Apple Valley, CA 92307-4377

**RE: Agenda Item 7 - Comments on Watermaster's Production Safe Yield Update (REVISED)**

Dear Board of Directors:

On behalf of Golden State Water Company (GSWC), we submit the following revised comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield (or PSY) for each Subarea of the Basin.<sup>1</sup> We request that the Watermaster review our comments and consider the attached technical analysis by aquilogic, Inc. (aquilogic) as the Watermaster continues to refine its update of the PSY for each Subarea—specifically Watermaster's estimate of flow across the Transition Zone—and issues its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24 required by the Mojave Basin Judgment.

**I. Statement of Interest**

GSWC, formerly Southern California Water Company and a party to the Judgment, is a division of American States Water Company, a "Class A" utility regulated by the California Public Utilities Commission, provides water service to approximately 260,000 customers throughout California. GSWC's Mountain Desert District operates water systems within three of the Mojave Basin Subareas—Alto, Este, and Centro—and provides water service to 15,275 water service connections and a population of approximately 50,400 in and around the cities and communities of Barstow, Apple Valley, and Lucerne Valley. GSWC has adjudicated Base Annual Production<sup>2</sup> rights of 1,940 acre-feet per year (AFY) in the Alto Subarea, 178 AFY in the Este Subarea, and 14,407 AFY in the Centro Subarea. Groundwater produced from 29 wells located in these Subareas provides GSWC's sole source of supply for its Mountain Desert District customers. Accordingly, GSWC has a significant interest in

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<sup>1</sup> This February 28, 2024 revised comment letter clarifies statements in our prior February 27, 2024 comment letter and supersedes it. The clarifications are in Section V of this letter.

<sup>2</sup> All capitalized terms not defined herein have the same meaning as set forth in the Judgment.



implementation of the Judgment and management of the Basin, and in particular the sustainability of those Subareas in which GSWC operates—especially in the Centro Subarea.

## **II. Importance of the Accuracy of the Calculation of PSY**

The accuracy of the PSY for each Subarea is critical to implement the Physical Solution imposed by the Judgment. Based on the PSY, Watermaster adjusts the Free Production Allowance (or FPA) for each Subarea. Given the importance of the calculation of PSY and FPA under the Judgment and its corresponding effects on Producers' rights, the Watermaster has the obligation to use the best available records and data, and install, operate, and maintain measurement devices to monitor streamflow and groundwater levels.<sup>3</sup>

## **III. Water Levels in the Centro Subarea Continue to Decline**

Since entry of the Judgment in 1996, water levels in the Centro Subarea have remained the same or continued to decline, despite Centro Subarea Producers reducing pumping consistent with the FPAs and Alta Subarea Producers purportedly meeting their Minimum Subarea Obligations, as Watermaster has reported in its Annual Reports.<sup>4</sup> Falling water levels became particularly pronounced beginning in late 2017 near the City of Barstow and Lenwood and Hodge Recharge Sites resulting in water quality impacts to GSWC's Bradshaw Wellfield which consists of eleven active production wells. At the same time, nitrate levels in four of the production wells increased to levels exceeding the Nitrate MCL of 10 mg/l. GSWC was forced to take these wells out of service and to construct a \$5 million dollar nitrate treatment facility to treat and contain the nitrate impacted supply. The on-going operation and maintenance cost of the nitrate system is on the order of \$2 million per year. Nitrate impacts are continuing to expand to additional wells at the Bradshaw Wellfield and expansion of the newly constructed treatment facility may be necessary.

## **IV. Concern with Accuracy of Watermaster's Estimate of Flow Across the Transition Zone and the Resulting Impact on Watermaster's Calculation of PSY**

GSWC has reviewed the Watermaster Engineer's presentation to the Watermaster Board on January 24, 2024 and also the memorandum from Robert C. Wagner regarding the Transition Zone Water Balance memorandum, dated February 28, 2024, and recently posted to the Watermaster website. GSWC is concerned that the Watermaster's calculation of PSY and FPA do not accurately reflect observed conditions in the Centro subarea and that further study is required to ensure adequate and

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<sup>3</sup> Judgment, ¶¶ 24(e), (w), see also Judgment, Ex. G, ¶ 2(b), 6 (requiring installation of monitoring wells in the Transition Zone and at Subarea boundaries).

<sup>4</sup> See, e.g., Watermaster, 2021-2022 Twenty-ninth Annual Report, p. 28, Fig. 3-15 (May 1, 2023) available at [https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122\\_Revised.pdf](https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122_Revised.pdf) (acknowledging some seasonal variability in water levels but noting continuing decline in water levels for at least the past 10 years).

sustainable supplies to GSWC's Barstow System. The accuracy of the Watermaster's calculation of flow across the Transition Zone is of critical importance to the Watermaster's calculation of the PSY and FPAs for each Subarea.<sup>5</sup>

#### **V. GSWC Commissioned an Independent Analysis of Flow Across the Transition Zone**

In anticipation of the Watermaster's update of the PSY, GSWC asked aquilogic to analyze inflows into the Centro Subarea from the Transition Zone. Aquilogic's analysis, presented in the enclosed memorandum dated February 23, 2024 and titled "Progress Report and Mojave Basin Transition Zone Water Budget" (hereafter, "aquilogic memorandum") concludes that surface water inflow into the Centro Subarea may be overestimated because the Watermaster's assumption that all inflows into the Transition Zone at the Lower Narrows gage, adjusted by an estimated Transition Zone water balance, are equal to inflows into the Centro Subarea is likely incorrect.

The aquilogic memorandum describes the available stream gages along the Mojave River in the vicinity of the Transition Zone. It identifies that Lower Narrows gage provides a long-term dataset at the upstream boundary of the Transition Zone (adjacent to the Alto Subarea), but no similar long-term downstream gage exists at the Transition Zone boundary with the Centro Subarea.<sup>6</sup> Aquilogic, however, identifies that the Wild Crossing gage historically existed near the Centro Subarea and Transition Zone boundary between March 1966 through October 1970.<sup>7</sup> The Wild Crossing gage provides the best available data that show the potential change in surface flows in the Mojave River across the Transition Zone by comparing flow rates at the Lower Narrows and Wild Crossing gages.<sup>8</sup> Based on the data available, surface water flows at the Wild Crossing gage, when operational, were significantly lower than those at the Lower Narrows gage, suggesting that the Mojave River recharges groundwater in the Transition Zone rather than flowing into the Centro Subarea, as Watermaster assumes.<sup>9</sup>

Further, aquilogic identified that the average annual net stream recharge within the Transition Zone between Water Year 1966-1970 was approximately 59,500 AFY.<sup>10</sup> When compared to the Judgment's estimate of 2,000 AFY of Subsurface Flow between the Transition Zone and the Centro Subarea, it is

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<sup>5</sup> The Judgment requires that the Watermaster rely on pertinent hydrologic data and estimates, including the factors and criteria identified in Exhibits C and H of the Judgment, to calculate the PSY and FPAs. (See Judgment, ¶¶ 2(a), 24(o), (w), Exes. C & H.) For example, Exhibit C to the Judgment explains the process to establish the Base Flow and Storm Flow in the Mojave River at the Lower Narrows (Transition Zone boundary with the Alto Subarea) to estimate inflows into the Centro Subarea that inform the calculation of PSY and FPA. (See Judgment, Ex. C, ¶ B(1).)

<sup>6</sup> The aquilogic memorandum identifies that closest gages to the Centro Subarea and Transition Zone boundary are the Barstow gage and the recently established Hodge/Hinkley gage, which are more than eight miles from the boundary and have significant limitations due to the width of the river channel at these locations. (aquilogic memorandum, p. 2.)

<sup>7</sup> *Id.* at p. 2.

<sup>8</sup> *Id.* at p. 3.

<sup>9</sup> See *id.* at p. 3, Fig. 2.

<sup>10</sup> See *id.* at pp. 3-4, Fig. 3.

unclear without additional analysis what happens to this additional recharge.<sup>11</sup> Based on available well information, the aquilologic memorandum finds that it is reasonable to conclude that groundwater pumping within the Transition Zone, along with environmental uses, remove the additional stream recharge from the Transition Zone.<sup>12</sup> In sum, the assumption that Centro Subarea stream inflow equals stream discharge measure at the Lower Narrows gage, adjusted by an estimated Transition Zone water balance, may not be accurate.<sup>13</sup>

The aquilologic memorandum further analysis to estimate the PSY and FPA for the Centro Subarea more accurately, including:

- preparation of a more detailed Transition Zone water budget based on U.S. Geological Survey modeling and other data sources;<sup>14</sup>
- expansion of the model domain used for the PSY to include all of the Transition Zone, Centro and Baja Subareas; and
- preparation of a written draft report for stakeholder review and comment prior to submission to the court.<sup>15</sup>

Given the impacts of falling water levels in the Centro Subarea on GSWC operations and facilities, coupled with aquilologic's analysis and recommendations presented in the attached memorandum, GSWC believes additional analysis of flow across the Transition Zone is warranted to support implementation of the Judgment.

## **VI. GSWC Request for Further Analysis of the Transition Zone as Part of the PSY Update**

GSWC respectfully requests that the Watermaster consider these comments and the aquilologic memorandum before completing its update of PSY for each Subarea and before issuing its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24. In addition, should the recommended analysis show the need for additional subsurface and surface monitoring to evaluate hydrogeologic conditions with the Transition Zone, especially at the Centro Subarea boundary, GSWC asks Watermaster to commit to install, operate, and maintain appropriate monitoring equipment to address data gaps.

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<sup>11</sup> *Id.* at p. 4; Judgment, Ex. G, ¶ 1(e).

<sup>12</sup> aquilologic memorandum, p. 5.

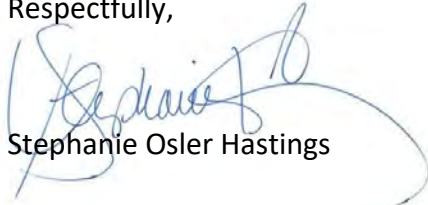
<sup>13</sup> The aquilologic memorandum also notes that 15,095 AF of treated wastewater was discharged in the Transition Zone downstream of the Lower Narrows gage in Water Year 2022, suggesting that Watermaster's assumptions for the Transition Zone require further review based on current conditions as well. (aquilologic memorandum, p. 5.)

<sup>14</sup> See *id.* at pp. 6-7.

<sup>15</sup> The February 28, 2024 Watermaster memorandum does not appear to include the recommended analyses.

Thank you for your consideration of these comments. GSWC appreciates the Watermaster's commitment to further evaluate Basin conditions as required by and as necessary to implement the Judgment effectively.

Respectfully,

A handwritten signature in blue ink, appearing to read "Stephanie Osler Hastings", is written over a circular blue ink stamp or seal.

Stephanie Osler Hastings

cc: Leland McElhaney, Brunick, McElhaney & Kennedy  
Robert Wagner, Watermaster Engineer

Attached: aquilogic, Inc. memorandum, dated February 23, 2024

## MEMORANDUM

To: Stephanie Hastings, Shareholder, Brownstein, Farber, Hyatt, Schreck, LLP  
From: Anthony Brown, Principal-in-Charge, aquilogic, Inc.  
Robert H. Abrams, Ph.D., P.G., CHg., Senior Principal Consultant, aquilogic, Inc.  
Date: February 23, 2024  
**Subject: Progress Report and Mojave Basin Transition Zone Water Budget**  
Project No.: 018-10

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Aquilologic, Inc. (**aquilologic**) has prepared this memorandum for two purposes. First, the memorandum documents preliminary work performed for the Golden State Water Company in the Mojave Basin pertaining to water outflow from the Transition Zone, which represents inflow to the Centro Subarea (**Figure 1**). Preliminary work indicates this outflow may be overestimated by the Mojave Basin Watermaster (Watermaster). Consequently, inflow to the Centro Subarea may also be overestimated. Second, the memorandum outlines an approach to provide further assessment of this outflow/inflow, to be supported by data and analyses.

The Mojave Basin is subject to a Stipulated Judgment (Judgment) of water rights.<sup>1</sup> The Judgment stipulates that Alto Subarea Producers have an obligation to deliver 23,000 acre-feet per year (AFY) of Subsurface Flow<sup>2</sup> and Base Flow<sup>3</sup> to the Transition Zone. Watermaster appears to assume that surface water inflow to the Transition Zone provides the basis for estimating surface water inflow to the Centro Subarea.<sup>4</sup> However, there is no direct evidence to support this assumption. In fact, there is direct evidence that this assumption may be incorrect.

## BACKGROUND

The Transition Zone is defined in the Judgment as part of the Alto Subarea. Watermaster assumes that the Alto Subarea Producers' obligation to the Transition Zone is satisfied by inflow to the Transition Zone from upstream portions of the Alto Subarea.<sup>5</sup> This inflow is comprised of Subsurface Flow and Base Flow. The obligation to the Transition Zone appears to be considered by Watermaster to also satisfy an obligation to the Centro Subarea. For example, the first annual report notes, "[s]uch discharge records are used in the calculations of compliance by Alto

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<sup>1</sup> Riverside (1996). Judgment after Trial, Mojave Basin Area Adjudication. City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568. January 10.

<sup>2</sup> Subsurface Flow is defined in the Judgment as, "Groundwater which flows beneath the earth's surface."

<sup>3</sup> Base Flow is defined in the Judgment as, "That portion of the total surface flow measured Annually at Lower Narrows which remains after subtracting Storm Flow."

<sup>4</sup> After accounting for estimated gains/losses in the Transition Zone, such as sewage treatment plant outfall and estimated consumptive use, as stated or implied in multiple annual reports.

<sup>5</sup> Watermaster (1995). First annual report of the Mojave Basin Area Watermaster, 1993-1994, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. February 28.

*Subarea Producers with their obligation to the Centro Subarea.*<sup>6</sup> Subsequent annual reports contain similar statements.

The Judgment specifies that 2,000 AFY of the Alto Producers' obligation to the Transition Zone is satisfied by Subsurface Flow. Watermaster assumes that groundwater inflow to the Centro Subarea from the Transition Zone is also 2,000 AFY.<sup>7,8</sup> Therefore, Watermaster appears to assume that 21,000 AFY of the obligation to the Centro Subarea must be satisfied by Base Flow from the Transition Zone.

Watermaster states that the change of groundwater storage in the Transition Zone is zero because water levels in key piezometers near both the upstream and downstream boundaries of the Transition Zone are relatively constant.<sup>9</sup> Because of this, Watermaster assumes Mojave River discharge measured at the Lower Narrows gage, adjusted by an estimated Transition Zone water balance, is essentially equivalent to Mojave River discharge entering the Centro Subarea<sup>10</sup> (**Figure 1**). However, there is no active stream gage at the upstream boundary of the Centro Subarea. Therefore, Watermaster's assumption regarding inflow to the Centro Subarea cannot be evaluated directly.

## STREAM DISCHARGE

There are no stream gages in most of the Transition Zone. However, there is one long-term gage (i.e., water year [WY] 1931 to present) located at the upstream boundary of the Transition Zone (Lower Narrows gage) (**Figure 1**). Another long-term stream gage is located near the Centro Subarea-Baja Subarea boundary (Barstow gage). A stream gage has recently been re-established approximately eight miles downstream of the Transition Zone-Centro Subarea boundary (Hodge/Hinkley gage).

The Hodge/Hinkley and Barstow gages measure discharge across an ephemeral Mojave River channel that can be over 0.25 miles wide. Discharge is generally limited at these gages to Storm Flow (i.e., very little, if any, Base Flow is measured by these gages).<sup>11</sup> The wide channel leads to uncertainty in the stream discharge measurements from these gages because Storm Flows may

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<sup>6</sup> Watermaster (1995). First annual report of the Mojave Basin Area Watermaster, 1993-1994, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. February 28.

<sup>7</sup> As stated or implied in multiple annual reports.

<sup>8</sup> However, it should be noted that the cross-sectional area for groundwater flow between the Transition Zone and the Centro Subarea potentially expands and contracts with varying volumes of Transition Zone recharge, which may increase or decrease the assumed 2,000 AFY of Subsurface Flow. Studies to understand the geometry of this potentially dynamic cross-sectional area are warranted but have not yet been undertaken by Watermaster.

<sup>9</sup> As stated or implied in multiple annual reports

<sup>10</sup> The Lower Narrows gage is located at the upstream boundary of the Transition Zone.

<sup>11</sup> Storm Flow is defined in the Judgment as *"That portion of the total surface flow originating from precipitation and runoff without having first percolated to Groundwater storage in the zone of saturation and passing a particular point of reckoning, as determined annually by the Watermaster."*

not always fill the entire width of the channel or may flow in parts of the channel away from the gage. Nevertheless, discharge measurements from these gages are the best available data.

From WY 1931 through WY 2023, Mojave River discharge at the Lower Narrows gage averaged 46,100 AFY. Discharge decreased by an average of 341 AFY over that period. From WY 1994 through WY 2023, Mojave River discharge at the Lower Narrows gage averaged 28,300 AFY. The decrease in average annual discharge over this period increased to 521 AFY.

As noted, there is no active stream gage at or adjacent to the Centro Subarea's upstream boundary. However, there was such a gage from March 1966 through WY 1970: the Wild Crossing gage (**Figure 1**).

## DATA ANALYSIS

The Wild Crossing gage was discontinued because of unstable controls and changing stage-discharge relations that did not allow for acceptable discharge records.<sup>12</sup> However, stream discharge measured at the Wild Crossing gage is the best data available that can show the potential change in discharge between the upstream boundary of the Transition Zone and the upstream boundary of the Centro Subarea, despite its shortcomings and relatively short period of record. It should be noted that the Hodge/Hinkley gage was also discontinued two different times since 1932 because of unstable controls and changing stage-discharge relations. However, it was reestablished in 2022, which suggests high-quality data can be gathered at gage locations previously deemed problematic.

## Stream Recharge to Groundwater

**Figure 2** shows the annual discharge at the Lower Narrows gage, the Wild Crossing gage, and the Barstow gage for the period WY 1966 through WY 1970.<sup>13</sup> For the purposes of this analysis, net stream recharge to groundwater is approximated as the difference in discharge between successive gages.<sup>14</sup> Discharge at the Wild Crossing gage was lower than discharge at the Lower Narrows gage every year during this period. WY 1969 is particularly striking because annual stream discharge at the Wild Crossing gage (156,000 AF) was 135,000 AF lower than discharge at the Lower Narrows gage (291,000 AF), a decrease of approximately 46 percent.<sup>15</sup>

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<sup>12</sup> Lines, G.C. (1996). Ground-water and surface-water relations along the Mojave River, Southern California: U.S. Geological Survey Water-Resources Investigations Report 95-4189, 43 p.

<sup>13</sup> The Wild Crossing gage was not active until March 1, 1966, thus may underestimate the annual discharge for WY 1966.

<sup>14</sup> This is a reasonable approximation, even though it ignores Base Flow and evapotranspiration, because most of the flow measured at the Wild Crossing gage and the Barstow gage are from episodic storm events. However, evapotranspiration along the stream course may require further evaluation.

<sup>15</sup> WY 1969 represents the largest amount of discharge on record for the Lower Narrows, Wild Crossing, and Barstow gages.

The consistent pattern of lower stream discharge at the Wild Crossing gage compared to the Lower Narrows gage during this period indicates that stream discharge at the Lower Narrows gage was more likely than not significantly greater than stream discharge entering the Centro Subarea. Furthermore, the consistent pattern indicates that significant net stream recharge to groundwater from the Mojave River likely occurred in the Transition Zone.

**Figure 3** shows that the average annual stream discharge for WY 1966-1970 decreased substantially between the Lower Narrows and Wild Crossing gages (i.e., by approximately 51,500 AFY). The total average annual net stream recharge between the Lower Narrows gage and the Barstow gage for the WY 1966-1970 period was approximately 59,500 AFY (**Figure 3**). Thus, 86 percent of the total net stream recharge between the Lower Narrows and Barstow gages occurred between the Lower Narrows gage and the Wild Crossing gage, i.e., in the Transition Zone (**Figure 3**). Net stream recharge between the Wild Crossing gage and the Barstow gage (i.e., the Centro Subarea) represents only 14 percent of the total net stream recharge between the Lower Narrows and Barstow gages.

As noted, net stream recharge in the Transition Zone averaged approximately 51,500 AFY for WY 1966-1970. Also as noted, the Judgment specifies that Subsurface Flow into the Centro Subarea from the Transition Zone is 2,000 AFY. Thus, the fate of the Transition Zone net stream recharge is unclear without further analysis, which is discussed below.

## Groundwater Extractions

Groundwater extraction data were obtained for 1951-1973 and WY 1994-2022 from the Mojave Water Agency (MWA).<sup>16</sup> Data were analyzed for 1966-1970 and WY 1994-2022 to determine annual groundwater extractions in the Transition Zone. Data from the earlier period were scanned from hard copy and digitized. Data from the later period were provided digitally.

**Figures 4** and **5** show the wells for which extractions were reported for the 1966-1970 and WY 1994-2022 periods, respectively. Groundwater extractions were compared to stream recharge to assess if extractions may account for the fate of the Transition Zone stream recharge.

The upper panel of **Figure 6** compares the annual stream recharge in the Transition Zone to the annual reported groundwater extractions. As noted, the WY 1969 stream discharge and recharge were anomalously high. They are statistical outliers, which may cause the average value of stream recharge for WY 1966-1970 to be skewed high when compared to average groundwater extractions, which typically do not have extreme changes year to year.

Rather than comparing average values for this period, the median values of annual stream recharge (33,234 AFY) and annual groundwater extractions (30,287 AFY) for the 1966-1970 period were compared. The median values suggest that most of the Mojave River net stream

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<sup>16</sup> Jeff Ruesch, Mojave Water Agency, email communications, July 2023.



recharge to groundwater in the Transition Zone during the 1966-1970 period was extracted by the approximately 260 wells completed in the Transition Zone at that time (**Figures 4 and 6**).

Transition Zone groundwater extractions in the 1966-1970 period may have facilitated higher net stream recharge by sufficiently changing the hydraulic gradient between the River and groundwater enough to induce stream recharge. This could occur even while water levels in key piezometers remain relatively constant. If so, the water-level data may appear to show that the change in groundwater storage in the Transition Zone is zero, when in fact the groundwater flow system is highly dynamic and may include significant net stream recharge.

The lower panel of **Figure 6** shows groundwater extractions in the Transition Zone for the 1966-1970 and WY 1994-2022 periods. The median value for 1966-1970 was 30,287 AFY. The median value for WY 1994-2022 was 11,522 AFY. This is a significant decrease in pumping, likely due to implementation of the Judgment. This decrease may suggest that recent and current net stream recharge in the Transition Zone is minimal compared to the WY 1966-1970 period.

However, a reasonable hypothesis is that significant net stream recharge continued to occur proportionately in the Transition Zone in the recent past and is currently occurring. The analysis described above suggests that groundwater extractions, on average, may remove an equivalent volume of net stream recharge from the Transition Zone. If so, surface water inflow to the Centro Subarea may be overestimated when based on the adjusted stream discharge measured at the Lower Narrows gage, because there may be unaccounted stream losses in the Transition Zone.

Additionally, the occurrence of Transition Zone stream losses and the effect of groundwater extractions and phreatophytes on streamflow losses and stream discharge in the Mojave Basin has been noted in previous reports prepared by others.<sup>17,18</sup> Furthermore, it should be noted that 15,095 AF of treated wastewater was discharged to the Transition Zone downstream of the Lower Narrows stream gage during WY 2022.<sup>19</sup>

## **OUTLINE OF PROPOSED WORK TO FURTHER EVALUATE THE TRANSITION ZONE WATER BUDGET**

Watermaster was directed by the Court in 2022 to re-evaluate the Production Safe Yield (PSY) for each Subarea. **Aquilologic** believes a rigorous reevaluation must include a detailed

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<sup>17</sup> Stamos, C.L., Martin, P., Nishikawa, T., and Cox, B.F. (2001). Simulation of ground-water flow in the Mojave River Basin, California. U.S. Geologic Survey Water-Resources Investigations Report 01-4002 Version 1.1.

<sup>18</sup> Todd Engineers (2013). Final report: Conceptual hydrogeologic model and assessment of water supply and demand for the Centro and Baja Management Subareas, Mojave River Groundwater Basin. Prepared by Todd Engineers and Kennedy/Jenks Consultants for the Mojave Water Agency. July.

<sup>19</sup> Watermaster (2023). Twenty-ninth annual report of the Mojave Basin Area Watermaster, water year 2021-2022, City of Barstow et al. v. City of Adelanto et al. Riverside County Superior Court Case No. 208568, Riverside County. May 1.

redetermination of the Transition Zone water budget. Material presented to date by Watermaster does not appear to have included a redetermined Transition Zone water budget.<sup>20</sup>

The analyses performed to date by **aquilogic** and others suggest that groundwater flow dynamics and the Transition Zone water budget are complex. The analyses provide a foundation for deeper evaluation of the Transition Zone water budget and its evolution through time. For example, the **aquilogic** analyses reported here can form components of an overall water budget evaluation. The objective of such an evaluation would be to provide an in-depth analysis of the volume of water that flows into the Centro Subarea annually.

A complete water budget would include all inflows, outflows, and the change of groundwater storage over time. Previous work by others can be leveraged to support development of a complete water budget. For example, the Judgment specifies that 2,000 AFY of groundwater flows into the Centro Subarea from the Transition Zone. This flow rate was specified before in-depth modeling was conducted by the U.S. Geological Survey (USGS) or MWA. A deeper analysis may reveal that this specified flow rate is too low or too high.

Groundwater flow into the Centro Subarea occurs in the Mojave River alluvium, in deeper horizons across the Helendale Fault, and other areas along the Transition Zone-Centro Subarea boundary (**Figure 1**). This flow rate is difficult to assess without using a groundwater flow model. A groundwater model can be used to contribute to a complete water budget evaluation by calculating the transient change in groundwater storage and groundwater flow rates that cannot otherwise be determined due to lack of data in key locations. **Aquilogic** strongly recommends that the current Mojave Basin groundwater flow model used by Watermaster be updated to include the entire basin, as soon as possible. In its current form, it is premature to use the model for any analyses involving the Transition Zone.

The water budget for the Transition Zone should be developed with sufficient detail and rigor to at least meet Sustainable Groundwater Management Act (SGMA) regulations for historic and current water budgets. A preliminary list of tasks to be performed includes, but may not be limited to, the following:

- Compile and review available previous work by others on groundwater flow and water budgets in the Alto and Centro Subareas, including the Transition Zone
- Evaluate the usefulness of the USGS Basin Characterization Model (BCM)<sup>21</sup> and the Parameter-elevation Regressions on Independent Slopes Model (PRISM)<sup>22</sup> dataset for application to the Transition Zone water budget

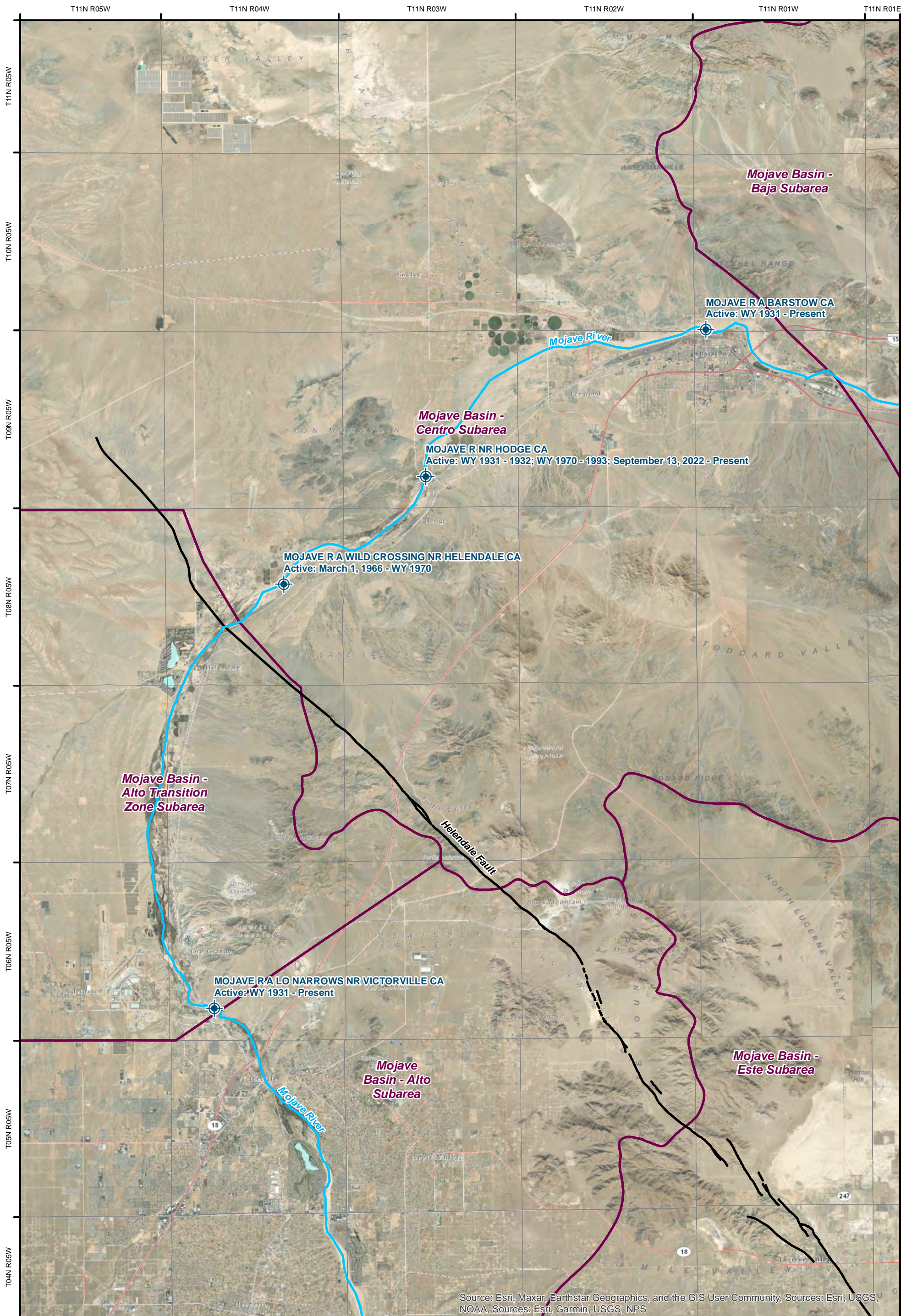
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
<sup>20</sup> Watermaster (2024). Groundwater Model and Production Safe Yield Update. Watermaster presentation prepared by Wagner and Bonsignore, Consulting Civil Engineers. Mojave Water Agency / Watermaster Board Meeting, January 24, 2024.

<sup>21</sup> [https://ca.water.usgs.gov/projects/reg\\_hydro/basin-characterization-model.html](https://ca.water.usgs.gov/projects/reg_hydro/basin-characterization-model.html)

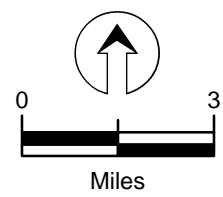
<sup>22</sup> <https://prism.oregonstate.edu/>


- Evaluate groundwater levels in the Transition Zone from WY 1931-present, with particular focus on the WY 1966-1970 and WY 1994-2022 periods to support the analyses described above
  - Estimate evapotranspiration by standard methods, including the use of satellite and areal images, and compare with previous studies
  - Compile all available water level data for the Transition Zone
  - Evaluate the water level data in terms of changes in well hydrographs and spatial water-level distributions over time
  - Determine if groundwater levels increased, decreased, or remained the same during the WY 1966-1970 period
- Use the USGS model and the updated MWA model (if and when available) to further evaluate the WY 1966-1970 period
  - Update the USGS model as needed, including groundwater extractions and potentially extending the model in time
  - Evaluate Transition Zone changes in groundwater storage, stream recharge, effects of evapotranspiration, groundwater extractions, and surface and groundwater flow into the Centro Subarea
- Critically evaluate results and available previous work to determine the best estimate of the Transition Zone water budget
- Identify data gaps and limitations in the analyses
- Effectively communicate the results to stakeholders
- Thoroughly document the analyses and prepare both draft and final reports



-  Stream Gages
-  Helendale Fault
-  Mojave River
-  Adjudicated Areas
-  Township/Range

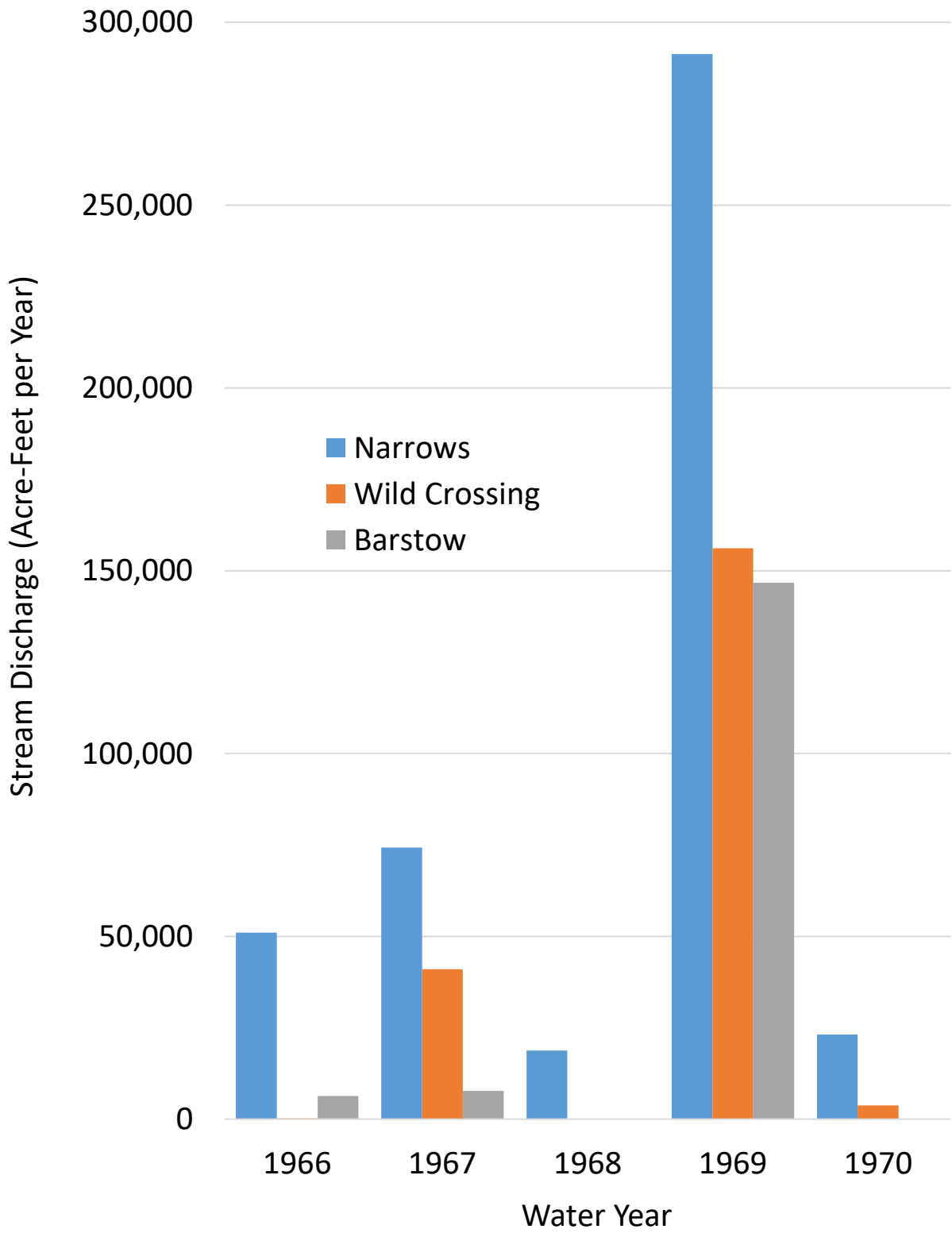
**Notes:**  
All locations approximate.  
WY: Water Year

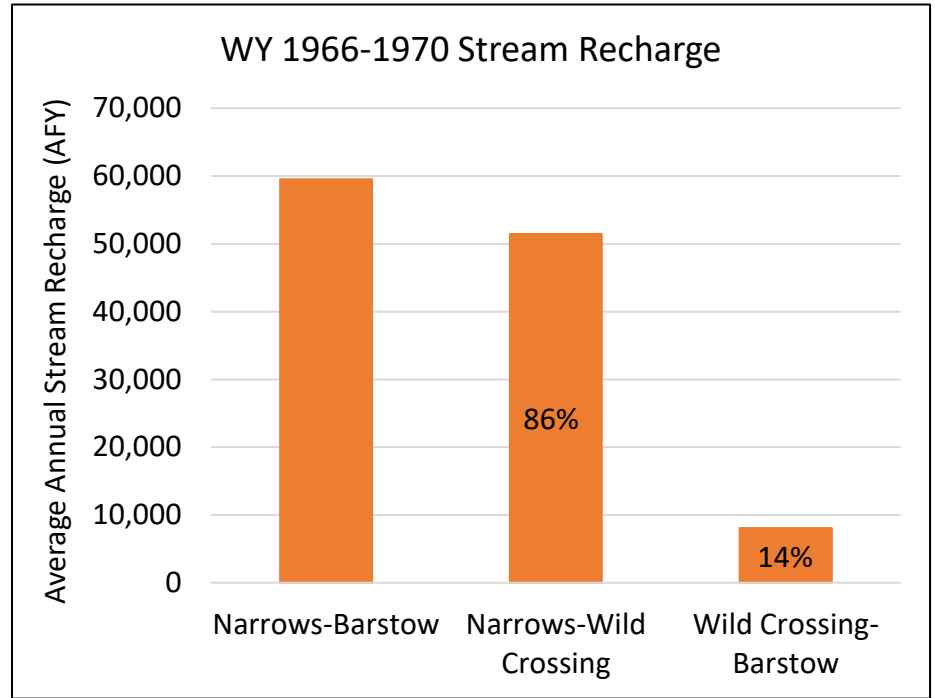
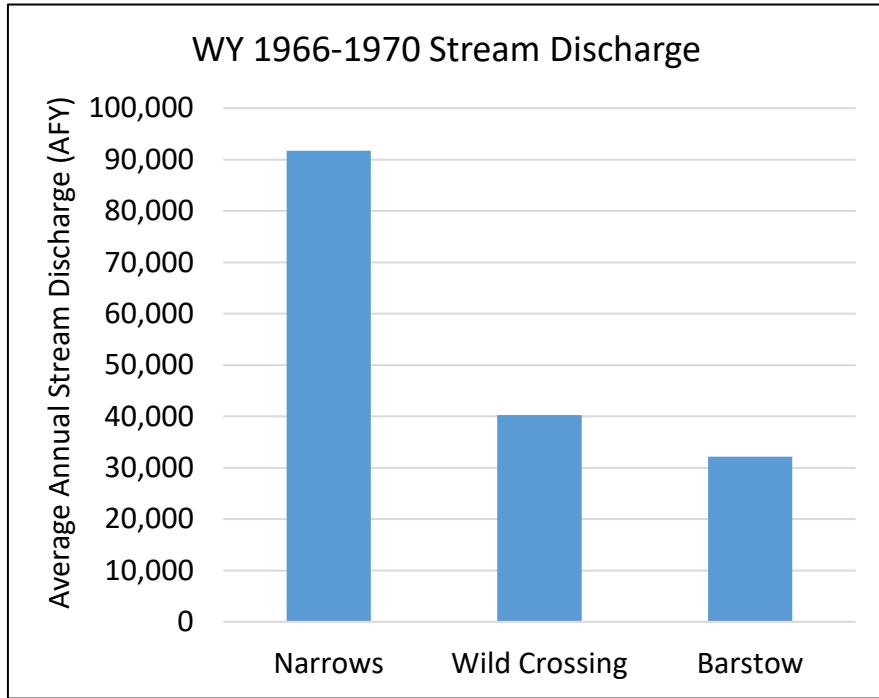


 aquilogic, Inc. BHFS - GSWC Mojave

**Key Features in the Mojave Basin**

|                  |                   |                 |
|------------------|-------------------|-----------------|
| Date: 10/18/2023 | Project #: 018-10 | <b>Figure 1</b> |
|------------------|-------------------|-----------------|





AFY: Acre-Feet per Year  
 WY: Water Year



BHFS- GSWC Mojave

### Stream Discharge and Recharge

Date: 2/23/2024

Project #: 018-10

Figure 3

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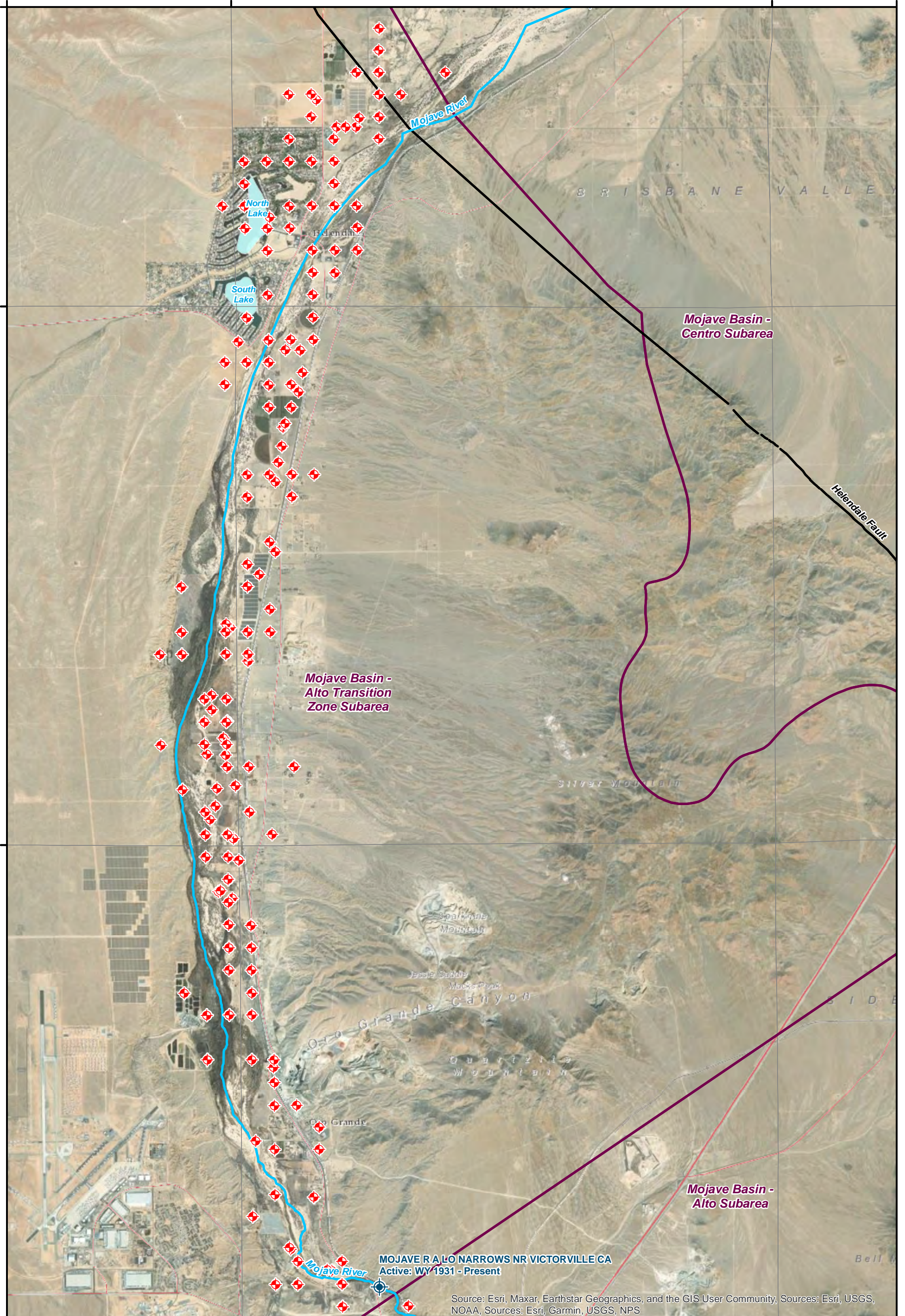
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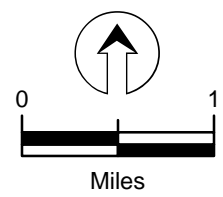
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MOJAVE R & LO NARROWS NR VICTORVILLE CA  
 Active: WY 1931 - Present

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

- ◆ Production Well Locations
  - Stream Gages
  - Helendale Fault
  - Mojave River
  - Adjudicated Areas
  - Township/Range
- Notes:**  
 All locations approximate.



**aquilogic, Inc.** BHFS - GSWC Mojave

**Transition Zone Production Wells  
1966-1970**

|                  |                   |                 |
|------------------|-------------------|-----------------|
| Date: 10/18/2023 | Project #: 018-10 | <b>Figure 4</b> |
|------------------|-------------------|-----------------|

T08N R05W

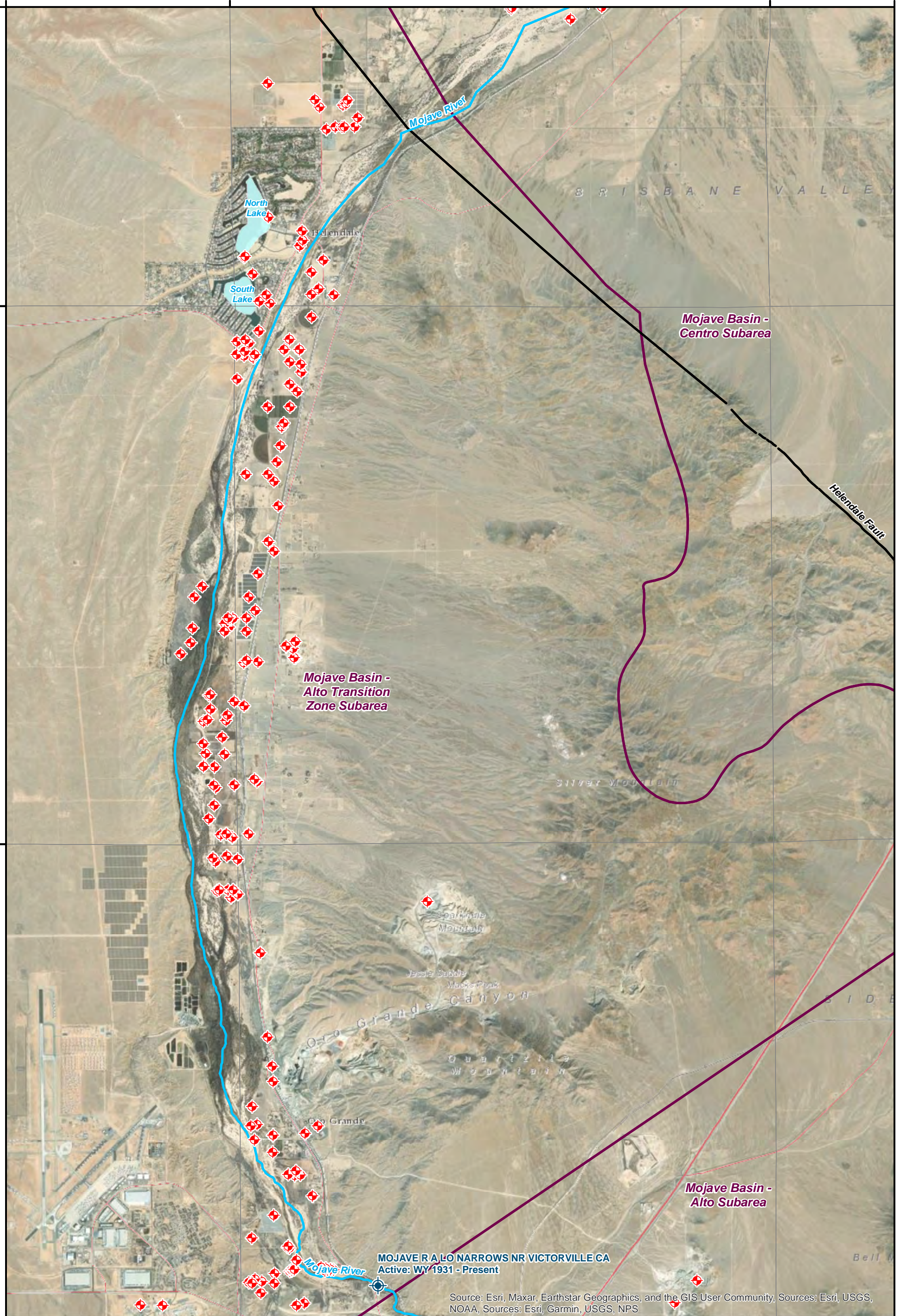
T08N R04W

T08N R03W

T08N R05W

T07N R05W

T06N R05W

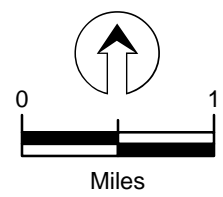


MOJAVE R & LO NARROWS NR VICTORVILLE CA  
 Active: WY 1931 - Present

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

- ◆ Production Well Locations
- Stream Gages
- Helendale Fault
- Mojave River
- Adjudicated Areas
- Township/Range

**Notes:**  
 All locations approximate.  
 WY: Water Year

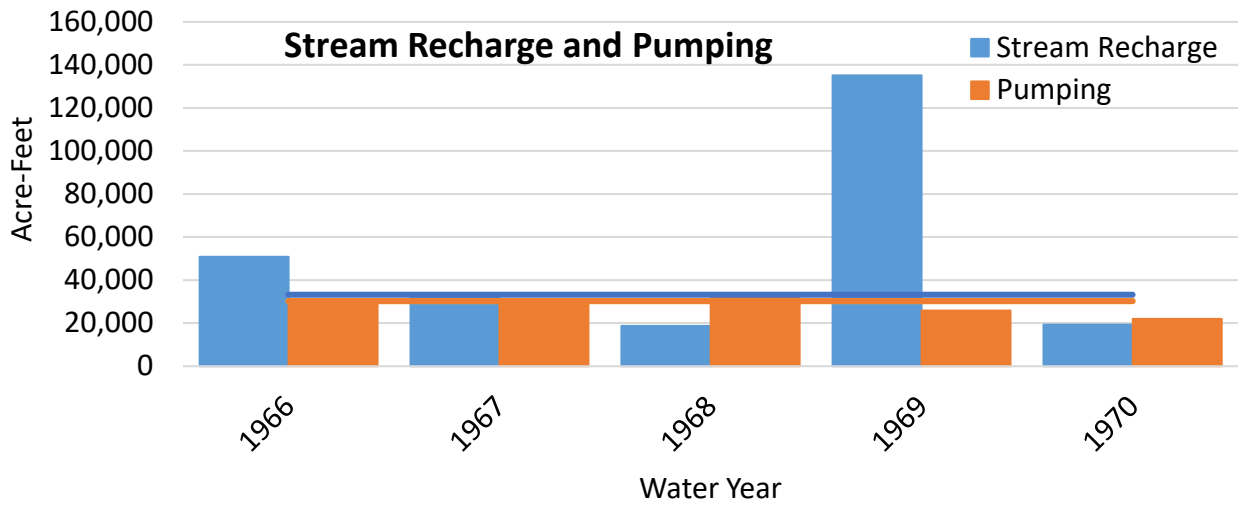


aquilogic, Inc. BHFS - GSWC Mojave

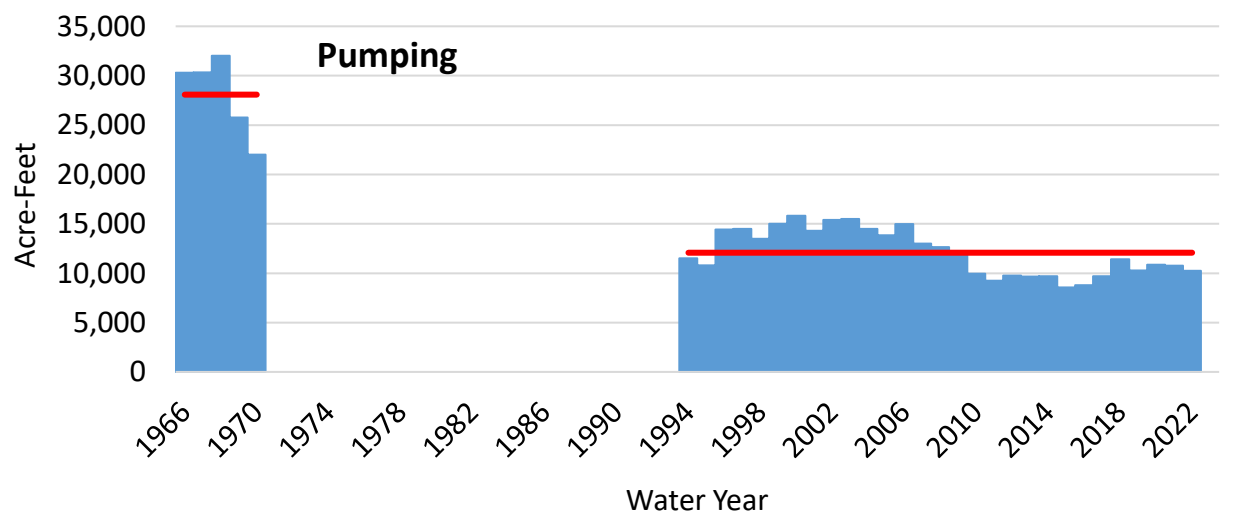
### Transition Zone Production Wells WY 1994 - 2022

|                  |                   |                 |
|------------------|-------------------|-----------------|
| Date: 10/18/2023 | Project #: 018-10 | <b>Figure 5</b> |
|------------------|-------------------|-----------------|





1966-1970  
 Median Stream Recharge = 33,234 AFY  
 1966-1970  
 Median Pumping = 30,287 AFY



1966-1970  
 Median = 30,287 AFY

1994-2022  
 Median = 11,522 AFY

# **EXHIBIT D**

February ~~27~~28, 2024

Stephanie Osler Hastings  
Attorney at Law  
805.882.1415 direct  
shastings@bhfs.com

**VIA EMAIL TO: WATERMASTER@MOJAVEWATER.ORG**

Board of Directors  
Mojave Basin Area Watermaster  
Mojave Water Agency  
13846 Conference Center Drive  
Apple Valley, CA 92307-4377

**RE: Agenda Item 7 - Comments on Watermaster's Production Safe Yield Update (REVISED)**

Dear Board of Directors:

On behalf of Golden State Water Company (GSWC), we submit the following revised comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield (or PSY) for each Subarea of the Basin.<sup>1</sup> We request that the Watermaster review our comments and consider the attached technical analysis by aquilogic, Inc. (aquilogic) as the Watermaster continues to refine its update of the PSY for each Subarea—specifically Watermaster's estimate of flow across the Transition Zone—and issues its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24 required by the Mojave Basin Judgment.

**I. Statement of Interest**

GSWC, formerly Southern California Water Company and a party to the Judgment, is a division of American States Water Company, a "Class A" utility regulated by the California Public Utilities Commission, provides water service to approximately 260,000 customers throughout California. GSWC's Mountain Desert District operates water systems within three of the Mojave Basin Subareas—Alto, Este, and Centro—and provides water service to 15,275 water service connections and a population of approximately 50,400 in and around the cities and communities of Barstow, Apple Valley, and Lucerne Valley. GSWC has adjudicated Base Annual Production<sup>42</sup> rights of 1,940 acre-feet per year (AFY) in the Alto Subarea, 178 AFY in the Este Subarea, and 14,407 AFY in the Centro Subarea. Groundwater produced from 29 wells located in these Subareas provides GSWC's sole source of supply for its Mountain Desert District customers. Accordingly, GSWC has a significant

<sup>1</sup> [This February 28, 2024 revised comment letter clarifies statements in our prior February 27, 2024 comment letter and supersedes it. The clarifications are in Section V of this letter.](#)

<sup>42</sup> All capitalized terms not defined herein have the same meaning as set forth in the Judgment.

interest in implementation of the Judgment and management of the Basin, and in particular the sustainability of those Subareas in which GSWC operates—especially in the Centro Subarea.

## II. Importance of the Accuracy of the Calculation of PSY

The accuracy of the PSY for each Subarea is critical to implement the Physical Solution imposed by the Judgment. Based on the PSY, Watermaster adjusts the Free Production Allowance (or FPA) for each Subarea. Given the importance of the calculation of PSY and FPA under the Judgment and its corresponding effects on Producers' rights, the Watermaster has the obligation to use the best available records and data, and install, operate, and maintain measurement devices to monitor streamflow and groundwater levels.<sup>23</sup>

## III. Water Levels in the Centro Subarea Continue to Decline

Since entry of the Judgment in 1996, water levels in the Centro Subarea have remained the same or continued to decline, despite Centro Subarea Producers reducing pumping consistent with the FPAs and Alta Subarea Producers purportedly meeting their Minimum Subarea Obligations, as Watermaster has reported in its Annual Reports.<sup>34</sup> Falling water levels became particularly pronounced beginning in late 2017 near the City of Barstow and Lenwood and Hodge Recharge Sites resulting in water quality impacts to GSWC's Bradshaw Wellfield which consists of eleven active production wells. At the same time, nitrate levels in four of the production wells increased to levels exceeding the Nitrate MCL of 10 mg/l. GSWC was forced to take these wells out of service and to construct a \$5 million dollar nitrate treatment facility to treat and contain the nitrate impacted supply. The on-going operation and maintenance cost of the nitrate system is on the order of \$2 million per year. Nitrate impacts are continuing to expand to additional wells at the Bradshaw Wellfield and expansion of the newly constructed treatment facility may be necessary.

## IV. Concern with Accuracy of Watermaster's Estimate of Flow Across the Transition Zone and the Resulting Impact on Watermaster's Calculation of PSY

GSWC has reviewed the Watermaster Engineer's presentation to the Watermaster Board on January 24, 2024 and also the memorandum from Robert C. Wagner regarding the Transition Zone Water Balance memorandum, dated February 28, 2024, and recently posted to the Watermaster website. GSWC is concerned that the Watermaster's calculation of PSY and FPA do not accurately reflect observed conditions in the Centro subarea and that further study is required to ensure adequate and

<sup>23</sup> Judgment, ¶¶ 24(e), (w), see also Judgment, Ex. G, ¶ 2(b), 6 (requiring installation of monitoring wells in the Transition Zone and at Subarea boundaries).

<sup>34</sup> See, e.g., Watermaster, 2021-2022 Twenty-ninth Annual Report, p. 28, Fig. 3-15 (May 1, 2023) available at [https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122\\_Revised.pdf](https://www.mojavewater.org/wp-content/uploads/2023/10/29AR2122_Revised.pdf) (acknowledging some seasonal variability in water levels but noting continuing decline in water levels for at least the past 10 years).

sustainable supplies to GSWC's Barstow System. The accuracy of the Watermaster's calculation of flow across the Transition Zone is of critical importance to the Watermaster's calculation of the PSY and FPAs for each Subarea.<sup>45</sup>

#### V. GSWC Commissioned an Independent Analysis of Flow Across the Transition Zone

In anticipation of the Watermaster's update of the PSY, GSWC asked aquilogic to analyze inflows into the Centro Subarea from the Transition Zone. Aquilogic's analysis, presented in the enclosed memorandum dated February 23, 2024 and titled "Progress Report and Mojave Basin Transition Zone Water Budget" (hereafter, "aquilogic memorandum") concludes that surface water inflow into the Centro Subarea is may be overestimated because the Watermaster's assumption that all inflows into the Transition Zone at the Lower Narrows gage, adjusted by an estimated Transition Zone water balance, are equal to inflows into the Centro Subarea is likely incorrect.

The aquilogic memorandum describes the available stream gages along the Mojave River in the vicinity of the Transition Zone. It identifies that Lower Narrows gage provides a long-term dataset at the upstream boundary of the Transition Zone (adjacent to the Alto Subarea), but no similar long-term downstream gage exists at the Transition Zone boundary with the Centro Subarea.<sup>56</sup> Aquilogic, however, identifies that the Wild Crossing gage historically existed near the Centro Subarea and Transition Zone boundary between March 1966 through October 1970.<sup>67</sup> The Wild Crossing gage provides the best available data that show the potential change in surface flows in the Mojave River across the Transition Zone by comparing flow rates at the Lower Narrows and Wild Crossing gages.<sup>78</sup> Based on the data available, surface water flows at the Wild Crossing gage, when operational, were significantly lower than those at the Lower Narrows gage, suggesting that the Mojave River recharges groundwater in the Transition Zone rather than flowing into the Centro Subarea, as Watermaster assumes.<sup>89</sup>

Further, aquilogic identified that the average annual net stream recharge within the Transition Zone between Water Year 1966-1970 was approximately 59,500 AFY.<sup>910</sup> When compared to the

<sup>45</sup> The Judgment requires that the Watermaster rely on pertinent hydrologic data and estimates, including the factors and criteria identified in Exhibits C and H of the Judgment, to calculate the PSY and FPAs. (See Judgment, ¶¶ 2(a), 24(o), (w), Exes. C & H.) For example, Exhibit C to the Judgment explains the process to establish the Base Flow and Storm Flow in the Mojave River at the Lower Narrows (Transition Zone boundary with the Alto Subarea) to estimate inflows into the Centro Subarea that inform the calculation of PSY and FPA. (See Judgment, Ex. C, ¶ B(1).)

<sup>56</sup> The aquilogic memorandum identifies that closest gages to the Centro Subarea and Transition Zone boundary are the Barstow gage and the recently established Hodge/Hinkley gage, which are more than eight miles from the boundary and have significant limitations due to the width of the river channel at these locations. (aquilogic memorandum, p. 2.)

<sup>67</sup> *Id.* at p. 2.

<sup>78</sup> *Id.* at p. 3.

<sup>89</sup> See *id.* at p. 3, Fig. 2.

<sup>910</sup> See *id.* at pp. 3-4, Fig. 3.

Judgment's estimate of 2,000 AFY of Subsurface Flow between the Transition Zone and the Centro Subarea, it is unclear without additional analysis what happens to this additional recharge.<sup>4011</sup> Based on available well information, the aquilogic memorandum finds that it is reasonable to conclude that groundwater pumping within the Transition Zone, along with environmental uses, remove the additional stream recharge from the Transition Zone.<sup>41</sup> ~~Given this evidence of stream losses in the Transition Zone, surface water inflow into the~~<sup>12</sup> In sum, the assumption that Centro Subarea ~~cannot equal~~stream inflow equals stream discharge ~~measured~~measure at the Lower Narrows gage.<sup>42</sup> adjusted by an estimated Transition Zone water balance, may not be accurate.<sup>13</sup>

The aquilogic memorandum further analysis to estimate the PSY and FPA for the Centro Subarea more accurately, including:

- preparation of a more detailed Transition Zone water budget based on U.S. Geological Survey modeling and other data sources;<sup>4314</sup>
- expansion of the model domain used for the PSY to include all of the Transition Zone, Centro and Baja Subareas; and
- preparation of a written draft report for stakeholder review and comment prior to submission to the court.<sup>4415</sup>

Given the impacts of falling water levels in the Centro Subarea on GSWC operations and facilities, coupled with aquilogic's analysis and recommendations presented in the attached memorandum, GSWC believes additional analysis of flow across the Transition Zone is warranted to support implementation of the Judgment.

## VI. GSWC Request for Further Analysis of the Transition Zone as Part of the PSY Update

GSWC respectfully requests that the Watermaster consider these comments and the aquilogic memorandum before completing its update of PSY for each Subarea and before issuing its Free

<sup>4011</sup> Id. at p. 4; Judgment, Ex. G, ¶ 1(e).

<sup>41</sup> ~~aquilogic memorandum, p. 5.~~

<sup>12</sup> aquilogic memorandum, p. 5.

<sup>42</sup> ~~The aquilogic memorandum also notes that 15,095 AF of treated wastewater was discharged in the Transition Zone downstream of the Lower Narrows gage in Water Year 2022, suggesting that Watermaster's assumptions for the Transition Zone require further review based on current conditions as well. (aquilogic memorandum, p. 5.)~~

<sup>13</sup> The aquilogic memorandum also notes that 15,095 AF of treated wastewater was discharged in the Transition Zone downstream of the Lower Narrows gage in Water Year 2022, suggesting that Watermaster's assumptions for the Transition Zone require further review based on current conditions as well. (aquilogic memorandum, p. 5.)

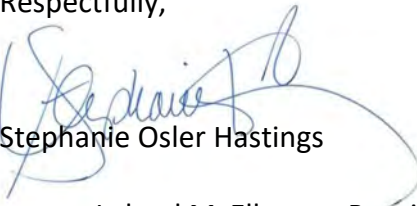
<sup>4314</sup> See id. at pp. 6-7.

<sup>4415</sup> The February 28, 2024 Watermaster memorandum does not appear to include the recommended analyses.

Production Allowance for Water Year 2024-25 and Annual Report for 2023-24. In addition, should the recommended analysis show the need for additional subsurface and surface monitoring to evaluate hydrogeologic conditions with the Transition Zone, especially at the Centro Subarea boundary, GSWC asks Watermaster to commit to install, operate, and maintain appropriate monitoring equipment to address data gaps.

Thank you for your consideration of these comments. GSWC appreciates the Watermaster's commitment to further evaluate Basin conditions as required by and as necessary to implement the Judgment effectively.

Respectfully,



Stephanie Osler Hastings

cc: Leland McElhaney, Brunick, McElhaney & Kennedy  
Robert Wagner, Watermaster Engineer

Attached: aquilogic, Inc. memorandum, dated February 23, 2024

| <b>Summary report:</b>   |           |
|--|-----------|
| <b>Litera Compare for Word 11.2.0.54 Document comparison done on 5/3/2024<br/>9:56:16 AM</b> |           |
| <b>Style name:</b> Brownstein  |           |
| <b>Intelligent Table Comparison:</b> Active  |           |
| <b>Original DMS:</b> iw://dm.bhfs.com/ACTIVE/27288210/6                                      |           |
| <b>Modified DMS:</b> iw://dm.bhfs.com/ACTIVE/27288210/8                                      |           |
| <b>Changes:</b>  |           |
| Add  | 52        |
| Delete   | 38        |
| <del>Move From</del>   | 1         |
| Move To  | 1         |
| Table Insert   | 0         |
| <del>Table Delete</del>  | 0         |
| Table moves to   | 0         |
| <del>Table moves from</del>  | 0         |
| Embedded Graphics (Visio, ChemDraw, Images etc.)   | 0         |
| Embedded Excel   | 0         |
| Format changes   | 0         |
| <b>Total Changes:</b>  | <b>92</b> |



# **EXHIBIT E**

## **Eldridge, Melissa**

---

**From:** Eldridge, Melissa  
**Sent:** Wednesday, March 27, 2024 9:55 AM  
**To:** Watermaster@mojavewater.org  
**Cc:** Leland P. McElhaney; rcwagner@wbecorp.com; Hastings, Stephanie; Carlson, Mack; Toby Moore; Bob Abrams  
**Subject:** Agenda Items 7 & 9 - Comments on Watermaster's Production Safe Yield Update (February 2024)  
**Attachments:** 2024.03.27 Agenda Item 7 & 9 Follow up Letter to Watermaster re Transition Zone.pdf

On behalf of Golden State Water Company (GSWC), attached are comments related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield for each Subarea of the Basin. Please distribute the attached to the Board in advance of today's meeting.

### ***Melissa A. Eldridge***

Legal Practice Assistant  
**Brownstein Hyatt Farber Schreck, LLP**  
1021 Anacapa Street, 2nd Floor  
Santa Barbara, CA 93101  
805.882.1482 tel  
[MEldridge@bhfs.com](mailto:MEldridge@bhfs.com)

***Brownstein - we're all in.***

March 27, 2024

**VIA EMAIL TO: WATERMASTER@MOJAVEWATER.ORG**

Stephanie Osler Hastings  
Attorney at Law  
805.882.1415 direct  
shastings@bhfs.com

Board of Directors  
Mojave Basin Area Watermaster  
Mojave Water Agency  
13846 Conference Center Drive  
Apple Valley, CA 92307-4377

**RE: Agenda Items 7 & 9 - Comments on Watermaster's Production Safe Yield Update (February 2024), proposed recommendation for Free Production Allowance for Water Year 2024-25, Watermaster Annual Report for Water Year 2022-23**

Dear Board of Directors:

This letter follows my letter dated February 28, 2024 on behalf of Golden State Water Company (GSWC) related to the Mojave Basin Area (Basin) Watermaster's evaluation and update of the Production Safe Yield (PSY) for each Subarea of the Basin—specifically Watermaster's estimate of flow across the Transition Zone. GSWC is a party to the Mojave Basin Judgment and a producer in three of the Mojave Basin Subareas—Alto, Este, and Centro.

Despite the significant concerns raised by my February 28, 2024 letter, which included a technical analysis by aquilogic, Inc. regarding the accuracy of the Watermaster's calculation of flow across the Transition Zone, and the potential resulting impacts on Watermaster's calculation of the Production Safe Yield and Free Production Allowances for each Subarea, to date, GSWC has not received any response from the Watermaster.<sup>1</sup>

At the Watermaster's February 28 meeting, the Watermaster Engineer's presentation<sup>2</sup> included some information not previously shared that may represent an attempt to assess streamflow losses (i.e., groundwater recharge) in the Transition Zone, although the purpose is unclear.<sup>3</sup> To the extent that this information implies that most streamflow loss between the Lower Narrows gage and the Barstow gage

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<sup>1</sup> The minutes of the Watermaster's February 28, 2024 meeting reflect Director Limbaugh's direction to the Mojave Water Agency or the Watermaster to respond to GSWC February 28, 2024 comment letter.

<sup>2</sup> Watermaster Agenda, February 28, 2024, Item 7 Presentation: Production Safe Yield Update and Proposed Free Production Allowance (2024-2025), available at:  
[https://mojavewater.granicus.com/Viewer.php?view\\_id=2&clip\\_id=1336&meta\\_id=107549](https://mojavewater.granicus.com/Viewer.php?view_id=2&clip_id=1336&meta_id=107549)

<sup>3</sup> Watermaster Agenda, February 28, 2024, Item 7 Presentation: Production Safe Yield Update and Proposed Free Production Allowance (2024-2025), slides 24 and 25. The March 27, 2024 presentation on the same topic does not include this information. (See generally, Watermaster Agenda, March 27, 2024, Item 7 Presentation: Production Safe Yield Update and Proposed Free Production Allowance (2024-2025).)

occurs in the downstream half of the Centro Subarea, it contradicts the analysis conducted by aquilogic, which points to the conclusion that most streamflow loss between the Lower Narrows gage and the Barstow gage may occur in the Transition Zone—before it reaches the Centro Subarea. Given that groundwater extraction patterns, and perhaps other factors, have changed over the last 50+ years, this apparent contradiction can only be resolved through further, in-depth analysis, preferably with a well-calibrated groundwater flow model, which to date has not occurred.

Accordingly, GSWC reiterates its prior request that the Watermaster consider and respond to its comments and recommendations, inclusive of those contained in the aquilogic memorandum, before completing its update of PSY for each Subarea and before issuing its Free Production Allowance for Water Year 2024-25 and Annual Report for 2023-24. In addition, should the recommended analysis show the need for additional subsurface and surface monitoring to evaluate hydrogeologic conditions with the Transition Zone, especially at the Centro Subarea boundary, GSWC asks Watermaster to commit to install, operate, and maintain appropriate monitoring equipment to address data gaps.

If helpful, GSWC would be pleased to discuss its concerns in more detail with Watermaster Staff and Engineer.

Respectfully,



Stephanie Osler Hastings

cc: Leland McElhaney, Brunick, McElhaney & Kennedy  
Robert Wagner, Watermaster Engineer  
Toby Moore, Golden State Water Co.  
Bob Abrams, aquilogic, Inc.

**PROOF OF SERVICE**

I am over the age of eighteen years and not a party to the within-entitled action. I am employed in Santa Barbara County, California. My business address is Brownstein Hyatt Farber Schreck, LLP, 1021 Anacapa Street, 2nd Floor, Santa Barbara, California 93101-2711. My electronic service address is [Meldridge@bhfs.com](mailto:Meldridge@bhfs.com). On May 21, 2024, I served a copy of the following document(s):

**DECLARATION OF STEPHANIE OSLER HASTINGS IN SUPPORT OF GOLDEN STATE WATER COMPANY'S OPPOSITION TO MOJAVE WATER AGENCY'S MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2024-2025**



BY E-MAIL OR ELECTRONIC TRANSMISSION: I caused a copy of the document(s) listed above to be sent to the persons at the e-mail addresses listed below

William J. Brunick, Esq.  
Leland P. McElhaney, Esq.  
Brunick, McElhaney & Kennedy, PLC  
P. O. Box 13130  
San Bernardino, CA 92423-3130  
Email: [bbrunick@bmklawplc.com](mailto:bbrunick@bmklawplc.com)  
[lmcelhaney@bmklawplc.com](mailto:lmcelhaney@bmklawplc.com)

Attorneys for Defendant/Cross-Complainant  
Mojave Water Agency

Valerie Wiegenstein  
Jeffrey D. Ruesch  
Watermaster Services Managers  
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Email: [vwiegenstein@MojaveWater.org](mailto:vwiegenstein@MojaveWater.org)  
[jruesch@mojavewater.org](mailto:jruesch@mojavewater.org)

Mojave Basin Area Watermaster

I declare under penalty of perjury under the laws of the State of California that the above is true and correct. Executed on May 21, 2024, at Santa Barbara, California.

  
Melissa Eldridge

**PROOF OF SERVICE**

**STATE OF CALIFORNIA     }  
COUNTY OF SAN BERNARDINO}**

I am employed in the County of the San Bernardino, State of California. I am over the age of 18 and not a party to the within action; my business address is 13846 Conference Center Drive, Apple Valley, California 92307.

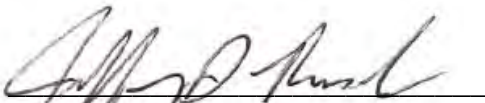
On May 22, 2024, the document(s) described below were served pursuant to the Mojave Basin Area Watermaster's Rules and Regulations paragraph 8.B.2 which provides for service by electronic mail upon election by the Party or paragraph 10.D, which provides that Watermaster shall mail a postcard describing each document being served, to each Party or its designee according to the official service list, a copy of which is attached hereto, and which shall be maintained by the Mojave Basin Area Watermaster pursuant to Paragraph 37 of the Judgment. Served documents will be posted to and maintained on the Mojave Water Agency's internet website for printing and/or download by Parties wishing to do so.

Document(s) filed with the court and served herein are described as follows:

**DECLARATION OF STEPHANIE OSLER HASTINGS IN SUPPORT OF  
GOLDEN STATE WATER COMPANY'S OPPOSITION TO MOJAVE  
WATER AGENCY'S MOTION TO ADJUST FREE PRODUCTION  
ALLOWANCE FOR WATER YEAR 2024-2025**

  X   (STATE) I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on May 22, 2024 at Apple Valley, California.

  
\_\_\_\_\_  
Jeffrey D. Ruesch

## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Los Angeles, CA 90066-2122

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P. O. Box # 2059  
Lucerne Valley, CA 92356-2059

Attn: Dwayne Oros  
Adelanto, City Of  
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Adelanto, CA 92301-1914

(adesdevon@gmail.com)  
Ades, John and Devon (via email)

Attn: Pedro Dumaua  
(pdumaua@ducommun.com)  
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Attn: Chun Soo and Wha Ja Ahn  
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davidahn0511@gmail.com)  
Ahn, Chun Soo and David (via email)  
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Apple Valley, CA 92308-8206

Attn: Matthew Patterson  
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Apple Valley, CA 92308-0938

Attn: Matthew Schulenberg  
Apple Valley Unified School District  
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Attn: Emely and Joe Saltmeris  
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Apple Valley, CA 92307-0072

Attn: Tina Kuhns  
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Sandi.Archibek@gmail.com)  
Archibek, Eric (via email)  
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Newberry Springs, CA 92365-9517

Avila, Angel and Evalia  
1523 S. Visalia  
Compton, CA 90220-3946

Attn: Sheré R. Bailey  
(LegalPeopleService@gmail.com)  
Bailey 2007 Living Revocable Trust, Sheré R.  
(via email)  
10428 National Blvd  
Los Angeles, CA 90034-4664

Attn: Daniel Shaw (barhwater@gmail.com)  
Bar H Mutual Water Company (via email)  
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Lucerne Valley, CA 92356-0844

Barber, James B.  
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Attn: John Munoz  
(barlenwater@hotmail.com);  
Bar-Len Mutual Water Company (via email)  
P. O. Box 77  
Barstow, CA 92312-0077

Attn: Curtis Palmer  
Baron, Susan and Palmer, Curtis  
141 Road 2390  
Aztec, NM 87410-9322

Attn: Jennifer Riley (hriley@barstowca.org)  
Barstow, City of (via email)  
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Barstow, CA 92311

## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Attn: Remo E. Bastianon  
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Apple Valley, CA 92308-9151

Attn: Mike Beinschroth  
(Beinschroth@gmail.com)  
Beinschroth Family Trust (via email)  
18794 Sentenac Road  
Apple Valley, CA 92307-5342

Beinschroth, Andy Eric  
6719 Deep Creek Road  
Apple Valley, CA 92308-8711

Attn: Chuck Bell (Chuckb193@outlook.com;  
Chuckb193@outlook.com)  
Bell, Charles H. Trust dated March 7, 2014  
(via email)  
P. O. Box 193  
Lucerne Valley, CA 92356-0193

Best, Byron L.  
21461 Camino Trebol  
Lake Forest, CA 92630-2011

Attn: Deborah Stephenson  
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Jason.Murray@bnsf.com;  
Blaine.Bilderback@bnsf.com)  
BNSF Railway Company (via email)  
602 S. Ferguson Avenue, Suite 2  
Bozeman, MT 59718-

Attn: Deborah Stephenson  
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BNSF Railway Company (via email)  
602 S. Ferguson Avenue, Suite 2  
Bozeman, MT 59718-6483

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20784 Iris Canyon Road  
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Box, Geary S. and Laura  
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Hesperia, CA 92340-2564

Attn: Marvin Brommer  
Brommer House Trust  
9435 Strathmore Lane  
Riverside, CA 92509-0941

Attn: Valeria Brown  
Brown Family Trust Dated August 11, 1999  
26776 Vista Road  
Helendale, CA 92342-9789

Brown, Jennifer  
10001 Choiceana Ave.  
Hesperia, CA 92345

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19575 Bear Valley Rd.  
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Bryant, Ian (via email)  
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(bubierbear@msn.com)  
Bubier, Diane Gail (via email)  
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Newberry Springs, CA 92365-9819

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Fountain Valley, CA 92708-5536

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Bush, Kevin (via email)  
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California Department Of Transportation (via  
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175 W. Cluster  
San Bernardino, CA 92408-1310

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405 N. Indian Hill Blvd.  
Claremont, CA 91711-4614

Attn: Catalina Fernandez-Moores  
(cfernandez@calportland.com)  
CalPortland Company - Agriculture (via  
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P. O. Box 146  
Oro Grande, CA 92368-0146

Attn: Catalina Fernandez-Moores  
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CalPortland Company - Oro Grande Plant (via  
email)  
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Oro Grande, CA 92368-0146

Attn: Tony Camanga  
Camanga, Tony and Marietta  
2309 Highland Heights Lane  
Carrollton, TX 75007-2033

Attn: Myron Campbell II  
Campbell, M. A. and Dianne  
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Carlton, Susan  
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Torrance, CA 90505-



## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Attn: Danielle Stewart  
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CDFW - Camp Cady (via email)  
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Chino Hills, CA 91709-3175

Attn: Jared Beyeler  
CDFW - Mojave Narrows Regional Park  
222 W. Hospitality Lane, 2nd Floor  
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(paco.cabral@wildlife.ca.gov;  
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CDFW - Mojave River Fish Hatchery (via  
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12550 Jacaranda Avenue  
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Attn: Alejandra Silva  
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16888 North E. Street  
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Attn: Jennifer Cutler  
Center Water Company  
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Lucerne Valley, CA 92356-0616

Attn: Nancy Ryman  
Chamisal Mutual Water Company  
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Choi, Yong Il and Joung Ae  
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Chung, et al.  
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Clark, Arthur  
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Club View Partners  
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Contratto, Ersula  
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Attn: Gwen Bartels  
Cross, Francis and Beverly  
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Jerome, ID 83338-5256

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Attn: Steve and Dana Rivett  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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De Jong Family Trust  
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Newberry Springs, CA 92365-9230

Attn: Randy Wagner  
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44579 Temescal Street  
Newberry Springs, CA 92365

Attn: Marie McDaniel  
Desert Dawn Mutual Water Company  
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Lucerne Valley, CA 92356-0392

Attn: Penny Zaritsky  
(pennyzaritsky2000@yahoo.com)  
Desert Girlz LLC (via email)  
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Lucerne Valley, CA 92356-0709

Attn: Denise Courtney  
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Attn: Debby Wyatt  
DLW Revocable Trust  
13830 Choco Rd.  
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Attn: Judith Dolch-Partridge, Trustee  
Dolch Living Trust Robert and Judith  
4181 Kramer Lane  
Bellingham, WA 98226-7145

Donaldson, Jerry and Beverly  
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Delta, CO 81416-8501

Attn: Jeffery Lidman  
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Apple Valley, CA 92307-0026

Attn: David Dorrance  
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Attn: David Looper  
Douglass, Tina  
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Gabrych, Eugene  
2006 Old Highway 395  
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Attn: Mitch Hammack  
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Gaeta, Miguel and Maria  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

Attn: Jay Storer  
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Attn: Brent Peterson  
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Nereida.Gonzalez@gswater.com)  
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160 Via Verde, Ste. 100  
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Gordon Acres Water Company  
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Gray, George F. and Betty E.  
975 Bryant  
Calimesa, CA 92320-1301

Attn: Brian E. Bolin  
Green Acres Estates  
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Apple Valley, CA 92307-0001

Attn: Eric Archibek  
Green Hay Packers LLC  
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24116 Santa Fe  
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Attn: Doug and Cheryl Hamilton  
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Attn: William Handrinos  
Handrinos, Nicole A.  
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Adelanto, CA 92301-9308

Hang, Phu Quang  
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Attn: Matt Wood  
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Hanson Aggregates WRP, Inc. (via email)  
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Attn: Mary Jane Hareson  
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Attn: Kenny Harmsen (harmsencow@aol.com)  
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Attn: Joshua Maze  
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Helendale, CA 92342-0249

## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Hesperia, CA 92345-3493

Attn: Janie Martines  
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Hesperia Water District (via email)  
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Hesperia, CA 92345-3493

Attn: Jeremy McDonald  
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Hesperia, City of (via email)  
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Hesperia, CA 92345-3493

Attn: Carabeth Carter ()  
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Attn: Lisset Sardeson  
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(leehiett@hotmail.com)  
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Attn: Lori Clifton (lclifton@robar.com)  
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Attn: Lori Clifton (lclifton@robar.com)  
Hi-Grade Materials Company (via email)  
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Attn: Frank Hilarides  
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Attn: Katherine Hill (Khill9@comcast.net)  
Hill Family Trust and Hill's Ranch, Inc. (via email)  
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Attn: Anne Roark  
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Lucerne Valley, CA 92356-0749

Ho, Ting-Seng and Ah-Git  
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Attn: Paul Hong  
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Attn: Sandra D. Hood  
Hood Family Trust  
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Attn: Ester Hubbard  
Hubbard, Ester and Mizuno, Arlean  
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Attn: Paul Johnson  
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39392 Burnside Loop  
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Attn: Daniel and Karen Gray  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Attn: James Jackson Jr.  
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Attn: Lawrence Dean  
Jackson, Ray Revocable Trust No. 45801  
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Attn: Audrey Goller  
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Jamboree Housing Corporation (via email)  
15940 Stoddard Wells Rd - Office  
Victorville, CA 92395-2800

Attn: Gary A. Ledford  
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Jess Ranch Water Company (via email)  
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Johnson, Carlean  
8626 Deep Creek Road  
Apple Valley, CA 92308

Attn: Paul Johnson  
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Johnson, Paul - Industrial (via email)  
10456 Deep Creek Road  
Apple Valley, CA 92308-8330

Johnson, Ronald  
1156 Clovis Circle  
Dammeron Valley, UT 84783-5211

Attn: Lawrence W. Johnston  
Johnston, Harriet and Johnston, Lawrence W.  
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Hesperia, CA 92340-1472

Attn: Magdalena Jones  
(mygoldenbiz9@gmail.com)  
Jones Trust dated March 16, 2002 (via email)  
35424 Old Woman Springs Road  
Lucerne Valley, CA 92356-7237

Jones, Joette  
81352 Fuchsia Ave.  
Indio, CA 92201-5329

Attn: Paul Jordan  
Jordan Family Trust  
1650 Silver Saddle Drive  
Barstow, CA 92311-2057

Attn: Ray Gagné  
Jubilee Mutual Water Company  
P. O. Box 1016  
Lucerne Valley, CA 92356

Attn: Lee Logsdon  
Juniper Riviera County Water District  
P. O. Box 618  
Lucerne Valley, CA 92356-0618

Attn: Ash Karimi  
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Koering, Richard and Koering, Donna  
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(via email)  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Attn: Vanessa Laosy  
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Attn: Robert Lawrence Jr.  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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Attn: Joe Trombino  
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## Mojave Basin Area Watermaster Service List as of May 22, 2024

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