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TECHNICAL MEMORANDUM

To: Mojave Basin Area Watermaster

From: Robert Wagner, P.E., A. Leonardo Urrego-Vallowe

Date: May 30, 2025

Re: **Responses to Court's questions to be addressed in the next motion to adjust FPA**

In October 2024, the Superior Court of California, County of Riverside ordered the Watermaster to re-evaluate PSY for the Alto, Centro, Baja and Oeste subareas, including the Transition Zone (TZ). The Court also presented questions to be answered by Watermaster in the next motion for adjustments to Free Production Allowance. The Court had also presented some of the same questions in its July 2024 Order. The purpose of this Technical Memorandum is to answer each of the Court's questions.

QUESTIONS TO BE ADDRESSED IN THE NEXT MOTION TO ADJUST FPA.

1. If the motion describes the production of nonparties:

a. What is the significance of that production to the Court's consideration of proposed changes to the FPA of parties?

Nonparty pumpers include Minimal Producers and other persons who produce more than 10 acre-feet of groundwater annually or who use groundwater for the unlawful cultivation of cannabis; although not designated as Minimal Producers, this includes as well the Cardozo Appellants who are parties to the Judgment. Watermaster estimates the amount of pumping by all nonparty producers. Some of the Cardozo Appellants report their production and the reminder of the Cardozo Appellants' production is estimated by Watermaster.

The latest estimates indicate nonparty groundwater production exceeding 10 acre-feet per year (i.e., non-Minimal Producer production) totals approximately 1,500 acre-feet per year. Nonparty groundwater production has been estimated using 2024 aerial imagery of irrigated acreage, and evapotranspiration of applied water (ETaw) from CUP+ -- CUP+ is a tool developed by DWR and the University of California, Davis to estimate ETaw values specific for each crop type.

The Minimal Producer estimate that has been used for PSY calculations (7,077 acre-feet annually) was published February 16, 2000 by Albert A Webb Associates (Webb) under the title "Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area". Periodic work performed thereafter by the Mojave Water Agency (MWA) concluded that the estimated groundwater production by Minimal Producers totals approximately 4,971 acre-feet annually. See Minimal Producer groundwater production analysis in 2013 Staff Report by MWA, **Attachment A** hereto. Using the higher and more conservative amount of 7,077 acre-feet per year ensures that all nonparty groundwater production is accounted for; accordingly, the estimated 7,077 acre-feet annually of groundwater production by nonparties has been included in Watermaster's PSY calculations.

b. Does "Producer" as defined in the judgment (at p. 11) include nonparty pumpers?

The Judgment defines "producer(s)" as a person who produces water, except for Minimal Producers. Thus, nonparties who produce more than 10 acre-feet per year are considered to be "producers," while persons producing less than 10 acre-feet of groundwater annually (i.e., Minimal Producers) are not considered to be "producers" as that term is defined in the Judgment.

c. Does "Free Production Allowance," as defined in the judgment (at p. 9) include water pumped by nonparty pumpers?

The Judgment defines Free Production Allowance (FPA) as "The total amount of water, and any Producer's share thereof, that may be Produced from a Subarea each Year free of any Replacement Obligation." (p. 9, para. "k".) The only persons who are bound by the Judgment and are subject to the Replacement Obligations provided for therein, are those persons who are Parties to the Judgment. Additionally, the Judgment does not assign a Base Annual Production right or a Free Production Allowance to persons who are not Parties to the Judgment, and BAP is one of the bases for determining a Party's FPA in any given year. Accordingly, FPA does not directly include water produced by nonparty pumpers. As explained below, however, groundwater production **by all persons**, including nonparties, is considered in determining Production Safe Yield, and PSY determines whether FPA must be ramped down. Therefore, production by nonparty pumpers is considered in determining PSY, but FPA itself does not include water pumped by nonparty pumpers.

d. Does the judgment require the Court to consider nonparty production when determining whether, and to what extent, the FPA of the parties to the judgment should be reduced? If not, does it allow the Court to do so?

Yes, the Judgment requires the Court to consider nonparty production when determining the FPA. The Judgment defines Production Safe Yield as "The 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." Therefore, in determining PSY all groundwater production ("under given patterns of Production, applied water, return flows and Consumptive Use . . . without resulting in a long-term net reduction of groundwater in storage") must be considered. This includes nonparty production. Therefore, the Court is required to consider pumping by nonparty pumpers when determining PSY and, correspondingly, to what extent the FPA of the parties to the Judgment should be reduced.

2. Exhibit G, paragraph 1, refers to "average Annual and minimum Annual Subsurface Flows and/or Base Flows per Year." Does the Judgment set a minimum annual subsurface flow that must be met each year, or only establish the requisite average annual flows?

Exhibit G, paragraph 1 states what Producers are required to do "to provide the following average Annual and minimum Annual Subsurface Flows and/or Base Flows per year." (Underscoring added.) Based on the "and/or" provision, this language could be interpreted to mean Producers are required to meet one of the two options, but not both. If so, then Producers could satisfy the requirement by providing average Annual and minimum Annual Base Flows per year, without providing average Annual and minimum Annual Subsurface Flows per year.

Moreover, recognizing it is not possible to "measure" subsurface flows, as to the Alto Subarea, paragraph 1, subdivision (e) of Exhibit G provides: "For the purposes of Paragraph 6 of this Exhibit G, the Subsurface Flow component **shall** be deemed to be 2,000 acre-feet per Year. In any Year Alto Subarea Producers shall have an obligation to provide to the Transition Zone a minimum combined Subsurface Flow and Base Flow as follows: ..."

Accordingly, as to the Alto Subarea, Subsurface Flow "shall" be deemed to be "2,000 acre-feet per year" (subject to the provisions of paragraph 6 discussed below). This mandate eliminates any need or reason to even attempt to measure the subsurface flows in the Alto Subarea. Moreover, paragraph 2, subdivision (b) of Exhibit G provides that "the MWA shall establish key wells to be used to monitor Groundwater levels in the Transition Zone and, subject to approval of the Court, Watermaster **shall** establish minimum water levels to be maintained in the key wells." All of that has been accomplished, and the establishment of minimum water levels in key wells located in the Transition Zone ensures that subsurface water passes through the Transition Zone and into the Centro Subarea. By maintaining minimum water levels, the gradient through the Transition Zone and across the Helendale Fault are relatively unchanged, and since the hydraulic conductivity values are assumed to remain constant, this ensures the subsurface flows are passing from the Transition Zone to the Centro Subarea. This was explained in the 1996 Amended Statement of Decision Section F. 2. as follows: "The transition zone has a fairly stable water level. It is necessary to maintain that water level so that the surface flows passing the Lower Narrows and the subsurface inflow into the transition zone will reach the Helendale Fault, and hence downstream areas; **the flows at the Helendale Fault will in the future be measured using monitoring wells** to insure that water levels are maintained within the transition zone." Excerpts from the 1996 Amended Statement of Decision describing this are included in **Attachment B**. Watermaster determines surface and subsurface flows at the Helendale Fault in compliance with the 1996 Amended Statement of Decision.

Notwithstanding the foregoing, paragraph 6 of Exhibit G of the Judgment provides: "Some

Subarea Obligations are expressed as average Annual or minimum Annual Subsurface Flow. In all cases the Subsurface Flow obligations have been established initially at amounts equal to the estimated historical average Subsurface Flow across Subarea boundaries. Not later than two Years following entry of this Judgment MWA shall begin to install monitoring wells to be used to obtain data to enable improved estimates of Subsurface Flow at each Subarea boundary where there is a Subsurface Flow obligation and to develop methodology for future determinations of actual Subsurface Flow. Not later than ten years following entry of this Judgment Watermaster shall prepare a report setting forth the results of the monitoring program and the future methodology. Following opportunity for review of Watermaster's report by all Parties, Watermaster shall prepare a recommendation to the Court as to the likely accuracy of the estimated historical Subsurface Flows and any revision of Subarea Obligations that may be indicated. Pending Watermaster's report to the Court, Subsurface Flows shall be assumed to be equal to the Subsurface Flow obligations for purpose[s] of accounting for compliance therewith."

All of this also was done, to wit: monitoring wells were installed and in 2006, Watermaster considered and adopted a recommendation, presented to the Court in April 2006, to establish subsurface flow obligations. "Notification was given to all the parties that an investigation was conducted and a report was prepared to determine changes to the subsurface flow amounts specified in the Judgment. No requests were received for copies of the report or for inspection and no comments were received. Watermaster held a detailed workshop on February 22, 2006 and took formal action on March 22, 2006 to adopt the recommended subsurface flow obligations." (Notice of Motion and Motion to adjust Free Production Allowance for Water Year 2006-2007; Memorandum of Points and Authorities, and Declaration of Robert C. Wagner in Support thereof, page 7 lines 12-16 of Memorandum of Points and Authorities). In addition, this memorandum stated, "The subsurface flow obligations for Este to Alto (200 acre-feet), Alto to Centro (2,000 acre-feet) and Centro to Baja (1,200 acre-feet) are recommended to remain unchanged." (page 8, lines 4-5). A copy of this memoranda and Notice of Motion and Motion to adjust Free Production Allowance for Water Year 2006-2007 is included as **Attachment C**.

The subsurface flow for Oeste to Alto of 800 acre-feet was formally adopted by Watermaster during the 2006-07 Water Year and reported to the Court in it's Notice of Motion and Motion to Adjust Free Production Allowance for Water Year 2007-2008, Memorandum of Points and Authorities, page 8, lines1-2 (included herein as **Attachment D**).

In the Court's Order Granting Motion to Adjust Free Production Allowance for Water Year 2007-2008, Watermaster was relieved of the obligation to determine the flow from Baja across the MWA boundary to Afton (page 3, lines 7-8 of **Attachment E**).

In 2019, Watermaster prepared and submitted to the Court a report titled "Consumptive Water User Study and Production Safe Yield Update, 2017-18 Water Year" (see **Attachment F**). As part of the 2019 PSY update for the Mojave Basin, an evaluation of subsurface flows between subareas was performed. This analysis indicated little change in the groundwater levels or gradients between the subarea boundaries and, therefore, the subsurface flow estimates (Alto - Transition Zone to Centro, Centro to Baja, Este to Alto, and Oeste to Alto) remained the same as previously evaluated by Webb in 2000, the USGS in 2001 and a 2005 study by California State

University Fullerton. The conclusions from this report stated that "it appears that the subsurface component of the subarea obligations called for in the Judgement continue to be met."

The Judgment does not provide for or require any further evaluation or study of the Subsurface Flow among subareas. Accordingly, the Judgment continues to provide that Subsurface Flow through the Transition Zone "**shall**" be deemed to be 2,000 acre-feet per Year. Watermaster has recently updated the estimates of subsurface flows through the Transition Zone in the area near the Helendale Fault. The results of these estimates are provided in more detail in the response to question 6.

The Upper Mojave River Basin Model prepared by MWA provided the subsurface flow from Este to Alto to be 1,558 acre-feet per year (2001-2020 average) and 1,674 acre-feet per year for the entire model calibration period (1951-2020 average). The minimum annual subsurface flow during the entire model calibration period (1951-2020) was 1,526 acre-feet. This demonstrates that Este has met its average annual subsurface flow and the minimum annual subsurface flow obligation to Alto since at least 1951.

In regard to the subsurface flows from Oeste to Alto, the Upper Mojave River Basin Model provided the subsurface flow to be 3,319 acre-feet per year (2001-2020 average) and 3,051 acre-feet per year for the entire model calibration period (1951-2020 average). The minimum annual subsurface flow during the entire model calibration period (1951-2020) was 1,829 acre-feet. This demonstrates that Oeste has met its average annual subsurface flow and the minimum annual subsurface flow obligation to Alto since at least 1951.

Lastly, MWA is finalizing the Regional Groundwater Model which will provide more reliable estimates of the subsurface flow from the Transition Zone into Centro.

3. The Watermaster has stated that, except for consumptive uses in the TZ, all the water that flows into the TZ passes the Helendale Fault into the Centro subarea. (Amd. Oppo. p.3.)

a. Is that conclusion true for both surface and subsurface flows?

Yes. The network of monitoring wells in the TZ supports this conclusion. The TZ monitoring wells show stable long-term water levels throughout the TZ, including the area near the Helendale Fault. This indicates that long-term average supply into the Transition Zone (minus all Consumptive Uses) equals the long-term average outflows to the Centro subarea at the Helendale Fault, as explained in the paragraphs below. The stable water levels in the TZ also allow storm flows to pass into Centro.

Hydrographs showing water levels in the Transition Zone and in the Centro subarea near the Helendale Fault are provided in **Attachment G**, including the location map of these wells. The attached hydrographs show measured water levels at seven (7) monitoring wells in the Transition Zone and three (3) monitoring wells in Centro subarea located right below the Helendale Fault. These hydrographs show the depth to water in feet at each well (primary vertical axis) and bar

chart with the total historical production in acre-feet from the Transition Zone (secondary vertical axis). The production data shows the historical increase in pumping that started in the 1950s caused the noticeable decline in water levels after 1950, and the reversing of that trend from the reduction in pumping after the 1990s due to ramp-down.

The hydrographs show groundwater levels to be relatively stable over time, with a few wells showing a rise in water levels since at least 1996 (after entry of the Judgment).

The last hydrograph titled "Transition Zone Production & Average Water Level for all Wells" is a compilation of all shallow wells (i.e., less than 50-feet of depth to water) located in the Transition Zone. **The average depth to water for all these shallow wells in the Transition Zone indicates that water levels have increased about 5 feet since 1931, and about 20 feet since 1990.**

Importantly, the average depth to water from the pre-development conditions (1930 – 1950) was 15.56 feet, which is the same as the average depth to water with and during the implementation of the Judgment (1996 - 2024) of 15.57 feet.

The flow requirements between subareas are described in the 1996 Amended Statement of Decision Section F. 2. (c) "Alto to Centro 21,000 acre-feet average annual surface flow as measured at the lower narrows (and maintained by an immediate replacement water obligation in the transition zone **to form a water bridge** down to the Helendale Fault) plus a 2,000 acre-feet average annual subsurface flow as estimated in Bulletin 84;…"

As per the 1996 Amended Statement of Decision, the surface water requirement from Alto to Centro of 21,000 acre-feet **is measured at the Lower Narrows**, not at the Helendale Fault. Excerpts from the 1996 Amended Statement of Decision confirming this requirement are included in **Attachment B**. Accordingly, for the last 29 years, Watermaster has looked to Base Flow **as measured at the Lower Narrows** to determine whether the Alto producers have satisfied their annual surface flow obligation to Centro. Therefore, in actuality and as a practical matter, the Alto Producers' obligation is to the TZ, and the Judgment does not guarantee or require that 21,000 acre-feet of surface flow reaches Centro each year. If 21,000 acre-feet of surface water does not reach the Transition Zone, then as defined by Exhibit G of the Judgment and calculated by Watermaster, the difference corresponds to the Alto Producers' Makeup Obligation and is the amount of water delivered to Centro to satisfy the Makeup Obligation.

The Makeup Obligation from Alto to Centro is determined by the base flow at Lower Narrows, subsurface flow deemed by the Judgment, and the treated water discharge from VVWRA in the TZ. **Attachment H** is Table 4-3 from the draft Thirty-First Annual Report of the Mojave Basin Area Watermaster. This attachment shows the yearly Makeup Obligations from Alto to Centro from Water Years 2014-2015 to 2023-2024. **It demonstrates that Alto producers have met their subarea obligation.** Each year Watermaster reports the preceding ten (10) years; however, the compilation is available in the Annual Reports since Water Year 1993-1994. It is important to note that there are only two inputs to determining the Makeup Obligation; (1) base flow and subsurface flow at Lower Narrows, and (2) VVWRA discharges.

b. Are there measurements that support that conclusion?

The hydrographs provided in **Attachment G** with measured long-term water levels support this conclusion. In addition, MWA conducted a Mann-Kendall (MK) statistical test to establish groundwater level trends for all wells located in the Transition Zone to determine whether there is a trend of water levels over time. The MK test was applied to the depth to water of 39 shallow wells from 1990 to 2024, 40 wells from 1996 to 2024 and 7 wells from 1931 to 1990. This statistical analysis concluded that approximately 70% (1996-2024) to 80% (1990-2024) of the shallow wells in the TZ show either a rise of groundwater levels (moderate to very strong upward trend) or no change (weak to negligible trend) for the periods from 1996 to 2024 and 1990 to 2024. **Attachment I** is a Technical Memorandum that describes the results from this analysis.

To calculate the surface and subsurface flows from the Transition Zone into Centro (at the Helendale Fault), Watermaster relies on the following measurements:

(I) measured surface flow into the Transition Zone as measured by USGS flow gage Mojave River at the Lower Narrows, near Victorville (measurements made weekly by USGS staff);
(II) measured discharge of treated wastewater effluent by VVWRA located within the TZ;
(III) measured groundwater production in the TZ;

- 99% of water pumped is metered/measured since at least 2012
- 93% by flow meters
- 7% by pump test and electrical records (one producer)

(IV) measured precipitation as published by NOAA at Victorville station.

Additionally, the recently installed stream gage near Hodge (9.2 river miles downstream from the Helendale Fault) further confirms the conclusion that all water that flows into the TZ, plus the treated wastewater from VVWRA in the TZ, less consumptive uses in the TZ, plus return flows to the TZ, pass into the Centro Subarea through the Helendale Fault.

Attachment J provides the hydrographs of the Mojave River surface flows measured by the USGS at the Lower Narrows (USGS gage #10261500) and near Hodge (USGS gage #10262000). The distance between these two gages is about 23.7 river miles. In Water Year 2022-2023, total volume of surface water at the Lower Narrows was 96,612 acre-feet, and total volume of surface water near Hodge was 84,410 acre-feet. The reason for the difference (water loss) between the two gages is considered as recharge to the aquifer and is explained in more detail later herein. In Water Year 2023-2024, total volume of surface water at the Lower Narrows was 41,450 acre-feet, and the total volume of water near Hodge was 41,819 acre-feet. These latter two numbers are almost the same. This demonstrates that the Transition Zone generally allows for surface, subsurface and storm flows to pass into the Centro subarea. The tables below provide the measurements and Watermaster calculations of the inflows to the Transition Zone and the outflows from the Transition Zone into Centro subarea for Water Years 2022-2023 and 2023-2024.

Water Year 2023
Transition Zone Hydrological Inventory Based on Various Supply Assumptions and 2022-23 Consumptive Use, Return Flow, and Imports
(All Amounts in Acre-Feet)

Inflow	**Flow (acre-feet)**	**Notes**
Surface Water Inflow	96,612	(1)
VVWRA	14,274	(2)
Subsurface Inflow	2,000	(3)
Ungaged Inflows	745	
Total:	**113,631**	
Outflow		
Surface Water Outflow	98,847	(4)
Subsurface Outflow	2,000	(5)
Agriculture	835	
Urban	5,771	(6)
Riparian Habitat	6,178	(7)
Total:	**113,631**	

Notes:

1. Water Year 2023 Lower Narrows Near Victorville, CA (10261500).
2. Total discharge to Transition Zone from VVWRA, 2022-23 Water Year.
3. Assumed from Exhibit G of the Judgment.
4. Estimated based on reported flows at USGS gaging station, Mojave River at Victorville Narrows and 2022-23 Consumptive Use (Watermaster Engineer, 2023).
5. Pursuant to Judgement after trial. (1996)
6. Includes consumptive use of "Minimals Pool" (estimated Minimal's production is 246 af).
7. Average consumptive use, using remote sensing from 2008 to 2023. Lines and Bilhorn (1996)

Water Year 2024
Transition Zone Hydrological Inventory Based on Various Supply Assumptions and 2023-24 Consumptive Use, Return Flow, and Imports
(All Amounts in Acre-Feet)

Inflow	**Flow (acre-feet)**	**Notes**
Surface Water Inflow	41,447	(1)
VVWRA	14,290	(2)
Subsurface Inflow	2,000	(3)
Ungaged Inflows	242	
Total:	**57,979**	
Outflow		
Surface Water Outflow	43,524	(4)
Subsurface Outflow	2,000	(5)
Agriculture	727	
Urban	5,550	(6)
Riparian Habitat	6,178	(7)
Total:	**57,979**	

Notes:

1. Water Year 2024 Lower Narrows Near Victorville, CA (10261500).
2. Total discharge to Transition Zone from VVWRA, 2023-24 Water Year.
3. Assumed from Exhibit G of the Judgment.
4. Estimated based on reported flows at USGS gaging station, Mojave River at Victorville Narrows and 2023-24 Consumptive Use (Watermaster Engineer, 2024).
5. Pursuant to Judgement after trial. (1996)
6. Includes consumptive use of "Minimals Pool" (estimated Minimal's production is 246 af).
7. Average consumptive use, using remote sensing from 2008 to 2023. Lines and Bilhorn (1996)

Under the conditions, in Water Year 2022-2023, the total volume of surface water near Hodge was 84,410 acre-feet and the calculated surface water outflow from the Transition Zone was 98,847 acre-feet per year. In the following Water Year 2023-2024, the total volume of surface water near Hodge was 41,819 acre-feet and the calculated surface water outflow from the Transition Zone was 43,524 acre-feet per year.

Hardt (1971) described the flow in the Mojave River system as extremely complex: the upstream area between The Forks and Helendale normally receives river recharge, whereas the lower half receives recharge from large floods. The amount of streamflow available for recharge varies from year to year depending on the river-channel characteristics and the climatic conditions.

In addition, recharge (water losses) between gaging stations are not uniform and rely on different factors such as the characteristics of the flood event, the location of riparian vegetation, geologic features of the basin, and antecedent conditions of soil moisture above the water table. Hardt (1971) states that "Water losses to the subsurface are much greater during the first high flow or flood of the winter because the soil is dry after 6-8 months of no flow in the river. After the river bottom has been wetted, subsequent floods of similar discharge move farther downstream." This is the reason why in Water Year 2022-2023, total volume of surface water at the Lower Narrows was 96,612 acre-feet, and total volume of surface water near Hodge was 84,410 acre-feet.

Durbin and Hardt (1974) explained that the quantity of water that infiltrates into the streambed is a function of (1) the length of time that the channel contains water, (2) the permeability of the streambed, (3) the area of the channel that is wetted, and (4) the prior accumulation of infiltrated water.

Stamos (2001) states that most of the river's streambed are generally dry, and continuous surface flows along the entire river would occur only during episodes of flood flows. According to Stamos (2001), "the distance that surface water may flow is dependent on preceding storms and the moisture content of the unsaturated zone below the river."

All these references explain the behavior of the measured surface flows during the Water Years 2022-2023 and 2023-2024. The storm flows at the Lower Narrows and near Hodge during the Water Year 2022-2023 were preceded by an 11-year period of drought conditions from 2012 to 2022 as shown on the hydrograph of the Mojave River at the Forks (**Attachment L**). After the 11 years of dry conditions, some of the flow between the Lower Narrows and Hodge was lost to infiltration into the streambed.

The storms during Water Year 2023-2024 occurred immediately after the channel was wet and water had already infiltrated, which reduced the absorption capacity of the channel. This explains why the total surface water measured at the Lower Narrows was about the same as the total surface water measured near Hodge during the Water Year 2023-2024.

The occurrence and magnitude of surface flow across the Helendale Fault into Centro is driven by the frequency and intensity of storms as described by Stamos (2001). Therefore, we do not expect to see this pattern repeated every single year.

c. What other evidence supports that conclusion?

In addition to the actual measurements described above, Watermaster computes or relies on the following estimates when determining the flows from the Transition Zone into the Centro subarea:

(a) subsurface inflow from Alto to the Transition Zone of 2,000 acre-feet per year average annually (established as aforesaid by the Judgment);
(b) calculated runoff contributions from precipitation;
(c) calculated consumptive use by riparian vegetation, using remote sensing techniques;

(d) estimated consumptive use from production (based on climatological conditions, population data, and irrigated acreages reported by producers); and
(e) estimated return flows from production (i.e., pumping minus consumptive use).

4. If one wanted to measure surface flow from the TZ into Centro, could that be done? If so, how? To what extent, if any, does the Watermaster currently do so?

Hypothetically, if one wanted to measure flows at this location, a new stream flow gage could be installed to record flow at this location. However, the reliability of the data would be subject to the same historical problems experienced by previously installed gages at Wild Crossing and Hodge.

Watermaster does not currently measure surface flows at the Helendale Fault.

We note that making reliable measurements in wide sandy unstable channels like the Mojave River is challenging because the channel geometry -- which is a critical element in stream flow calculation -- is constantly changing. Furthermore, the episodic occurrence of surface flow makes direct measurements, upon which reliable stream gage calculations depend, hard to collect because the episodic nature of the flow in the river at this location makes it difficult to predict when to mobilize staff to make a measurement.

The USGS recently re-installed and operates the USGS gage Mojave River near Hodge. The new stream flow data is being collected, reviewed and published by the USGS. As explained above, the stream gage measurements near Hodge during the last two years appear to confirm that **surface water reaching Hodge (9.2 river miles downstream from the Helendale Fault) is nearly equal to the total of the surface water flowing into the TZ at the Lower Narrows, together with the treated wastewater added in the TZ, less consumptive uses in the TZ, plus return flows in the TZ, plus runoff from precipitation**.

5. The Watermaster has said that the Wild Crossing stream gage was discontinued because it was unreliable. What was the reason for the unreliability?

The USGS Water-Resources Investigations Report 95-4189 (USGS, Lines 1996), page 6, notes that the gaging stations at Wild Crossing, near Helendale and near Hodge (about 9 river miles downstream) were discontinued, as explained below:

Gaging station 10261900, Mojave River at Wild Crossing, near Helendale, was operated during water years 1967-70. About 7 mi farther downstream, gaging station 10262000, Mojave River near Hodge, was operated during water years 1931-32 and 1971- 93. Both stations were discontinued because of unstable controls and changing stage-discharge relations that did not allow for acceptable discharge records.

6. If one wanted to measure subsurface flow from the TZ into Centro, could that be done? If so, how? To what extent, if any, does the Watermaster currently do so?

No, subsurface flows cannot be directly measured. However, subsurface flows can be reasonably estimated (using the Darcy's equation) by measuring changes in the groundwater gradient (slope) across the fault zone, and by using estimates of hydraulic conductivity and saturated thickness of the aquifer section.

Watermaster estimates of subsurface flows were established by the parties to the Judgment. Pursuant to Exhibit G, paragraph 6, monitoring wells have been installed and monitored on a regular basis to evaluate the subsurface flow obligation, and Watermaster has prepared a report with the results of the monitoring program. In accordance with Exhibit G, in 2006, Watermaster engineer prepared a report providing the results of the monitoring program and methodology. As discussed earlier herein, the 2006 Watermaster report updated and verified the subsurface flows pursuant to requirements of the Judgment. Watermaster considered and adopted a recommendation, presented to the Court in April 2006, to establish subsurface flow obligations for Este to Alto (200 acre-feet per year), Alto to Centro (2,000 acre-feet per year) and Centro to Baja (1,200 acre-feet per year).

In 2019, the PSY update, prepared by Watermaster Engineer and provided to the Court (see **Attachment F**), substantiated the subsurface flow estimates in Exhibit G of the Judgment. The 2019 PSY update indicated no changes in the hydrologic conditions between 1998 and 2016 and therefore, the flow across the Alto (TZ) to Centro appeared to be unchanged.

In April of 2025, Watermaster prepared updated estimates of the subsurface flows near the Helendale Fault to update the 2006 study of flow across the TZ to Centro boundary. This update indicates that the estimated subsurface flow ranges from 2,300 to 3,400 AFY based on water levels for nine years between 2006 and 2024. As explained in the report included herein as **Attachment K**. Based upon this more recent analysis, the Judgment's assumption of 2,000 acre-feet Subsurface Flow through the TZ appears to be conservative and, accordingly, Centro actually is receiving more than 2,000 acre-feet per year of subsurface flow.

MWA is finalizing the Regional Groundwater Model which will provide more reliable estimates of the subsurface flow from the TZ into Centro.

Attachment M is a hydrogeologic cross section along the Mojave River between the Adelanto Fault and the Helendale Fault, prepared in 2005 by URS Corporation. This cross section shows the water levels near the ground surface. It shows the 1998 water levels are about equal for both the regional aquifer and the floodplain aquifer. **Most importantly, water levels are relatively stable and near the ground surface between the Lower Narrows and the Centro Subarea**.

7. Other than precipitation, does all inflow into Centro come from the TZ?

No, in addition to the inflow from the TZ, the Centro subarea receives local runoff contributions (as ungaged inflow) that cannot be directly measured but can be simulated by the Regional Groundwater Model that MWA is developing.

8. The Judgment requires PSY to be based on "a sequence of years that is representative of the long-term average." In the motion to enforce the judgment, both the Watermaster and Victorville criticized Golden State for cherry-picking a misleadingly short time frame for comparing groundwater levels. Similarly, in its 7-3-24 order, the Court criticized the Watermaster for relying on short timeframes and inconsistent timeframes. Sometimes the Watermaster has cited to the 1931-1990 average, but other times the Watermaster has relied on 20-year or even 5-year averages.

a. Is the 1931-1990 timeframe representative of the climate in the basin today?

The hydrograph of the Mojave River at the Forks (**Attachment L**) shows the existing 60-year hydrologic base period of 1931-1990, and the new hydrologic base period of 2001-2020 proposed by Watermaster.

The 60-year hydrologic base period of 1931-1990 was based on the guidance from DWR Bulletin 84 (1967), as was the 2001-2020 proposed hydrologic base period.

The average water supply measured at The Forks for the existing base period (1931-1990) was 65,538 acre-feet per year. The average water supply measured at The Forks for the proposed base period (2001-2020) was 61,638 acre-feet per year, which is only 6-percent drier than the 1931-1990 base period.

We conclude that the recent average supply is similar in magnitude to the long-term average supply and therefore, from a water supply standpoint the 1931-1990 time frame of water supply is representative of the climate in the basin today.

b. How long is "long term?" 20 years? 30 years? 40 years? Longer?

According to the 1996 Amended Statement of Decision (page 21), "long term" period is the 60-year period 1931-1990. The Judgment does not identify a specific "long term" based period. However, after the Judgment was entered in January 1996, the Parties operated under the understanding that 1931 to 1990 would be the long term hydrologic base period for purposes of implementing the Judgment (see, e.g., Amended Statement of Decision, p.21). This also is consistent with the groundwater modeling published by the USGS (Stamos, 2001).

However, for water use and disposal (cultural conditions), we know that the cultural conditions during the 1931-1990 are not representative of recent cultural conditions. Because these changes generally occur slowly, Production Safe Yield is evaluated periodically every 5 or 10 years as population and water uses change.

c. Should the Court establish a different base period to be used when adjusting PSY and FPA and when questioning the accuracy of the Watermaster's model or recommendations? If so, when should that period begin and end?

The Regional Groundwater Model is being developed by the Mojave Water Agency. The 60-year hydrologic base period of 1931-1990 was used by the parties based on guidance from DWR Bulletin 84 (1967), which explains:

> *The base period conditions should be reasonably representative of long-time hydrologic conditions and should include both normal and extreme wet and dry years. Both the beginning and the end of the base period should be preceded by a series of wet years or a series of dry years, so that the difference between the amount of water in transit within the zone of aeration at the beginning and end of the base period would be a minimum. The base period should also be within the period of available records and should include recent cultural conditions as an aid for projections under future basin operational studies.*

Therefore, Bulletin 84 does not indicate a required duration in terms of years for an appropriate hydrologic base period, but only that the selected base period satisfies the conditions stated. For water supply, Watermaster proposed a new and more recent hydrologic base period of 2001-2020, which is consistent with DWR Bulletin 84 because: it starts and ends in a series of dry years, contains both normal and extreme wet and dry years, it has a minimum difference in the amount of water at the beginning and the end, and **it includes recent cultural conditions (i.e., pumping, patterns of water use, land uses)**. Today's cultural conditions are represented by the new recent hydrologic base period (2001-2020); cultural conditions are not expected to change in the near future. The reason for Watermaster to propose a new and more recent hydrologic base period is because the original 60-year hydrologic base period of 1931-1990 does not reflect the recent cultural conditions. The pumping, the volumetric patterns of pumping, water uses, and land uses have greatly changed from 1931-1990 to the recent time. The water supply observed in 2001-2020 is expected to repeat itself in the future for planning purposes. As mentioned above, our analysis indicated the water supply for the 1931-1990 and 2001-2020 differed by only 6-percent, however the cultural conditions from 1931-1990 are no longer representative of present and future cultural conditions.

Enclosures:

Attachment A – Staff Report on Minimal Producers by MWA dated April 25, 2013.

Attachment B – Excerpts from the 1996 Amended Statement of Decision.

Attachment C – Notice of Motion and Motion to adjust Free Production Allowance for Water Year 2006-2007; Memorandum of Points and Authorities, and Declaration of Robert C. Wagner in Support Thereof.

Attachment D – Notice of Motion and Motion to Adjust Free Production Allowance for Water Year 2007-2008, Memorandum of Points and Authorities.

Attachment E – Court's Order Granting Motion to Adjust Free Production Allowance for Water Year 2007-2008.

Attachment F – Consumptive Water User Study and Production Safe Yield Update, 2017-18 Water Year.

Attachment G – Hydrographs at Alto TZ and Centro wells near Helendale Fault.

Attachment H – Table 4-3 from the draft Thirty-First Annual Report of the Mojave Basin Area Watermaster.

Attachment I – MWA Statistical analysis memorandum.

Attachment J – Mojave River Hydrographs at Lower Narrows and near Hodge.

Attachment K – Subsurface Flow at the Alto-Centro Subarea Boundary.

Attachment L – Mojave River Flow at the Forks.

Attachment M – 2005 URS Transition Zone Hydrologic Coss Section A1-A1'.

ATTACHMENT A

Mojave Water Agency

DATE: April 25, 2013

TO: Board of Directors

FROM: Kirby Brill, General Manager

BY: Lance Eckhart, Principal Hydrogeologist

SUBJECT: CONSIDER THE ESTABLISHMENT OF AN ONGOING MINIMAL PRODUCER MONITORING PROGRAM AND RESCIND ORDINANCE 11

RECOMMENDATION

Staff recommends the approval by the Board of Directors to continue to monitor new Minimal Producers who enter the Mojave Basin Area. The monitoring program will measure future incremental basin water consumption stresses to anticipate future material impacts to the Mojave Basin Area water budget. Staff additionally recommends that the Board of Directors rescind Ordinance 11.

PREVIOUS CONSIDERATION BY COMMITTEE/BOARD OF DIRECTORS

- Technical Advisory Committee – September 7, 2005: Minimal Producers Producer Program Issues Presentation
- Planning, Resources & Technology Committee – February 7, 2006: Staff discussed with the Committee a Request for Proposals for a pilot study program for the Este Subarea. The Committee recommended that Staff move the Request for Proposals forward to the Board of Directors.
- Board of Directors Meeting – February 9, 2006: The Board of Directors approved release of a Request for Proposals for the pilot study program.
- Board of Directors Meeting – February June 22, 2006: The Board of Directors approved entering into a professional services agreement with SAIC for the Minimal Producer pilot study program.
- Technical Advisory Committee – June 6, 2007: Pilot Study on Minimal Producer Program in Este Subarea Presentation.
- Planning, Resources & Technology Committee – January 6, 2008: Workshop and update.
- Technical Advisory Committee – April 1, 2009: Methodology and update.
- Planning, Resources & Technology Committee – May 5, 2009: Staff discussed with the Committee a request to extend the work to be performed by SAIC in the Este Subarea to the other adjudicated subareas following a successful pilot test and modified project approach. The Committee recommended that staff move the Professional Services Agreement expansion forward to the Board of Directors.
- Board of Directors Meeting – May 28, 2009: The Board of Directors approved to enter into an agreement with SAIC for the Minimal Producer Pilot Study Project.
- Planning, Resources & Technology Committee – March 2, 2010: Update

- Board of Directors Meeting – March 1, 2011. Workshop and update.
- Board of Directors Meeting – April 28, 2011. Workshop and update.
- Planning, Resources & Technology Committee – August 2, 2011: Update
- Planning, Resources & Technology Committee (CLOSED SESSION) – September 6, 2011: Discussed potential legal challenges of instituting a Minimal Producer program.
- Board of Directors Meeting – November 3, 2011: Discussed potential legal challenges of instituting a Minimal Producer program.
- Technical Advisory Committee – June 7, 2012: Workshop and update.

BACKGROUND

Judgment after Trial in the matter of Barstow v. Adelanto was entered on January 10, 1996 excluded Minimal Producers from the Judgment. "Minimal Producer" is defined as "any person or entity producing equal to or less than 10 acre-feet of water per year (by well, surface water diversion, or other means) within the Lucerne Valley Basin, El Mirage Basin, and the Mojave River drainage areas, who are also within the Mojave Water Agency (MWA) boundaries, and is not required to be bound by the terms of the Mojave Basin Area Judgment (Judgment)." Minimal Producers were excluded because the total amount of water estimated to have been pumped at the time of trial was a small percentage of the total Base Annual Production, and because the task of assigning a Base Annual Production right to several thousand small parties was burdensome, time consuming and expensive. Instead, the Judgment provided that MWA would prepare a report to the Court setting forth the identity and verified Base Annual Production of each Minimal Producer in each Subarea of the Mojave Basin Area, and recommend a proposed system of Minimal Producer Assessments. MWA was also ordered to prepare a report to the Court setting forth a proposed program to be undertaken by MWA to implement the proposed system of Minimal Producer assessments. The Judgment provided that MWA name all Minimal Producers as parties to the Judgment for the purpose of adjudicating their water rights if an adequate Minimal Producer program could not be developed.

It was estimated before trial that Minimal Producers produced approximately 13,000 Acre-Feet/Year (AFY). This estimate was made by physically inspecting aerial photographs to identify the location of Minimal Producers. Each identified Minimal Producer was assigned one acre-foot of annual water production, plus an estimated amount for outdoor use. These numbers were refined in mid-1990's with additional cataloging and physical inspection of Minimal Producers. The mid-1990's revised estimate of Minimal Producer production was approximately 7,100 AFY. In 2000 the MWA Board of Directors adopted Ordinance 11 to address new Minimal Producers entering into the Mojave Basin Area. Ordinance 11 states that any new Minimal Producer initiates production of groundwater within the Mojave Basin Area after March 31, 2000 will be assessed the cost one acre-foot of imported water annually at the current set MWA rate and this water will be recharged to the respective subarea it was extracted from. Ordinance 11 was submitted to the Riverside Superior Court on June 23, 2000 for consideration and to date has not been accepted by the court.

Water Production (AFY)		
Subarea	Judgment	Mid-1990's Estimate
Alto	4,000	2,104
Baja	3,500	2,228
Centro	2,000	1,553
Este	2,000	954
Oeste	1,500	238
Total	**13,000**	**7,077**

ANALYSIS

In 2009, the Board authorized MWA staff to initiate a comprehensive assessment and cataloging of all Minimal Producers in Mojave Basin Area. The approach consisted of utilizing the MWA's in-house GIS resources, coupled with support from a consultant to assist with the use of sophisticated land use classification software for irrigated vegetation mapping. This process was vetted in a pilot area of the Este Subarea, calibrated to water metered "like-type" land use and was determined that the approach efficiently quantified Minimal Production on a site by site basis.

Based on the pilot test, the entire MWA service area was reviewed for the presence of Minimal Producers. The property of each Minimal Producer was analyzed and a property specific estimate for water production was developed. In addition to production, consumptive use was calculated based on the Este pilot test and detailed water use statistics generated from the Agency's 2011 Urban Water Management Plan.

Based on observed land use practices, it was determined that consumptive use as a whole for Minimal Producers was generally low due to the lack of outdoor irrigation and other water intensive uses. The median Minimal Producer was found to consume approximately 0.15 AFY. Approximately 90% of Minimal Producers were found to consume less that 1 AFY. Total Minimal production was calculated to be approximately 4,971 acre-feet with a corresponding consumptive use of 3,632 acre-feet.

Subarea	Groundwater Production (ac-ft)			Consumptive Use (ac-ft)		
	Judgment	Mid-1990 Estimates	"Current"	Judgment	Mid-1990 Estimates	"Current"
Alto	4,000	2,104	1,223	2,000	1,052	832
Baja	3,500	2,228	1,698	1,750	1,114	1,427
Centro	2,000	1,553	912	1,000	777	664
Este	2,000	954	921	1,000	477	573
Oeste	1,500	238	212	750	119	135
Total	**13,000**	**7,077**	**4,971**	**6,500**	**3,539**	**3,632**

Note:
1) Consumptive use factor of 50% was used for the original Judgment and mid-1990's Minimal Producer Estimates
2) Consumptive use factors for the "Current" study are based on work associated with the MWA's 2010 Urban Water Management Plan

Results of the Minimal Producer study demonstrated that Minimal Producers use far less water than originally estimated in the Judgment. Updated consumptive use estimates indicate that the majority (59%) of Minimal Producers consume less than 0.25 AFY and the median Minimal Producer consuming approximately 0.15 AFY. Barring material changes in land use behavior, this water use trend will continue. Based on the above, the costs associated the implementation of an Ordinance 11 "like" program to collect a fee proportionate to the de minimis amount of water consumptively used would be administratively complicated and very likely exceed the amount of revenue collected. In addition, any collection of a fee may be subject to Proposition 218 requiring voter approval.

Staff recommends that Minimal Producers entering into the basin continue to be monitored by the MWA to track incremental consumptive use and observe any changes in major land use trends. Staff recommends repeating the most recent Minimal Producer catalogue program in 2020 and once every 10 years following to reassess assumptions regarding water production/consumption and land use for Minimal Producers. Based on the results of the recent program indicating that Minimal Producer production and consumptive use is considerably less than original estimates in the Judgment, Staff recommends rescinding Ordinance 11. Ordinance 11 or some other vehicle can be reconsidered in the future as supported by the ongoing monitoring program described above.

FISCAL IMPACT

The fiscal impact for continuing to implement the ongoing monitoring program for new Minimal Producers will consist of no new additional staff time but may change if a material number of Minimal Producers begin to enter the region. Additional staff time and potentially outside resources will be needed to update and reassess Minimal Producer production/consumptive use once every ten years. These costs are not expected to be prohibitive.

ACTION

Motion to establish an ongoing minimal producer monitoring program and rescind Ordinance 11.

Board Action: Approved staff's recommendation.

Conditions: None
Date: April 25, 2013

General Manager: _____

ATTACHMENT B

recharge from periodic storm flows which is one of the principal sources of recharge for downgradient subareas without interference from upstream diversions. It will also benefit riparian vegetation in the lower subareas. [RT 510:4-511:0]

F. IDENTIFICATION OF SUBAREAS, SUBAREA

1. It is fair and equitable to maintain certain flow requirements between subareas as part of the physical solution. Flows to downstream subareas will be maintained either by supplemental water through the river and conveyance facilities, by purchase of transferred water by the watermaster, or by reductions in consumptive use. [RT 892:9-18; 910:14-18; 911:3-913:14]

2. The flow requirements between subareas are as follows: a) Este to Alto 200 acre-feet average annual subsurface flow as estimated in Bulletin 84; b) Oeste to Alto 800 acre-feet average annual subsurface flow as estimated in Bulletin 84; c) Alto to Centro 21,000 acre-feet average annual surface flow as measured at the lower narrows (and maintained by an immediate replacement water obligation in the transition zone to form a water bridge down to the Helendale Fault) plus a 2,000 acre-feet average annual subsurface flow as estimated in Bulletin 84; d) Centro to Baja 1,200 acre-feet average annual subsurface flow as estimated in Bulletin 84; e) Baja to the Mojave Basin 400 acre-feet average annual subsurface flow as estimated in Bulletin 84; f) these estimates and other subsurface estimates will need to be up-dated by the use of monitoring wells which will determine the water table slope at the boundaries. [RT 128:27-130:14]

The transition zone has a fairly stable water level. It is necessary to maintain that water level so that the surface flows passing the Lower Narrows and the subsurface inflow into the transition zone will reach the Helendale Fault, and hence downstream subareas; the flows at the Helendale Fault will in the future be measured using monitoring wells to insure that water levels are maintained within the transition zone. [RT 320:9-321:9]

G. ASSESSMENTS

1. The assessments imposed by the stipulated judgment are fair and equitable. It is not appropriate to require the Mojave Water Agency (MWA) to impose an ad valorem tax as part of the Physical Solution. Such a tax is not within the scope of the judgment, and is within the political prerogative of MWA.

2. Assessments apply to all production regardless of the type of use.

contractors is available on a year-to-year basis. Permanent sale of entitlement water among state contractors is a possibility. The only restriction preventing the MWA from purchasing such excess entitlement is the inability to pay for it. [RT 550:15-555:14;947:1-25;175:4-12; 175:25-176:23]

N. BENEFITS TO THE ENVIRONMENT

1. The Judgment Pursuant to Stipulation does not dedicate water in any specific amount to the phreatophytes. The stipulated judgment will attempt to obtain the water table levels that the California Department of Fish and Game set forth as being proper to sustain those habitat areas; however, natural conditions such as fires and floods could affect the extent of riparian habitat for the purposes of safe yield calculations. [RT 783:1-9]

2. Phreatophyte (riparian vegetation) use in the Mojave River generally increases with higher groundwater levels and decreases with lower groundwater levels. Based on aerial photographs and unit water use values of 3.9 acre-feet per acre, the average annual water use for the long term 1931-1990 period was estimated at 22,100 acre-feet for the Mojave River area. During the 1986-1990 drought period, average annual phreatophyte use was estimated to be 7,500 acre-feet per year. (Exhibit 2433)

Mr. Kuykendall testified that the consumptive use of phreatophytes for the total basin is 40,000 acre-feet. (RT 1933)

The stipulated judgment relies on a basin phreatophyte consumptive use of 7,500 acre-feet. This discrepancy in the consumptive use by phreatophytes will affect the validity of any basin safe yield calculation. Therefore, the watermaster is directed to conduct a study of the basin phreatophyte consumptive use.

3. Groundwater level standards have been established at certain points in riparian areas to insure that water tables are maintained at sufficient levels to insure riparian growth.

4. There is however, in the stipulated judgment, a recognition that in some riparian areas, there might need to be extraordinary efforts to protect the habitat, and the stipulated judgment provides a mechanism which is called a Biological Resources Trust Fund which is funded by assessments on all production and which is capped at one million dollars in 1993 dollars. The fund can be used by Fish and Game to construct wells, irrigate vegetation, do studies or other projects.

ATTACHMENT C

COPY

William J. Brunick (State Bar No.46289)
Steven K. Beckett (State Bar No. 97413)
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MOJAVE WATER AGENCY

NO FEE PER GOV'T. CODE SEC. 6103

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF RIVERSIDE

APR 03 2006

D. Mathews

RECEIVED
APR 06 2006
By

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CIV

CITY OF BARSTOW, et al.

Plaintiff,

vs.

CITY OF ADELANTO, et al.,

Defendant.

CASE NO. 208568

NOTICE OF MOTION AND MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2006-2007; MEMORANDUM OF POINTS AND AUTHORITIES, AND DECLARATION OF ROBERT C. WAGNER IN SUPPORT THEREOF

Assigned for All Purposes to:
Judge Michael E. Kaiser, Dept. 3

DATE: 5-12-06
TIME: 8:30 a.m.
DEPT: 3

To All Parties and their Respective Attorneys of Record:

Please take Notice that on May 12, 2006 at 8:30 a.m., or as soon thereafter as counsel may be heard, in Department 3 of the above entitled court located at 4050 Main Street, Riverside, California, Defendant/Cross-Complainant, Mojave Water Agency, acting in its capacity as the Mojave Basin Area Watermaster, will respectfully move, pursuant to paragraph 24(o) and Exhibit "H" of the judgement in the above entitled case, for the court's approval of the Watermaster's recommendation in its 12th Annual Report to adjust the Free Production Allowance (FPA) for each of the five (5) subareas (Alto, Baja, Centro, Este and Oeste) of the Mojave Water Basin as set forth herein for the Water Year 2006-2007.

This motion is based upon this notice, the Memorandum of Points and Authorities, the 12th Annual Report of the Watermaster lodged with the court concurrently with this motion, the Declaration of Robert Wagner, the pleadings, papers and records on file and upon such other further evidence, both oral and documentary, that may be presented at the hearing on this motion.

Dated: March 31, 2006

BRUNICK, MCELHANEY & BECKETT

WILLIAM J. BRUNICK, ESQ.
STEVEN K. BECKETT, ESQ.
Attorneys for Defendant/Cross-Complainant,
MOJAVE WATER AGENCY

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MEMORANDUM OF POINTS AND AUTHORITIES

I

BACKGROUND

The original complaint was filed by the City of Barstow et al. on May 30, 1990 and alleged that the cumulative water production upstream of the City of Barstow had over drafted the Mojave River System and it requested that the Mojave Water Agency (MWA) be ordered to obtain and provide supplemental water for use within the Mojave Basin Area (Basin). MWA filed its First Amended Cross-Complaint naming substantially all producers of water within the Basin, including parties downstream of the City of Barstow, and requested a determination of all of the water production from whatever source within the Basin.

After extensive negotiations, parties representing over 80% of the verified water production in the Basin agreed to a stipulated judgement which established a physical solution to the water supply problems. A trial of the claims of non-stipulating parties was held and the final judgement after trial adopted the physical solution set forth in the stipulated judgement.

The "Cardozo Group" of the non-stipulating parties appealed the judgement that was entered by the Superior Court. Following opinions by the Court of Appeal and Supreme Court, the judgement as to the stipulating parties was affirmed but reversed as to the Cardozo Group of non-stipulating parties. This essentially excluded the Cardozo Group from the stipulated judgement, including the assessment provisions. As of 8/23/02, Jess Ranch Water Co., previously a non-stipulating party, entered into a settlement agreement in which it stipulated to the judgement. An amendment to the judgement was filed on 12/05/02 which incorporated the changes with respect to the Cardozo Group and Jess Ranch Water Co.

II

THE JUDGEMENT'S PHYSICAL SOLUTION

On January 10, 1996 the court entered a judgement which addressed the overdraft situation existing in the Basin by the creation of a physical solution for the Basin's five distinct, but hydrologically interrelated, subareas (Alto, Baja, Centro, Este, and Oeste). The court determined that all five Subareas of the Basin had been in a state of overdraft since at least the 1950's, that the economy

and population overlying the Basin had dramatically grown in reliance upon the overdraft, and that all producers had contributed to the overdraft. The court's physical solution established a limit on the amount of water each Subarea could produce in one year before having to purchase replacement water. This is known as the Free Production Allowance (FPA). The Judgment also established each producer's Base Annual Production ("BAP"). A producer's BAP is based upon that producer's highest year of water production during the base period of 1986-1990. A producer's BAP serves as the basis for the producer's Base Annual Production Right ("BAPR"). BAPR is the right of each producer to a percentage of the FPA within a given Subarea.

Although the serious nature of the overdraft warranted an immediate reduction for all water production within the Basin, the Court approved a gradual reduction in production in order to soften the economic impact upon producers. Therefore, the Judgment sets forth the terms for a gradual reduction or rampdown of the FPA for all parties. After the first five years of the Judgment, the FPA for all parties was set at eighty percent (80%) of their original BAP. The judgement also provides that the court can review and adjust, as necessary, the FPA for each Subarea on an annual basis.

MWA was appointed as the initial Watermaster by the court to administer the judgement and physical solution set forth therein.

III

NECESSITY FOR ADJUSTMENT

Pursuant to the gradual Rampdown required in the judgment by the Water Year 1997-98, each producer's FPA was set at eighty percent (80%) of that producer's BAP specified by the Judgment. Exhibit "H" of the Judgment requires Watermaster to recommend a decrease in the FPA for a Subarea when that Subarea's FPA exceeds its estimated Production Safe Yield (PSY) by five percent (5%) or more.

Pursuant to paragraph 24(o) of the Judgment, the Watermaster is required to make a recommendation to the Court for adjusting the FPA of each Subarea, if necessary. The Watermaster retained the Engineering firm of Albert A. Webb Associates (Webb), to conduct a consumptive water use study for the purpose of updating the elements of Table C-1 of the Judgment. The Webb study was presented to the Watermaster in February of 2000 and provided the basis for the Watermaster's

proposed adjustments for Water Years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, and 2005-06. Pursuant to Exhibit H of the judgment, the Watermaster has filed its motions to adjust the FPA for prior Water Years and also provided certain alternatives to rampdown at the court's request.

The table on page 26, Chapter 5 of the 12th Annual Report of the Mojave Basin Area Watermaster shows the BAP, FPA for 2005-06 as ordered by the court and the estimated PSY for each Subarea. FPA is greater than the estimated PSY by more than 5% in each of the five(5) Subareas.

On June 15, 2005, the court entered its order granting the Watermaster's motion to adjust FPA for Water Year 2005-06 but deferred any ruling on the recommendation for the Baja Subarea. On December 19, 2005, the Court issues its offer for the Baja Subarea. As a result, FPA for Water Year 2005-06 was set as follows:

Subarea	2005-06 FPA
Alto - Agricultural	80% of BAP
Alto - Municipal and Industrial	60% of BAP
Baja[1]	70% of BAP **or** 75% of BAP pursuant to the Court Order of 12/29/05
Centro	80% of BAP
Este[2]	80% of BAP
Oeste	80% of BAP

1. The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006.
2. FPA to be set at 80% of Base Annual Production for the 2006-07 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

IV

RECOMMENDED ADJUSTMENTS TO FPA FOR WATER YEAR 2006-07

The Watermaster adopted FPA recommendations for the five sub-areas for the 2006-07 water year at its March 22, 2006 meeting, as required by the Judgment and consistent with previous direction from the court, as follows:

Subarea	2006-07 FPA RECOMMENDATION
Alto - Agricultural	80% of BAP
Alto - Municipal and Industrial	60% of BAP
Baja[1]	70% of BAP or 75% of BAP pursuant to the Court Order of 12/29/05
Centro	80% of BAP
Este[2]	80% of BAP
Oeste	80% of BAP

1. The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006.

2. FPA to be set at 80% of Base Annual Production for the 2006-07 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

A. Alto Subarea:

Rampdown in Alto will continue for Municipal and Industrial producers until FPA equals PSY, as required by the Judgment. Agricultural producers will remain at 80% of BAP. This will bring Alto to a near-balanced condition. When M&I producers transfer FPA, Carryover, or BAP from Agricultural producers, the amount of water to be credited to the transferee will be reduced to the rampdown amount existing at the time. For example, if M&I FPA is 60% of BAP then a transfer of 100 acre-feet from Agricultural to M&I will be credited as 60 acre-feet.

Due to the differential rampdown ordered by the court for the Alto subarea, a review was made of all of the Alto water producers so that they could be categorized as either agricultural or municipal and industrial producers. Agricultural producers were defined as those producing water for the irrigation of crops, i.e. alfalfa, grains, nut trees or orchards, dairies, livestock and all other incidental uses including small domestic. A list setting forth each producer for Water Year 2005-06 is set forth on pages 5-10 and 22 of Appendix H to the Watermaster's 12th Annual Report.

///

FPA currently exceeds PSY by greater than 5% of BAP which would normally result in a Rampdown recommendation. However, further Rampdown is not warranted in Alto at this time for several reasons. At the current level of FPA, the Alto Subarea is expected to purchase sufficient imported water supplies to arrest its overdraft condition within the next couple of years. The out of balance FPA-PSY condition in Alto is largely due to the inclusion of the minimal producer pool and the unidentified pool. The Alto Subarea Advisory Committee has requested that Watermaster ask the Court to eliminate the unidentified pool indicating that Alto producers would accept the risk that in the future BAP might be assigned to a producer who could prove a base period (1986-1990) water production right. The amount of water allocated to the minimal pool was likely larger than the actual amount pumped by minimals. Taking these factors into account, the Alto FPA is much closer to the estimated PSY than indicated herein (2.2% vs. 7.5%) and consequently, Rampdown is unnecessary at this time.

B. Baja Subarea:

Pursuant to the Judgment additional Rampdown in Baja is warranted. Free Production Allowance greatly exceeds the PSY and current water production and consumptive use greatly exceed the average net long-term supply in Baja. The continued overdraft in Baja will cause continued depletion of water from storage thereby impacting all water users. Of particular concern is the large number of individual well owners who pump small amounts of water for domestic uses and may lack the resources to drill deeper to chase a falling water table.

In June 2004, the Court directed the Baja Subarea Advisory Committee and the Watermaster to try to develop a program that would allow Baja to remain at 80% of BAP for the near future. Watermaster met with the Baja residents on several occasions last year and a proposal was presented by the Baja SAC in December 2004. The principal components of the Baja SAC's proposal are as follows:

- Rampdown of all producers to 75% of BAP effective October 1, 2005 for 10 years.
- Restrictions on transfers that would limit the use of FPA to the existing land and for the existing uses.
- Transfers, except those specifically allowed, would result in an immediate reduction in FPA to the appropriate Rampdown amount at the time of the

transfer.

- Carryover transfers are to be restricted but Carryover can be used for two years.

The Court held a separate hearing on Baja and issued an order dated December 29, 2005. The FPA for 2006-07 will be 75% for all Baja producers subject to the restrictions described in the order. A change in use or any change inconsistent with the December 29, 2005 order will result in further Rampdown to 70% for the 2006-07 Water Year. Rampdown shall then continue for all such producers in subsequent Water Years subject to court review.

C. Centro Subarea:

Watermaster recommends that FPA in Centro be left at 80% of BAP. Total water production in Centro has declined significantly since entry of Judgment. There is a slight surplus in Centro as measured against the long-term average water supply. Water levels in wells in areas of heavy pumping around Barstow show a greater downward trend than other wells during periods of below average water supply but in the past have recovered during periods of storm flow. Although FPA exceeds the PSY in Centro, further Rampdown would be unnecessary given the fact that there is an apparent surplus when considering the long-term average water supply and current levels of pumping. Watermaster will re-evaluate conditions in Centro annually and may make appropriate recommendations for Rampdown in the future.

D. Este Subarea:

Water levels are presently stable in Este in the short-term. Water production has declined from its peak in the 1980's and is well below the FPA and about equal to the estimated yield of the Subarea. Watermaster is also recommending that FPA remain at 80% and that the Court ordered stay on Rampdown (at 65%) remain in effect. Any material increases in water production or changing conditions could result in an immediate Rampdown in Este to 65% following further hearings with the Court. The Mojave Water Agency completed the Este Hydrologic study last year. A draft report on Este is currently being reviewed. Watermaster will provide a recommendation for the future management of Este to be presented to the Court in April 2007.

E. Oeste Subarea:

Total pumping in Oeste is relatively small and has declined since the Judgment was implemented. The estimated deficit is relatively small. A review of available water level data indicates

a slight downward trend in recent water levels, however, the magnitude of the indicated decline is small. Last year, part of Watermaster's recommendation to the Court on Rampdown alternatives included a recommendation to leave Oeste unchanged at 80%. Watermaster proposed to continue monitoring water levels and to consider further Rampdown when warranted. At this time, based on the water level data, decline in water production and only a small indicated deficit, Watermaster recommends that FPA remain at 80% for 2006-07. It should be noted that MWA has commenced a hydrologic study in Oeste to better understand water supply conditions.

V.

RECOMMENDATIONS REGARDING SUBSURFACE FLOW OBLIGATION BETWEEN SUBAREAS

Watermaster considered and adopted a recommendation to establish subsurface flow obligations as required by the Judgment. Notification was given to all the parties that an investigation was conducted and a report was prepared to determine changes to the subsurface flow amounts specified in the Judgment. No requests were received for copies of the report or for inspection and no comments were received. Watermaster held a detailed workshop on February 22, 2006 and took formal action on March 22, 2006 to adopt the recommended subsurface flow obligations.

The Judgment requires that Watermaster evaluate the subsurface flow from Baja across the MWA administrative boundary about six miles upstream from Afton. It was estimated before trial the amount of subsurface flow was 400 acre feet. The Judgment provides that the Baja producers pay a make up assessment in the event the subsurface flow obligation is not met.

The requirement to investigate and determine the amount of subsurface flow from Baja would be very difficult to meet. There is no historic data to evaluate, and the cost of drilling wells and obtaining necessary data would be burdensome and would not likely yield a great deal of information. Further, if Watermaster could establish the amount of subsurface flow at this point in the basin, the cost of delivering water to a point in the desert outside of the MWA boundary would be extremely high, and would be borne by the Baja producers. It is Watermaster's opinion that the requirement to evaluate the historic and present subsurface flow at the Baja boundary near Afton would not be in the best interests of the basin area producers. Watermaster approved a recommendation to request that the Court relieve Watermaster of the obligation to determine the subsurface flow from Baja to Afton, and that the Baja

producers be relieved of the obligation to provide make up water to Aflon.

Watermaster is still investigating the Oeste subarea and will report back to the Court prior to October 1, 2006 with a recommendation regarding the subsurface flow obligation from Oeste to Alto.

The subsurface flow obligations for Este to Alto (200 acre feet), Alto to Centro (2,000 acre feet and Centro to Baja (1200 acre feet) are recommended to remain unchanged.

VI.

TRANSITION ZONE WATER LEVELS

Mojave Water Agency is investigating the conditions in the Transition Zone in order to establish minimum water levels as required by the Judgment. Currently MWA is pursuing the installation of monitoring wells and working with Department of Fish and Game in this regard. Watermaster will report back to the Court prior to October 1, 2006 with a recommendation for minimum Transition Zone water levels.

VII.

FUTURE WORK

Watermaster and MWA will evaluate certain issues in each subarea in the 2005-06 and 2006-07 including the following:

Alto: The continued development of a key well monitoring program and implementation of water standards in the Transition Zone. Also, MWA is currently updating a groundwater model within the Alto subarea as well as pursing multiple recharge opportunities within Alto.

Baja: The continued monitoring of water levels and hydrologic issues affecting Baja.

Centro: MWA and Watermaster will begin the evaluation of hydrologeologic conditions in Harper Lake and the relationship between Harper Lake and the rest of Centro.

Este: Watermaster is developing a management plan that takes into account the hydrogeologic conditions particular to Este.

Oeste: MWA is investigating the hydrologic conditions in Oeste in relationship to water supply and the hydrogeology of Oeste. It is expected that a draft of ths investigation will be available to November 2006.

MWA is also actively investigating production by minimal producers, and has continued to

identify and catalogue new minimal producer wells. MWA has recently released a Request for Proposal to evaluate water production by minimal producers in Este and to develop a basin wide protocol for identifying and quantifying minimal producers. The work is ongoing and is expected to continue into the next water year.

VIII.

CONCLUSION

Based upon the foregoing, the Declaration of Robert Wagner , attached hereto as Exhibit 1, and the court's prior rulings, the Watermaster recommends that the Court implement the above adjustments for each Subarea.

Dated: March 31, 2006

BRUNICK, MCELHANEY & BECKETT

WILLIAM J. BRUNICK, ESQ.
STEVEN K. BECKETT, ESQ.
Attorneys for Defendant/Cross-Complainant,
MOJAVE WATER AGENCY

DECLARATION OF
ROBERT WAGNER

DECLARATION OF ROBERT C. WAGNER

I, Robert C. Wagner, declare as follows:

I am a licensed Civil Engineer in the State of California and President of the firm of Wagner and Bonsignore, Consulting Civil Engineers in Sacramento, California. A copy of my professional resume has been attached to prior declarations filed with the court in this action and is incorporated herein by reference. I serve in the capacity of Engineer for the Mojave Basin Area Watermaster. I am providing the following information in support of Watermaster's recommendations regarding Free Production Allowance (FPA), Subsurface Flow Obligations between subareas, and other matters that pertain to the continued implementation of the Judgment.

I incorporate by reference, as though fully set forth herein, my declarations and all attachments thereto that were filed with the court in this action in support of the prior Motions to Adjust Free Production Allowance.

In my capacity as Engineer for the Mojave Basin Area Watermaster, I have reviewed the Motion to Adjust Free Production Allowance for the Water Year 2006-07 and the Watermaster's 12th Annual Report. Each of the facts set forth in the Motion to Adjust Free Production Allowance for the Water Year 2006-07 are true and correct to the best of my knowledge and I could competently testify thereto.

I have reviewed the recommended adjustments to FPA for the Water Year 2006-07 set forth in the pending motion and each of the recommendations set forth therein for each of the Subareas are consistent with my opinions and recommendations as conveyed to the Watermaster.

It is recommended that FPA for each of the five subareas for the 2006-07 Water Year should remain unchanged from the FPA ordered by the Court for the 2005-2006 Water Year. Therefore, FPA for the 2006-07 Water Year should be set as follows:

Subarea	FPA Recommendation
Alto Agricultural	80% of BAP
Alto – Municipal and Industrial	60% of BAP
Baja[1]	70% of BAP or 75% of BAP pursuant to the Court Order of 12/29/05
Centro	80% of BAP
Este[2]	80% of BAP
Oeste	80% of BAP

The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006.

FPA to be set at 80% of Base Annual Production for the 2006-07 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

The Baja FPA is to remain at 75% for 10 years with certain restrictions. The conditions under which a producers FPA will remain at 75% were developed by the Baja subarea advisory

[1] The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006.

[2] FPA to be set at 80% of Base Annual Production for the 2006-07 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

committee in cooperation with the Watermaster. The Court held a hearing on September 9, 2005 and signed an order approving the agreement on December 29, 2005.

Watermaster has considered and adopted a recommendation to establish subsurface flow obligations as required by the Judgment. Notification was given to all the parties that an investigation was conducted and a report prepared to determine changes to the subsurface flow amounts specified in the Judgment. No requests were received for copies of the report or for inspection and no comments were received. Watermaster held a detailed workshop on February 22, 2006 and took formal action on March 22, 2006 to adopt the recommended subsurface flow obligations.

The Judgment requires that Watermaster evaluate the subsurface flow from Baja across the MWA administrative boundary about six miles upstream from Afton. It was estimated before trial the amount of subsurface flow was 400 acre feet. The Judgment provides that the Baja producers pay a make up assessment in the event the subsurface flow obligation is not met.

The requirement to investigate and determine the amount of subsurface flow from Baja would be very difficult to meet. There is no historic data to evaluate, and the cost of drilling wells and obtaining necessary data would be burdensome and would not likely yield a great deal of information. Further, if we could establish the amount of subsurface flow at this point in the basin, the cost of delivering water to a point in the desert outside of the MWA boundary would extremely high, and would be bourn by the Baja producers. It is my opinion that the requirement to evaluate the historic and present subsurface flow at the Baja boundary near Afton would not be in the best interests of the basin area producers. Watermastor approved a recommendation to request that the

Court relieve Watermaster of the obligation to determine the subsurface flow from Baja to Afton, and that the Baja producers be relieved of the obligation to provide make up water to Afton.

Mojave Water Agency is still investigating the Oeste subarea and will report back to Court prior to October 1, 2006 with a recommendation regarding the subsurface flow obligation from Oeste to Alto.

The subsurface flow obligations for Este to Alto (200 acre feet), Alto to Centro (2,000 acre feet) and Centro to Baja (1200 acre feet) are to remain unchanged.

Mojave Water Agency is investigating the conditions in the Transition Zone in order to establish minimum water levels as required by the Judgment. Currently MWA is pursuing the installation of monitoring wells and working with Department of Fish and Game in this regard. Watermaster will report back to Court prior to October 1, 2006 with a recommendation for minimum Transition Zone water levels.

Watermaster and MWA will evaluate certain issues in each subarea in the 2005-06 and 2006-07 water years including the following:

Alto: The continued development of a key well monitoring program and implementation of water level standards in the Transition Zone. Also, MWA is currently updating a groundwater model within the Alto subarea as well as pursuing multiple recharge opportunities within Alto.

Baja: The continued monitoring of water levels and hydrologic issues affecting Baja.

Cento: MWA and Watermaster sill begin the evaluation of hydrologeologic conditions in Harper Lake and the relationship between Harper Lake and the rest of Centro.

Este: Watermaster is developing a management plan that takes into account the hydrogeologic conditions particular to Este.

Oeste: MWA is investigating the hydrologic conditions in Oeste in relationship to water supply and the hydrogeology of Oeste. It is expected that a draft of this investigation will be available by November 2006.

MWA is also actively investigating production by minimal producers, and has continued to identify and catalogue new minimal producer wells. MWA has recently released a Request for Proposal to evaluate water production by minimal producers in Este, and to develop a basin wide protocol for identifying and quantifying minimal producers. The work is ongoing and is expected to continue into the next water year.

Date: March 31, 2006

Robert Wagner

ROBERT C. WAGNER, P.E., Declarant

MOJOZ092.PDF

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 1839 Commercenter West, San Bernardino, California.

On April 3, 2006, I served the foregoing document described as: **NOTICE OF MOTION AND MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2006-2007; MEMORANDUM OF POINTS AND AUTHORITIES, AND DECLARATION OF ROBERT C. WAGNER IN SUPPORT THEREOF** on the interested parties in this action as follows:

Patrick Flynn
Kopy Kat
570 W. Lambert Road, Suite C
Brea, CA 92621
Facsimile: (714) 990-6126

__XX__ **(BY MAIL)** I deposited such envelope in the mail at San Bernardino, California. The envelope was mailed with postage thereon fully prepaid.

____As follows: I am "readily familiar" with the firm's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at San Bernardino, California in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

____ (BY FACSIMILE) I faxed such document to the interested parties to their telecopier numbers as stated above.

__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 April 3, 2006, at San Bernardino, California.

Lisa M. Tovar, declarant

William J. Brunick (State Bar No.46289)
Steven K. Beckett (State Bar No. 97413)
BRUNICK, McELHANEY & BECKETT
1839 Commercenter West
San Bernardino, CA 92412
Telephone: (909) 889-8301
Facsimile: (909) 388-1889

Attorneys for Defendant/Cross-Complainant
MOJAVE WATER AGENCY

NO FEE PER GOV'T. CODE SEC. 6103

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al. Plaintiff, vs. CITY OF ADELANTO, et al., Defendant. AND RELATED CROSS ACTIONS	CIV CASE NO. 208568 **[PROPOSED] ORDER GRANTING MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2006-2007** Assigned for All Purposes to: Judge Michael E. Kaiser, Dept. 3

The above-entitled action came on regularly for hearing on May 17 2006 before the Honorable E. Michael Kaiser, Judge of the Superior Court, on the motion of Defendant/Cross-Complainant, MOJAVE WATER AGENCY, acting in its capacity as Watermaster, pursuant to the Judgment entered January 10, 1996, Paragraph 24(o), seeking an adjustment in Free Production Allowance (FPA). The court having reviewed and considered the moving, opposing, and reply papers, and the arguments of counsel, and good cause appearing, hereby GRANTS the motion on the following terms as to the Subareas defined in the Judgment of January 10, 1996 for the Water Year 2006-2007:

ALTO SUBAREA

1. FPA shall remain at 60% of Base Annual Production (BAP) for Municipal and Industrial (M&I) water producers.

2. FPA shall remain at 80% of BAP for Agricultural producers.

BAJA SUBAREA

FPA shall remain at 75% of BAP for both M & I and Agricultural producers pursuant to the court's order of December 29, 2005. If there is a change in purpose or place of use or other change inconsistent with the court's order of December 29, 2005, then rampdown shall occur reducing the FPA affected by the change to 70% of BAP at the time of the change.

CENTRO SUBAREA

FPA shall remain at 80% of BAP for both M & I and Agricultural producers.

ESTE SUBAREA

Rampdown is deferred and FPA shall continue to remain at 80% of BAP for both M & I and Agricultural producers. Watermaster shall provide a recommendation to the Court on future management of the Subarea in April 2007. Deferred rampdown may be implemented upon further order of the court following the Watermaster's report and motion seeking court approval which could result in FPA being reduced to the level required by the Judgment at the time the Motion is made.

OESTE SUBAREA

FPA shall remain at 80% of BAP for both M & I and Agricultural producers.

It is further ORDERED that Watermaster shall be relieved of the obligation to determine the subsurface flow from Baja to Afton, and that the Baja Subarea producers shall be relieved of the obligation to provide make up water toAfton.

Date: _____, 2006

E. Michael Kaiser, Judge of the Superior Court

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 1839 Commercenter West, San Bernardino, California.

On April 3, 2006, I served the foregoing document described as: **[PROPOSED] ORDER GRANTING MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2006-2007**on the interested parties in this action as follows:

Patrick Flynn
Kopy Kat
570 W. Lambert Road, Suite C
Brea, CA 92621
Facsimile: (714) 990-6126

__XX__ **(BY MAIL)** I deposited such envelope in the mail at San Bernardino, California. The envelope was mailed with postage thereon fully prepaid.

____As follows: I am "readily familiar" with the firm's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at San Bernardino, California in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

____ (BY FACSIMILE) I faxed such document to the interested parties to their telecopier numbers as stated above.

__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 April 3, 2006, at San Bernardino, California.

Lisa M. Tovar, declarant

William J. Brunick, (Bar No. 46289)
BRUNICK, McELHANEY & BECKETT
1839 Commercenter West
P.O. Box 6425
San Bernardino, California 92412-6425
Telephone: (909) 889-8301
Facsimile: (909) 388-1889

Attorneys for Defendant\Cross-Complainant,
MOJAVE WATER AGENCY

Exempt from filing fees per Govt. Code § 6103

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CTV

CITY OF BARSTOW, et al

Plaintiff,

v.

CITY OF ADELANTO, et al

Defendant.

AND RELATED CROSS ACTIONS

CASE NO.: **208568**

NOTICE OF LODGING OF TWELFTH ANNUAL REPORT OF THE MOJAVE BASIN AREA WATERMASTER, WATER YEAR 2004-2005

Assigned for All Purposes to:
Judge E. Michael Kaiser

PLEASE TAKE NOTICE THAT the Watermaster has lodged it's Annual Watermaster Report (hereinafter "Annual Report") with the Riverside County Superior Court pursuant to paragraph 24(k) of the Judgment. All provisions of page 30, paragraph 24, section k(1) and (2) have been complied with, and notice was given to all parties that a draft was available for review.

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Those parties seeking to obtain copies of the Annual Report may do so at the offices of the Mojave Water Agency located at 22450 Headquarters, Apple Valley, California 92307. Any party objecting to the filing or contents of the Annual Reprot must, pursuant to Paragraph 36 of the Judgment, file a noticed motion with the court.

Dated: April 3, 2006

BRUNICK, McELHANEY & BECKETT

By: _____
William J. Brunick
Attorneys for
Defendant/Cross-complainant,
MOJAVE WATER AGENCY

NOTICE OF LODGING

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 1839 Commercenter West, San Bernardino, California.

On April 3, 2006, I served the foregoing document described as: **NOTICE OF LODGING OF TWELFTH ANNUAL REPORT OF THE MOJAVE BASIN AREA WATERMASTER, WATER YEAR 2004-2005** on the interested parties in this action as follows:

Patrick Flynn
Kopy Kat
570 W. Lambert Road, Suite C
Brea, CA 92621
Facsimile No.: (714) 990-6126

____(BY MAIL) I deposited such envelope in the mail at San Bernardino, California. The envelope was mailed with postage thereon fully prepaid.

____As follows: I am "readily familiar" with the firm's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at San Bernardino, California in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

_XX__ (BY FACSIMILE) I faxed such document to the interested parties to their telecopier numbers as stated above.

_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 April 3, 2006, at San Bernardino, California.

P. Jo Anne Quinnis

PROOF OF SERVICE
(BY MAIL)
(C.C.P. Section 1013a(3))

STATE OF CALIFORNIA, COUNTY OF ORANGE

I am over the age of 18 and I am not a party to the within action. I am employed by KOPY KAT, INC., in the County of Orange, at 570 W. Lambert Road, Suite C, Brea, CA. 92621. I served the attached documents:

1. NOTICE OF MOTION AND MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2006-2007;

2. NOTICE OF LODGING;

3. (PROPOSED) ORDER.

4. DECLARATION OF ROBERT C. WAGNER

on the interested parties in this action by placing true copies in a sealed envelope(s), addressed as follows:

SEE ATTACHED SERVICE LIST

on APRIL 4, 2006, I placed said envelope(s) for collection and mailing, following ordinary business practices at the offices of KOPY KAT, INC. at the address set forth above, for deposit in the United States Postal Service. I am readily familiar with the practice of KOPY KAT, INC. for collection and processing of correspondence for mailing with the United States Postal Service, and said envelope(s) will be deposited with the United States Postal Service on said date in the ordinary course of business.

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

Executed on APRIL 4, 2006 at Brea, California.

(Signature)

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Abbond, Edward
11394 Cottontail Lane
Apple Valley, CA 92308

Abbott Family Trust
Box 77 Star Route
Oro Grande, CA 92368
Attn: Buck Abbott

Abshire, David V.
P.O. Box # 2071
Lucerne Valley, CA 92356
Attn: John McCallum

Adelanto, City Of
P. O. Box 10
Adelanto, CA 92301
Attn: Jack Stonesifer

Adelanto, City Of - George A F B
P. O. Box 10
Adelanto, CA 92301
Attn: Jack Stonesifer

Ades, John & Devon
13830 Choco Road
Apple Valley, CA 92307

Aerochem, Inc.
HCR Box 80A, 4001 El Mirage Road
Adelanto, CA 92301-0040
Attn: Kent T. Christenson

Agcon, Inc.
17671 Bear Valley Road
Hesperia, CA 92345
Attn: Lori Clifton

Aguayo, Jeanette L.
22619 Thompson Road
Hinkley, CA 92347

Ake, Charles J. & Marjorie M.
2301 Muriel Drive, Apt. 67
Barstow, CA 92311-6757

American States Water Company
2143 Convention Center Way, Suite 110
Ontario, CA 91764-5492
Attn: Gladys Rosendo

Anderson, Ross C. & Betty J.
13853 Oakmont Dr.
Victorville, CA 92395-4832

Apple Valley Country Club
15200 Rancherias Road
Apple Valley, CA 92307
Attn: Kris Waagen

Apple Valley Foothill County Water District
P. O. Box 914
Apple Valley, CA 92308-0914
Attn: Brenda Bitonti

Apple Valley Heights County Water District
9429 Cerra Vista
Apple Valley, CA 92308
Attn: Gail Hunter

Apple Valley Ranchos Water Company
P. O. Box 7005
Apple Valley, CA 92307
Attn: Jack L. Clarke

Apple Valley View Mutual Water Company
P.O. Box 3680
Apple Valley, CA 92307
Attn: Emely Saltmeris

Apple Valley, Town Of
14955 Dale Evans Parkway
Apple Valley, CA 92307
Attn: Rodger Lopez

Arguelles, Alfredo
48001 Silver Valley Road
Newberry Springs, CA 92365

Artinyan, Ludvik & Lucy
5300 Santa Monica Blvd. Suite 200
Los Angeles, CA 90029-1258

Artz, Richard & Gloria
P. O. Box 340
Newberry Springs, CA 92365

Atchison, Topeka, Santa Fe Railway Company
200 North Avenue H
Barstow, CA 92311
Attn: Dean Forshee

Avila, Angel & Evalia
1523 S. Visalia Avenue
Compton, CA 90220-

Bagley, Roy
33483 Dune Road
Newberry Springs, CA 92365

Baker, Gloria L.
P.O. Box 2928
Running Springs, CA 92382

Baldy Mesa Water District
10313 Duncan
Victorville, CA 92392-0830
Attn: Don Bartz

Ball, David P.
46849 Rodeo Drive
Newberry Springs, CA 92365

Bar H Mutual Water Company
P. O. Box 844
Lucerne Valley, CA 92356
Attn: Paul K. Nelson

Barak, Richard
38140 Calle Campo Rd.
Temecula, CA 92592

Barber, James B.
43774 Cottonwood Road
Newberry Springs, CA 92365

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Bar-Len Mutual Water Company
P. O. Box 77
Barstow, CA 92312-0077
Attn: James Moore

Baron, Susan & Palmer, Curtis
42354 Valley Center Rd.
Newberry Springs, CA 92365
Attn: Curtis Palmer

Barstow Calico K O A
P. O. Box 967
Yermo, CA 92398
Attn: Robert Moore

Bass Trust, Newton T.
14924 Chamber Lane
Apple Valley, CA 92307
Attn: Barbara Davison

Bastianon, Remo E.
9484 Iroquois Rd.
Apple Valley, CA 92308

Basura Family Trust
9776 Zepher Court
Apple Valley, CA 92308
Attn: Russell Cooper

Bedingfield, Lyndell & Charlene
43434 Cottonwood Road
Newberry Springs, CA 92365
Attn: Jeffrey P. McDonnell

Beebe, Robert W. & Dorothy K.
10111 Choicana
Hesperia, CA 92345

Beinschroth Family Trust
18794 Sentenac Road
Apple Valley, CA 92307
Attn: A. J. Beinschroth

Beinschroth, A. J.
18794 Sentenac Road
Apple Valley, CA 92307

Bell, Chuck
P. O. Box 193
Lucerne Valley, CA 92356

Bender, Marlene
23852 Pebble Beach
Laguna Niguel, CA 92677

Benton, Philip G.
P. O. Box 279
Newberry Springs, CA 92365

Best, Byron L.
26338 US Highway 58
Barstow, CA 92311-9696

Borgogno Revocable Living Trust
1400 E. Ocean Blvd. Unit # 2311
Long Beach, CA 90802-6943
Attn: Steve Borgogno

Borja, Leonil T. & Tital L.
20784 Iris Canyon Road
Riverside, CA 92508-

Bowman, Edwin L.
10691 Deerfield Drive
Cherry Valley, CA 92223-5599

Bracht, William F. & Alexander, Alicia M.
12439 Addison Street
N. Hollywood, CA 91607
Attn: W. Bracht & A. Alexander

Brommer Family Trust
13129 S. Baker Avenue
Ontario, CA 91761
Attn: Marvin & Carroll Brommer

Brooklier, Nancy L.
P.O. Box 254
Helendale, CA 92342

Brown, Bobby G. & Valeria R.
26776 Vista Road
Helendale, CA 92342

Brown, Jennifer
10001 Choiceana Ave.
Hesperia, CA 92345

Brown, Ronald A.
12031 Philadelphia Street
Whittier, CA 90601-3926

Brown, Sue & Doug
2414 El Mirage Road
El Mirage, CA 92301

Bruins, Nicholas
48525 Cheltham Drive
Newberry Springs, CA 92365
Attn: Joleen Szynkowski

Bruneau, Karen
19575 Bear Valley Rd.
Apple Valey, CA 92308-5104

Bunnell, Dick
6882 Rook Drive
Huntington Beach, CA 92647-

Burns, Annie L.
516 St. John Place
Inglewood, CA 90301-1318
Attn: Paul H. Johnson

Calico Junction
P. O. Box 1923
Barstow, CA 92312-1923
Attn: Harvey J. Walker Jr.

Calico Lakes Homeowners Association
c/o Haven Management Inc.
2151 Conventi
Ontario, CA 91764
Attn: Sally Tashman

Mojave Basin Area Watermaster's Service List as of May 18, 2005

California Department Of Transportation
1800 Dill Road
Barstow, CA 92311
Attn: Gerald Brown

Callahan, Bernerd J.
23502 Coso Rd
Mission Viejo, CA 92692

CalMat Company
405 N. Indian Hill Blvd.
Claremont, CA 91711
Attn: Robert W. Bowcock

Camanga, Tony & Marietta
48924 Bedford Rd.
Newberry Springs, CA 92365

Campbell Family Trust
22229 Bronc Court
Canyon Lake, CA 92587
Attn: Eugene Campbell

Campbell, Bryan M.
431 Barstow Road
Barstow, CA 92311-

Campbell, M. A. & Dianne
P. O. Box 451163
Houston, TX 77245-1163

Candlewood Investment Properties
P. O. Box 373
Victorville, CA 92393-0373
Attn: Lance G. Taylor

Carlton, Susan
2273 248th Street
Lomita, CA 90717-1507

Casa Colina Foundation
11981 Midway
Lucerne Valley, CA 92356
Attn: Rod Peek

CDFG - Camp Cady
109429 Highway 395
Coleville, CA 96107-
Attn: William Holtz

CDFG - Mojave Narrows Regional Park
777 East Rialto Avenue
San Bernardino, CA 92415-0763
Attn: Phillip J. Krause

CDFG - Mojave River Fish Hatchery
12550 Jacaranda Avenue
Victorville, CA 92395-5183
Attn: Gary L. Williams

Cemex, Inc.
16888 North E. Street
Victorville, CA 92394
Attn: Jackelin Simmons

Center Water Company
P. O. Box 616
Lucerne Valley, CA 92356
Attn: Donna Chandler

Chamisal Mutual Water Company
1442 El Mirage Rd.
El Mirage, CA 92301
Attn: Dwayne Ross

Chang, Timothy & Jane
5121 Burnett Street
Long Beach, CA 90815-1906

Channell, Dale E.
186 Verde Ridge Ct.
Henderson, NV 89012-2452

Cheyenne Lake, Inc.
6255 E. Quartz
Anaheim, CA 92807
Attn: Carl Pugh

Chiao Mei Development
8808 Mission Drive, Suite #208
Rosemead, CA 91770
Attn: Peter Chao

Cho Brothers Ranch
P. O. Box 397
Five Points, CA 93624
Attn: Chung Cho Gong

Choi, Yong Il & Joung Ae
34424 Mountain View Road
Hinkley, CA 92347

Christison, Joel
6302 Trinette
Garden Grove, CA 92645

Chuang, Marshal
740 Woodward Blvd.
Pasadena, CA 91107-5720

Clark, Arthur
11919 Bayless St.
Moreno Valley, CA 92557

Cline, Vivian D.
45835 Twin Lakes Drive
Newberry Springs, CA 92365

Club View Partners
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Conner, William H.
47994 Palma Vista Road
Newberry Springs, CA 92365

Contratto, Ersula
21814 Hinkley Road
Barstow, CA 92311

Cool Water Ranch
22749 US Highway 18 #A42
Apple Valley, CA 92307-4303
Attn: Paul Henderson

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Cramer, Margaret Muir
15030 Genesee Road
Apple Valley, CA 92307

Crandall, Esther
2196 Kendall Drive, Apt. 215
San Bernardino, CA 92407

Cross, Francis & Beverly
Paradise Valley Box 16
Barstow, CA 92311

Cross, Sharon I.
P. O. Box 922
Lucerne Valley, CA 92356

Crystal Hills Water Company
P. O. Box 650
Lucerne Valley, CA 92356
Attn: Raymond Razo

Crystal Lakes Property Owners Association
P. O. Box 351
Yermo, CA 92398
Attn: Bob Buck

Daggett Community Services District
P. O. Box 308
Daggett, CA 92327
Attn: Lawrence Alf

Dahlquist, George R.
3056 N. Buena Vista
Burbank, CA 91504

Darr, James S.
Star Route, Kramer Junction
Boron, CA 93516

Davis Family Trust
19685 Gray Mountain Rd.
El Mirage, CA 92301
Attn: Paul W. Davis Jr.

De Jong Family Trust
46561 Fairview Road
Newberry Springs, CA 92365
Attn: Alan L. De Jong

Delano Enterprises, Inc.
4616 Emerald Bay Drive
Arvin, CA 93203
Attn: Gary Delano

Dennison, Quentin D. - Clegg, Frizell & Joke
44579 Temescal Street
Newberry Springs, CA 92365
Attn: Randy Wagner

Desert Dawn Mutual Water Company
P. O. Box 392
Lucerne Valley, CA 92356
Attn: Peggy Roork

Desert Springs Mutual Water Company
P. O. Box 396
Lucerne Valley, CA 92356-0396
Attn: Denise Courtney

Desert View Dairy
37501 Mountain View Rd.
Hinkley, CA 92347
Attn: Paul Ryken

Desert Wind LLC
7503 SVL Box
Victorville, CA 92392-
Attn: Mee Song

Dexter Family Trust
12600 Apple Valley Road
Apple Valley, CA 92308
Attn: J.P. Dexter

Dick Van Dam Dairy
3180 Cottonwood Avenue
San Jacinto, CA 92582
Attn: Glenn Van Dam

DJC Corporation
35300 Old Woman Springs Road
Lucerne Valley, CA 92356-7706
Attn: Magdalena Jones

Docimo, Allen & Kathryn
48275 Silver Valley Road
Newberry Springs, CA 92365-

Docimo, Donald P. & Patricia J.
53280 Avenue Madero
La Quinta, CA 92253

Dolch, Robert & Judy
15760 Stoddard Wells Road
Victorville, CA 92395-2831

Donaldson, Jerry & Beverly
58556 Amber Road
Olathe, CO 81425-9568

Dorman, Dudley D. & Billie B.
41100 Elkhorn St.
Newberry Springs, CA 92365
Attn: David McQuinn

Dossey, D. A.
137 Woodhill Drive
Morehead, KY 40351-7860

Dowell, Leonard
5125 2nd Avenue
Los Angeles, CA 90043-1948

Dowse, Philip
P. O. Box 400-847
Hesperia, CA 92340-0847

D'Silva, Melanie
1037 N. Grand Ave #196
Covina, CA 91724-2048

Elisabella, LLC
P.O. Box 488
Helendale, CA 92342
Attn: Jesus Enriquez

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Evenson, Edwin H. & Joycelaine C.
P. O. Box 66
Oro Grande, CA 92368

Evkhanian, James H. & Phyllis
P. O. Box 77
Glendale, CA 91209-0077

Eygnor, Robert E. & Patsy C.
23032 Bryman Road
Oro Grande, CA 92368-

Fahim, Ashraf & Mikhail, Mervat W.
1268 Flemington Road
Riverside, CA 92506-
Attn: Ashraf Fahim

Farley, Greggory J.
7787 Lakeside Dr.
Riverside, CA 92509-5324

Ferro, Dennis & Norma
1311 1st Avenue N.
Jacksonville Beach, FL 32250-3512

First CPA LLC
3043 Prospect Avenue
Rosemead, CA 91770-2244
Attn: Jerrica Liu

Fischer, Elmer G. & Beverly C.
5051 Hawk Ridge Road
Summit Valley, CA 92345-9203

Fisher, Dolores
3185 Valencia Avenue
San Bernardino, CA 92404

Fisher, Jerome
7603 Hazeltine
Van Nuys, CA 91405

Friend, Joseph & Deborah
P. O. Box 253
Barstow, CA 92312

Friends of Harper Lake, Inc.
7151 Coriander Trail
Oak Hills, CA 92345-9029
Attn: Henry Orlosky

Fundamental Christian Endeavors, Inc.
49191 Cherokee Road
Newberry Springs, CA 92365
Attn: Mark Asay

Gabrych, Eugene
2006 Old Highway 395
Fallbrook, CA 92028

Gaeta, Trinidad
10551 Dallas Avenue
Lucerne Valley, CA 92356
Attn: Jay Storer

Gaines, Jack & Mary
36280 Soapmine Road
Barstow, CA 92311

Garcia, Daniel
9899 Summerhill Rd.
Alta Loma, CA 91737

Gardena Mission Church, Inc.
P. O. Box 304
Lucerne Valley, CA 92356-0304
Attn: Sang Hwal Kim

Gayjikian, Samuel & Hazel
P. O. Box 684
Lucerne Valley, CA 92356

Gesiriech, Wayne D.
23677 Community Blvd.
Hinkley, CA 92347

Gold, Harold
1037 N. Primrose Avenue
Rialto, CA 92376

Gordon Acres Water Company
P. O. Box 1607
Lucerne Valley, CA 92356-1035
Attn: Tom Warnock

Graves, Chester B.
500 N. San Dimas Canyon Road
San Dimas, CA 91773-2200

Gray, George F. & Betty E.
975 Bryant
Calimesa, CA 92320

Green Acres Estates
P. O. Box 1754
Apple Valley, CA 92307
Attn: Susan Zutavern

Greenhouse Family Trust
25322 Aster Road
Oro Grande, CA 92368-
Attn: Sheryl Greenhouse

Grieder, Raymond H. & Dorisanne
41234 Harper Lake Road
Hinkley, CA 92347

Grill, Nicholas P. & Millie D.
P. O. Box 901
Helendale, CA 92342

Gubler, Hans
P. O. Box 3100
Landers, CA 92285

Gulbranson, Merlin
4410 N. Arizona St.
Kingman, AZ 86401-2738
Attn: Tamara McKenzie

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Gutierrez, Jose & Gloria
24116 Santa Fe
Hinkley, CA 92347

Hackbarth, Edward E.
P.O. Box 1089
Corona, CA 92878-1089

Hainje, Kenneth Edward
P. O. Box 413
Helendale, CA 92342-0413

Halanna Equities III
233 Sansome Street, Suite 928
San Francisco, CA 94104-2315
Attn: Alexandra Lioanag

Hal-Dor Ltd.
35300 Old Woman Springs Road
Lucerne Valley, CA 92356
Attn: Magdalena Jones

Hamilton Trust, Don & Ruth M.
9312 Deep Creek Road
Apple Valley, CA 92308-8319
Attn: Don & Ruth M. Hamilton

Hamilton, Doug & Cheryl
19945 Round Up Way
Apple Valley, CA 92308-8338

Hamilton, et al.
9312 Deep Creek Road
Apple Valley, CA 92308-8319
Attn: Don & Ruth M. Hamilton

Handley, Don R. & Mary Ann
29611 Exeter Street
Lucerne Valley, CA 92356

Handrinos, Nicole A.
1140 Parkdale Rd.
Adelanto, CA 92301
Attn: William Handrinos

Hanify, Michael D., dba - White Bear Ranch
36511 Lenwood Road
Hinkley, CA 92347
Attn: Donald F. Hanify

Hanson Aggregates WRP, Inc.
P. O. Box 190
Newberry Springs, CA 92365-0190
Attn: Marie Lachica

Haralik, Bess & Robert
32990 Harvard Road
Newberry Springs, CA 92365

Hare, Thomas R. & Helen P.
35729 Dixie Road
Hinkley, CA 92347-9631

Hareson, Nicholas & Mary
1737 Anza Avenue
Vista, CA 92084

Harmsen, James & Ruth Ann
23920 Community Blvd.
Hinkley, CA 92347-9721

Harper Lake Company VIII
43880 Harper Lake Road
Hinkley, CA 92347
Attn: Glen King

Harper Lake, LLC
7151 Coriander Trail
Oak Hills, CA 92345-9029
Attn: Henry Orlosky

Harrison, Connie & Harold
22230 National Trails Hwy.
Oro Grande, CA 92368

Hart, Merrill W.
12636 Lincoln Street
Lucerne Valley, CA 92356

Harter, Joe & Sue
34530 Minneola Road
Daggett, CA 92327

Harvey, Frank
P. O. Box 753
Yermo, CA 92398

Harvey, Jeffrey W. & Lisa M.
13760 Wells Fargo Rd.
Oak Hills, CA 92345

Hass, Pauline L.
P.O. Box 1004
Barstow, CA 92312

Helendale School District
P. O. Box 249
Helendale, CA 92342
Attn: Peter Czamota

Hendley, Rick & Barbara
P. O. Box 905
Yermo, CA 92398-0905
Attn: Jim Martin

Hert, Scott
P. O. Box 590
Lucerne Valley, CA 92356

Hesperia Golf And Country Club
17970 Bangor Avenue
Hesperia, CA 92345
Attn: Jerry McCrory

Hesperia Water District
15776 Main Street
Hesperia, CA 92345-3454
Attn: Mike Podegracz

Hettinga, Hein & Ellen
17094 Cucamonga Avenue
Corona, CA 92880
Attn: Patricia Mohr

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Hi Desert Mutual Water Company
32766 Sylvan
Barstow, CA 92311
Attn: Denis Pafundi

Hickman, Alex & Debe
48550 Riverside Drive
Newberry Springs, CA 92365-9017

Hiett, Harry J. & Clarice M.
P. O. Box 265
Daggett, CA 92327-0265

Hi-Grade Materials Company
17671 Bear Valley Road
Hesperia, CA 92345-4902
Attn: Lori Clifton

Hilarides, Frank
37404 Harvard Road
Newberry Springs, CA 92365

Hileman, Katherine
22150 W. Main Street
Barstow, CA 92311

Hill, Melvin
25749 Community Blvd.
Barstow, CA 92311
Attn: Sylvia Pile

Hitchin Lucerne, Inc.
P. O. Box 749
Lucerne Valley, CA 92356
Attn: Mary Thomas

Ho, Ting-Seng & Ah-Git
1994 Allenby Road
Germantown, TN 38138-4346

Hodge, Stanley W.
15124 Riverside Drive
Apple Valley, CA 92307

Hollister, Robert H. & Ruth M.
P. O. Box 2
Newberry Springs, CA 92365
Attn: Chuck Hollister

Holway, C. Robert
73 Sunflower Lane
Oro Grande, CA 92368

Hong, Paul B. & May
P.O. Box # 1432
Covina, CA 91722

Horton, John
47716 Fairview Road
Newberry Springs, CA 92365-9258

Horton's Children's Trust
47716 Fairview Road
Newberry Springs, CA 92365-9258
Attn: John Horton

Howard, Norman N.
27871 Beryl Avenue
Barstow, CA 92311

Howser, Huell B.
450 North Rossmore
Los Angeles, CA 90004-

Hrubik, Thomas A.
P. O. Box 2611
Apple Valley, CA 92307-0049

Hubbard, Ester & Mizuno, Arlean
2225 7th Avenue
Los Angeles, CA 90018-1146
Attn: Ester Hubbard

Huerta, Hector
25684 Community Blvd.
Barstow, CA 92311

Hunt, Ralph M. & Lillian F.
P. O. Box 603
Yermo, CA 92398

Huntbach, David J.
P. O. Box 641
Barstow, CA 92312-0641

Hutchison, William O.
P. O. Box 97
Newberry Springs, CA 92365

Hyatt, James & Brenda
P. O. Box 85
Newberry Springs, CA 92365

Irvin, Bertrand W.
3224 W. 111th Street
Inglewood, CA 90303-2313

Jackson, Ray
P. O. Box 333
Newberry Springs, CA 92365

Jamboree Housing Corporation
15940 Stoddard Wells Road - Office
Victorville, CA 92395-2800
Attn: Jim Vasquez

Jess Ranch Water Company
11401 Apple Valley Road
Apple Valley, CA 92308
Attn: Gary A. Ledford

Jo, Myung Hyun
P. O. Box 1844
Lucerne Valley, CA 92356-1844

Johnson, Carlean
8626 Deep Creek Road
Apple Valley, CA 92308

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Johnson, James R. & Ellen
48084 Fairview Road
Newberry Springs, CA 92365

Johnson, Ronald
19919 Poppy Road
Apple Valley, CA 92308

Johnston, Harriet & Johnston, Lawrence W.
P. O. Box 1472
Hesperia, CA 92340-1472
Attn: Lawrence W. Johnston

Jones, Joette
28485 Highway 58
Barstow, CA 92311

Jordan Family Trust
31325 Clay River Road
Barstow, CA 92311
Attn: Raymond Jordan

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

Juniper Riviera County Water District
P. O. Box 386
Apple Valley, CA 92307
Attn: Michael W. Mines

Kaplan, Abraham M.
340 N. Newport Blvd., Penthouse 723
Orange, CA 92869-8505
Attn: Joice Kaplan

Karimi, Hooshang
1254 Holmby Ave
Los Angeles, CA 90024-

Kasner Family Limited Partnership
1101 S. East End Avenue
Pomona, CA 91766-3842
Attn: Robert R. Kasner

Kasner, Robert
1101 S. East End Avenue
Pomona, CA 91766

Katcher, August M. & Marceline
47887 Palo Verde Lane
Newberry Springs, CA 92365

Keel, Al J. & Barbara
7165 Kenyon Ave
Hesperia, CA 92345

Kemp, Robert & Rose
48441 National Trails Highway
Newberry Springs, CA 92365

Kemper Campbell Ranch
10 Kemper Campbell Ranch Road
Victorville, CA 92395-3357
Attn: Jean De Blasis

Kemper, Walter R. & Jonna S.
1770 N. Arrowhead Ave.
San Bernardino, CA 92405

Kernek, Keith & Priscilla
31801 Soapmine Rd.
Barstow Rd., CA 92311
Attn: Kernek

Kiel, Mary
42224 1/2 Valley Center Road
Newberry Springs, CA 92365
Attn: Betty Mobbs

Kim, Jin S. & Hyun H.
53 Bluecoat
Irvine, CA 92620

Kim, Joon Ho
46561 Fairview Road
Newberry Springs, CA 92365
Attn: Alan De Jong

Kim, Ju Sang
2250 Simon Street
Fullerton, CA 92833-

Kosharek, John & Joann
P. O. Box 357
Newberry Springs, CA 92365

Lake Arrowhead Community Services District
P. O. Box 700
Lake Arrowhead, CA 92352
Attn: Patti McGonigle

Lake Jodie Property Owners Association
20650 Geronimo Road
Apple Valley, CA 92308
Attn: Robert Angerer

Lake Waikiki
230 Hillcrest Drive
La Puente, CA 91744
Attn: Nancy Lan

Lake Wainani Owners Association
4725 McKinnon Drive
Anaheim, CA 92807
Attn: Ron Basbas

Langley, Michael R. & Sharon
13426 Ramona Parkway
Baldwin Park, CA 91706

Lawrence, William W.
44940 Silver Valley Road
Newberry Springs, CA 92365

Lawson, Ernest & Barbara
20277 Rock Springs Road
Apple Valley, CA 92308

Lee, Chun Hwa & Myung Sook
5808 N. Primrose Ave Apt A
Temple City, CA 91780
Attn: Chun Lee

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Lee, Doo Hwan
P. O. Box 556
Lucerne Valley, CA 92356-0556

Lee, et al., Sepoong & Woo Poong
#6 Ensueno East
Irvine, CA 92714
Attn: Sepoong & Woo Poong Lee

Lee, Moonyoung & Okhea
400 S. Lafayette Park Pl. # 207
Los Angeles, CA 90057-1626

Lee, Vin Jang T.
41717 Silver Valley Road
Newberry Springs, CA 92365
Attn: Eric Archibek

Lem, Hoy
3904 W. 182 Street
Torrance, CA 90504-4839

Lenhert, Ronald & Toni
P.O. Box 1688
Victorville, CA 92393-1688

Levine, Leslie
34530 Minneola Road
Daggett, CA 92327
Attn: Joe Harter

LHC Alligator, LLC
P. O. Box 670
Upland, CA 91785-0670
Attn: John M. Goodman

Liang, Yuan - I & Tzu - Mei Chen
416 Alamosa Drive
Claremont, CA 91711
Attn: Patrick Liang

Little, Don & Mustafa, Ed
P. O. Box 1748
Victorville, CA 92393-1748
Attn: Don Little

Lo. Peter C. N. & Debbie D. J.
5303 Temple City Blvd.
Temple City, CA 91780-3149

Longman, Jack
P. O. Box 358
Cave Junction, OR 97523

Lopez, Baltazar
1351 S. San Antonio
Pomona, CA 91766

Lounsbury, J. Peter & Carolyn
14499 Robinson Ranch Road
Oro Grande, CA 92368

Love, Charles & Deanna
P.O. Box 1476
Helendale, CA 92342
Attn: Chuck Love

Low, Dean
1031 Briarcliff Road
Monrovia, CA 91016-1703

Lua, Michael T. & Donna S.
18838 Aldridge Place
Rowland Heights, CA 91748

Lucerne Valley Mutual Water Company
P. O. Box 1311
Lucerne Valley, CA 92356
Attn: Donna Chandler

Lucerne Valley Partners
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Lucerne Vista Mutual Water Company
P. O. Box 677
Lucerne Valley, CA 92356-0677
Attn: Judy Felsch

Luckey, Manley J.
8531 Glendale Road
Hesperia, CA 92345

Luth, Ken
22680 Bryman Road
Oro Grande, CA 92368

M Bird Construction
1613 State Street, Ste. 10
Barstow, CA 92311-4162
Attn: Eugene R. & Vickie R. Bird

M.B. Landscaping & Nursery, Inc.
20824 Jamison Avenue
Carson, CA 90745-1212
Attn: Maria Martinez

Mahjoubi, Afsar S.
46622 Fairview Road
Newberry Springs, CA 92365
Attn: Robert Saidi

Malin, Andy & Solomon, Paula
2420 N. David Street
Pahrump, NV 89048-3244
Attn: Andy Malin

Maloney, Janice
42525 Silver Valley Road
Newberry Springs, CA 92365

Manning, Sharon S.
19332 Balan Road
Rowland Heights, CA 91748-4017
Attn: Jimmy Berry

Marcroft, James A. & Joan
P. O. Box 519
Newberry Springs, CA 92365

Mariana Ranchos County Water District
9600 Manzanita Street
Apple Valley, CA 92308-8605
Attn: Mike Bush

Mojave Basin Area Watermaster's Service List as of May 18, 2005

Marshall, Charles
32455 Lakeview Road
Newberry Springs, CA 92365

Martin, Michael D. & Arlene D.
32942 Paseo Mira Flores
San Juan Capistrano, CA 92675

Mayberry, Donald J. & Sandra D.
34788 Sandi Lane
Newberry Springs, CA 92365

McCall, Vivian E.
14445 Melrose Avenue
Oro Grande, CA 92368

McCollum, Charles L.
13846 Sagassum Ct.
Hesperia, CA 92345
Attn: Rod Sexton

McInnis, William S.
8758 Deep Creek Road
Apple Valley, CA 92308

Mead, G. C. (Buck)
31314 Clay River Road
Barstow, CA 92311

Meadowbrook Dairy
P.O. Box 294370
Phelan, CA 92329-4370
Attn: Edward Imsand

Meyers, Lonnie
35523 Mountain View Rd.
Hinkley, CA 92347-9613

Milbrat, Irving H.
20202 Blue Jay Drive
Redding, CA 96002
Attn: David I. Milbrat

Mitchell, Charles Thomas
P.O. Box 783
Yermo, CA 92398

Mitchell, Charlotte
35533 Minneola Road, P. O. Box 61
Yermo, CA 92398

Mitchell, Robin & Judith
2808 Arizona Avenue, Apt. 1
Santa Monica, CA 90404-1571

Mitsubishi Cement Corporation
5808 State Highway 18
Lucerne Valley, CA 92356
Attn: Douglas Shumway

Mizrahie, et al.
4105 W. Jefferson Blvd.
Los Angeles, CA 90048-
Attn: Philip Mizrahie

Monaco Investment Company
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Morek, Gregory M. & Lisa A.
P. O. Box 669
Helendale, CA 92342-0669

Morris Trust, Julia V.
43744 Silver Valley Road
Newberry Springs, CA 92365
Attn: Billie Elliot

Moss, Lawrence W. & Helen J.
12154 Pine Street
Norwalk, CA 90650-4259

Most, Milton & Jennie
25119 108th Avenue E
Graham, WA 98338

Mountain View, L.L.C.
821 W. Main Street
Barstow, CA 92311
Attn: Denise Flores

Mulligan, Robert & Inez
325 Hankins Drive
St. Helena, OR 97051
Attn: Dennis Hills

Munn and Thurston Family Trust
1105 W. Quince Street
San Diego, CA 92103-
Attn: Sharon Thurston

Murphy, Bernard H.
P.O. Box 400132
Hesperia, CA 92340

Murphy, Jean
46126 Old National Trails Highway
Newberry Springs, CA 92365-9025

Navajo Mutual Water Company
21933 Otoe Road
Apple Valley, CA 92307
Attn: James Hanson

Nelson, Mildred L.
36975 Mountain View Road
Hinkley, CA 92347

New Springs Limited Partnership
416 Alamosa Drive
Claremont, CA 91711
Attn: Yuan-I Liang

Newberry Community Services District
P. O. Box 206
Newberry Springs, CA 92365
Attn: Ellen Johnson

Nunn, Donald & Pearl
23450 Esaws Road
Apple Valley, CA 92307

Mojave Basin Area Watermaster's Service List as of May 18, 2005

O. F. D. L., Inc.
16796 Bushard St.
Fountain Valley, CA 92708
Attn: William G. Swift

Odessa Water District
220 E. Mountain View Street, Suite A
Barstow, CA 92311
Attn: Jeannette Hayhurst

Ohai, Reynolds & Dorothy
8135 Pinositas Road
Whittier, CA 90605-1329

Omya California, Inc.
P. O. Box 825
Lucerne Valley, CA 92356
Attn: Manfred Keil

P & H Engineering & Development Corporation
8948 Reseda Blvd., Suite 217
Northridge, CA 91324-3914
Attn: M. T. Shoraka

P G & E
35863 Fairview Road
Hinkley, CA 92311
Attn: Johnny Baca

Pathfinder Investors
41717 Silver Valley Road
Newberry Springs, CA 92365
Attn: Eric Archibek

Patino, José
3914 W. 105th Street
Inglewood, CA 90303-1815

Payan, Paul & Felima
6202 Vinevale Avenue
Bell, CA 90201-1327

Pearce, Craig L.
30137 Fort Cady Rd.
Newberry Springs, CA 92365

Pearl, Alice
5860 Rose Ave.
Long Beach, CA 90805-4308
Attn: Barbara Riley

Pearson, Deryl B.
P. O. Box 401601
Hesperia, CA 92345

Perez, Eva
14817 Chandler Street
Corona, CA 91720

Perko, Bert K.
42258 Navajo Road
Yermo, CA 92398-0762

Perry, Thomas A.
14807 Kinai Road
Apple Valley, CA 92307
Attn: Paul H. Johnson

Petelski, Richard A.
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Mojave Basin Area Watermaster's Service List as of May 18, 2005

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Mojave Basin Area Watermaster's Service List as of May 18, 2005

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Mojave Basin Area Watermaster's Service List as of May 18, 2005

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Mojave Basin Area Watermaster's Service List as of May 18, 2005

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Mojave Basin Area Watermaster's Service List as of May 18, 2005

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MOJAVE WATER AGENCY

NO FEE PER GOV'T. CODE SEC. 6103

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al.

Plaintiff,

vs.

CITY OF ADELANTO, et al.,

Defendant.

AND RELATED CROSS ACTIONS

CASE NO. 208568

NOTICE OF MOTION AND MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2007-2008; MEMORANDUM OF POINTS AND AUTHORITIES, AND DECLARATIONS OF ROBERT C. WAGNER, VALERIE L. WIEGENSTEIN AND STEVEN K. BECKETT IN SUPPORT THEREOF

Assigned for All Purposes to:
Judge Gloria Connor Trask
Dept. 4

DATE: 5/7/07
TIME: 8:30 a.m.
DEPT: 4

To All Parties and their Respective Attorneys of Record:

Please take Notice that on _____, 2007 at 8:30 a.m., or as soon thereafter as counsel may be heard, in Department 4 of the above entitled court located at 4050 Main Street, Riverside, California, Defendant/Cross-Complainant, Mojave Water Agency, acting in its capacity as the Mojave Basin Area Watermaster, will respectfully move, pursuant to paragraph 24(o) and Exhibit "H" of the judgement in the above entitled case, for the court's approval of the Watermaster's recommendation in its 13th Annual Report to adjust the Free Production Allowance (FPA) for each of the five (5)

subareas (Alto, Baja, Centro, Este and Oeste) of the Mojave Water Basin as set forth herein for the Water Year 2007-2008.

This motion is based upon this notice, the Memorandum of Points and Authorities, the 13th Annual Report of the Watermaster lodged with the court concurrently with this motion, the Declarations of Robert Wagner, Valerie L. Wiegenstein and Steven K. Beckett, the pleadings, papers and records on file and upon such other further evidence, both oral and documentary, that may be presented at the hearing on this motion.

Dated: April 2, 2007

BRUNICK, MCELHANEY & BECKETT

WILLIAM J. BRUNICK, ESQ.
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MOJAVE WATER AGENCY

MEMORANDUM OF POINTS AND AUTHORITIES

I

BACKGROUND

The original complaint was filed by the City of Barstow et al. on May 30, 1990 and alleged that the cumulative water production upstream of the City of Barstow had over drafted the Mojave River System and it requested that the Mojave Water Agency (MWA) be ordered to obtain and provide supplemental water for use within the Mojave Basin Area (Basin). MWA filed its First Amended Cross-Complaint naming substantially all producers of water within the Basin, including parties downstream of the City of Barstow, and requested a determination of all of the water production from whatever source within the Basin.

After extensive negotiations, parties representing over 80% of the verified water production in the Basin agreed to a stipulated judgement which established a physical solution to the water supply problems. A trial of the claims of non-stipulating parties was held and the final judgement after trial adopted the physical solution set forth in the stipulated judgement.

The "Cardozo Group" of the non-stipulating parties appealed the judgement that was entered by the Superior Court. Following opinions by the Court of Appeal and Supreme Court, the judgement as to the stipulating parties was affirmed but reversed as to the Cardozo Group of non-stipulating parties. This essentially excluded the Cardozo Group from the stipulated judgement, including the assessment provisions. As of 8/23/02, Jess Ranch Water Co., previously a non-stipulating party, entered into a settlement agreement in which it stipulated to the judgement. An amendment to the judgement was filed on 12/05/02 which incorporated the changes with respect to the Cardozo Group and Jess Ranch Water Co.

II

THE JUDGEMENT'S PHYSICAL SOLUTION

On January 10, 1996 the court entered a judgement which addressed the overdraft situation existing in the Basin by the creation of a physical solution for the Basin's five distinct, but hydrologically interrelated, subareas (Alto, Baja, Centro, Este, and Oeste). The court determined that all five Subareas of the Basin had been in a state of overdraft since at least the 1950's, that the economy

and population overlying the Basin had dramatically grown in reliance upon the overdraft, and that all producers had contributed to the overdraft. The court's physical solution established a limit on the amount of water each Subarea could produce in one year before having to purchase replacement water. This is known as the Free Production Allowance (FPA). The Judgment also established each producer's Base Annual Production ("BAP"). A producer's BAP is based upon that producer's highest year of water production during the base period of 1986-1990. A producer's BAP serves as the basis for the producer's Base Annual Production Right ("BAPR"). BAPR is the right of each producer to a percentage of the FPA within a given Subarea.

Although the serious nature of the overdraft warranted an immediate reduction for all water production within the Basin, the Court approved a gradual reduction in production in order to soften the economic impact upon producers. Therefore, the Judgment sets forth the terms for a gradual reduction or rampdown of the FPA for all parties. After the first five years of the Judgment, the FPA for all parties was set at eighty percent (80%) of their original BAP. The judgement also provides that the court can review and adjust, as necessary, the FPA for each Subarea on an annual basis.

MWA was appointed as the initial Watermaster by the court to administer the judgement and physical solution set forth therein.

III

NECESSITY FOR ADJUSTMENT

Pursuant to the gradual Rampdown required in the judgment by the Water Year 1997-98, each producer's FPA was set at eighty percent (80%) of that producer's BAP specified by the Judgment. Exhibit "H" of the Judgment requires Watermaster to recommend a decrease in the FPA for a Subarea when that Subarea's FPA exceeds its estimated Production Safe Yield (PSY) by five percent (5%) or more.

Pursuant to paragraph 24(o) of the Judgment, the Watermaster is required to make a recommendation to the Court for adjusting the FPA of each Subarea, if necessary. The Watermaster retained the Engineering firm of Albert A. Webb Associates (Webb), to conduct a consumptive water use study for the purpose of updating the elements of Table C-1 of the Judgment. The Webb study was presented to the Watermaster in February of 2000 and provided the basis for the Watermaster's

proposed adjustments for Water Years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07. Pursuant to Exhibit H of the judgment, the Watermaster has filed its motions to adjust the FPA for prior Water Years and also provided certain alternatives to rampdown at the court's request.

On June 27, 2006, the court entered its order granting the Watermaster's motion to adjust FPA for Water Year 2006-07. After considering the objections of the Baja Lake Owners to the order, the court entered an amended order on October 25, 2006.(See Exhibit "2" to Declaration of Valerie L. Wiegenstein attached hereto as Exhibit "B") As a result, FPA for Water Year 2006-07 was set as follows:

Subarea	**2006-07 FPA**
Alto - Agricultural	80% of BAP
Alto - Municipal and Industrial	60% of BAP
Baja[1]	70% of BAP **or** 75% of BAP pursuant to the Court Order of 12/29/05
Centro	80% of BAP
Este[2]	80% of BAP
Oeste	80% of BAP

1. The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006. Change in use or any change inconsistent with the December 29, 2005 order may result in rampdown to the recommended adjustment at that time pursuant to the terms of the Judgment.
2. FPA to be set at 80% of Base Annual Production for the 2007-08 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

The table on page 30, Chapter 5 of the 13th Annual Report of the Mojave Basin Area Watermaster shows the BAP, FPA for 2006-07 as ordered by the court and the estimated PSY for each Subarea. FPA is greater than the estimated PSY by more than 5% of BAP in each of the five(5) Subareas.

However, as previously reported to the Court, Watermaster reduced the aggregate BAP in Alto and Oeste by removing the unidentified pool and reducing the minimal pool to the current MWA estimate. The unidentified pool was established in 1993 to account for the possibility that an

unidentified producer could prove up a BAP right. The Alto Subarea Advisory Committee requested that the pool be removed. Watermaster proposed removing the Oeste unidentified pool because it was unlikely that any water in the pool could be claimed. For consistency we are recommending that we do the same in the remaining Subareas. The overall effect of reducing the pools is insignificant since the Centro unidentified pool is exhausted and there is little unidentified BAP in Baja and Este.

The table on page 30, Ch. 5 of the 13th Annual Report of the Mojave Basin Area Watermaster shows the BAP with the current modifications as proposed, the FPA for 2006-07, the estimated PSY, the difference between them as a percentage of BAP as well as the 2005-06 Verified Production from each area. FPA is greater than PSY by more than 5% of BAP in each of the Subareas except for Alto.

IV

RECOMMENDED ADJUSTMENTS TO FPA FOR WATER YEAR 2007-08

The Watermaster adopted FPA recommendations for the five sub-areas for the 2007-08 Water Year at its March 28, 2007 meeting, as required by the Judgment and consistent with previous direction from the court, as follows:

Subarea	2007-08 FPA RECOMMENDATION
Alto - Agricultural	80% of BAP
Alto - Municipal and Industrial	60% of BAP
Baja[1]	65% of BAP or 75% of BAP pursuant to the Court Order of 12/29/05
Centro	80% of BAP
Este[2]	80% of BAP
Oeste	80% of BAP

1. The Baja Subarea Advisory Committee submitted a proposal to the Court for an alternative to the Rampdown mandated by the Judgment which includes a recommendation to set FPA at 75% (starting in 2005-2006) of Base Annual Production for ten years pursuant to certain restrictions. The Baja SAC proposal was ordered by the Court on December 29, 2005 and a copy was mailed to all Baja parties on January 5, 2006. Change in use or any change inconsistent with the December 29, 2005 order may result in rampdown to the recommended adjustment at that time pursuant to the terms of the Judgment.

2. FPA to be set at 80% of Base Annual Production for the 2007-08 Water Year. The Este Subarea may be subject to future Rampdown to 65% immediately if water use conditions change.

A. Alto Subarea:

FPA in Alto will remain unchanged at 60% of BAP for Municipal and Industrial producers. Agricultural producers will remain at 80% of BAP. When M&I producers transfer FPA, Carryover, or BAP from Agricultural producers, the amount of water to be credited to the transferee will be reduced to the rampdown amount existing at the time. For example, if M&I FPA is 60% of BAP then a transfer of 100 acre-feet from Agricultural to M&I will be credited as 60 acre-feet.

Due to the differential rampdown ordered by the court for the Alto subarea, a review was made of all of the Alto water producers so that they could be categorized as either agricultural or municipal and industrial producers. Agricultural producers were defined as those producing water for the irrigation of crops, i.e. alfalfa, grains, nut trees or orchards, dairies, livestock and all other incidental uses including small domestic. A list setting forth each producer for Water Year 2006-07 is set forth on pages 5-10 and 23 of Appendix H to the Watermaster's 13th Annual Report.

FPA (currently at 60% of BAP) exceeds PSY by about 4.1% of BAP indicating that further Rampdown is not warranted in Alto at this time. Other considerations that could result in a continuation of Rampdown in Alto include increasing water production, falling water levels and water quality problems. The importation of supplemental water is expected to be sufficient to offset overproduction within two years. In 2006, Watermaster purchased about 8,200 acre-feet for Replacement Obligations incurred in 2005. Watermaster expects that Replacement Water purchases in 2007 could be as high as 16,500 acre-feet. At the current Rampdown amount and pumping projections, Replacement Water Obligations and thus supplemental water purchases could be as much as 30,000 acre-feet by 2009 or 2010.

B. Baja Subarea:

Pursuant to the Judgment additional Rampdown in Baja is warranted. FPA exceeds PSY and current water production and consumptive use exceed the average net long-term supply in Baja. The continued overdraft in Baja will cause continued depletion of water from storage thereby impacting Baja water users.

The court held a separate hearing on the Baja Subarea in 2005 and issued its order dated December 29, 2005. (See Exhibit "1" to Declaration of Valerie L. Wiegenstein attached hereto as Exhibit

"B") The principal components of the order, which were proposed by the Baja Subarea Advisory Committee, are as follows:

- Rampdown of all producers to 75% of BAP effective October 1, 2005 for 10 years.
- Restrictions on transfers that would limit the use of FPA to the existing land and for the existing uses.
- Transfers, except those specifically allowed, would result in an immediate reduction in FPA to the appropriate Rampdown amount at the time of the transfer.
- Carryover transfers are to be restricted but Carryover can be used for two years.

The FPA for 2007-08 will be 75% for all Baja producers subject to the restrictions described in the order. A change in use or any change inconsistent with the order may result in further Rampdown to 65% for Water Year 2007-08. Rampdown shall then continue for all such producers in subsequent Water Years subject to court review.

The Baja Subarea Advisory Committee (BSAC) submitted a request to Watermaster dated November 28, 2006 to "formulate a recommendation to the court which, if adopted, would protect those still covered by the moratorium on ramp downs at the end of 10 years from a sudden and total ramp down from 75% to whatever the court has imposed on the entire Subarea at that time".(See Exhibit "1" to Declaration of Robert Wagner attached hereto as Exhibit "A")

Watermaster's recommendations herein are consistent with the December 29, 2005 order, the elements of which were proposed by the BSAC. While the BSAC may ask the court to revisit its order, Watermaster is not making such a request. Additionally, the California Department of Fish and Game has submitted a letter to Watermaster in support of Watermaster's recommendation and opposing the request of the BSAC. (See Exhibit "1" to Declaration of Steven K. Beckett attached hereto as Exhibit "C")

C. Centro Subarea:

Watermaster recommends that FPA in Centro be left at 80% of BAP. Total water production in Centro has declined significantly since entry of Judgment. There is a slight surplus in Centro as measured against the long-term average water supply. Water levels in wells in areas of heavy pumping around Barstow show a greater downward trend than other wells during periods of below average water

supply but in the past have recovered during periods of storm flow. Although FPA exceeds the PSY in Centro, further Rampdown would be unnecessary at this time given the fact that there is an apparent surplus when considering the long-term average water supply and current levels of pumping. Watermaster will re-evaluate conditions in Centro annually and may make appropriate recommendations for Rampdown in the future.

D. Este Subarea:

Water levels have been relatively stable in Este. Water production, which has declined from its peak in the 1980's, is far less than the FPA. Watermaster is continuing data collection and analysis and recommends that FPA remain at 80% and that the Court ordered stay on Rampdown (at 65%) remain in effect. Any material increases in water production or changing conditions could result in an immediate Rampdown in Este to 65% or lower following further hearings with the Court.

Among the findings of the investigations in Este is that there exists a significant water level difference across the Helendale Fault that would prevent water movement from Lucerne to Fifteen Mile Valley. In recognition of this condition it may be necessary to treat Este differently under the Judgment. Watermaster is currently working with the Este Subarea Advisory Committee to establish a management plan recognizing the effects of the Helendale Fault on water movement and water supply to Este.

E. Oeste Subarea:

MWA commenced a hydrologic study in Oeste to better understand the water supply conditions. The study's findings confirm water levels failing at a slow rate. MWA is presently preparing a regional groundwater model that will use data developed from the hydrologic study to predict the basin's response to various pumping stresses. At this time, Watermaster recommends that FPA remain at 80%. Additional rampdown in Oeste may be warranted in the 2008-09 Water Year.

V

SUBSURFACE FLOW OBLIGATIONS BETWEEN SUBAREAS

Watermaster considered and adopted a recommendation, presented to the Court in April 2006, to establish subsurface flow obligations as required by the Judgment, except for the Oeste to Alto

obligation. During the 2006-07 Water Year, Watermaster formally adopted the subsurface flow obligation from Oeste to Alto that is set forth in the Judgment as 800 acre-feet.

The Judgment requires that Watermaster evaluate the subsurface flow from Baja across the MWA administrative boundary about six miles upstream from Afton. It was estimated before trial the amount of subsurface flow was 400 acre-feet. The Judgment provides that the Baja producers pay a make-up assessment in the event the subsurface flow obligation is not met. The Court asked Watermaster to provide an explanation as to the difficulty and impracticality of requiring the Baja residents to comply with this part of the Judgment.

The requirement to investigate and determine the amount of subsurface flow from Baja would be very difficult to meet for several reasons including: a lack of historic data to evaluate, the high cost of drilling wells and obtaining necessary data for future evaluation and the financial burden to the Baja residents. Further, if the amount of subsurface flow that had occurred across the boundary could be established, it would be necessary to construct a pipeline that would extend several miles to a point in the desert outside of the MWA boundary. The requirement to evaluate the historic and present subsurface flow at the Baja boundary near Afton would not be in the best interests of the basin area producers. The Court previously relieved Watermaster of the obligation to determine the subsurface flow from Baja to Afton and it is Watermaster's recommendation that this waiver continue.

VI

TRANSITION ZONE WATER LEVELS

MWA investigated the conditions in the Transition Zone in order to establish minimum water levels as required by the Judgment. Currently MWA is pursuing the installation of monitoring wells and working with Department of Fish and Game in this regard. The purpose of establishing minimum water levels is to ensure that the Transition Zone does not interfere with storm flow in a way that deviates from the base period hydrology. The available data for Transition Zone water levels indicates that the Transition Zone is not interfering with storm flows.

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VII

MINIMAL PRODUCERS

MWA continues to investigate minimal producers and identify and catalogue new minimal producer wells. A contract to develop and implement a pilot program for minimal producer evaluation using aerial photography was approved in 2006 and is expected to be completed in 2007. The pilot program, if successful, will be expanded for use throughout the Basin Area.

VIII

CONCLUSION

Based upon the foregoing, the Declarations of Robert Wagner, Valerie L. Wiegenstein and Steven K. Beckett , attached hereto as Exhibits "A", "B" and "C"respectively, and the court's prior rulings, Watermaster recommends that the Court grant this motion and implement the above adjustments for each Subarea.

Dated: April 2, 2007

BRUNICK, MCELHANEY & BECKETT

WILLIAM J. BRUNICK, ESQ.
STEVEN K. BECKETT, ESQ.
Attorneys for Defendant/Cross-Complainant,
MOJAVE WATER AGENCY

ATTACHMENT E

JUN 20 2007

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NO FEE PER GOV'T. CODE SEC. 6103

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al.

Plaintiff,

vs.

CITY OF ADELANTO, et al.,

Defendant.

AND RELATED CROSS ACTIONS

CASE NO. 208568

[Proposed] ORDER GRANTING MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2007-2008

Assigned for All Purposes to:
Judge Gloria Connor Trask, Dept. 4

The above-entitled action came on regularly for hearing on May 7, 2007, before the Honorable E. Michael Kaiser, Judge of the Superior Court, on the motion of Defendant/Cross-Complainant, MOJAVE WATER AGENCY, acting in its capacity as Watermaster, pursuant to the Judgment entered January 10, 1996, Paragraph 24(o), seeking an adjustment in Free Production Allowance (FPA). The court having reviewed and considered the moving, opposing, and reply papers, and the arguments of counsel, and good cause appearing, hereby GRANTS the motion on the following terms as to the Subareas defined in the Judgment of January 10, 1996 for the Water Year 2007-2008:

ALTO SUBAREA

1. Free Production Allowance (FPA) shall remain at 60% of Base Annual Production (BAP) for Municipal and industrial (M&I) water producers.

2. Free Production Allowance shall remain at 80% of Base Annual Production for Agricultural producers, i.e., those who produce water for the irrigation of the crops, or as otherwise determined by Watermaster.

BAJA SUBAREA

FPA shall remain at 75% for all Producers pursuant to the Court's Order of December 29, 2005. A change in use or any change inconsistent with the December 29, 2005 Order may result in further rampdown to 65% for the 2007-2008 water year. Pursuant to the Court's December 29, 2005 Order, if Watermaster believes that any Producer has changed its type of use or place of use, Watermaster shall place the name of such Producer on a list of Producers which are removed from the ten (10) year rampdown moratorium and present the names of any such Producers to the Court at the next rampdown hearing, if any, for approval by the Court for further rampdown, if appropriate, for such Producers. Pursuant to the December 29, 2005 Order, Watermaster shall continue to maintain and publish the list of producers subject to the ten (10) year rampdown moratorium.

CENTRO SUBAREA

FPA shall remain at 80% of BAP for both M&I and Agricultural Producers.

ESTE SUBAREA

Rampdown is deferred and FPA shall continue to remain at 80% of BAP for both M&I and Agricultural Producers. However, deferred rampdown could be implemented upon further order of the court following the Watermaster's request and motion seeking court approval which could result in FPA being reduced to the level required by the Judgment at the time the Motion is made.

OESTE SUBAREA

FPA shall remain at 80% of BAP for both M&I and Agricultural Producers.

TRANSITION ZONE WATER LEVELS

Watermaster considered data and information related to setting water levels in the Transition Zone as required by the Judgment. The purpose for setting minimum water levels is to prioritize recharge in the Alto Subarea between Transition Zone and the upper part of Alto.

The water level recommendations and monitoring well locations were determined in cooperation with the California Department of Fish and Game and were the subject of a hearing before the Watermaster prior to adoption. The monitoring location and water level criteria are set for in the Thirteenth Annual Watermaster Report to the Court. Watermaster shall report annually on the conditions in the Transition Zone.

SUBSURFACE FLOW OBLIGATION TO AFTON

Watermaster is relieved of the obligation to determine the flow from Baja across the MWA boundary to Afton.

ELIMINATION OF UNIDENTIFIED AND MINIMAL POOLS

Watermaster has previously recommended to the Court that the unidentified and minimal producer pools in Alto and Oeste be removed from consideration when Watermaster establishes FPA for each Subarea. Watermaster is recommending that the pools in the remaining Subareas be removed from consideration as well. Consequently, upon this Order, the aggregate BAP for each Subarea, as shown on Exhibit B, Table B-1 of the Judgment will be as follows:

Subarea	BAP
Alto	116,412
Baja	66,157
Centro	56,269
Este	21,205
Oeste	7,095

The estimated consumptive use by minimal producers is included in the calculation of Production Safe Yield (Table 5-1, 5-2, 13th Annual Report) and therefore is already included in the considerations of FPA, consistent with previous Watermaster actions.

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ORDER

IT IS SO ORDERED.

Date: Aug 3, 2007

E. Michael Kaiser,
Judge of the Superior Court

PROOF OF SERVICE

STATE OF CALIFORNIA }
COUNTY OF RIVERSIDE }

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 22450 Headquarters Dr., Apple Valley, California 92307.

On June 18, 2007, I served the foregoing document described as: **[Proposed] ORDER GRANTING MOTION TO ADJUST FREE PRODUCTION ALLOWANCE FOR WATER YEAR 2007-2008** on the interested parties in this action by placing a true copy thereof enclosed in sealed envelopes addressed as follows:

SEE ATTACHED SERVICE MAILING LIST

_XX_ (BY MAIL) I deposited such envelope in the mail at San Bernardino, California. The envelope was mailed with postage thereon fully prepaid.

____As follows: I am "readily familiar" with the firm's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at San Bernardino, California in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

___ **(BY OVERNIGHT COURIER SERVICE)**: I caused such envelopes to be delivered via overnight courier service to the addressee(s) described above.

____(BY FACSIMILE) On this date, the aforesaid document was transmitted by facsimile transmission number (909) 388-1889, to the person(s) whose name(s) and facsimile number(s) are referenced. The transmissions were reported without error.

_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 June 18, 2007, at Apple Valley, California.

V. Wiegenstein

Valerie Wiegenstein

Mojave Basin Area Watermaster's Service List as of June 18, 2007

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Attn: John McCallum

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Adelanto, CA 92301
Attn: John Sponsler

Adelanto, City Of - George A F B
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Mojave Basin Area Watermaster's Service List as of June 18, 2007

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CDFG - Mojave River Fish Hatchery
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Garden Grove, CA 92645

Clark, Arthur
11919 Bayless St.
Moreno Valley, CA 92557

Cline, Vivian D.
45835 Twin Lakes Drive
Newberry Springs, CA 92365

Club View Partners
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Conner, William H.
11535 Mint Canyon Rd.
Agua Dulce, CA 91390-4577

Contratto, Ersula
21814 Hinkley Road
Barstow, CA 92311

Corbridge, Linda S.
10744 Eton Avenue
Chatsworth, CA 91311-

Cramer, Margaret Muir
15030 Genesee Road
Apple Valley, CA 92307

Crandall, Esther
2196 Kendall Drive, Apt. 215
San Bernardino, CA 92407

Cross, Francis & Beverly
Paradise Valley Box 16
Barstow, CA 92311

Cross, Sharon I.
P. O. Box 922
Lucerne Valley, CA 92356

Crystal Lakes Property Owners Association
P. O. Box 351
Yermo, CA 92398
Attn: Bob Buck

Daggett Community Services District
P. O. Box 308
Daggett, CA 92327
Attn: Lawrence Alf

Dahlquist, George R.
3056 N. Buena Vista
Burbank, CA 91504

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Darr, James S.
40716 Highway 395
Boron, CA 93516

Davis Family Trust
19685 Gray Mountain Rd.
El Mirage, CA 92301
Attn: Paul W. Davis Jr.

De Jong Family Trust
46561 Fairview Road
Newberry Springs, CA 92365
Attn: Alan L. De Jong

Dennison, Quentin D. - Clegg, Frizell & Joke
44579 Temescal Street
Newberry Springs, CA 92365
Attn: Randy Wagner

Desert Dawn Mutual Water Company
P. O. Box 392
Lucerne Valley, CA 92356
Attn: Peggy Roork

Desert Springs Mutual Water Company
P. O. Box 396
Lucerne Valley, CA 92356-0396
Attn: Denise Courtney

Desert View Dairy
37501 Mountain View Rd.
Hinkley, CA 92347
Attn: Paul Ryken

Dexter Family Trust
12600 Apple Valley Road
Apple Valley, CA 92308
Attn: J.P. Dexter

Dick Van Dam Dairy
3180 Cottonwood Avenue
San Jacinto, CA 92582
Attn: Glenn Van Dam

DJC Corporation
35300 Old Woman Springs Road
Lucerne Valley, CA 92356-7706
Attn: Magdalena Jones

Docimo, Allen & Kathryn
48275 Silver Valley Road
Newberry Springs, CA 92365-

Docimo, Donald P. & Patricia J.
1176 Lee Ann Circle
San Jacinto, CA 92582-3087

Dolch, Robert & Judy
15760 Stoddard Wells Road
Victorville, CA 92395-2831

Donaldson, Jerry & Beverly
16736 B Road
Delta, CO 81416-8501

Dora Land, Inc.
P.O. Box 931
Westminster, CA 92684-
Attn: Jeffery Lidman

Dorrance, David W. & Tamela L.
2027 Valleria Court
Sugar Land, TX 77479-

Dossey, D. A.
137 Woodhill Drive
Morehead, KY 40351-7860

Dowell, Leonard
5125 2nd Avenue
Los Angeles, CA 90043-1948

Dowse, Philip
P. O. Box 400-847
Hesperia, CA 92340-0847

D'Silva, Melanie
Three Ravina Drive Ste. #1450
Atlanta, GA 30346-2117

Elisabella, LLC
P.O. Box 488
Helendale, CA 92342
Attn: Jesus Enriquez

Evenson, Edwin H. & Joycelaine C.
P. O. Box 66
Oro Grande, CA 92368

Evkhanian, James H. & Phyllis
P. O. Box 77
Glendale, CA 91209-0077

Eygnor, Robert E. & Patsy C.
23032 Bryman Road
Oro Grande, CA 92368-

Farley, Greggory J.
7787 Lakeside Dr.
Riverside, CA 92509-5324

Ferro, Dennis & Norma
1311 1st Avenue N.
Jacksonville Beach, FL 32250-3512

First CPA LLC
3043 Prospect Avenue
Rosemead, CA 91770-2244
Attn: Jerrica Liu

Fischer, Elmer G. & Beverly C.
1372 W. 26th Street
San Bernardino, CA 92405-
Attn: Carl Fischer

Fisher, Dolores
3185 Valencia Avenue
San Bernardino, CA 92404

Fisher, Jerome
7603 Hazeltine
Van Nuys, CA 91405

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Frates, D. Cole
5700 Wilshire Blvd. Suite 330
Los Angeles, CA 90036-

Frazier, et al
8707 Deep Creek Road
Apple Valley, CA 92308-
Attn: Della Frazier

Friend, Joseph & Deborah
P. O. Box 253
Barstow, CA 92312

Fundamental Christian Endeavors, Inc.
49191 Cherokee Road
Newberry Springs, CA 92365
Attn: Mark Asay

Gabrych, Eugene
2006 Old Highway 395
Fallbrook, CA 92028

Gaeta, Miguel & Maria
9366 Joshua Avenue
Lucerne Valley, CA 92356-
Attn: Miguel Gaeta

Gaeta, Trinidad
10551 Dallas Avenue
Lucerne Valley, CA 92356
Attn: Jay Storer

Gaines, Jack & Mary
36280 Soapmine Road
Barstow, CA 92311

Garcia, Daniel
9899 Summerhill Rd.
Alta Loma, CA 91737

Gayjikian, Samuel & Hazel
P. O. Box 684
Lucerne Valley, CA 92356

Gold, Harold
1037 N. Primrose Avenue
Rialto, CA 92376

Golden State Water Company
2143 Convention Center Way, Suite 110
Ontario, CA 91764-5492
Attn: Gladys Rosendo

Gordon Acres Water Company
P. O. Box 1607
Lucerne Valley, CA 92356-1035
Attn: Tom Warnock

Graves, Chester B.
500 N. San Dimas Canyon Road
San Dimas, CA 91773-2200

Gray, George F. & Betty E.
975 Bryant
Calimesa, CA 92320

Green Acres Estates
P. O. Box 1754
Apple Valley, CA 92307
Attn: Susan Zutavern

Greenhouse Family Trust
25322 Aster Road
Oro Grande, CA 92368-
Attn: Sheryl Greenhouse

Grieder, Raymond H. & Dorisanne
41234 Harper Lake Road
Hinkley, CA 92347

Gubler, Hans
P. O. Box 3100
Landers, CA 92285

Gulbranson, Merlin
P.O. Box 482
Helendale, CA 92342-
Attn: Tamara McKenzie

Gutierrez, Jose & Gloria
24116 Santa Fe
Hinkley, CA 92347

Haas, Bryan C. and Hinkle, Mary H.
14730 Tigertail Road
Apple Valley, CA 92307-

Hackbarth, Edward E.
P.O. Box 1089
Corona, CA 92878-1089

Hainje, Kenneth Edward
P. O. Box 413
Helendale, CA 92342-0413

Halanna Equities III
233 Sansome Street, Suite 928
San Francisco, CA 94104-2315
Attn: Alexandra Lioanag

Hal-Dor Ltd.
35300 Old Woman Springs Road
Lucerne Valley, CA 92356
Attn: Magdalena Jones

Hamilton Trust, Don & Ruth M.
9312 Deep Creek Road
Apple Valley, CA 92308-8319
Attn: Don & Ruth M. Hamilton

Hamilton, Doug & Cheryl
19945 Round Up Way
Apple Valley, CA 92308-8338

Hamilton, et al.
9312 Deep Creek Road
Apple Valley, CA 92308-8319
Attn: Don & Ruth M. Hamilton

Handley, Don R. & Mary Ann
29611 Exeter Street
Lucerne Valley, CA 92356
Attn: Mary Ann Hendley-Norris

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Handrinos, Nicole A.
1140 Parkdale Rd.
Adelanto, CA 92301
Attn: William Handrinos

Hanify, Michael D., dba - White Bear Ranch
36511 Lenwood Road
Hinkley, CA 92347
Attn: Donald F. Hanify

Hanson Aggregates WRP, Inc.
P. O. Box 190
Newberry Springs, CA 92365-0190
Attn: Marie Lachica

Haralik, Bess & Robert
32990 Harvard Road
Newberry Springs, CA 92365

Hare, Thomas R. & Helen P.
35729 Dixie Road
Hinkley, CA 92347-9631

Hareson, Nicholas & Mary
1737 Anza Avenue
Vista, CA 92084

Harmsen, James & Ruth Ann
23920 Community Blvd.
Hinkley, CA 92347-9721

Harper Lake Company VIII
43880 Harper Lake Road
Hinkley, CA 92347
Attn: Glen King

Harper Lake, LLC
7151 Coriander Trail
Oak Hills, CA 92344-9029
Attn: Henry Orlosky

Harrison, Connie & Harold
22230 National Trails Hwy.
Oro Grande, CA 92368

Harter, Joe & Sue
34530 Minneola Road
Daggett, CA 92327

Harvey, Frank
P. O. Box 753
Yermo, CA 92398

Harvey, Jeffrey W. & Lisa M.
P.O. Box 268
San Bernardino, CA 92402-

Hass, Pauline L.
P.O. Box 1004
Barstow, CA 92312

Helendale Community Services District
P. O. Box 2608
Helendale, CA 92342-2608
Attn: Kimberly Cox

Helendale School District
P. O. Box 249
Helendale, CA 92342
Attn: Peter Czarnota

Hendley, Rick & Barbara
P. O. Box 905
Yermo, CA 92398-0905
Attn: Jim Martin

Hermanas Misioneras Servidoras de la Palabra
3980 Opal Steet
Riverside, CA 92509-
Attn: Marina Tapia

Hert, Scott
P. O. Box 590
Lucerne Valley, CA 92356

Hesperia Golf & Country Club
17970 Bangor Avenue
Hesperia, CA 92345-6933
Attn: Drew Taylor

Hesperia Water District
9700 7th Avenue
Hesperia, CA 92345-3493
Attn: Mike Podegracz

Hettinga, Hein & Ellen
17094 Cucamonga Avenue
Corona, CA 92880
Attn: Patricia Mohr

Hi Desert Mutual Water Company
32722 Amarylis
Barstow, CA 92311
Attn: Walt Young

Hickman, Alex & Debe
48550 Riverside Drive
Newberry Springs, CA 92365-9017

Hiett, Harry J. & Clarice M.
P. O. Box 272
Daggett, CA 92327-0265

High Desert Associates, Inc.
405 North Indian Hill Blvd.
Claremont, CA 91711-4614
Attn: Robert W. Bowcock

Hi-Grade Materials Company
17671 Bear Valley Road
Hesperia, CA 92345-4902
Attn: Lori Clifton

Hilarides 1998 Revocable Family Trust
37404 Harvard Road
Newberry Springs, CA 92365
Attn: Frank Hilarides

Hileman, Katherine
2743 Apollo Drive
Barstow, CA 92311
Attn: Lee Hileman

Hill, Melvin
25749 Community Blvd.
Barstow, CA 92311
Attn: Sylvia Pile

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Hitchin Lucerne, Inc.
P. O. Box 749
Lucerne Valley, CA 92356
Attn: Mary Thomas

Ho, Ting-Seng & Ah-Git
1994 Allenby Road
Germantown, TN 38138-4346

Hodge, Stanley W.
15124 Riverside Drive
Apple Valley, CA 92307

Hollister, Robert H. & Ruth M.
P. O. Box 2
Newberry Springs, CA 92365
Attn: Christine Stevens

Holway, C. Robert
38365 Birch Hill Ct
Murrieta, CA 92563-4724

Hong, Paul B. & May
P.O. Box # 1432
Covina, CA 91722

Horton, John
47716 Fairview Road
Newberry Springs, CA 92365-9258

Horton's Children's Trust
47716 Fairview Road
Newberry Springs, CA 92365-9258
Attn: John Horton

Howard, Norman N.
27871 Beryl Avenue
Barstow, CA 92311

Hrubik, Thomas A.
P. O. Box 2611
Apple Valley, CA 92307-0049

Hubbard, Ester & Mizuno, Arlean
2225 7th Avenue
Los Angeles, CA 90018-1146
Attn: Ester Hubbard

Huerta, Hector
25684 Community Blvd.
Barstow, CA 92311

Hunt, Ralph M. & Lillian F.
P. O. Box 603
Yermo, CA 92398

Hutchison Trust, William O.
P. O. Box 97
Newberry Springs, CA 92365
Attn: William O. Hutchison

Hyatt, James & Brenda
P. O. Box 85
Newberry Springs, CA 92365

Irvin, Bertrand W.
3224 W. 111th Street
Inglewood, CA 90303-2313

Jackson, James N. Jr Revocable Living Trust
1245 S. Arlington Avenue
Los Angeles, CA 90019-3517
Attn: James Jackson Jr.

Jackson, Ray
P. O. Box 333
Newberry Springs, CA 92365

Jamboree Housing Corporation
15940 Stoddard Wells Road - Office
Victorville, CA 92395-2800
Attn: Joseph E. Brooks

Jess Ranch Water Company
906 Old Ranch Road
Florissant, CO 80816-
Attn: Gary A. Ledford

Jo, Myung Hyun
P. O. Box 1844
Lucerne Valley, CA 92356-1844

Johnson, Carlean
8626 Deep Creek Road
Apple Valley, CA 92308

Johnson, James R. & Ellen
48084 Fairview Road
Newberry Springs, CA 92365

Johnson, Ronald
3447 East Stoneview Circle
Washington, UT 84780-

Johnston, Harriet & Johnston, Lawrence W.
P. O. Box 1472
Hesperia, CA 92340-1472
Attn: Lawrence W. Johnston

Jones, Joette
46618 Madison Street, #101
Indio, CA 92201-

Jordan Family Trust
31325 Clay River Road
Barstow, CA 92311
Attn: Raymond Jordan

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

Juniper Riviera County Water District
P. O. Box 386
Apple Valley, CA 92307
Attn: Michael W. Mines

Karimi, Hooshang
1254 Holmby Ave
Los Angeles, CA 90024-

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Kasner Family Limited Partnership
11584 East End Avenue
Chino, CA 91710-
Attn: Robert R. Kasner

Kasner, Robert
11584 East End Avenue
Chino, CA 91710-

Katcher, August M. & Marceline
47887 Palo Verde Lane
Newberry Springs, CA 92365

Kemp, Robert & Rose
48441 National Trails Highway
Newberry Springs, CA 92365

Kemper Campbell Ranch
10 Kemper Campbell Ranch Road
Victorville, CA 92395-3357
Attn: Jean De Blasis

Kemper, Walter R. & Jonna S.
1770 N. Arrowhead Ave.
San Bernardino, CA 92405

Kiel, Mary
42224 1/2 Valley Center Road
Newberry Springs, CA 92365
Attn: Betty Mobbs

Kiewit Pacific Company
PO Box 339
Newberry Springs, CA 92365-0339
Attn: John Welch

Kim, Jin S. & Hyun H.
53 Bluecoat
Irvine, CA 92620

Kim, Joon Ho
46561 Fairview Road
Newberry Springs, CA 92365
Attn: Alan De Jong

Kim, Ju Sang
2250 Simon Street
Fullerton, CA 92833-

Kim, Seon Ja
P. O. Box 1137
Yermo, CA 92398-1137

Kladstrup, Kitty L.
35850 Ord Street
Newberry Springs, CA 92365-

Koegler, Ronald R. & Carolyn V.
1001 Tremonto Road
Santa Barbara, CA 93103-

Koroghlian, Ted & Najwa
1549 Valencia Avenue
Pasadena, CA 91104-

Kosharek, John & Joann
P. O. Box 357
Newberry Springs, CA 92365

Lake Arrowhead Community Services District
P. O. Box 700
Lake Arrowhead, CA 92352
Attn: Patti McGonigle

Lake Jodie Property Owners Association
20331 Pima Road
Apple Valley, CA 92308-5124
Attn: Robert Angerer

Lake Waikiki
230 Hillcrest Drive
La Puente, CA 91744
Attn: Nancy Lan

Lake Wainani Owners Association
4725 McKinnon Drive
Anaheim, CA 92807
Attn: Ron Basbas

Langley, Michael R. & Sharon
13426 Ramona Parkway
Baldwin Park, CA 91706

Lawrence, William W.
P.O. Box 98
Newberry Springs, CA 92365
Attn: Robert Lawrence Jr.

Lawson, Ernest & Barbara
20277 Rock Springs Road
Apple Valley, CA 92308

Lee, Doo Hwan
P. O. Box 556
Lucerne Valley, CA 92356-0556

Lee, et al., Sepoong & Woo Poong
#6 Ensueno East
Irvine, CA 92620-
Attn: Sepoong & Woo Poong Lee

Lee, Vin Jang T.
41717 Silver Valley Road
Newberry Springs, CA 92365
Attn: Eric Archibek

Lem, Hoy
3904 W. 182 Street
Torrance, CA 90504-4839

Lenhert, Ronald & Toni
P.O. Box 1688
Victorville, CA 92393-1688

Levine, David & Margaret
12549 Kling Street
Studio City, CA 91604-1109

Levine, Leslie
34530 Minneola Road
Daggett, CA 92327
Attn: Joe Harter

Mojave Basin Area Watermaster's Service List as of June 18, 2007

LHC Alligator, LLC
P. O. Box 670
Upland, CA 91785-0670
Attn: John M. Goodman

Liang, Yuan - I & Tzu - Mei Chen
416 Alamosa Drive
Claremont, CA 91711
Attn: Patrick Liang

Lin, Kuan Jung & Chung, Der-Bing
2026 Turnball Canyon
Hacienda Heights, CA 91745-
Attn: James Lin

Lo, Peter C. N. & Debbie D. J.
5303 Temple City Blvd.
Temple City, CA 91780-3149

Lopez, Baltazar
12318 Post Office Rd
Lucerne Valley, CA 92356-

Lounsbury, J. Peter & Carolyn
14499 Robinson Ranch Road
Oro Grande, CA 92368

Love, Charles & Deanna
P.O. Box 1476
Helendale, CA 92342
Attn: Chuck Love

Low, Dean
1031 Briarcliff Road
Monrovia, CA 91016-1703

Lua, Michael T. & Donna S.
18838 Aldridge Place
Rowland Heights, CA 91748

Lucerne Valley Mutual Water Company
P. O. Box 1311
Lucerne Valley, CA 92356
Attn: Donna Chandler

Lucerne Valley Partners
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Lucerne Vista Mutual Water Company
P. O. Box 677
Lucerne Valley, CA 92356-0677
Attn: John Felsch

Luckey, Manley J.
8531 Glendale Road
Hesperia, CA 92345

M Bird Construction
1613 State Street, Ste. 10
Barstow, CA 92311-4162
Attn: Eugene R. & Vickie R. Bird

M.B. Landscaping & Nursery, Inc.
20300 Figueroa Street
Carson, CA 90745-1212
Attn: Maria Martinez

Mahjoubi, Afsar S.
46622 Fairview Road
Newberry Springs, CA 92365
Attn: Robert Saidi

Maloney, Janice
42525 Silver Valley Road
Newberry Springs, CA 92365

Manning, Sharon S.
19332 Balan Road
Rowland Heights, CA 91748-4017
Attn: Jimmy Berry

Marcroft, James A. & Joan
P. O. Box 519
Newberry Springs, CA 92365

Mariana Ranchos County Water District
9600 Manzanita Street
Apple Valley, CA 92308-8605
Attn: Mike Bush

Marshall, Charles
32455 Lakeview Road
Newberry Springs, CA 92365

Martin, Michael D. & Arlene D.
32942 Paseo Mira Flores
San Juan Capistrano, CA 92675

Mayberry, Donald J. & Sandra D.
34555 Sandi Lane
Newberry Springs, CA 92365-9448

McCollum, Charles L.
13846 Sagassum Ct.
Hesperia, CA 92345
Attn: Rod Sexton

McInnis, William S.
8758 Deep Creek Road
Apple Valley, CA 92308

Mead, G. C. (Buck)
31314 Clay River Road
Barstow, CA 92311

Meadowbrook Dairy
P.O. Box 294370
Phelan, CA 92329-4370
Attn: Edward Imsand

Meyers, Lonnie
35523 Mountain View Rd.
Hinkley, CA 92347-9613

Milbrat, Irving H.
20202 Blue Jay Drive
Redding, CA 96002
Attn: David I. Milbrat

Mitchell, Charles Thomas
P.O. Box 783
Yermo, CA 92398

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Mitchell, Charlotte
P.O. Box 783
Yermo, CA 92398-0783

Mitsubishi Cement Corporation
5808 State Highway 18
Lucerne Valley, CA 92356
Attn: David Rib

Mizrahie, et al.
4105 W. Jefferson Blvd.
Los Angeles, CA 90048-
Attn: Philip Mizrahie

Monaco Investment Company
9903 Santa Monica Blvd., PMB #541
Beverly Hills, CA 90212-1671
Attn: Manoucher Sarbaz

Morris Trust, Julia V.
43744 Silver Valley Road
Newberry Springs, CA 92365
Attn: Billie Elliot

Moss, Lawrence W. & Helen J.
38338 Old Woman Springs Road Spc# 72
Lucerne Valley, CA 92356-8116

Most, Milton & Jennie
23780 Cuyama Road
Apple Valley, CA 92307-
Attn: Chuck Most

Mountain View, L.L.C.
821 W. Main Street
Barstow, CA 92311
Attn: Denise Flores

Mulligan, Robert & Inez
325 Hankins Drive
St. Helena, OR 97051
Attn: Dennis Hills

Murphy, Bernard H.
P.O. Box 400132
Hesperia, CA 92340

Murphy, Jean
46126 Old National Trails Highway
Newberry Springs, CA 92365-9025

Navajo Mutual Water Company
21933 Otoe Road
Apple Valley, CA 92307
Attn: James Hanson

Nelson, Mildred L.
36975 Mountain View Road
Hinkley, CA 92347

New Springs Limited Partnership
416 Alamosa Drive
Claremont, CA 91711
Attn: Yuan-I Liang

Newberry Community Services District
P. O. Box 206
Newberry Springs, CA 92365
Attn: Ellen Johnson

Newberry Corporation
P.O. Box 8547
Calabasas, CA 91372-
Attn: Faye Wazzan

Nunn, Donald & Pearl
23450 Esaws Road
Apple Valley, CA 92307

O. F. D. L., Inc.
16796 Bushard St.
Fountain Valley, CA 92708
Attn: William G. Swift

Odessa Water District
220 E. Mountain View Street, Suite A
Barstow, CA 92311
Attn: Jeannette Hayhurst

Ohai, Reynolds & Dorothy
8135 Pinositas Road
Whittier, CA 90605-1329

Old Grove Properties, LLC
P. O. Box 967
Yermo, CA 92398-0967
Attn: Fred Dornon

Omya California, Inc.
P. O. Box 825
Lucerne Valley, CA 92356
Attn: Manfred Keil

P & H Engineering & Development Corporation
1423 South Beverly Glen Blvd. Apt. A
Los Angeles, CA 90024-6171
Attn: M. T. Shoraka

P G & E
35863 Fairview Road
Hinkley, CA 92311
Attn: Johnny Baca

Pak, Edwin H.
12337 Caravel Cr
Cerritos, CA 90703-8412

Pathfinder Investors
41717 Silver Valley Road
Newberry Springs, CA 92365
Attn: Eric Archibek

Patino, José
3914 W. 105th Street
Inglewood, CA 90303-1815

Pearce, Craig L.
30137 Fort Cady Rd.
Newberry Springs, CA 92365

Pearl, Alice
5860 Rose Ave.
Long Beach, CA 90805-4308
Attn: Barbara Riley

Pearson, Deryl B.
P. O. Box 401601
Hesperia, CA 92345

Mojave Basin Area Watermaster's Service List as of June 18, 2007

Perez, Eva
14817 Chandler Street
Corona, CA 91720

Perko, Bert K.
42258 Navajo Road
Yermo, CA 92398-0762

Perry, Thomas A.
14807 Kinai Road
Apple Valley, CA 92307
Attn: Paul H. Johnson

Petelski, Richard A.
19450 Seneca Rd.
Apple Valley, CA 92307

Pettigrew, Dan
3157 Olive Hill Road
Fallbrook, CA 92028

Pettigrew, James and Cherlyn
8000 Deep Creek Rd.
Apple Valley, CA 92308-
Attn: James Pettigrew

Pittman, Leroy W.
1056 N. Western Avenue
Los Angeles, CA 90029-2310

Poland, John R. & Kathleen A.
744 N. Magnolia Avenue
Upland, CA 91786
Attn: Kathy Gillmore

Polich, Lee & Donna
11640 Deep Creek Road
Apple Valley, CA 92308

Porter, Timothy M.
34673 Little Dirt Road
Newberry Springs, CA 92365-9646

Price, Donald & Ruth
701 Montara Road Spc 213
Barstow, CA 92311-

Pruett, Andrea
P.O. Box 37
Newberry Springs, CA 92365

Quigg and Company, Inc.
1927 Harbor Blvd. #201
Costa Mesa, CA 92627-
Attn: James Quigg

Quiros, Fransisco J. & Hermann, Ronald
960 Western Ave.
Colton, CA 92324-2656
Attn: Fransisco J. Quiros

Rancheritos Mutual Water Company
P. O. Box 348
Apple Valley, CA 92307
Attn: Elizabeth Murena

Rancho Las Flores, LLC
33971 Selva Road, Suite 250
Dana Point, CA 92629-3734
Attn: Clifford C. Hood

Reddy, Bommi V. & Karuna V.
35190 Marks Rd.
Barstow, CA 92311

Reed, Delbert E. & Linda
10291 Deep Creek Road
Apple Valley, CA 92308

Reed, Mike
9864 Donaldson Road
Lucerne Valley, CA 92356

Rees, Michael J. & Sue A
35000 Indian Trails
Helendale, CA 92342

Reeves, Richard
140 East Stetson Ave, PMB #128
Hemet, CA 92543-

Reliant Energy Coolwater L.L.C.
P. O. Box 337
Daggett, CA 92327
Attn: Steve Swift

Rice, Henry C. & Diana
1015 15th Place
Hermosa Beach, CA 90254-

Rieger Family Trust, Walter M.
P.O. Box 27
Newberry Springs, CA 92365
Attn: Audrey Rieger

Riggs, John H. & Millicent L.
P.O. Box 612
Beaumont, CA 92223

Rim Properties, A General Partnership
15434 Sequoia Road
Hesperia, CA 92345-1667
Attn: Ian Bryant

Rios, Mariano V.
P. O. Box 1864
Barstow, CA 92312-1864

Rivero, Fidel V.
P.O. Box 845
Barstow, CA 92312-

Riverside Cement Company - Oro Grande Plant
P. O. Box 146
Oro Grande, CA 92368-0146
Attn: Gregory Knapp

Robertson's Ready Mix
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Mojave Basin Area Watermaster's Service List as of June 18, 2007

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Mojave Basin Area Watermaster's Service List as of June 18, 2007

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ATTACHMENT F

MOJAVE BASIN AREA WATERMASTER

CONSUMPTIVE WATER USE STUDY

AND

PRODUCTION SAFE YIELD UPDATE

2017-18 WATER YEAR

May 1, 2019

Prepared by

Robert C. Wagner, Watermaster Engineer
Wagner & Bonsignore Consulting Civil Engineers, A Corporation
Mojave Basin Area Watermaster

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May 1, 2019

Tom McCarthy, Executive Officer
Mojave Basin Area Watermaster
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Dear Mr. McCarthy,

This letter transmits the report titled "Consumptive Water User Study and Production Safe Yield Update, 2017-18 Water Year." The report provides a detailed evaluation of the consumptive use of water in each of the five subareas and establishes the Production Safe Yield for determining adjustments to Free Production Allowance.

The report was completed pursuant to the Courts request at the hearing of July 6, 2018. Status reports were given to the Court regarding the progress on completion on October 12, 2018 and January 31, 2019.

The following individuals provided information, analysis and support in preparation of this document. Their efforts were essential to the report's timely preparation and completion.

Valerie Wiegenstein, Watermaster Services Manager
Jeffrey D. Ruesch, Database Program Administrator, Watermaster
Emmett Campbell, Senior Watermaster Specialist
David Seielstad, Senior Watermaster Specialist
Jesse Gebauer, Geoscientist, Wagner & Bonsignore Consulting Engineers

Very truly yours,

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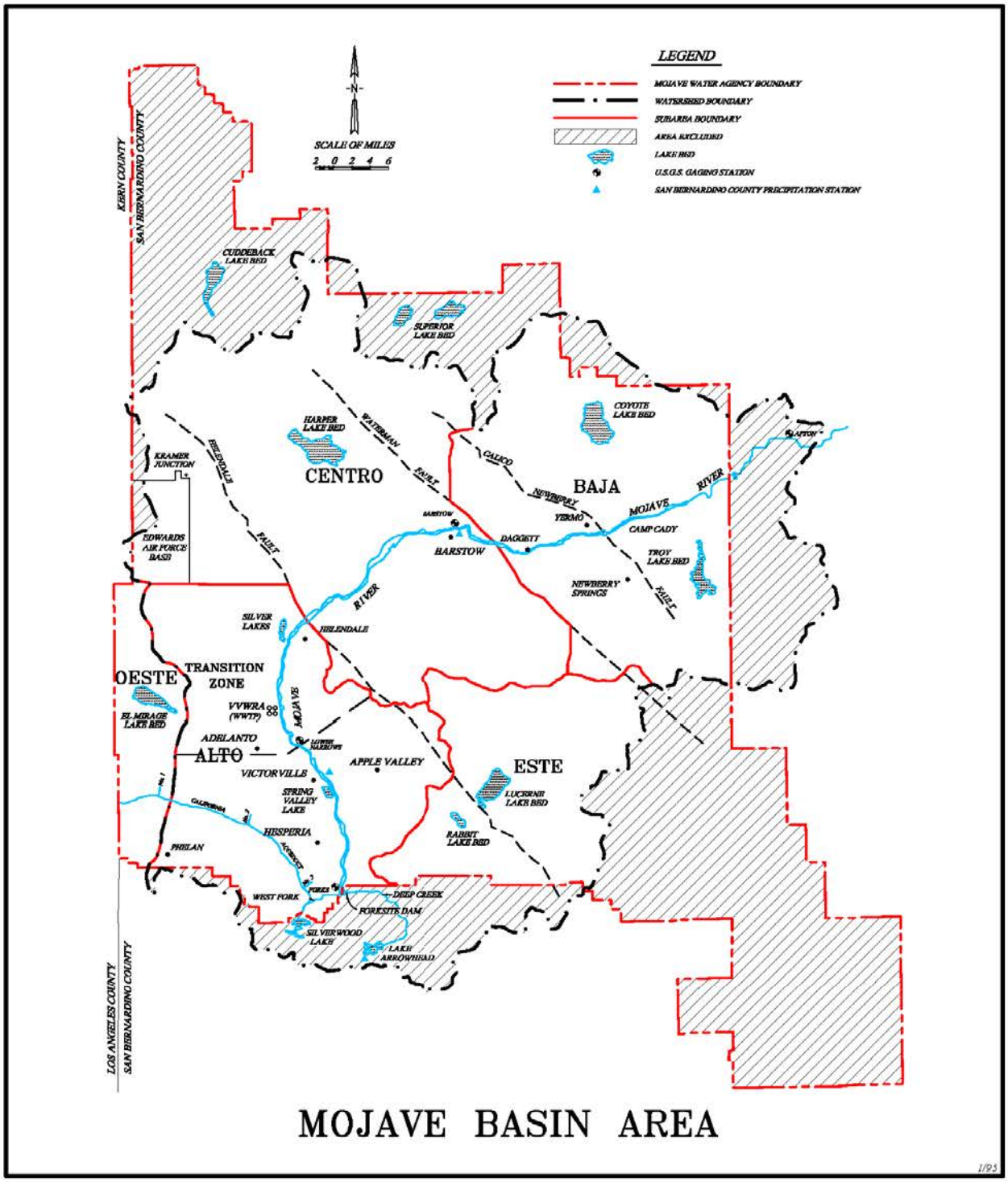
Table of Contents

Appendices

Attachments


LEGEND
MOJAVE WATER AGENCY BOUNDARY
WATERSHED BOUNDARY
SUBAREA BOUNDARY
AREA EXCLUDED
LAKE BED
U.S.G.S. GAGING STATION
SAN BERNARDINO COUNTY PRECIPITATION STATION
SCALE OF MILES
2 0 2 4 6
KERN COUNTY
SAN BERNARDINO COUNTY
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
CUDDEBACK LAKE BED
SUPERIOR LAKE BED
COYOTE LAKE BED
HARPER LAKE BED
CENTRO
BAJA
WATERMAN FAULT
CALICO FAULT
NEWBERRY FAULT
HELENDALE FAULT
KRAMER JUNCTION
EDWARDS AIR FORCE BASE
MOJAVE RIVER
YERMO
CAMP CADY
DAGGETT
BARSTOW
TROY LAKE BED
NEWBERRY SPRINGS
SILVER LAKES
HELENDALE
OESTE
TRANSITION ZONE
EL MIRAGE LAKE BED
VVWRA (WWTP)
ADELANTO
ALTO
VICTORVILLE
APPLE VALLEY
ESTE
LUCERNE LAKE BED
RABBIT LAKE BED
SPRING VALLEY LAKE
HESPERIA
PHELAN
WEST FORK
DEEP CREEK
FORESTA DAM
SILVERWOOD LAKE
LAKE ARROWHEAD
MOJAVE BASIN AREA
1/95

Consumptive Water Use Study and Production Safe Yield Update

Background and Extent of Investigation

The Judgment After Trial, January 1996 (Judgment) requires that Watermaster annually review conditions in the five Subareas of the Mojave Basin Area (MBA) for the purpose of establishing Free Production Allowance (FPA) for the next water year (water year commences October 1 of each year). Watermaster staff and engineer compile water production information for each party to the Judgment, evaluate land uses, sequential water uses and make estimates of consumptive use. In addition, elements of water supply, obligations under the Judgment and water levels in various wells throughout the Basin Area are evaluated.

The Judgment required that Production Safe Yield (PSY) be re-evaluated after 5 years to account for land use changes and possible changes in water supply conditions. In February 2000, Albert A. Webb Associates (Webb) prepared a report and update of the consumptive uses and estimates of the PSY for the 5 subareas established in the Judgement. The report presented herein is an update to the estimates by Webb.

The PSY calculation is defined in the Judgment and generally includes the 60-year average water supply (1931-1990) based on the published records of the USGS at West Fork, Mojave River and Deep Creek Mojave River, gaging stations (Appendix D). It is assumed that the water supply that occurred during the 60-year hydrologic base period will repeat in the future. The calculation assumes that the cultural conditions (pumping, patterns of water use, land uses, riparian water demands) for a given year are consistent throughout the 60-year hydrologic period.

The current investigation is primarily focused on changes in use by producers, changes in consumptive use, and return flow. In general water supply assumptions, for long term supply, made by Webb and established at trial are mostly unchanged. Specific changes to the elements of water supply use and disposal as reported by Webb and as estimated by Watermaster Engineer are shown on Table 1 (and shown in final form as Table 5-1 of the Watermaster Annual Report, included herein as Attachment 1).

Details of water supply and the estimated consumptive use for each producer in each subarea are discussed in more detail under various sections of this report. An evaluation of the long-term changes in groundwater gradients at subarea boundary locations is provided in the section on subsurface flow.

TABLE 1

Production Safe Yield Update
Based on Long-Term Average Natural Water Supply and Outflow, and Imports, Consumptive Use, and Production for 2018

(all amounts in acre-feet)

WATER SUPPLY	Este	Oeste	Alto	Centro	Baja	Basin Totals
Surface Water Inflow	1,700	1,500	~~69,100~~ 68,500 [1]	~~34,700~~ 33,600 [2]	~~14,400~~ 17,358 [3]	~~72,700~~ 72,652 [4]
Subsurface Inflow	0	0	1,000	2,000	~~1,200~~ 1,581 [5]	0 [6]
Deep Percolation of Precipitation[1]	0	0	3,500	0	100	3,600
Imports	~~2,630~~ 2,000	0	~~1,620~~ 2,234	~~0~~ 2,262 [8]	0	~~4,250~~ 6,496
TOTAL	**3,700**	**1,500**	**75,234**	**37,862**	**19,039**	**82,748**

CONSUMPTIVE USE AND OUTFLOW	Este	Oeste	Alto	Centro	Baja	Basin Totals
Surface Water Outflow	0	0	~~34,700~~ 33,600 [2]	~~14,000~~ 16,406 [8]	~~8,200~~ 5,372 [9]	~~8,200~~ 5,372
Subsurface Outflow	~~825~~ 200	~~350~~ 800	2,000	~~1,200~~ 1,581 [5]	0	0
Consumptive use						
Agriculture[10]	~~3,900~~ 2,327	~~2,300~~ 1,208	~~7,900~~ 1,311	~~13,000~~ 8,895	~~20,800~~ 17,664	~~47,900~~ 31,405
Urban[10,11]	~~2,200~~ 1,500	~~1,300~~ 1,724	~~40,700~~ 40,603	~~8,500~~ 7,557	~~7,900~~ 6,338	~~60,600~~ 57,722
Phreatophytes[13]	0	0	11,000	3,000	2,000	16,000 [12]
TOTAL	**4,027**	**3,732**	**88,514**	**37,439**	**31,374**	**110,499**
Surplus / (Deficit)	~~(2,595)~~ (327)	~~(2,450)~~ (2,232)	~~(20,905)~~ (13,280)	~~(3,000)~~ 423	~~(23,200)~~ (12,335)	~~(52,150)~~ (27,751)
Total Estimated Production[14]	~~9,751~~ 5,055	~~6,502~~ 3,944	~~90,767~~ 77,686	~~36,375~~ 20,665	~~43,879~~ 24,524	~~187,274~~ 131,874
PRODUCTION SAFE YIELD[15]	~~**7,156**~~ **4,728**	~~**4,052**~~ **1,712**	~~**69,862**~~ **64,406**	~~**33,375**~~ **21,088**	~~**20,679**~~ **12,189**	~~**135,124**~~ **104,123**

See Attachment 1 for final Production Safe Yield table with footnotes.

Water Supply

As indicated on Table 1, water supply includes gaged and ungaged inflow, subsurface flow, deep percolation of precipitation, and certain imports. Return flow is also an element of supply and is included as water production less consumptive use.

Surface Water Inflow, Gaged and Ungaged

Surface water inflow to the Basin Area is the measured flow of the Mojave River at the Forks and is the sum of the reported discharge of Deep Creek and West Fork Mojave River as recorded by the USGS stream gages (Appendix D). Surface water inflow to Este and Oeste is estimated based on information developed before trial and by Webb. Surface inflow to Este and Oeste is ungaged. Surface water supply to Oeste is from the Sheep Creek watershed. Surface water supply to Centro is estimated at the Helendale fault from the USGS gaging station records at Lower Narrows and adjustments for consumptive uses in the Transition Zone and contributions from discharges by Victor Valley Wastewater Treatment Plant (VVWRA). Surface water supply to Baja is estimated from USGS gaging station records at Barstow and adjustments for losses between the Barstow gage and Waterman fault.

Ungaged inflow to Alto is estimated from Webb and from the Judgment. Webb estimated ungaged inflow to Alto to be 3,500 acre-feet; the estimate in the Judgment is 3,000 acre-feet. For this report, ungaged inflow to Alto is estimated to be 3,000 acre-feet. USGS (Stamos 2001) estimated ungaged inflow to Alto for the 60-year period (1931-1990) and for the 69 years 1931-1968) to be about 2,400 acre-feet. The ungaged inflow to Alto is subject to further evaluation but we believe 3,000 acre-feet is more representative than the estimate by Webb and may overstate the actual amount.

Subsurface Inflow

Subsurface inflow to the Basin Area is estimated based on long term average water levels at subarea boundaries. Estimates of subsurface flow as indicated in the Judgment (Exhibit G), are considered to be representative of the current subsurface flows except for the Centro to Baja subarea. USGS modeling (Stamos 2001) estimated the total subsurface inflow to Baja including subsurface flow from Centro to be 1,581 acre-feet. Additional investigations in 2006 and 2019 by Watermaster Engineer (Subsurface Flows between Subareas, Appendix A) substantiated the estimates in Exhibit G of the Judgment. Subsurface inflow to Alto from Este (200 acre-feet) and from Oeste (800 acre-feet) is assumed to be unchanged from the estimates made for the Judgment. The subsurface flow from Alto to Centro is assumed to be 2,000 acre-feet, unchanged from the Judgment.

The basic methodology to estimate subsurface flow is to calculate a groundwater gradient at the subarea boundaries. Generally, the hydraulic properties of the soil medium are unchanged over time and the saturated thickness of the water bearing material is also relatively unchanged. Therefore, if the water levels measured in the same wells over different time periods do not change, the estimated subsurface flow will also not change.

Deep Percolation of Precipitation

As reported by USGS and by California Department of Water Resources (DWR) precipitation falling on the desert floor is 100% consumed by native vegetation or soil evaporation and therefore does not contribute to a subarea's water supply. DWR assumed that all precipitation less than 8 inches would be consumed and therefore estimates the deep percolation of precipitation only for areas exceeding 8 inches of average annual rainfall (DWR, Bulletin 84, 1967). DWR estimated the deep percolation of precipitation to be 3,500 acre-feet per year. Unless there are significant changes in land use in the upper watershed area where average annual precipitation exceeding 8 inches occurs, we will continue to include 3,500 acre-feet per year as part of supply. However, further study would be required to refine this value. In general precipitation throughout the Basin Area is less than 8 inches, averaging 6 to 4 inches or less in most areas. With the exception of the amount reported by DWR, there is very little supply from precipitation falling on the desert floor. Long term average annual precipitation is reported in the Watermaster Annual Report (WMAR) for Lake Arrowhead (upper Alto watershed), Victorville and Barstow (Annual Report, Figures 3-1 and 3-2). Average precipitation at Victorville is 5.42 inches and 4.54 inches at Barstow.

Total Estimated Production

Total water production is compiled annually for each producer and is the basis for estimating consumptive use of production. The total estimated production in the Mojave Basin Area for the 2017-18 water year was 131,874 acre-feet. This is down from 187,300 acre-feet of total production in the 1996-97 water year. Verified water production by individual producers is reported in the WMAR on Appendix B. During 2017-18, water production within the 5 subareas, excluding minimal producers was:

Este	4,101 acre-feet
Oeste	3,706 acre-feet
Alto	74,317 acre-feet
Centro	19,111 acre-feet
Baja	22,296 acre-feet

Minimal producers pumped an estimated 7,077 acre-feet. Consumptive use of minimal producers is included the PSY calculation.

Consumptive Water Use and Outflow

Outflow from each subarea is shown on Table 1. Total outflow from the Basin Area is measured at the USGS gage at Afton about 6 miles downstream from the Mojave Basin Area (MBA) boundary in Baja. Outflow from Alto to Centro is determined by a separate water balance calculation for the Transition Zone (TZ), (Definition of Transition Zone, see Judgment page 13). The water balance for the TZ is described in the WMAR on pages 23 and 24, and includes Figures 3-6 through 3-9. Figure 3-10 of the WMAR shows the result of this water balance analysis since 1991 (see Attachment 4).

The methodology for determining consumptive use and the total amount by type of use and by Subarea is included in Appendix B. Detailed evaluation of the consumptive water use for each producer is listed in Appendix C.

Water Supply Surplus/Deficit

The difference between the elements of water supply (inflow), outflow and consumptive results in either a surplus, or a deficit. The surplus/deficit for each subarea is shown on Table 5-1 of the WMAR (Attachment 1).

Production Safe Yield

The production safe yield for water year 2017-18 for all subareas was 104,123 acre-feet compared to 135,124 acre-feet in the 1996-97 water year. PSY is calculated as the difference between total pumping in a subarea and the deficit between total water supply and consumptive use and outflow. The results and recommendation for PSY are shown on Table 5-1 (Attachment 1).

Elements of supply included in PSY include certain imports that have been long term reliable supplies but could be interrupted. Wastewater effluent discharged to the MBA in Alto by Lake Arrowhead Community Services District (LACSD), and wastewater effluent discharged to Este by Big Bear Area Wastewater Reclamation Authority (BBAWRA), is included in the PSY calculation for those subareas. The amounts of discharge are reported in the WMAR page 20. PSY for 2018 is considered representative for future planning. Changes that occur in the annual amount discharged by these entities are evaluated annually and reported in the WMAR.

Results

The results of this investigation including changes to supply and consumptive uses are show below. The updated PSY as indicated on Table 5-1 (Attachment 1) for each subarea is as follows:

Este	4,728 acre-feet
Oeste	1,712 acre-feet
Alto	64,406 acre-feet
Centro	21,088 acre-feet
Baja	12,189 acre-feet

Imported Water Supply

In the 2017-18 water year, the Mojave Water Agency purchased and released 14,998 acre-feet of State Water Project Water into the Mojave River within the Alto Subarea, 165 acre-feet in the Centro Subarea, and 86 acre-feet in Baja. Water imported by MWA, or for certain storage accounts is not included in the PSY calculation, except that water imported for High Desert Power Plant is included to the extent of the consumptive use for HDPP (considered 100% for cooling for power generation).

References

Department of Water Resources (DWR). (1967). Mojave River Ground Water Basins Investigation. *Bulletin No. 84*.

State of California Superior Court. (1996). Mojave Basin Area Adjudication. Judgment After Trial. *City of Barstow, et al. v. City of Adelanto, et al. Riverside County Superior Court Case No. 208568*. January 10.

Stamos, C. L., Martin, P., Nishikawa, T., & Cox, B. F. (2001). Simulation of ground-water flow in the Mojave River basin, California. U.S. Geological Survey Water-Resources Investigations Report, 01-4002, version 3. doi:10.3133/wri014002

Webb, Albert A. Associates (2000). Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area.

Mojave Basin Area Watermaster (2019). Twenty-fifth Annual Report for Water Year 2017-18.

APPENDIX A

Evaluation of Subsurface Flows Between Subareas
Mojave Basin Production Safe Yield Update

Evaluation of Subsurface Flows Between Subareas
Mojave Basin Production Safe Yield Update

Introduction

As part of a Production Safe Yield update for the Mojave Basin, an evaluation of the subsurface (groundwater) flows between subareas was performed. An evaluation of subsurface flows was previously performed by Ernest M. Weber as part of the Albert A. Webb Associates (Webb) *Consumptive Use Water Study and Update of Production Safe Yield Calculations for the Mojave Basin Area* in 2000. The purpose of the Webb study was to evaluate, and if applicable, update Table C-1 of the Judgement after Trial (1996) to reflect cultural conditions on the long-term subsurface flow between subareas. The five subareas evaluated in the Webb report relied on 1998 groundwater elevation data obtained from the U.S. Geological Survey (USGS) as well as aquifer hydraulic parameters (transmissivity) developed in a USGS study by Hardt (1971).

In addition to the subsurface inflow/outflow data in Table C-1 and the analysis by Webb, subsurface flow through the Centro Subarea was analyzed in a 2005 study by California State University Fullerton (CSUF; Napoli and Laton, 2005). The current update incorporates and expands on the findings of this prior study by CSUF and further evaluates potential changes in water levels and flow gradients across the Centro-Baja Subarea boundary through 2016. Additionally, a study by the USGS (Stamos and others, 2001) was reviewed to further evaluate inflow data to the Baja Subarea.

In the prior studies by Webb (2000) and Napoli and Laton (2005), subsurface flows across the subarea boundaries were calculated using a form of Darcy's equation. In this equation, the flow across the boundary in gallons per day Q = TWI; where W is the width of aquifer at the basin boundary in feet; T (transmissivity) is the hydraulic conductivity of the aquifer material times the saturated thickness of the aquifer, expressed in gallons per day per foot of aquifer width; and I is the slope of the groundwater surface (i.e., the gradient). Of these parameters, the hydraulic conductivity and physical configuration of the basin boundary are not expected to change significantly over time. The variables that would be expected to affect short-term changes in groundwater flow across the subarea boundaries are the saturated thickness of the aquifer (which would change with changes in groundwater levels) and changes in the flow gradient. The basic premise of this update is that if groundwater levels and gradients have not changed since the prior studies, the subsurface flow previously estimated from those studies would also not have changed.

The work of Webb relied on 1998 groundwater data developed by the USGS. The current update also incorporates 1998 USGS groundwater data from a regional water table map, as well as subsequent maps for the years up to 2016 (the last published water table map by USGS) and historical water level data (well hydrographs) maintained by Mojave Water Agency. In addition, the USGS water table map for 1996 was reviewed, in addition to groundwater level hydrographs for wells near the subarea boundaries for years prior to 1998. From the preliminary review, we concluded that the conditions between 1996 (Judgement after Trial) and 1998 (update by Webb) were essentially unchanged. For the Centro-Baja subareas, water table maps and gradient calculations developed in the study by Napoli and Laton (CSUF, 2005) were also reviewed. For

our analysis of the Centro-Baja subareas, groundwater data from the USGS were compared to those developed by Napoli and Laton and were also updated using USGS data through 2016.

Subsurface Flow – Este to Alto and Oeste to Alto

In the Judgement after Trial (Table C-1, 1996), inflow to Alto Subarea was estimated at 1,000 acre-ft/yr, with 200 acre-ft/yr from Este subarea and 800 acre-ft/yr from Oeste. The subsurface flow from Este to Alto Subarea was calculated by Webb using average transmissivities across the basin boundary from a USGS study by Hardt (1971) and 1998 water level data from USGS. Webb's estimates of subsurface flow across the boundary ranged from 545 acre-ft/yr, up to 1,385 acre-ft/yr. Using an average transmissivity, the subsurface inflow from Este Subarea was estimated by Webb at 825 acre-ft/yr.

For this current update, the USGS water table maps for the vicinity of the Este-Alto subarea boundary for the years 1998 and 2016 were compared (see Figure 1). The USGS maps show the 2,825 groundwater elevation contour as lying at the boundary of the subareas. It was noted that the position of the 2,825 and 2,900 groundwater elevation contours were little changed between 1998 and 2016 water table maps. The gradient (slope) calculated between the two elevation contours for the years 1998 (0.0026 ft/ft) and 2016 (0.0027 ft/ft) were essentially the same. Based on this comparison, it appears that water levels and gradients across the Este-Alto subarea boundary in 1998 and 2016 are little changed.

The Webb report noted that the boundary between Oeste and Alto Subareas is roughly along Sheep Creek, where a groundwater mound is present. They concluded that no flow occurred across most of this boundary, except in a northern, two-mile segment of the boundary, south of the Alto-Transition Zone boundary. In this area, Webb adjusted the flow to account for the flat slope of the gradient across the boundary. The subsurface flow was estimated at about 350 acre-ft/yr.

Comparison of the 1998 and 2016 groundwater table maps by USGS indicate that the elevation and gradient of the water table at the Oeste-Alto boundary is little changed (see Figure 2). The location of the 2,800 and 2,900 groundwater elevation contours are nearly unchanged, with a groundwater gradient ranging from about 0.0047 to 0.0062 feet per foot between contours. Review of MWA hydrograph maps also show little change in water levels near the subarea boundary since the early 1990s. Webb estimated subsurface inflow from Este and Oeste at 1,175 acre-ft/yr, somewhat higher overall than 1,000 acre-ft/yr listed on Table C-1 of the Judgement after Trial. However, as discussed, the subsurface flows estimated in the Webb update is an average based on a range of possible transmissivities of the aquifer.

Subsurface Flow – Alto to Centro

The boundary of the Alto and Centro subareas is defined by the Helendale Fault. The subsurface flow across the boundary was assumed to be 2,000 acre-ft/yr in Table C-1 of the Judgement after Trial and was accepted by Webb in their study. Groundwater elevations and gradients in the Floodplain Aquifer along the Mojave River were compared in the current update using the 1998 and 2016 USGS water table maps (see Figure 3). In comparing the 1998 and 2016 data, the

location of the 2,400 and 2,500 groundwater elevation contours just up gradient of the Helendale Fault were noted to be little changed. The gradient was also calculated to be 0.0032 ft/ft during the two periods. The hydrogeologic conditions between 1998 and 2016 appear essentially unchanged and the subsurface flow presented in Table C-1 and in Webb's report would then also appear to be unchanged.

Well hydrographs developed by USGS and MWA indicate that water levels in several wells completed within the shallow Floodplain Aquifer are influenced by large storm events and rise rapidly after those events (such as in 2005 and 2010-11). Water levels then slowly decline over the next several years, until the next large storm event. Overall, when peak water levels were compared after storm events, they appeared to be similar. It appeared that water levels recovered after episodic large storm events, with the highest water levels generally consistent over time.

Subsurface Flow – Centro to Baja

The report by Webb accepted the subsurface flows listed in Table C-1 of the Judgement after Trial, which is estimated at 1,200 acre-ft/yr. The net subsurface inflow to Baja was subsequently revised to 1,581 acre-ft/yr, based on groundwater studies by the USGS.

In their study of groundwater flow between the Centro and Baja Subareas, Napoli and Laton (CSUF, 2005) prepared groundwater elevation contour maps and calculated flow gradients for the years 1960, 1993, and 2004. During this period, the flow gradient across the boundary (defined as the Waterman Fault; also referred to on the USGS maps as the Camp Rock-Harper Lake fault) was calculated by CSUF (Napoli and Laton, 2005) to range from 0.0047 ft/ft. (1960) to 0.0052 ft/ft (1993 and 2004), which amounts to only a variation of 0.0005 ft/ft over a 43-year period. Based on their analysis, the CSUF report concluded that groundwater levels had been stable across the Centro Subarea over the period from1990 to 2005. Further, since Centro Subarea had seen no substantial change in water levels "then it can be said that no change in flow across the subarea boundary has occurred" (Napoli and Laton, CSUF, 2005).

It should be noted that the transect used to calculate gradient in the 2005 study by Napoli and Laton is somewhat oblique to groundwater contours and so the groundwater flow gradient calculated by them is somewhat flatter than if the transect were drawn perpendicular to contours (to measure the maximum slope of the water table). In addition, the transect selected by Napoli and Laton crosses the Waterman Fault/subarea boundary, so that the gradient calculated is actually an average value of a somewhat flatter gradient west of the fault/subarea boundary and somewhat steeper gradient east of the fault/boundary.

As part of the current update, additional flow gradients were calculated using USGS water table maps, along the same transect as shown on the Napoli and Laton (2005) report, for the years 1998, 2006, and 2016 (see Figure 4). For those years, the calculated gradients ranged from 0.0045 ft/ft. to 0.0053 ft/ft., essentially the same as calculated by Napoli and Laton.

To be consistent with historical gradient comparisons at other subarea boundaries, USGS water level data were also used to compare 1998 and 2016 gradients within the easternmost Centro

subarea, just west of the Waterman fault/subarea boundary. For those years, the average calculated gradient was nearly identical, at 0.0023 ft/ft in 1998 and 0.0025 ft/ft in 2016.

The position of 2,020 and 2,150 groundwater elevation contours on the USGS maps, which are located just west of the Waterman Fault and Centro-Baja boundary, were compared for the years 1998 and 2016 (see Figure 4). The position of the groundwater level contours shifted only very slightly between the years analyzed, which supports the conclusion by CSUF that water levels within the Centro Subarea have not changed substantially over time. The annual subsurface flow across the subarea boundary appears to be little changed since 1998, as concluded by Napoli and Laton (CSUF, 2005) and the current update.

Conclusions

Although the water table maps by USGS reveal groundwater pumping depressions and areas of local groundwater declines within the Mojave basin, the current analysis found little change in groundwater levels or gradients at the subarea boundaries evaluated. In particular, the current analysis indicates that subsurface flows through the Alto Transition Zone to Centro Subareas, and from the Centro to Baja Subareas remain essentially unchanged from the prior evaluations by Webb in 2000, Stamos and others (USGS, 2001), and CSUF (Napoli and Laton) in 2005. Therefore, it appears that the subsurface component of the subarea obligations called for in the Judgement continue to be met.

References

Webb, Albert A. Associates, 2000, Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area: Consultant's report to the Mojave Basin Area Watermaster, dated February 16, 2000, 234p.

Hardt, W.F., 1971, Hydrologic Analysis of Mojave River Basin, California, Using Electric Analog Model: U.S. Geological Survey Open File Report 72-157, 91p.

Mojave Water Agency, 2018, Subarea Hydrograph Maps: http://www.mojavewater.org/subarea-hydrograph-gallery.html

Napoli, N. and Laton, W.R., 2005, Groundwater Flow Between Basins Report, Mojave River Basin, Centro – Baja Hydrologic Subareas: California State University Fullerton, report to the Mojave Water Agency, October 2005, 43p., with illustrations.

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. Geological Survey Water-Resources Investigations Report 01-4002, Version 3, 137p., with illustrations.

U.S. Geological Survey, 1992 to 2016, Regional Water Table (Year) in the Mojave River and Morongo Groundwater Basins, Southwestern Mojave Desert, California: Scientific Investigations Map Series (various lead authors), Scale 1:170,000: available at: https://ca.water.usgs.gov/mojave/mojave-water-levels.html

Weber, E.M. (Supervising Geologist), 1967, Mojave River Groundwater Basins Investigation: California Department of Water Resources, Bulletin 84, 196p, with figures and tables.

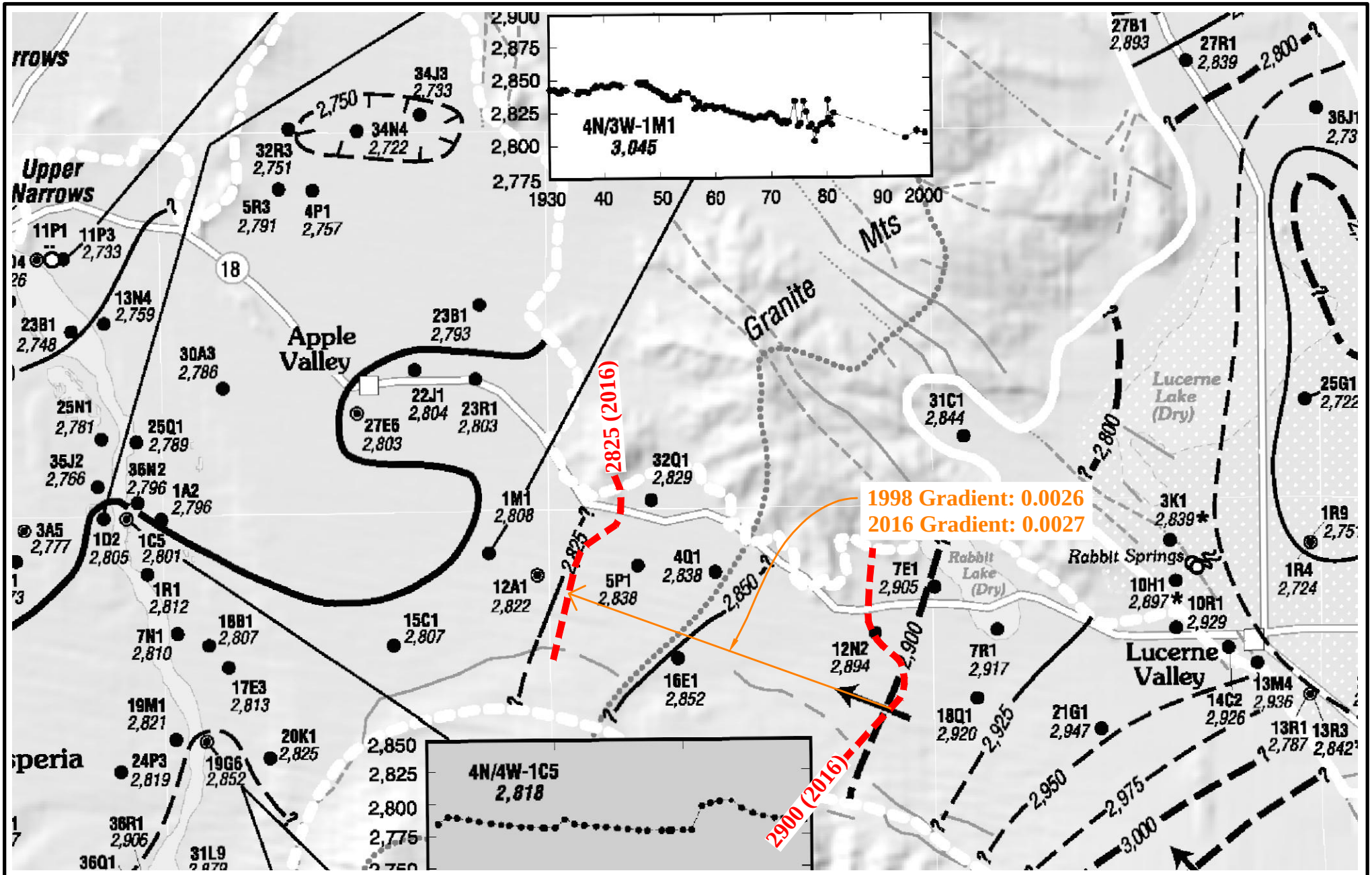


Figure 1
1998-2016 Comparison
Groundwater Levels & Gradients
Alto-Este Boundary

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Base map per USGS 1998 Groundwater Contour Map.

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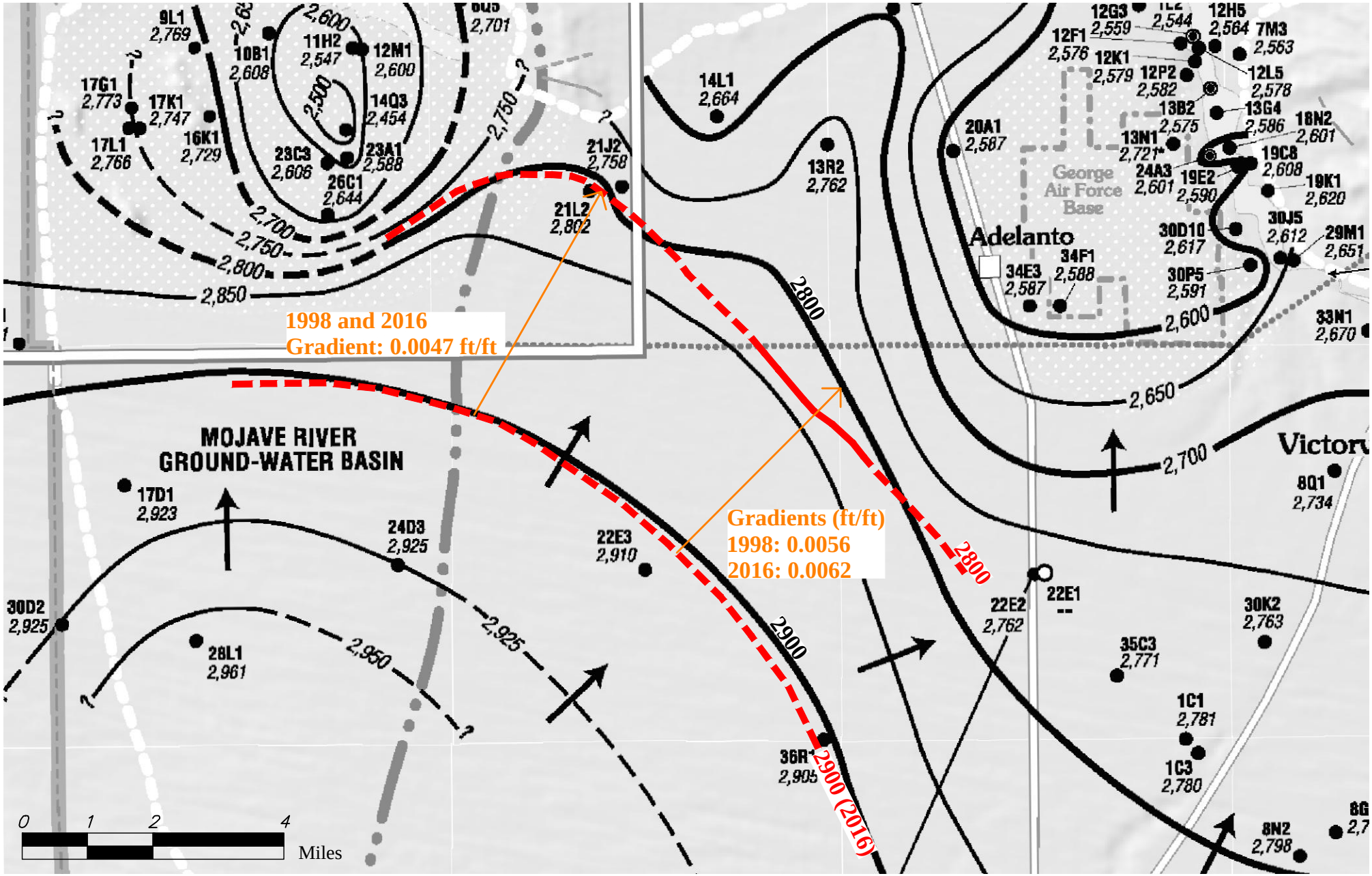
April 2019



2900 2016 Groundwater Contour (ft)

2800 1998 Groundwater Contour (on Base Map)

0.0047 Caculated Gradient and Flow Direction (ft/ft)

Figure 2
1998-2016 Comparison
Groundwater Levels & Gradients
Alto-Oeste Boundary

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Base map per USGS 1998 Groundwater Contour Map.

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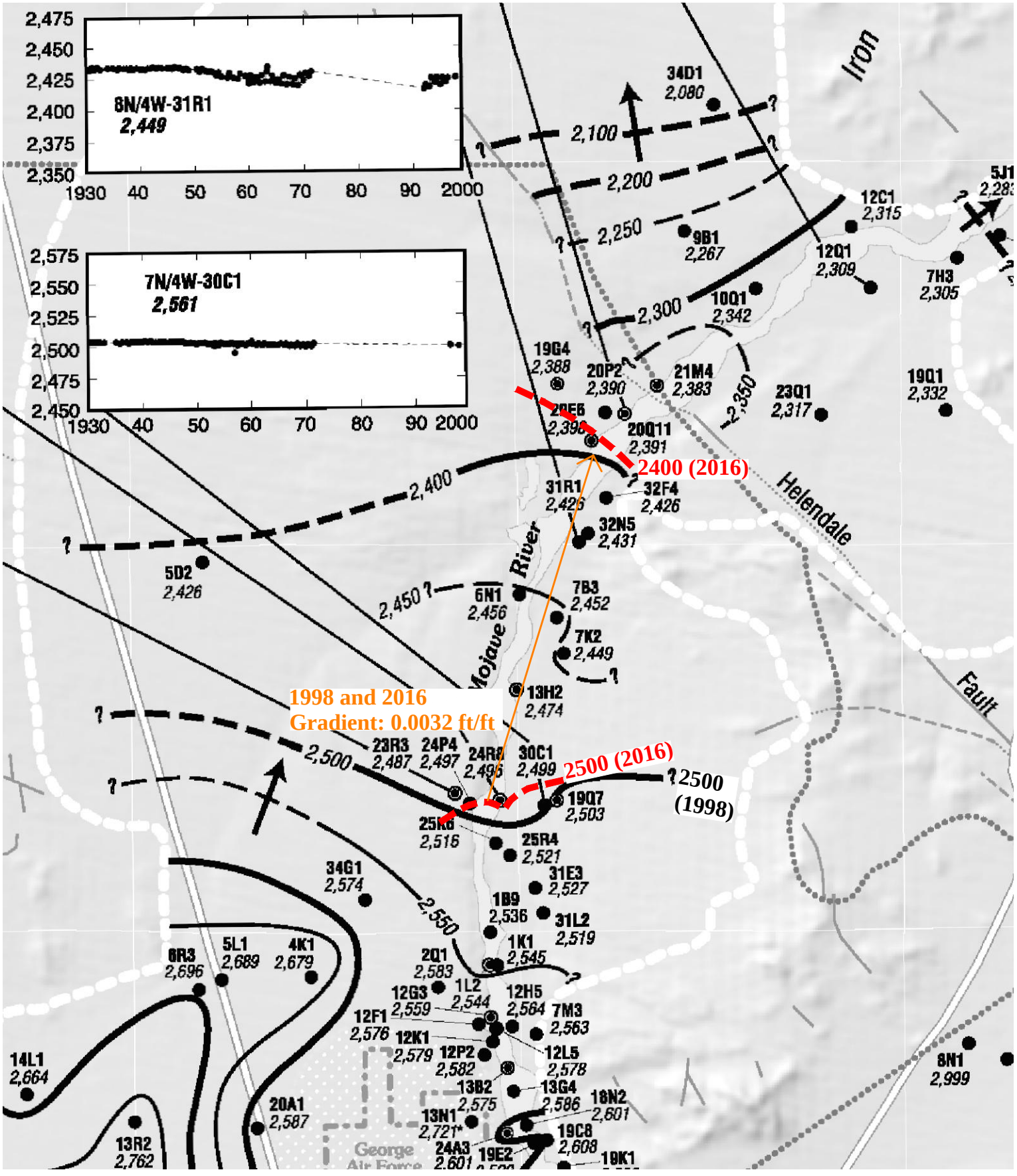
April 2019



2400 2016 Groundwater Contour

280 1998 Groundwater Contour (on Base Map)

0.0032 Caculated Gradient and Flow Direction

Figure 3
1998-2016 Comparison
Groundwater Levels & Gradients
Alto TZ-Centro Boundary

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Base map per USGS 1998 Groundwater Contour Map.

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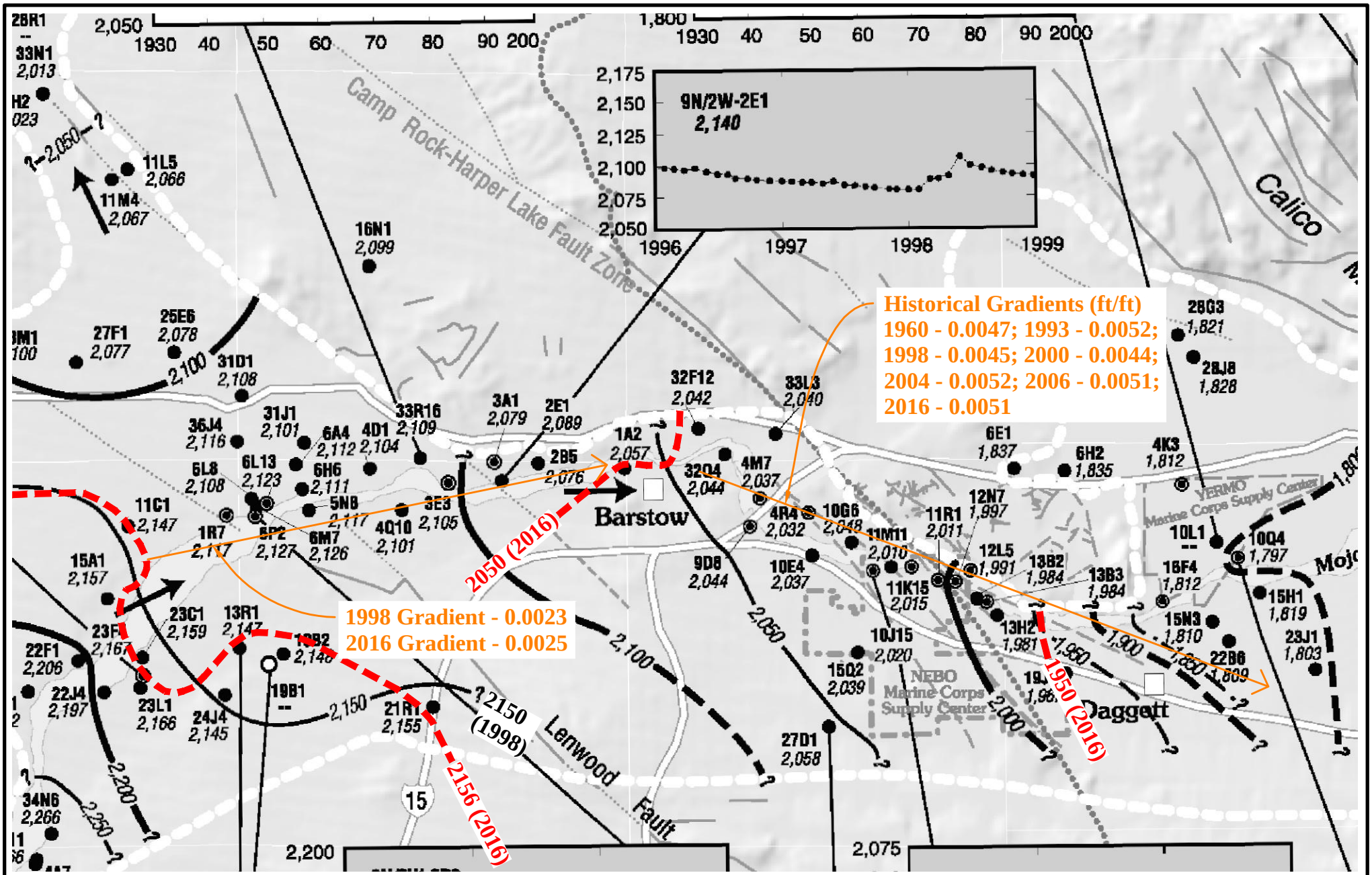
April 2019



2050 2016 Groundwater Contour

2050 1998 Groundwater Contour (on Base Map)

0.0042 Caculated Gradient and Flow Direction

Figure 4
1998-2016 Comparison
Groundwater Levels & Gradients
Centro-Baja Boundary

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Base map per USGS 1998 Groundwater Contour Map.

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April 2019

APPENDIX B

Consumptive Water Use Analysis for 2017-18

Consumptive Water Use Analysis for 2017-18

Introduction

The purpose of this update to the consumptive water use values for the Mojave Basin Area Watermaster for the 2017-18 water year is to refine estimates of consumptive use and return flow and ultimately re-calculate Production Safe Yield (PSY). The area of study is the five subareas of the Mojave Basin Area as identified in the Judgment After Trial - January 10, 1996. These subareas are Este, Oeste, Alto, Centro, and Baja. Each of these subareas are hydrologically connected, yet, they are climatologically distinct. Consumptive water use for all the water production in the Mojave Basin Area was estimated based on the water use type and location.

Some portion of the water applied to beneficial uses is lost to the water supply system. Consumptive Water Use is the evapotranspiration and the evaporation of water applied to beneficial uses. This is the water permanently removed from the system. The difference between water produced (pumped from the ground) and water consumed is return flow; return flow is considered part of the supply to the extent that it returns to the groundwater body.

The consumptive use crop unit values for irrigated acres is estimated using the Consumptive Use Program Plus (CUP+) from the California Department of Water Resources (DWR). The climate data used for CUP+ is from the California Irrigation Management Information System (CIMIS) for the Victorville and Newberry Springs stations and the crop coefficients for various crop types are from the Food and Agriculture Organization of the United Nations 56 (FAO 56). CUP+ in conjunction with CIMIS data utilized the Penman-Monteith equation to calculate a reference evapotranspiration value along with an applied water use value for each crop type. The consumptive use unit values for each subarea including the Transition Zone can be found on Tables 1 through 6.

Reference evapotranspiration calculated by CIMIS differs from the output of DWR's CUP+. CIMIS uses a modified Penman equation (referred to as the "CIMIS Penman equation"), while CUP+ uses a modified Penman-Monteith equation to calculate reference evapotranspiration. In addition, in order to complete the monthly climatological record, missing daily climate values were manually computed as the average of the previous day and the following day. On occasions when there was missing climatological data for many consecutive days, climate data was filled with data from the nearest CIMIS station.

For agriculture, a land use study using CUP+ applied water values and aerial photography were used to determine how much water should have been used if a crop is 100% efficient and is being irrigated to obtain optimal yield and coverage. For much of the Mojave Basin Area, crops are under-irrigated and this can be seen by the quality of the crop where there may be poor coverage (dead spots) or a crop may be fallowed during certain parts of the year. This is especially true for the Baja subarea where many crops may be grown for only one quarter or where orchards may appear under-irrigated to the point where many trees may have died. For this report, the assumptions made for orchards are that the trees are mature, that the coverage of trees is optimal, and that the size and quality of the fruit (or nut) is high. If any of these conditions are not met, the orchard is most likely being under-irrigated, and therefore, does not contribute to any return flow.

TABLE 1
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
ALTO SUBAREA

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.39	0.26	0.21	0.21	0.27	0.36	0.58	0.65	0.84	0.85	0.83	0.65	6.10
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.39	0.26	0.06	0.16	0.26	0.32	0.58	0.65	0.84	0.83	0.83	0.65	5.83
Grass	0.31	0.21	0.15	0.13	0.21	0.26	0.47	0.52	0.67	0.66	0.67	0.52	4.78
Other Orchard	0.16	--	--	--	--	0.20	0.46	0.62	0.93	0.96	0.96	0.69	4.98
Pasture	0.37	0.24	0.11	0.15	0.24	0.30	0.56	0.62	0.80	0.78	0.79	0.62	5.58
Row Crops	--	--	--	--	--	0.25	0.47	0.54	0.74	0.74	0.63	--	3.37

[(1)] Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Victorville CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

TABLE 2
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
TRANSITION ZONE

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.39	0.26	0.21	0.21	0.27	0.36	0.58	0.65	0.84	0.85	0.83	0.65	6.10
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.39	0.26	0.17	0.16	0.26	0.32	0.58	0.65	0.84	0.83	0.83	0.65	5.94
Grass	0.31	0.21	0.12	0.13	0.20	0.25	0.47	0.52	0.67	0.66	0.67	0.52	4.73
Pasture	0.37	0.24	0.06	0.15	0.24	0.30	0.56	0.62	0.80	0.79	0.79	0.62	5.54

[(1)] Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Victorville CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

TABLE 3
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
BAJA SUBAREA

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.57	0.38	0.30	0.27	0.38	0.49	0.78	0.87	1.05	1.01	1.03	0.81	7.94
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.57	0.38	0.12	0.27	0.38	0.44	0.78	0.85	1.05	0.93	1.02	0.81	7.60
Grain	--	0.13	0.01	0.23	0.42	0.49	0.73	0.29	--	--	0.00	0.00	2.30
Grass	0.46	0.31	0.23	0.22	0.30	0.34	0.62	0.68	0.84	0.73	0.82	0.65	6.20
Other Orchard	0.16	--	--	--	--	0.26	0.62	0.81	1.16	1.08	1.18	0.92	6.19
Pasture	0.54	0.36	0.17	0.26	0.36	0.41	0.74	0.81	0.99	0.92	0.97	0.77	7.30
Pistachios	0.39	--	--	--	--	--	0.23	0.64	1.19	1.11	1.21	0.83	5.60
Row Crops	--	--	--	--	--	0.34	0.62	0.71	0.92	0.84	0.89	--	4.32
Sudan Grass	0.64	--	--	--	--	--	0.40	0.85	0.83	0.64	1.06	0.94	5.36
Sorghum	0.46	0.03	--	--	--	--	0.16	0.29	0.81	0.97	1.07	0.84	4.63
Teff Grass	0.54	0.36	0.17	0.26	0.36	0.41	0.74	0.81	0.99	0.92	0.97	0.77	7.30

[(1)] Crop Evapotranspiration (ET_C), and Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Newberry Springs II CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

[(2)] Teff grass irrigated like pasture. Source: http://www.extension.uidaho.edu/forage/Proceedings/2009%20proceedings/Teff.pdf

TABLE 4
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
CENTRO SUBAREA

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.57	0.38	0.30	0.27	0.38	0.49	0.78	0.87	1.05	1.01	1.03	0.81	7.94
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.57	0.38	0.09	0.27	0.38	0.44	0.78	0.85	1.05	0.93	1.02	0.81	7.57
Grain	--	0.13	0.03	0.23	0.41	0.49	0.73	0.25	--	--	0.00	0.00	2.27
Grass	0.46	0.31	0.23	0.22	0.30	0.34	0.62	0.68	0.84	0.73	0.82	0.65	6.20
Jujube	--	--	--	--	--	--	--	0.41	0.84	1.16	1.30	0.73	4.44
Pasture	0.54	0.36	0.15	0.26	0.36	0.41	0.74	0.81	1.00	0.92	0.97	0.77	7.29
Pistachios	0.38	--	--	--	--	--	0.23	0.64	1.19	1.16	1.21	0.83	5.64
Row Crops	--	--	--	--	--	0.34	0.62	0.71	0.92	0.84	0.80	--	4.23
Sorghum	0.45	--	--	--	--	--	0.16	0.28	0.81	0.97	1.07	0.84	4.58
Sudan Grass	0.66	0.09	--	--	--	--	0.40	0.85	0.86	0.64	1.06	0.94	5.50

[(1)] Crop Evapotranspiration (ET_C), and Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Newberry Springs II CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

TABLE 5
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
ESTE SUBAREA

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.39	0.26	0.21	0.21	0.27	0.36	0.58	0.65	0.84	0.85	0.83	0.65	6.10
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.39	0.26	0.05	0.16	0.26	0.32	0.58	0.65	0.84	0.83	0.83	0.65	5.82
Grain	--	0.09	0.07	0.13	0.28	0.36	0.55	0.22	--	--	0.00	0.00	1.70
Grass	0.31	0.21	0.12	0.13	0.20	0.25	0.47	0.52	0.67	0.66	0.67	0.52	4.73
Jujube	--	--	--	--	--	--	--	0.32	0.67	1.03	1.06	0.55	3.63
Other Orchard	--	--	--	--	--	0.20	0.46	0.62	0.93	0.96	0.96	0.74	4.87
Pasture	0.37	0.24	0.06	0.15	0.24	0.30	0.56	0.62	0.80	0.79	0.79	0.62	5.54
Pistachios	0.27	0.05	--	--	--	--	0.20	0.49	0.96	0.99	0.99	0.67	4.62
Row Crops	--	--	--	--	--	0.25	0.47	0.54	0.74	0.74	0.63	--	3.37
Teff Grass	0.37	0.24	0.06	0.15	0.24	0.30	0.56	0.62	0.80	0.79	0.79	0.62	5.54

[(1)] Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Victorville CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

[(2)] Teff grass irrigated like pasture. Source: http://www.extension.uidaho.edu/forage/Proceedings/2009%20proceedings/Teff.pdf

TABLE 6
MOJAVE BASIN AREA WATERMASTER
ESTIMATED UNIT CROP DEMAND BASED ON DWR'S CUP+ PROGRAM
WATER YEAR 2017-18
OESTE SUBAREA

	ET_O[(1)] (ft)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Reference Evapotranspiration	0.39	0.26	0.21	0.21	0.27	0.36	0.58	0.65	0.84	0.85	0.83	0.65	6.10
	ET_{AW}[(1)] (ft)												
Crop	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Total**
Alfalfa	0.39	0.26	0.15	0.16	0.26	0.32	0.58	0.65	0.84	0.83	0.83	0.65	5.92
Grain	--	0.09	0.07	0.13	0.28	0.36	0.55	0.22	--	--	0.00	0.00	1.70
Grass	0.31	0.21	0.12	0.13	0.20	0.25	0.47	0.52	0.67	0.66	0.67	0.52	4.73

[(1)] Evapotranspiration of Applied Water (ET_{AW}) results found using DWR's CUP+ Program Version 6.9 based on daily climate data measured at the Victorville CIMIS Station, soil properties found using USDA Natural Resources Conservation Service Web Soil Survey program, and crop development data from FAO Irrigation and Drainage Paper No. 56 (Allen, R.K., L.S. Pereira, D. Raes, and M. Smith, 1998). Daily weather data from CIMIS was used by CUP+ to compute daily Reference Evapotranspiration (ETO) using the Penman-Montieth equation.

Land Use Categories

Each type of production is associated with a land use type. There are 10 different land use types categorized by the Mojave Basin Area Watermaster. These include agricultural, dairy, municipal, domestic, golf course, industrial, parks, recreational lakes, and aquaculture. Land use categories also include subcategories. The land use types can be found on Table 7 below.

TABLE 7
MOJAVE BASIN AREA WATERMASTER
LAND USE CATEGORIES

WATER USE	WATER SUB 1	WATER SUB 2
Agriculture	Alfalfa	Apricots
Aquaculture	Commercial	Apples
Dairy	Domestic	Barley
Domestic	Grain	Cattle
Golf Course	Livestock	Dairy
Industrial	Mobile Home Park	Domestic
Municipal	Municipal	Horses
No Use	Orchard	Peaches
Parks	Pasture	Pistachios
Recreational Lakes	Recreational Lake	Pomegranates
	Row Crops	Poultry
	Sod	Ostriches
	Sorghum	Recreational Lakes
	Sudan Grass	Sudan Grass
		Jujubes

Consumptive Use of Irrigated Acreage

Aerial photography is used in conjunction with Watermaster field visit photographs and producer interviews to determine what kind of crop is being grown. Using Geographic Information Systems (GIS) and yearly aerial photography, the total acreage being irrigated is determined. This is done for crops, golf courses, and parks. In some instances, a producer may plant different crops on the same land at different times of the year. The consumptive use is estimated for both crops. Table 8 shows the total crop type by subarea.

TABLE 8
MOJAVE BASIN AREA WATERMASTER
2017-18 ESTIMATES OF NET IRRIGATED ACREAGE BY CROP TYPE
(ALL AMOUNTS IN ACRES)

Subarea	Alfalfa	Grain	Sudan Grass	Sorghum	Orchard	Pasture	Row Crops	Sod	Teff Grass
Alto	155	0	0	0	0	118	1	51	0
Baja	2,550	916	232	0	694	21	2	0	260
Centro	1,032	209	61	307	48	34	1	0	0
Este	290	37	0	0	156	34	25	0	60
Oeste	149	147	0	0	0	0	0	0	0
Totals	**4,176**	**1,309**	**293**	**307**	**898**	**207**	**29**	**51**	**320**

The total consumptive use of a crop is determined by multiplying the consumptive use of applied water by the total number of irrigated acres. This gives the potential consumptive use in acre-feet. Subtracting the potential consumptive use from the total production for a particular crop yields the consumptive use and the return flow for that specific producer. If the potential consumptive use is higher than the total production, it is assumed that the crop is being under-irrigated and that 100% of the production was consumed.

Consumptive Use of Municipal Production

Consumptive use of municipal production is determined by separating indoor use from outdoor use. For the purposes of this study, indoor domestic use is assumed to be 100% return flow and outdoor use is considered to be 100% consumed. High rates of evaporation in the desert, conservation, restrictions on outdoor uses, changes in landscaping to desert landscapes, ordinances preventing over irrigation, and improved leak detection all support the assumption of 100% outdoor consumptive use. Indoor consumptive use is difficult to measure, and whether water is discharged to sewer or septic, it is assumed to be returned to the system. Municipal leaks in distribution systems are assumed to not contribute to return flow. Leaks are assumed to be repaired timely and thus do not contribute to return flow.

To determine indoor use, the Victor Valley Wastewater Reclamation Authority's (VVWRA) 2009 Flow Projection Analysis was used to estimate gallons per capita per day (gpcd). For a single-family residence (SFR), the sewer generation rate is 57 gpcd and for a multi-family residence (MFR), the sewer generation rate is 46.7 gpcd. Total indoor use is determined by population from census data. Resident population estimates for individual municipalities was determined by using census data and Beacon Economics Growth Forecast (2015). SFR and MFR population numbers were determined by extrapolating total single-family homes versus total multi-family homes. It is assumed that the average occupancy of a SFR is the same as the average occupancy of a MFR. Sewered and septic parcels are determined using GIS data from VVWRA and individual municipalities. Population numbers for the sewered parcels were obtained by extrapolating the

area of sewered parcels with population data from the 2010 census. It is also assumed that all new construction (assumed as population growth) is sewered.

The municipal production is broken down into different categories including SFR, MFR, commercial, industrial, irrigation, other, and system losses. Since the municipal producers do not report this information to the Watermaster, the values were extrapolated using the 2015 Urban Water Management Plans for each municipality, where these values were reported to the State.

The average consumptive use for municipal producers varies by subarea. In the Upper Alto region, the average 2018 municipal consumptive use was 51%. In the Transition Zone, the average 2018 municipal consumptive use was 36%. In the Centro subarea, the average 2018 municipal consumptive use was 25%. In the Baja subarea, the average 2018 municipal consumptive use was 95%. In the Este subarea, the average 2018 municipal consumptive use was 51%. In Oeste, the average municipal consumptive use was 32%.

Commercial water use values were calculated by taking the total commercial area and multiplying by a factor for gallons per square foot per day (gal/sf/day). The commercial square footage for each City was obtained from the VVWRA flow projection model and the "future" values were estimated using the average population growth from Beacon Economics (2015).

Consumptive use for domestic production uses the average indoor production estimates for each subarea. It is assumed that the production for single family residences with a well is comparable to single family residences on municipal water. This is done for each subarea including the Transition Zone separate from the Upper Alto region.

Dairy production is assumed to be 100% consumptively used. The water used for dairy operations is either consumed by the cows or evaporated after a wash down of the dairy facilities.

Consumptive use for golf courses is estimated in the same manner as other crops. Grass, sod, and park have the same consumptive use factor as golf courses.

Industrial production is assumed to be 100% consumptively use.

Consumptive use for recreational lakes is calculated at 100% of verified production. This is due to lake consumptive use only being evaporation off the top of the lake. Aquaculture consumptive use is considered the same as a recreational lake.

In the Judgment, a Minimal Producer is defined as a producer who used less than 10 acre-feet during the 1986-90 base period. Minimal producer total production is assumed to be the same as reported by Albert A. Webb Associates in February 2000. The consumptive use for minimal producers is treated the same as domestic use and is calculated based on the average indoor use for single family residences. The only exception is for the Baja subarea where minimal producer population was used to estimate consumptive use. Baja minimal producer consumptive use was calculated differently because many of the minimal producers have private lakes and small orchards and therefore, use water differently than minimal producers in the other subareas. Minimal producer production and consumptive use are listed below on Table 9.

TABLE 9
MOJAVE BASIN AREA WATERMASTER
MINIMAL PRODUCER CONSUMPTIVE USE BY SUBAREA
(ALL AMOUNTS IN ACRE-FEET)

Subarea	Estimated Total Production	Consumptive Use
Este	954	489
Oeste	238	75
Alto	2,104	1,075
Centro	1,553	396
Baja	2,228	1,996

Total consumptive use by subarea was broken down into land use categories which can be found on Table 10. The consumptive use by category is the sum of the land use types from Table 7.

TABLE 10
MOJAVE BASIN AREA WATERMASTER
CONSUMPTIVE USE BY CATEGORY FOR EACH SUBAREA
(ALL AMOUNTS IN ACRE-FEET)

Use Type	Este	Oeste	Alto	Centro	Baja
Agricultural	2,327	674	1,311	8,679	17,547
Dairy	0	534	0	216	117
Municipal	223	1,633	28,383	2,775	330
Domestic	534	79	1,197	416	3,155
Golf Course	0	0	3,775	17	0
Industrial	703	12	3,735	4,276	995
Parks	36	0	316	0	11
Recreational Lakes	4	0	3,037	73	1,837
Aquaculture	0	0	160	0	10
Agricultural Subtotal	2,327	1,208	1,311	8,895	17,664
Urban Subtotal	1,500	1,724	40,603	7,557	6,338
Total	**3,827**	**2,932**	**41,914**	**16,452**	**24,002**

Notes
1. Consumptive use categories are summed from Appendix C.
2. CDFW North Narrows Park in Alto has 41 acres of "Pasture" in the wetlands behind the park that is not part of the phreatophyte consumptive use. The "pasture" is categorized under recreational lakes in Appendix C. This usage has been moved to the "Agriculture" category for this table.
3. Due to rounding, the sums of the individual items may not be equal to the totals.

Differences Between Webb and 2017-18 Consumptive Use Reports

Albert A. Webb and Associates (Webb) produced a consumptive water use report in 2000 for the Watermaster. The Webb report incorporated the cultural conditions that existed during the 1996-1997 Water Year.

Municipal Consumptive Use

In the Webb report, the municipal consumptive use was estimated at 50% of total production. The 2018 report calculated consumptive use using VVWRA flow projections coupled with producer and population data to estimate total consumptive use. In the Upper Alto region, the average 2018 municipal consumptive use was 51%. In the Transition Zone, the average 2018 municipal consumptive use was 36%. In the Centro subarea, the average 2018 municipal consumptive use was 25%. In the Baja subarea, the average 2018 municipal consumptive use was 95%. In the Este subarea, the average 2018 municipal consumptive use was 51%. In Oeste, the average municipal consumptive use was 32%.

Agricultural Consumptive Use

If the total production was higher than 65% of total production, the Webb report defaulted to 65% consumptive use. In the 2018 report, if the potential consumptive use is over 100% of total production, then the crop is considered to be under-irrigated and will therefore have no return flow.

Minimal Producers

In the Webb report, minimal producer consumptive use is defaulted to 50% of total production. In the 2018 report, minimal producer consumptive use is determined by using the average municipal consumptive use by subarea. In the case of Baja, minimal producer population numbers were used to estimate the consumptive use for Baja minimal producers.

Production Safe Yield

Production Safe Yield (PSY) is defined in the Judgment as "*The 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.*" In the Webb report, the total PSY for the Mojave Basin Area was estimated to be 135,124 acre-feet. In the 2018 report, the total PSY of all the basins is estimated to be 104,123 acre-feet.

One aspect of the PSY is the return flow from production. For the Mojave Basin Area, return flow is counted as part of the supply. The main difference between the water balance conditions from the Webb and 2018 reports is that the total amount of return flow decreased. Figures 1 and 2 display the main differences in the water balance conditions for the Baja and Alto subareas from the Webb and 2018 reports.

FIGURE 1
COMPARISON OF PRODUCTION SAFE YIELD ELEMENTS
WEBB STUDY AND 2018 STUDY
BAJA SUBAREA

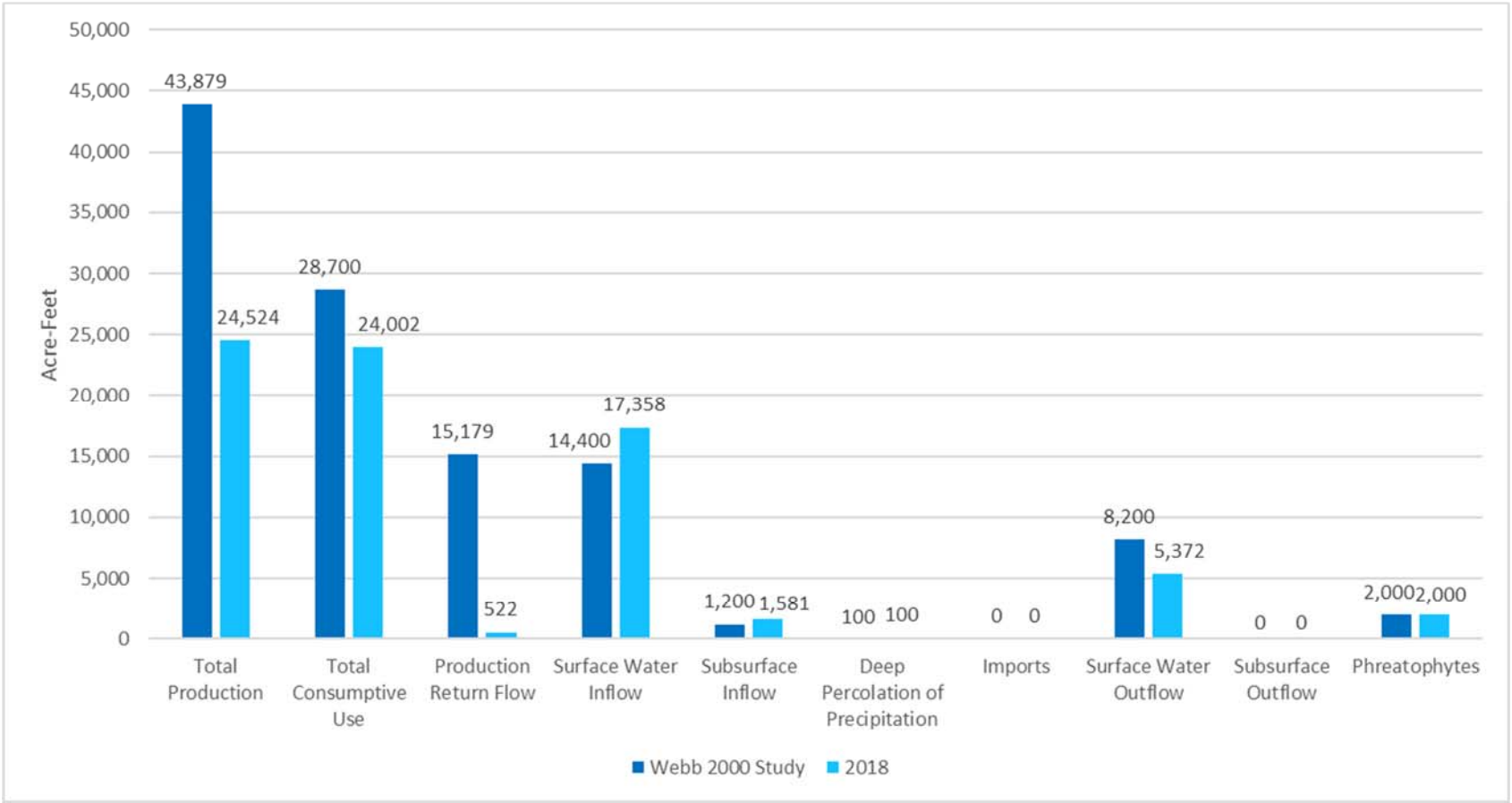
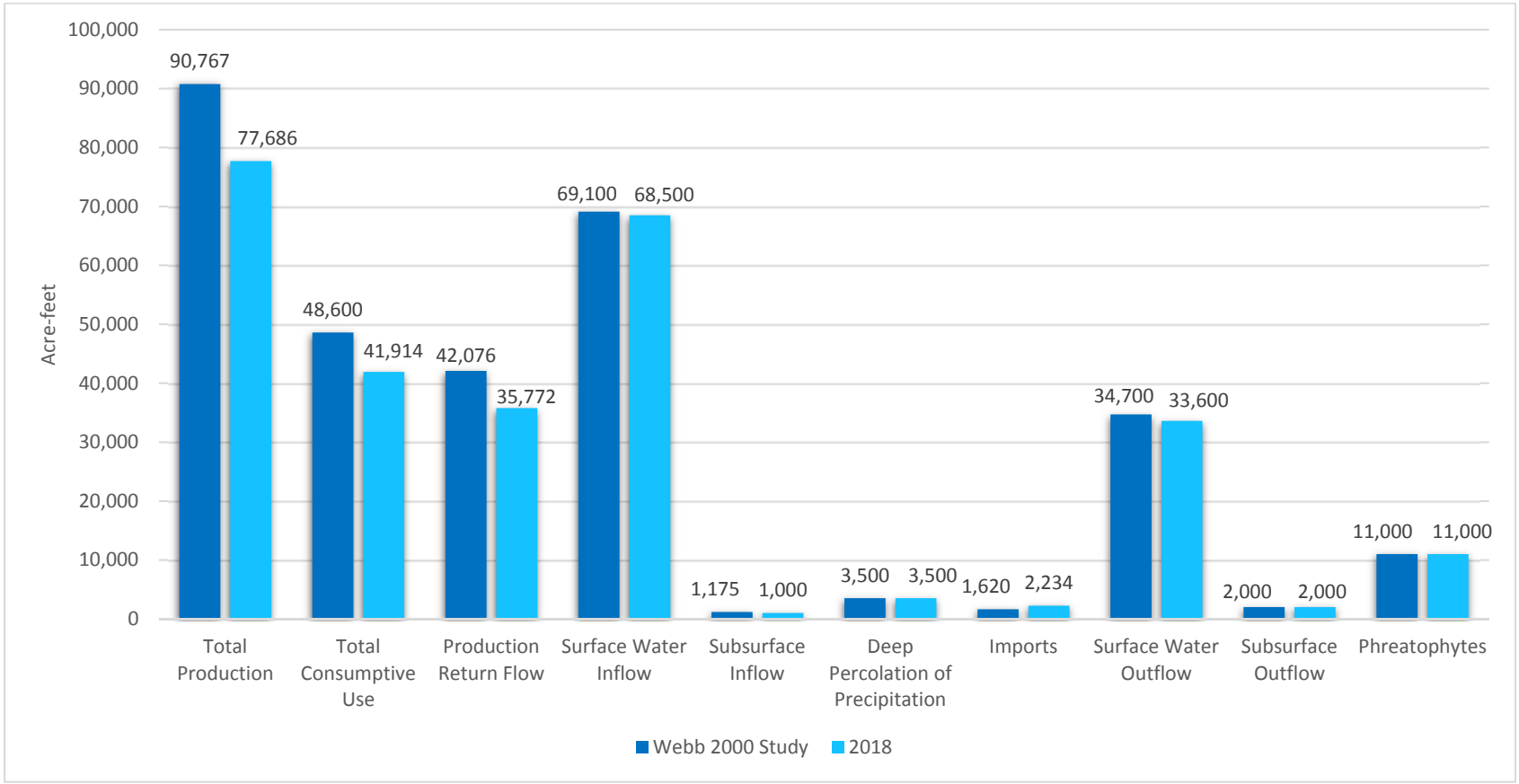


FIGURE 2
COMPARISON OF PRODUCTION SAFE YIELD ELEMENTS
WEBB STUDY AND 2018 STUDY
ALTO SUBAREA



References

Allen R.G., Pereira L.S., Raes D., Smith M. (1998). Crop Evapotranspiration: Guidelines for Computing Crop Water requirements. *FAO Irrigation and Drainage Paper 56.* United Nations-Food and Agricultural Organization, Rome.

Beacon Economics. (2015). Mojave Water Agency Population Forecast. http://mojavewater.granicus.com/MetaViewer.php?view_id=2&clip_id=559&meta_id=38184

California Irrigation Management Information System (CIMIS). (2019). https://cimis.water.ca.gov

City of Adelanto. (2016). 2015 Urban Water Management Plan. June 22, 2016.

CSA 64 – Spring Valley Lake. (2017). Urban Water Management Plan.

CSA 70J – Oak Hills. (2017). Urban Water Management Plan.

Department of Water Resources (DWR). (2015). Consumptive Use Program+ Model (CUP+M), Version 6.9. https://water.ca.gov/Programs/Water-Use-And-Efficiency/Land-And-Water-Use/Agricultural-Water-Use-Models

Hesperia Water District. (2016). 2015 Urban Water Management Plan. June 7, 2016.

Liberty Utilities (Park Water) Corp. (2016). 2015 Urban Water Management Plan. June 24, 2016.

Mojave Water Agency. (2016). 2015 Urban Water Management Plan. June 9, 2016.

RBF Consulting. (2009). VVWRA Flow Projection Update – Update 3.

State of California Superior Court. (1996). Mojave Basin Area Adjudication. Judgment After Trial. *City of Barstow, et al. v. City of Adelanto, et al. Riverside County Superior Court Case No. 208568*. January 10.

U.S. Department of Agriculture Natural Resources Conservation Service. (2015). Web Soil Survey. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Victorville Water District. (2016). 2015 Urban Water Management Plan.

Webb, Albert A. Associates (2000). Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area.

APPENDIX C

Consumptive Water Use for Individual Producers, 2017-18

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Alto Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Adelanto, City Of	Municipal			960.22	25.15%	960.22	3,818
Ades, John and Devon	Domestic	Grass	0.08	3.07	51.12%	3.07	6
Agcon, Inc.	Industrial	Lake	2.27	293.00	100.00%	293.00	293
	Domestic			0.36	36.50%	0.36	1
American States Water Company	No Use			0.00	0.00%	0.00	0
Apple Valley Foothill County Water District	Municipal			48.56	51.12%	48.56	95
Apple Valley Heights County Water District	Municipal			27.31	26.77%	27.31	102
Apple Valley Unified School District	Parks	Park	9.93	47.47	87.90%	47.47	54
Apple Valley View Mutual Water Company	Municipal			12.27	51.12%	12.27	24
Apple Valley, Town Of	Golf Course	Golf Course	95.09	454.53	98.13%	458.25	467
		Lake	0.61	3.72			
	Parks	Park	24.00	114.72	100.00%	41.00	41
Aqua Capital Management, LP-Agriculture	No Use			0.00	0.00%	0.00	0
Aqua Capital Management, LP-Industrial	No Use			0.00	0.00%	0.00	0
Bass Trust, Newton T.	Domestic	Grass	0.09	1.02	51.12%	1.02	2
Bastianon Revocable Trust	Domestic			0.51	51.12%	0.51	1
Beebe, Robert W. and Dorothy K.	No Use			0.00	0.00%	0.00	0
Beinschroth Family Trust	Agriculture	Alfalfa	11.60	67.63	100.00%	18.00	18
	Domestic	Park	1.91	14.82	100.00%	29.00	29
		Lake	0.54	14.82			
Box, Geary S. and Laura	Domestic	Grass	0.20	2.04	51.12%	2.04	4
Brown, Bobby G. and Valeria R.	Domestic	Grass	0.17	0.36	36.50%	0.36	1
Brown, Jennifer	Domestic	Grass	0.15	2.04	51.12%	2.04	4
Bruneau, Karen	Domestic	Grass	0.15	1.02	51.12%	1.02	2

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Bryant, Ian	No Use			0.00	0.00%	0.00	0
Bunnell, Dick	Domestic			0.73	36.50%	0.73	2
CalMat Company	Industrial			4.00	100.00%	4.00	4
CalPortland Company - Agriculture	No Use			0.00	0.00%	0.00	0
CalPortland Company - Oro Grande Plant	Industrial			763.00	100.00%	763.00	763
CDFW - Mojave Narrows Regional Park	Parks	Grass	5.47	26.15	50.28%	26.15	52
	Recreational Lakes	Lake	36.42	222.16	26.48%	454.85	1,718
		Pasture	41.70	232.69			
CDFW - Mojave River Fish Hatchery	Aquaculture	Lake	2.70	16.47	100.00%	20.00	20
		Grass	1.42	6.79			
		Park	3.55	16.97			
Cemex, Inc.	Industrial	Park	5.92	1,152.00	100.00%	1,152.00	1,152
Cunningham, Jerry	No Use			0.00	0.00%	0.00	0
Dolch, Robert and Judy	Domestic	Grass	0.12	2.04	51.12%	2.04	4
Dora Land, Inc.	No Use			0.00	0.00%	0.00	0
East Desert Land Company, LLC	Agriculture	Alfalfa	142.92	848.94	70.28%	848.94	1,208
Evenson, Edwin H. and Joycelaine C.	Domestic			0.36	36.50%	0.36	1
Federal Bureau of Prisons, Victorville	No Use			0.00	0.00%	0.00	0
Fischer Revocable Living Trust	Domestic			0.51	51.12%	0.51	1
Fisher Trust, Jerome R.	No Use			0.00	0.00%	0.00	0
Fitzwater, R. E.	Domestic	Grass	0.05	0.36	36.50%	0.36	1
Frazier, et al.	No Use			0.00	0.00%	0.00	0
Golden State Water Company	Municipal			175.38	19.82%	175.38	885
Green Acres Estates	Domestic	Grass	0.07	2.56	51.12%	2.56	5

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Gulbranson, Merlin	No Use			0.00	0.00%	0.00	0
Haas, Bryan C. and Hinkle, Mary H.	No Use			0.00	0.00%	0.00	0
Halanna Equities III	Domestic	Grass	0.31	3.07	51.12%	3.07	6
Hamilton Family Trust	Domestic	Other Orchard	0.32	7.67	57.90%	8.68	15
		Grass	0.20	0.96			
		Lake	0.01	0.06			
Helendale Community Services District	Municipal	Pasture	5.07	886.34	71.83%	1,105.43	1,539
		Sod	41.74	197.43			
		Park	4.58	21.66			
Helendale School District	Domestic	Park	1.95	2.19	36.50%	2.19	6
Hesperia - Golf Course, City of	Golf Course	Golf Course	93.70	447.89	79.22%	452.34	571
		Lake	0.73	4.45			
Hesperia Venture I, LLC	Domestic	Lake	16.00	0.51	51.12%	0.51	1
Hesperia Water District	Municipal			5,960.44	42.96%	5,960.44	13,874
	Parks	Lake	10.90	66.49	40.30%	156.78	389
		Park	18.89	90.29			
Hesperia, City of	No Use			0.00	0.00%	0.00	0
Hi-Grade Materials Company	Industrial	Lake	0.08	18.00	100.00%	18.00	18
Holway Jeffrey R and Patricia Gage	No Use			0.00	0.00%	0.00	0
Holway, Jeffrey R	No Use			0.00	0.00%	0.00	0
Hunt, Connie	No Use			0.00	0.00%	0.00	0
Jamboree Housing Corporation	Municipal	Grass	1.72	20.96	51.12%	20.96	41
Jess Ranch Water Company	Municipal			1,259.15	88.24%	1,259.15	1,427
	Golf Course	Golf Course	172.67	825.36	76.84%	864.46	1,125
		Lake	6.41	39.10			
	Aquaculture	Lake	20.00	140.00	100.00%	140.00	140

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Johnson, Carlean	Agriculture	Grass Pasture	1.17 1.37	5.59 7.64	60.17%	13.24	22
Johnson, Ronald	No Use			0.00	0.00%	0.00	0
Johnston, Harriet and Johnston, Lawrence W.	Domestic	Grass	0.37	2.04	51.12%	2.04	4
Kanesaka, Kenji and Yukari	No Use			0.00	0.00%	0.00	0
Kemper Campbell Ranch	Domestic Agriculture	 Lake Pasture	 5.13 51.41	11.25 31.29 286.87	51.12% 100.00%	11.25 121.00	22 121
Laguna Water II, Ltd.	No Use			0.00	0.00%	0.00	0
Lake Arrowhead Community Services District	No Use			0.00	0.00%	0.00	0
Langley, James	No Use			0.00	0.00%	0.00	0
Langley, James - Industrial	No Use			0.00	0.00%	0.00	0
Lawson, Ernest and Barbara	Domestic	Grass	0.05	0.51	51.12%	0.51	1
Lenhert, Ronald and Toni	Domestic	Grass	0.28	4.09	51.12%	4.09	8
LHC Alligator, LLC	No Use			0.00	0.00%	0.00	0
Liberty Utilities (Apple Valley Ranchos Water) Corp.	Municipal			4,002.87	48.37%	4,002.87	8,276
Low, Dean	No Use			0.00	0.00%	0.00	0
Luckey 2010 Revocable Trust	Domestic	Grass	0.15	0.51	51.12%	0.51	1
Mariana Ranchos County Water District	Municipal			110.70	52.71%	110.70	210
McInnis, William S.	Domestic	Park Pasture	0.25 0.07	4.77 0.39	73.77%	5.16	7
McKinney, Paula	No Use			0.00	0.00%	0.00	0
MLH, LLC	Domestic	Grass	0.50	4.09	51.12%	4.09	8
Mojave Water Agency	Municipal			16.00	100.00%	16.00	16

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Navajo Mutual Water Company	Municipal			15.33	51.12%	15.33	30
Nuñez, Luis Segundo	Domestic			0.51	51.12%	0.51	1
Nunn Family Trust	Domestic	Grass	0.02	0.51	51.12%	0.51	1
Oro Grande School District	Municipal			30.00	100.00%	30.00	30
	Parks	Park	10.16	48.06	100.00%	35.00	35
Perry Revocable Living Trust, Thomas and Patricia	Domestic	Grass	0.07	0.51	51.12%	0.51	1
Phelan Piñon Hills Community Services District	Municipal			52.00	32.28%	52.00	161
Pittman, Leroy W.	Domestic			0.36	36.50%	0.36	1
Polich, Donna	No Use			0.00	0.00%	0.00	0
Rancheritos Mutual Water Company	Municipal			55.72	51.12%	55.72	109
Rim Properties, A General Partnership	No Use			0.00	0.00%	0.00	0
Rue Ranch	Domestic	Lake	1.00	1.02	51.12%	1.02	2
San Bernardino County - High Desert Detention Center	Municipal			121.00	100.00%	121.00	121
San Bernardino County Service Area 42	Municipal			24.09	36.50%	24.09	66
San Bernardino County Service Area 64	Municipal			1,541.90	55.05%	1,541.90	2,801
San Bernardino County Service Area 70J	Municipal			668.02	39.18%	668.02	1,705
Sapp, Robert D. and Lee, Teresa J.	Domestic	Grass	0.51	3.58	51.12%	3.58	7
Scray, Michelle A. Trust	Domestic			0.51	51.12%	0.51	1
Service Rock Products Corporation	Industrial			8.00	100.00%	8.00	8
Sheep Creek Water Company	No Use			0.00	0.00%	0.00	0
Silver Lakes Association	Golf Course	Golf Course	197.33	933.35	84.71%	991.15	1,170
		Park	12.22	57.80			
	Recreational Lakes	Lake	6.59	40.20	64.25%	1,624.80	2,529
		Lake	259.77	1,584.60			

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Snowball Development, Inc.	No Use			0.00	0.00%	0.00	0
Spring Valley Lake Association	Recreational Lakes	Lake	195.00	1,189.50	47.33%	1,189.50	2,513
Spring Valley Lake Country Club	Golf Course	Golf Course	130.68	624.65	92.15%	647.83	703
		Lake	3.80	23.18			
Storm, Randall	No Use			0.00	0.00%	0.00	0
Sudmeier, Glenn W.	Domestic			0.51	51.12%	0.51	1
Summit Valley Ranch, LLC	Domestic	Lake	1.15	9.71	51.12%	9.71	19
Thompson Living Trust, James A. and Sula B.	Domestic			0.51	51.12%	0.51	1
Thompson Living Trust, R.L. and R.A.	Agriculture	Pasture	1.98	11.05	100.00%	4.00	4
Thrasher, Gary	Domestic	Grass	1.08	0.73	36.50%	0.73	2
	Agriculture	Pasture	10.64	58.95	100.00%	13.00	13
Thunderbird County Water District	Municipal			43.41	40.57%	43.41	107
Transamerica Fin'l Svc - Spears, Larry B. and Erlinda	No Use			0.00	0.00%	0.00	0
Vanhoops Holdings, LP	No Use			0.00	0.00%	0.00	0
Victor Valley Community College District	Municipal	Grass	28.00	377.90	100.00%	412.00	412
		Lake	5.59	34.10			
Victor Valley Memorial Park	Municipal	Park	7.16	34.22	76.06%	34.22	45
Victorville Water District, ID#1	Municipal			9,108.59	52.27%	9,108.59	17,427
	Industrial			1,497.00	100.00%	1,497.00	1,497
	Golf Course	Golf Course	75.47	360.75	90.19%	360.75	400
	Parks	Park	2.00	9.56	95.60%	9.56	10
Victorville Water District, ID#2	Municipal			2,577.29	52.27%	2,577.29	4,931
Vogler, Albert H.	Domestic	Row Crops	0.84	0.51	51.12%	0.51	1
Wagner Living Trust	No Use			0.00	0.00%	0.00	0

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Wakula Family Trust	Domestic			0.36	36.50%	0.36	1
Ward, Ken and Barbara	Agriculture	Pasture	6.12	34.15	100.00%	16.00	16
West, Howard and Suzy	No Use			0.00	0.00%	0.00	0
West, Jimmie E.	Domestic	Grass	0.25	0.36	36.50%	0.36	1
Western Rivers Conservancy	Domestic			0.36	36.50%	0.36	1
Western Water Company	No Use			0.00	0.00%	0.00	0
Westland Industries, Inc.	Domestic	Lake	0.01	14.31	51.12%	14.31	28
Wiener, Melvin and Mariam S.	No Use			0.00	0.00%	0.00	0
Wood, Michael and Denise	Agriculture	Sod Grass	9.15 0.12	43.28 0.57	99.65%	43.85	44
Wyatt Family Trust	No Use			0.00	0.00%	0.00	0
Minimal Producers	Domestic			1,075.48	51.12%	1,075.48	2,104
Summary for the Alto Subarea						**41,913.74**	**77,686.00**

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Baja Subarea
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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
35250 Yermo, LLC	Domestic	Lake Grass	0.02 0.11	13.28	94.86%	13.28	14
Ahn, Chun Soo and Wha Ja	Domestic			0.95	95.00%	0.95	1
Ake, Charles J. and Marjorie M.	No Use			0.00	0.00%	0.00	0
Archibek, Eric	No Use			0.00	0.00%	0.00	0
Arguelles, Alfredo	Agriculture Domestic	Grain	62.77	144.37 0.95	57.75% 95.00%	144.37 0.95	250 1
Atchison, Topeka, Santa Fe Railway Company	Industrial			57.00	100.00%	57.00	57
Bailey 2007 Living Revocable Trust, Sheré R.	No Use			0.00	0.00%	0.00	0
Barber, James B.	Domestic	Grass Lake	0.35 0.80	38.88 6.35	100.00%	41.00	41
Baron, Susan and Palmer, Curtis	No Use			0.00	0.00%	0.00	0
Bender Trust, Dolores M.	No Use			0.00	0.00%	0.00	0
Borgogno Revocable Living Trust	Agriculture	Alfalfa	220.00	1,672.00	100.00%	761.00	761
Borja, Leonil T. and Tital L.	No Use			0.00	0.00%	0.00	0
Bredelis, Ronald C. and Jean	Domestic	Grass Lake	0.02 0.78	25.60 6.19	100.00%	27.00	27
Brown, Ronald A.	Agriculture	Alfalfa	84.37	641.21	100.00%	174.00	174
Bubier, Diane Gail	Recreational Lakes	Lake	1.49	11.83	98.59%	11.83	12
Budget Finance Company	No Use			0.00	0.00%	0.00	0
Bush, Kevin	No Use			0.00	0.00%	0.00	0
Calico Junction	No Use			0.00	0.00%	0.00	0
Calico Lakes Homeowners Association	Recreational Lakes Domestic	Lake Grass	24.56 4.19	195.01 71.12	100.00% 94.83%	168.00 71.12	168 75

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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
California Department Of Transportation	Domestic			15.17	94.81%	15.17	16
CalMat Company	No Use			0.00	0.00%	0.00	0
Camanga, Tony and Marietta	Domestic			0.95	95.00%	0.95	1
Campbell, M. A. and Dianne	No Use			0.00	0.00%	0.00	0
Carlton, Susan	Domestic			0.95	95.00%	0.95	1
CDFW - Camp Cady	Agriculture	Grain	49.56	113.99	100.00%	66.00	66
	Aquaculture	Lake	1.11	8.81	100.00%	7.00	7
	Domestic	Pasture	0.53	5.69	94.83%	5.69	6
CF Properties, LLC	Agriculture	Grain	121.00	278.30	100.00%	211.00	211
Cheyenne Lake, Inc.	Recreational Lakes	Lake	15.36	121.96	100.00%	104.00	104
	Domestic	Park	11.56	88.19	94.83%	88.19	93
Clark, Arthur	No Use			0.00	0.00%	0.00	0
Conner, William H.	No Use			0.00	0.00%	0.00	0
Corbridge, Linda S.	Domestic			0.95	95.00%	0.95	1
	Agriculture	Pistachios	16.65	93.24	100.00%	8.00	8
Cross, Francis and Beverly	No Use			0.00	0.00%	0.00	0
Crystal Lakes Property Owners Association	Recreational Lakes	Lake	46.22	366.99	100.00%	326.00	326
	Domestic	Grass	4.52	97.67	94.83%	97.67	103
Daggett Community Services District	Municipal			191.76	88.78%	191.76	216
Daggett Ranch, LLC	Domestic	Lake	0.37	35.08	94.81%	35.08	37
		Grass	0.74	4.59			
De Jong Family Trust	Agriculture	Alfalfa	352.00	2,675.20	100.00%	1,763.00	1,763
		Grain	152.00	349.60			
		Pistachios	1.47	8.23			
	Domestic			6.64	94.86%	6.64	7

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Dennison, Quentin D. - Clegg, Frizell and Joke	No Use			0.00	0.00%	0.00	0
Docimo Living Trust, Allen Lee	Recreational Lakes	Lake	9.56	75.91	100.00%	65.00	65
Donaldson, Jerry and Beverly	Domestic			0.95	95.00%	0.95	1
Dowell, Leonard	No Use			0.00	0.00%	0.00	0
Evert Family Trust	Recreational Lakes	Lake	3.25	25.81	73.73%	25.81	35
	Domestic			0.95	95.00%	0.95	1
Fejfar, Monica Kay	No Use			0.00	0.00%	0.00	0
Fernandez, Arturo	No Use			0.00	0.00%	0.00	0
Ferro, Dennis and Norma	No Use			0.00	0.00%	0.00	0
First CPA LLC	Agriculture			33.00	100.00%	33.00	33
Fundamental Christian Endeavors, Inc.	Domestic			37.93	94.83%	37.93	40
	Parks	Grass	1.70	10.54	21.51%	10.54	49
	Recreational Lakes	Lake	4.72	37.48	100.00%	33.00	33
Gabrych, Eugene	Agriculture	Alfalfa	122.00	927.20	100.00%	823.00	823
		Grain	121.00	278.30			
Garcia, Daniel	Domestic	Pistachios	2.18	1.90	95.00%	1.90	2
Garg, Om P.	Domestic			4.74	94.80%	4.74	5
GenOn Energy, Inc.	Industrial			754.00	100.00%	754.00	754
Gray, George F. and Betty E.	No Use			0.00	0.00%	0.00	0
Hackbarth, Edward E.	Agriculture	Alfalfa	110.00	836.00	100.00%	861.00	861
		Grain	119.00	273.70			
Hanson Aggregates WRP, Inc.	No Use			0.00	0.00%	0.00	0
Hareson, Nicholas and Mary	No Use			0.00	0.00%	0.00	0

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Harter, Joe and Sue	Agriculture	Pistachios	138.02	772.91	100.00%	2,578.00	2,578
		Alfalfa	319.42	2,427.59			
		Teff Grass	179.77	1,312.32			
		Grain	76.62	176.23			
	Domestic			3.79	94.75%	3.79	4
Hass, Pauline L.	Domestic			0.95	95.00%	0.95	1
Hawkins, James B.	No Use			0.00	0.00%	0.00	0
Hendley, Rick and Barbara	Domestic			12.33	94.85%	12.33	13
Hiett, Harry L.	Agriculture	Other Orchard	0.44	2.72	100.00%	2.00	2
Hilarides 1998 Revocable Family Trust	Industrial			1.00	100.00%	1.00	1
	Domestic			0.95	95.00%	0.95	1
Ho, Ting-Seng and Ah-Git	No Use			0.00	0.00%	0.00	0
Hollister, Robert H. and Ruth M.	Domestic			1.90	95.00%	1.90	2
Hong, Paul B. and May	No Use			0.00	0.00%	0.00	0
Hood Family Trust	Domestic	Grass	0.01	1.90	95.00%	1.90	2
Horton, John	No Use			0.00	0.00%	0.00	0
Horton's Children's Trust	Domestic	Grass	0.32	7.59	94.88%	7.59	8
	Recreational Lakes	Lake	16.54	131.33	100.00%	115.00	115
Hubbard, Ester and Mizuno, Arlean	Domestic	Row Crops	0.44	2.84	94.67%	2.84	3
Hunt, Ralph M. and Lillian F.	Domestic	Grass	0.06	3.79	100.00%	4.00	4
		Pasture	1.15	8.40			
Hyatt, James and Brenda	Domestic	Lake	2.14	16.12	94.82%	16.12	17
Im, Nicholas Nak-Kyun	Recreational Lakes	Lake	2.63	20.88	77.34%	20.88	27
	Agriculture	Pistachios	46.49	260.34	100.00%	35.00	35
Irvin, Bertrand W.	Domestic	Lake	0.98	13.28	94.86%	13.28	14

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Italmood Inc., et. al.	Agriculture	Pistachios	68.67	384.55	100.00%	17.00	17
	Domestic			2.84	94.67%	2.84	3
Jacks, James F.	Domestic			0.95	95.00%	0.95	1
Jackson, James N. Jr Revocable Living Trust	No Use			0.00	0.00%	0.00	0
Jackson, Ray Revocable Trust No. 45801	No Use			0.00	0.00%	0.00	0
Johnson, James R. and Ellen	Agriculture	Pistachios	9.82	54.99	100.00%	26.00	26
Karimi, Hooshang	No Use			0.00	0.00%	0.00	0
Kasner Family Limited Partnership	Agriculture	Alfalfa	236.00	1,793.60	100.00%	854.00	854
Kasner, Robert	Agriculture	Grain	119.01	273.72	100.00%	2,687.00	2,687
		Alfalfa	395.09	3,002.68			
		Teff Grass	79.93	583.49			
	Domestic			0.95	95.00%	0.95	1
	Industrial			33.00	100.00%	33.00	33
Katcher, August M. and Marceline	Domestic			0.95	95.00%	0.95	1
Kemp, Robert and Rose	No Use			0.00	0.00%	0.00	0
Kim, Joon Ho and Mal Boon Revocable Trust	Agriculture	Alfalfa	117.00	889.20	100.00%	337.00	337
Kim, Seon Ja	Domestic			0.95	95.00%	0.95	1
Koegler, Ronald R. and Carolyn V.	Domestic			13.28	94.86%	13.28	14
Koering, Richard and Koering, Donna	Domestic	Grass	0.04	0.95	95.00%	0.95	1
Koroghlian, Ted and Najwa	Domestic	Lake	0.45	6.64	94.86%	6.64	7
Kosharek, John and Joann	Domestic	Lake	0.40	9.48	94.80%	9.48	10
Lake Jodie Property Owners Association	Recreational Lakes	Lake	28.47	226.05	100.00%	196.00	196
	Domestic	Grass	2.47	102.41	94.82%	102.41	108
		Other Orchard	2.85				
Lake Waikiki	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Baja Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Lake Wainani Owners Association	Recreational Lakes	Lake	23.27	184.76	100.00%	170.00	170
	Domestic	Grass	2.79	17.30	100.00%	33.00	33
		Pistachios	5.06	28.34			
		Row Crops	0.37	1.60			
Lam, Phillip	Recreational Lakes	Grass	0.10	0.62	73.51%	5.15	7
		Lake	0.57	4.53			
Langley, Michael R. and Sharon	Agriculture	Pistachios	18.95	106.12	100.00%	12.00	12
Lavanh, et al.	Domestic			0.95	95.00%	0.95	1
Lawrence, William W.	Domestic	Grass	0.08	0.95	95.00%	0.95	1
Lee, Vin Jang T.	No Use			0.00	0.00%	0.00	0
Lem, Hoy	No Use			0.00	0.00%	0.00	0
Liang, Yuan - I and Tzu - Mei Chen	No Use			0.00	0.00%	0.00	0
Liberty Utilities (Apple Valley Ranchos Water) Corp.	Municipal			122.60	88.84%	122.60	138
Lin, Kuan Jung and Chung, Der-Bing	No Use			0.00	0.00%	0.00	0
Lo, et al.	Agriculture	Pistachios	12.89	72.18	100.00%	30.00	30
		Row Crops	0.02	0.09			
		Lake	0.13	1.03			
M Bird Construction	No Use			0.00	0.00%	0.00	0
Mahjoubi, Afsar S.	No Use			0.00	0.00%	0.00	0
Maloney, Janice	Domestic			1.90	95.00%	1.90	2
Manning, Sharon S.	Domestic	Row Crops	0.68	39.83	94.83%	39.83	42
		Lake	1.03				
Marcroft, James A. and Joan	Domestic	Grass	0.32	25.60	94.81%	25.60	27
		Lake	0.60				
Marshall, Charles	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Baja Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Martin, Michael D. and Arlene D.	Agriculture	Pistachios	14.33	80.25	100.00%	42.00	42
Milbrat, Irving H.	Domestic	Lake	0.30	30.34	94.81%	30.34	32
Miller Living Trust	No Use			0.00	0.00%	0.00	0
Mizrahie, et al.	No Use			0.00	0.00%	0.00	0
Morris Trust, Julia V.	Domestic			0.95	95.00%	0.95	1
Mulligan, Robert and Inez	No Use			0.00	0.00%	0.00	0
Murphy, Jean	Domestic	Lake	0.08	3.79	94.75%	3.79	4
New Springs Limited Partnership	No Use			0.00	0.00%	0.00	0
Newberry Community Services District	Domestic	Park	1.36	10.43	94.82%	10.43	11
Newberry Springs Recreational Lakes Association	No Use			0.00	0.00%	0.00	0
O. F. D. L., Inc.	Recreational Lakes	Lake	16.33	129.66	100.00%	108.00	108
	Domestic	Grass	1.55	55.95	94.83%	55.95	59
P and H Engineering and Development Corporation	No Use			0.00	0.00%	0.00	0
Patino, José	Domestic			0.95	95.00%	0.95	1
Pearce, Craig L.	Domestic	Grass	0.02	12.33	94.85%	12.33	13
Perko, Bert K.	Agriculture	Lake	0.36	2.86			
		Pistachios	49.45	276.92	100.00%	41.00	41
Poland, John R. and Kathleen A.	Domestic	Lake	0.70	12.33	99.62%	12.95	13
		Grass	0.10	0.62			
Porter, Timothy M.	No Use			0.00	0.00%	0.00	0
Pozzato Partners, Limited	Domestic			31.29	94.82%	31.29	33
Price, Donald and Ruth	Domestic			0.95	95.00%	0.95	1
Pruett, Andrea	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Baja Subarea
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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Quakenbush, Samuel R.	Domestic	Pasture	0.03	4.74	94.80%	4.74	5
		Lake	0.57				
Quiros, Fransisco J. and Herrmann, Ronald	Agriculture	Pistachios	25.00	140.00	100.00%	35.00	35
Rice, Henry C. and Diana	No Use			0.00	0.00%	0.00	0
Rizvi, S.R Ali	No Use			0.00	0.00%	0.00	0
Rossi, James L. and Naomi I.	Agriculture	Alfalfa	48.00	364.80	100.00%	321.00	321
S and B Brothers, LLC	Recreational Lakes	Lake	6.49	51.53	99.10%	51.53	52
Sagabean-Barker, Kanoeolokelani L.	Recreational Lakes	Lake	1.68	13.34	100.00%	12.00	12
	Domestic			1.90	95.00%	1.90	2
Samra, Jagtar S.	Domestic	Lake	0.68	8.53	94.78%	8.53	9
San Bernardino Co Barstow - Daggett Airport	Municipal			16.00	100.00%	16.00	16
Service Rock Products Corporation	Industrial			1.00	100.00%	1.00	1
Shaw, Robert M. and Lori A. Slater-Shaw	Domestic	Lake	1.42	11.27	100.00%	11.00	11
		Grass	0.18	1.12			
		Pistachios	0.41	2.30			
Sheng, Jen	Domestic			0.95	95.00%	0.95	1
Sheppard, Thomas and Gloria	Agriculture	Other Orchard	0.41	2.54	36.26%	2.54	7
	Domestic			0.95	95.00%	0.95	1
Short, Charles H. Revocable Trust	No Use			0.00	0.00%	0.00	0
Short, Jerome E.	Domestic	Lake	2.32	16.12	94.82%	16.12	17
Singh, et al.	No Use			0.00	0.00%	0.00	0
Smith, Denise dba Amerequine Beauty, Inc	Agriculture	Pasture	19.00	138.70	100.00%	91.00	91
Smith, Porter and Anita	No Use			0.00	0.00%	0.00	0
Smith, William E. and Patricia A.	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Baja Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Southern California Edison Company	No Use			0.00	0.00%	0.00	0
Southern California Gas Company	Industrial			7.00	100.00%	7.00	7
Sperry, Wesley	No Use			0.00	0.00%	0.00	0
St. Antony Coptic Orthodox Monastery	Agriculture	Alfalfa	29.88	227.09	100.00%	44.00	44
		Other Orchard	18.29	113.22			
		Pistachios	7.86	44.02			
	Recreational Lakes	Lake	1.14	9.05	25.86%	9.05	35
	Domestic	Grass	0.10	122.32	94.82%	122.32	129
Starke, George A. and Jayne E.	No Use			0.00	0.00%	0.00	0
Sundown Lakes, Inc.	Recreational Lakes	Park	6.79	42.10	100.00%	168.00	168
		Lake	22.06	175.16			
Sunray Land Company, LLC	Industrial			1.00	100.00%	1.00	1
Szynkowski, Ruth J.	Domestic	Row Crops	0.01	1.90	95.00%	1.90	2
Tapie, Raymond L.	Domestic			0.95	95.00%	0.95	1
Teisan, Jerry	No Use			0.00	0.00%	0.00	0
Thayer, Sharon	Recreational Lakes	Lake	3.94	31.28	100.00%	27.00	27
	Domestic	Other Orchard	0.23	2.84	94.67%	2.84	3
Thomas, Stephen and Lori	Aquaculture	Lake	0.38	3.02	50.29%	3.02	6
Triple H Partnership	Agriculture	Pistachios	27.78	155.57	100.00%	92.00	92
Tsui, Richard	No Use			0.00	0.00%	0.00	0
Turner, Terry	Domestic			0.95	95.00%	0.95	1
Union Pacific Railroad Company	Industrial			66.00	100.00%	66.00	66
Vaca, Andy and Teresita S.	Domestic	Lake	0.88	8.53	94.78%	8.53	9
Van Bastelaar, Alphonse	Agriculture	Pistachios	62.06	347.54	100.00%	94.00	94

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Baja Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Van Dam Family Trust, Glen and Jennifer	Agriculture	Pistachios	138.60	776.16	100.00%	3,134.00	3,134
		Grain	94.65	217.70			
		Alfalfa	314.26	2,388.38			
Van Leeuwen, John	Agriculture	Sudan Grass	232.00	1,243.52	100.00%	910.00	910
		Grass	2.81	17.42			
	Dairy			117.00	100.00%	117.00	117
Vander Dussen Trust, Agnes and Edward	Agriculture	Grass	119.00	737.80	100.00%	839.00	839
		Alfalfa	118.00	896.80			
Wang, Steven	No Use			0.00	0.00%	0.00	0
Ward, Raymond	Industrial	Pistachios	24.35	75.00	100.00%	75.00	75
		Lake	0.14				
	Domestic			0.95	95.00%	0.95	1
Weems, Lizzie	Domestic	Pistachios	1.27	7.11	100.00%	10.00	10
		Lake	0.76	6.03			
Weeraisinghe, Maithri N.	Domestic			0.95	95.00%	0.95	1
Western Horizon Associates, Inc.	Agriculture	Alfalfa	84.68	643.57	100.00%	479.00	479
		Grass	27.15	168.33			
Wet Set, Inc.	Recreational Lakes	Lake	13.80	109.57	100.00%	95.00	95
	Domestic	Park	12.82	37.93	94.83%	37.93	40
Witte, E. Daniel and Marcia	Domestic			0.95	95.00%	0.95	1
WLSR, Inc.	Recreational Lakes	Lake	21.36	169.60	100.00%	133.00	133
Worsey, Joseph A. and Revae	No Use			0.00	0.00%	0.00	0
Minimal Producers	Domestic			1,996.29	89.60%	1,996.29	2,228
Summary for the Baja Subarea						**24,002.08**	**24,524.00**

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Centro Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Apple Valley Heights County Water District	No Use			0.00	0.00%	0.00	0
Aqua Capital Management, LP	No Use			0.00	0.00%	0.00	0
Atchison, Topeka, Santa Fe Railway Company	No Use			0.00	0.00%	0.00	0
Bar-Len Mutual Water Company	Municipal	Grass	1.20	7.39	25.49%	7.39	29
Barstow Community Developers, LLC	Golf Course			17.00	100.00%	17.00	17
Best, Byron L.	No Use			0.00	0.00%	0.00	0
Brommer Family Trust	No Use			0.00	0.00%	0.00	0
Chafa, Larry R. and Delinda C.	Domestic			0.25	25.49%	0.25	1
Choi, Yong Il and Joung Ae	No Use			0.00	0.00%	0.00	0
Chong, Joan	Agriculture	Jujube	10.49	46.58	100.00%	26.00	26
	Domestic	Row Crops	0.47	0.51	25.49%	0.51	2
Christison, Joel	Domestic	Pistachios	29.00	0.25	25.49%	0.25	1
Contratto, Ersula	Domestic	Grass	0.04	0.25	25.49%	0.25	1
Darr, James S.	Industrial			285.00	100.00%	285.00	285
	Municipal	Grass	0.04	20.25	88.03%	20.25	23
De Vries, Neil and Mary Family Trust	Domestic	Grass	0.10	0.25	25.49%	0.25	1
Dorrance, David W. and Tamela L.	No Use			0.00	0.00%	0.00	0
Eygnor, Robert E.	No Use			0.00	0.00%	0.00	0
Federal National Mortgage Association - Fannie Mae	No Use			0.00	0.00%	0.00	0
Frates, D. Cole	No Use			0.00	0.00%	0.00	0
Friend, Joseph and Deborah	Agriculture	Park	1.57	9.73	88.49%	9.73	11
Gabrych, Eugene	No Use			0.00	0.00%	0.00	0
Gaines Family Trust, Jack and Mary	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Centro Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Golden State Water Company	Municipal			2,741.93	49.12%	2,741.93	5,582
Grill, Nicholas P. and Millie D.	Industrial			66.00	100.00%	66.00	66
	Agriculture	Pasture	3.28	23.91	100.00%	4.00	4
	Domestic			0.25	25.49%	0.25	1
Gutierrez, Jose and Gloria	Agriculture	Grass	0.21	1.30	100.00%	94.00	94
		Pasture	0.86	6.27			
		Row Crops	0.14	0.59			
		Alfalfa	15.08	114.16			
	Domestic			0.25	25.49%	0.25	1
Hanify, Michael D., dba - White Bear Ranch	No Use			0.00	0.00%	0.00	0
Harmsen Family Trust	Agriculture	Alfalfa	71.00	537.47	100.00%	436.00	436
	Dairy			26.00	100.00%	26.00	26
Harper Lake Company VIII	Industrial			1,001.00	100.00%	1,001.00	1,001
	Recreational Lakes	Lake	29.23	232.09	100.00%	73.00	73
		Lake	3.74	29.70			
Helendale Community Services District	No Use			0.00	0.00%	0.00	0
Hensley, Mark P.	Agriculture	Pistachios	8.10	45.68	100.00%	22.00	22
Hi Desert Mutual Water Company	Municipal			5.10	25.49%	5.10	20
High Desert Associates, Inc.	No Use			0.00	0.00%	0.00	0
Hill Family Trust and Hill's Ranch, Inc.	Domestic	Grass	0.48	10.20	25.49%	10.20	40
Howard, et al.	No Use			0.00	0.00%	0.00	0
Huerta, Hector	Agriculture	Alfalfa	124.00	938.68	100.00%	914.00	914
	Dairy			10.00	100.00%	10.00	10
Jones, Joette	No Use			0.00	0.00%	0.00	0
Jordan Family Trust	Domestic	Grass	0.42	1.02	25.49%	1.02	4
Kasner Family Limited Partnership	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Centro Subarea
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Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Kim, Jin S. and Hyun H.	No Use			0.00	0.00%	0.00	0
Lee, et al., Sepoong and Woo Poong	Domestic			0.25	25.49%	0.25	1
Leyerly, Geneva	Domestic			1.02	25.49%	1.02	4
McCollum, Charles L.	No Use			0.00	0.00%	0.00	0
Mead Family Trust	Domestic	Grass	0.04	0.25	25.49%	0.25	1
Mojave Solar, LLC	Industrial			1,632.00	100.00%	1,632.00	1,632
Most Family Trust	No Use			0.00	0.00%	0.00	0
Odessa Water District	No Use			0.00	0.00%	0.00	0
Ohai, Reynolds and Dorothy	Domestic			0.25	25.49%	0.25	1
Osterkamp, Gerold	Dairy	Pasture	2.00	125.00	100.00%	125.00	125
		Grass	1.83				
Pacific Gas and Electric Company	Agriculture	Grain	144.00	326.88	100.00%	1,454.00	1,454
		Alfalfa	227.00	1,718.39			
	Industrial			1,270.00	100.00%	1,270.00	1,270
	Domestic			0.51	25.49%	0.51	2
Rios, Mariano V.	Domestic	Grass	0.04	1.53	25.49%	1.53	6
Rivero, Fidel V.	Domestic			0.25	25.49%	0.25	1
Ruisch Trust, Dale W. and Nellie H.	Agriculture	Grain	28.00	63.56	80.25%	479.91	598
		Alfalfa	55.00	416.35			
	Dairy			48.00	100.00%	48.00	48
	Domestic			0.51	25.49%	0.51	2
Ruisch, et al.	Agriculture	Alfalfa	116.85	884.55	100.00%	475.00	475
		Grain	37.21	84.47			
Service Rock Products Corporation	Industrial			18.00	100.00%	18.00	18
Sexton, Rodney A. and Sexton, Derek R.	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Centro Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Soppeland Revocable Trust	Domestic			0.25	25.49%	0.25	1
Synagrow-WWT, Inc. (dba Nursury Products, LLC)	Industrial			4.00	100.00%	4.00	4
Tallakson Family Revocable Trust	Domestic			1.53	25.49%	1.53	6
Valenti, Vito	No Use			0.00	0.00%	0.00	0
Van Dam Revocable Trust, E and S	Agriculture	Grass	0.40	2.48	100.00%	155.00	155
		Pasture	28.13	205.07			
	Dairy			7.00	100.00%	7.00	7
Van Leeuwen, John	Agriculture	Sorghum	307.00	1,406.06	100.00%	1,292.00	1,292
		Grass	0.24	1.49			
Vernola Trust, Pat and Mary Ann	Agriculture	Alfalfa	422.99	3,202.03	100.00%	3,317.00	3,317
		Sudan Grass	60.61	333.36			
Victorville Water District, ID#1	No Use			0.00	0.00%	0.00	0
Werner, Andrew J.	No Use			0.00	0.00%	0.00	0
Western Development and Storage, LLC	No Use			0.00	0.00%	0.00	0
Withey, Connie	Domestic			0.25	25.49%	0.25	1
Minimal Producers	Domestic			395.83	25.49%	395.83	1,553
Summary for the Centro Subarea						**16,451.03**	**20,665.00**

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Este Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Abdul, Harry and Anita	Industrial			4.00	100.00%	4.00	4
	Domestic			1.54	51.20%	1.54	3
Abshire, David V.	No Use			0.00	0.00%	0.00	0
Ahn, Chun Soo and David	No Use			0.00	0.00%	0.00	0
Ahn Revocable Living Trust	Agriculture	Jujube	31.76	115.29	100.00%	67.00	67
Ahn Revocable Trust	Agriculture	Pistachios	27.00	124.74	100.00%	20.00	20
Anderson, Ross C. and Betty J.	No Use			0.00	0.00%	0.00	0
Avila, Angel and Evalia	Agriculture	Pasture	32.00	177.28	100.00%	118.00	118
Bar H Mutual Water Company	Municipal			14.90	59.59%	14.90	25
Bell, Chuck	Agriculture	Alfalfa	65.00	378.30	100.00%	243.00	243
	Domestic	Grass	0.17	3.58	51.20%	3.58	7
Bracht, William F. and Alexander, Alicia M.	Agriculture	Other Orchard	3.70	18.02	52.08%	27.60	53
		Pasture	1.73	9.58			
Casa Colina Foundation	Domestic	Grass	0.64	5.63	51.20%	5.63	11
	Recreational Lakes	Lake	0.66	4.03	11.18%	4.03	36
Center Water Company	Municipal			12.51	59.59%	12.51	21
Chung, et al.	Agriculture	Jujube	12.53	45.48	100.00%	34.00	34
		Other Orchard	0.11	0.54			
		Park	0.71	3.36			
Club View Partners	No Use			0.00	0.00%	0.00	0
Cross, Sharon I.	Domestic	Grass	0.06	0.51	51.20%	0.51	1
DaCosta, Dean Edward	Domestic			0.51	51.20%	0.51	1
Dahlquist, George R.	No Use			0.00	0.00%	0.00	0
Desert Dawn Mutual Water Company	Municipal			11.92	59.59%	11.92	20

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Este Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Desert Springs Mutual Water Company	Municipal			26.22	59.59%	26.22	44
DJC Corporation	No Use			0.00	0.00%	0.00	0
Gabrych, Eugene	No Use			0.00	0.00%	0.00	0
Gaeta, Miguel and Maria	Domestic			0.51	51.20%	0.51	1
Gaeta, Trinidad	Agriculture	Grain	37.00	62.90	48.02%	62.90	131
	Domestic			0.51	51.20%	0.51	1
Gardena Mission Church, Inc.	No Use			0.00	0.00%	0.00	0
Gayjikian, Samuel and Hazel	Domestic			0.51	51.20%	0.51	1
Golden State Water Company	Municipal			43.81	37.13%	43.81	118
Gordon Acres Water Company	Municipal			10.13	59.59%	10.13	17
Gubler, Hans	Agriculture	Row Crops	3.46	10.00	100.00%	10.00	10
Hal-Dor Ltd.	Agriculture			16.00	100.00%	16.00	16
Harvey, Lisa M.	Domestic	Grass	0.28	0.51	51.20%	0.51	1
Hert, Scott	Agriculture	Alfalfa	36.00	209.52	100.00%	199.00	199
	Domestic			0.51	51.20%	0.51	1
Hi-Grade Materials Company	Industrial	Lake	2.00	168.00	100.00%	168.00	168
Hitchin Lucerne, Inc.	Domestic			5.12	51.20%	5.12	10
Jubilee Mutual Water Company	Municipal			59.59	59.59%	59.59	100
Juniper Riviera County Water District	Municipal			6.67	10.11%	6.67	66
Kim, Ju Sang	Domestic			0.51	51.20%	0.51	1
Lee, Anna K. and Eshban K.	No Use			0.00	0.00%	0.00	0
Lee, Doo Hwan	No Use			0.00	0.00%	0.00	0
Lopez, Baltazar	No Use			0.00	0.00%	0.00	0

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Este Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Lua, Michael T. and Donna S.	No Use			0.00	0.00%	0.00	0
Lucerne Valley Mutual Water Company	Municipal			19.07	59.59%	19.07	32
Lucerne Valley Partners	No Use			0.00	0.00%	0.00	0
Lucerne Vista Mutual Water Company	Municipal			10.73	59.59%	10.73	18
M.B. Landscaping and Nursery, Inc.	Agriculture	Alfalfa	189.35	1,102.02	84.97%	1,102.02	1,297
	Domestic			2.05	51.20%	2.05	4
Mitsubishi Cement Corporation	Industrial	Park	5.09	357.00	100.00%	357.00	357
Monaco Investment Company	No Use			0.00	0.00%	0.00	0
Moss, Lawrence W. and Helen J.	Domestic			16.39	51.20%	16.39	32
Norris Trust, Mary Ann	Domestic			0.51	51.20%	0.51	1
Oasis World Mission	Agriculture	Pistachios	13.90	64.22	100.00%	48.00	48
		Jujube	16.16	58.66			
Omya California, Inc.	Industrial			30.00	100.00%	30.00	30
Pak, Kae Soo and Myong Hui Kang	Agriculture	Jujube	26.56	96.41	100.00%	69.00	69
		Row Crops	0.56	1.89			
Pettigrew, Dan	No Use			0.00	0.00%	0.00	0
Pettigrew, James and Cherlyn	Agriculture	Teff Grass	60.00	332.40	100.00%	138.00	138
	Domestic			0.51	51.20%	0.51	1
Reed, Mike	Domestic	Grass	0.05	0.51	51.20%	0.51	1
Rhee, Andrew N.	Agriculture	Jujube	16.22	58.88	100.00%	41.00	41
Robertson's Ready Mix	Industrial			87.00	100.00%	87.00	87
Royal Way	Agriculture	Lake	0.15	0.92	70.11%	35.06	50
		Other Orchard	2.97	14.46			
		Park	4.16	19.68			

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Este Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
S and E 786 Enterprises, LLC	No Use			0.00	0.00%	0.00	0
Saba, Saba A. and Shirley L.	No Use			0.00	0.00%	0.00	0
San Bernardino County Service Area 29	Parks	Park	7.62	36.04	68.00%	36.04	53
Son's Ranch	Agriculture	Other Orchard	4.31	20.99	38.87%	20.99	54
	Domestic			0.51	51.20%	0.51	1
Specialty Minerals, Inc.	Industrial			57.00	100.00%	57.00	57
Spillman, James R. and Nancy J.	Domestic	Grass	0.37	4.31	86.21%	4.31	5
The Cushenbury Trust, c/o Specialty Minerals, Inc.	No Use			0.00	0.00%	0.00	0
Weiser, et al.	Agriculture	Row Crops	20.60	69.42	46.49%	75.31	162
		Other Orchard	1.21	5.89			
	Domestic			0.51	51.20%	0.51	1
West End Mutual Water Company	Municipal			7.75	59.59%	7.75	13
Wilshire Road Partners	No Use			0.00	0.00%	0.00	0
Minimal Producers	Domestic			488.49	51.20%	488.49	954
Summary for the Este Subarea						**3,827.01**	**5,055.00**

Mojave Basin Area Watermaster
Estimate of Consumptive Use by Producer
2017-18 Water Year
Oeste Subarea
(Unless Otherwise Noted All Amounts Shown Are in Acre-feet)

Producer	Water Use	Irrigation Type	Irrigated Acres	Potential Consumptive Use	Potential Consumptive Use Percentage	Consumptive Use	Verified Production
Aerochem, Inc.	Industrial			10.00	100.00%	10.00	10
Brown, Sue and Doug	No Use			0.00	0.00%	0.00	0
Chamisal Mutual Water Company	Municipal			10.57	35.22%	10.57	30
Dossey, D. A.	No Use			0.00	0.00%	0.00	0
Handrinos, Nicole A.	Domestic			0.32	31.52%	0.32	1
Hettinga Revocable Trust	Agriculture	Alfalfa	149.00	882.08	100.00%	674.00	674
		Grain	147.00	249.90			
	Dairy			534.00	100.00%	534.00	534
Phelan Piñon Hills Community Services District	Municipal			1,622.15	66.24%	1,622.15	2,449
	Industrial			2.00	100.00%	2.00	2
Troeger Family Trust, Richard H.	Domestic	Grass	0.33	3.45	57.53%	3.45	6
Minimal Producers	Domestic			75.01	31.52%	75.01	238
Summary for the Oeste Subarea						**2,931.49**	**3,944.00**

APPENDIX D

Mojave River Discharge at Various Points, 1931-2018

Mojave River Discharge at Various Points, 1931-2018

Water Year	Mojave River at The Forks[2]	Mojave River at Lower Narrows[3]	VVWRA Discharge	Makeup Water Purchases	Lower Narrows + VVWRA + Makeup Water	Mojave River at Barstow[4]	Mojave River at Waterman Fault[5]	Mojave River at Afton, Estimated[6]	Mojave River at Afton, Measured[7]
1930-31	15,431	22,460	0	0	22,460	0	0	1,268	1,268
31-32	99,283	84,190	0	0	84,190	40,305	34,109	18,850	-
32-33	22,429	23,910	0	0	23,910	0	0	1,000	-
33-34	16,114	23,830	0	0	23,830	0	0	1,000	-
34-35	57,544	33,810	0	0	33,810	1,180	0	1,000	-
1935-36	24,098	20,420	0	0	20,420	0	0	1,000	-
36-37	169,120	150,253	0	0	150,253	103,879	100,741	54,070	-
37-38	218,195	188,080	0	0	188,080	138,094	137,466	72,200	-
38-39	40,494	29,680	0	0	29,680	550	0	1,000	-
39-40	31,159	27,480	0	0	27,480	0	0	1,000	-
1940-41	161,108	143,350	0	0	143,350	96,003	94,670	49,900	-
41-42	26,019	25,790	0	0	25,790	101	0	1,000	-
42-43	149,890	127,287	0	0	127,287	90,974	89,820	47,200	-
43-44	86,762	77,650	0	0	77,650	36,254	35,626	18,200	-
44-45	70,747	54,640	0	0	54,640	22,087	21,459	10,800	-
1945-46	54,464	43,210	0	0	43,210	12,577	11,949	6,720	-
46-47	50,277	37,200	0	0	37,200	2,877	2,249	1,000	-
47-48	13,626	26,310	0	0	26,310	0	0	1,000	-
48-49	22,988	22,842	0	0	22,842	0	0	1,000	-
49-50	12,418	21,630	0	0	21,630	0	0	1,000	-
1950-51	2,219	20,819	0	0	20,819	0	0	1,000	-
51-52	102,948	66,793	0	0	66,793	12,548	8,782	2,190	-
52-53	8,817	21,800	0	0	21,800	0	0	990	990
53-54	54,394	31,230	0	0	31,230	0	0	952	952
54-55	17,873	22,520	0	0	22,520	0	0	912	912
1955-56	16,234	21,743	0	0	21,743	0	0	902	902
56-57	22,076	20,559	0	0	20,559	0	0	753	753
57-58	148,917	98,044	0	0	98,044	20,063	16,297	2,784	2,784
58-59	18,351	20,321	0	0	20,321	4	0	597	597
59-60	8,772	19,274	0	0	19,274	0	0	684	684
1960-61	4,483	18,913	0	0	18,913	0	0	668	668
61-62	67,235	26,761	0	0	26,761	735	0	563	563
62-63	5,636	17,026	0	0	17,026	0	0	751	751
63-64	10,902	17,090	0	0	17,090	1	0	539	539
64-65	21,444	16,802	0	0	16,802	6	0	566	566
1965-66	116,246	51,013	0	0	51,013	6,350	1,340	4,781	4,781
66-67	128,072	74,220	0	0	74,220	7,691	7,063	1,466	1,466
67-68	24,618	18,794	0	0	18,794	0	0	358	358
68-69	341,487	291,130	0	0	291,130	146,601	145,346	72,725	72,725
69-70	17,102	23,115	0	0	23,115	0	0	542	542
1970-71	20,445	20,437	0	0	20,437	0	0	360	360
71-72	23,281	22,804	0	0	22,804	44	0	598	598
72-73	64,375	34,714	0	0	34,714	151	0	311	311
73-74	27,180	17,746	0	0	17,746	0	0	435	435
74-75	16,842	16,619	0	0	16,619	0	0	160	160

1975-76	23,686	20,182	0	0	20,182	1	0	297	297
76-77	11,714	28,210	0	0	28,210	2	0	897	897
77-78	362,630	209,124	0	0	209,124	50,463	45,013	46,749	46,749
78-79	112,217	72,340	0	0	72,340	5,560	4,932	1,200	1,200
79-80	307,155	229,630	0	0	229,630	137,654	136,399	66,700	66,700
1980-81	16,082	23,147	0	0	23,147	0	0	1,381	1,381
81-82	57,781	35,350	0	0	35,350	1	0	1,052	1,052
82-83	262,174	189,150	0	0	189,150	92,995	91,113	13,312	13,312
83-84	29,323	27,020	0	0	27,020	42	0	1,820	1,820
84-85	24,560	21,056	0	0	21,056	0	0	684	684
1985-86	45,957	16,964	4,286	0	21,250	0	0	550	550
86-87	10,799	14,468	4,601	0	19,069	0	0	561	561
87-88	17,363	16,133	5,484	0	21,617	8	0	915	915
88-89	10,922	11,487	6,330	0	17,817	0	0	431	431
89-90	7,789	8,918	6,941	0	15,859	0	0	548	548
1990-91[1]	38,580	10,848	7,276	0	18,124	0	0	744	744
91-92[1]	86,060	25,673	7,387	0	33,060	30	0	628	628
92-93[1]	428,700	284,939	7,331	0	292,270	122,800	116,604	66,590	66,590
93-94	31,679	10,913	7,753	0	18,666	0	0	483	483
94-95	201,191	113,279	7,949	0	121,228	11,110	9,855	391	391
1995-96	21,400	11,182	8,475	1,804	21,461	0	0	633	633
96-97	31,712	8,211	8,705	2,253	19,169	0	0	646	646
97-98	170,132	83,517	9,353	2,870	95,740	10,512	8,629	1,287	1,287
98-99	9,320	9,298	8,744	0	18,042	0	0	579	579
99-00	19,298	6,990	9,006	3,440	19,436	0	0	283	283
2000-01	17,433	5,618	9,286	3,306	18,210	0	0	350	350
01-02	2,451	4,550	9,689	5,115	19,354	0	0	239	239
02-03	34,197	6,242	10,281	4,753	21,276	0	0	249	249
03-04	36,922	5,384	11,392	5,950	22,726	0	0	394	394
04-05	355,224	192,590	13,246	4,222	210,058	126,168	121,775	44,638	44,638
2005-06	106,946	27,252	13,542	0	40,794	182	0	186	186
06-07	5,866	4,942	13,067	3,008	21,017	0	0	150	150
07-08	50,384	9,155	13,865	2,859	25,879	10	0	166	166
08-09	30,912	4,360	13,609	3,206	21,175	0	0	112	112
09-10	102,427	19,166	14,525	3,074	36,765	374	0	190	190
2010-11	210,108	126,351	14,825	565	141,741	23,358	20,158	6,402	6,402
11-12	29,733	9,504	14,674	0	24,178	0	0	302	302
12-13	9,429	7,325	14,310	0	21,635	0	0	118	118
13-14	12,104	6,790	12,898	0	19,688	42	0	1,404	1,404
14-15	9,032	5,610	12,926	1,513	20,049	0	0	366	366
2015-16	10,664	4,959	12,940	1,406	19,305	0	0	160	160
16-17	57,434	9,626	13,262	2,447	25,335	0	0	293	293
17-18	16,294	3,787	12,824	2,505	19,116	0	0	197	197
Avg 1931-1990	**65,538**	**51,958**	**461**	**0**	**52,419**	**17,097**	**16,406**	**8,732**	**5,943**
Avg 1931-2018	**68,953**	**46,995**	**3,873**	**617**	**51,484**	**15,004**	**14,334**	**7,410**	**5,372**
% Change (1931-90 to 31-2018)	**5%**	**-10%**	**741%**	**-**	**-2%**	**-12%**	**-13%**	**-15%**	**-10%**

Notes

(1) Discharge Values from USGS Simulation of Ground-Water Flow in the Mojave River Basin, CA (Lower Narrows and Afton, CA values from gaging station).
(2) Discharge of Mojave River at The Forks from the addition of values as reported from USGS stations at West Fork Mojave River Near Hesperia, CA (10261000), and Deep Creek Near Hesperia, CA (10260500).
(3) Discharge of Mojave River at Lower Narrows as reported by USGS station Mojave River at Lower Narrows Near Victorville, CA (10261500).
(4) Discharge of Mojave River at Barstow as reported by USGS station Mojave River at Barstow, CA (10262500).
(5) Discharge of Mojave River at Waterman Fault as predicted by model based on surface water losses to groundwater storage between Barstow and Waterman Fault.
(6) Discharge of Mojave River at Afton, CA from water years 1932 through 1952 by William Hardt and published by USGS in Open - File Report, "Hydrologic Analysis of Mojave River Basin California using Electric Analog Model" dated August 18, 1971. Water Years 1979 and 1980 estimated by Mojave Basin Area Watermaster. All other water year discharge values as reported by USGS station Mojave River at Afton, CA (10263000).
(7) USGS station Mojave River at Afton, CA (10263000). No reported data for 1931-1952. Water Years 1979 and 1980 estimated by Mojave Basin Area Watermaster.

Summary Comparison of Discharge at Various Points on the Mojave River

Water Year Period	Mojave River at Forks[1]	Mojave River at Lower Narrows + VVWRA[2]	Mojave River at Lower Narrows + VVWRA + Makeup Water Purchases[2]	Mojave River at Barstow[3]	Mojave River at Waterman Fault[4]
1931-1990	65,538	52,419	52,419	17,097	16,406
1931-2018	68,953	50,867	51,484	15,004	14,334

Water Year Period	Mojave River at Afton, Estimated [5]	Mojave River at Afton, Measured[6]	Potential Surface Water Recharge in Baja Subarea Based on Estimated Afton Flow[7]	Potential Surface Water Recharge in Baja Subarea Based on Measured Afton Flow[8]
1931-1990	8,732	5,943	7,675	10,464
1931-2018	7,410	5,372	6,924	8,962

Notes

(1) Combined discharge of USGS stations at West Fork Mojave River Near Hesperia, CA (10261000), and Deep Creek Near Hesperia, CA (10260500).
(2) USGS station Mojave River at Lower Narrows Near Victorville, CA (10261500), plus effluent discharges by VVWRA.
(3) USGS station Mojave River at Barstow, CA (10262500).
(4) Discharge of Mojave River at Waterman Fault as predicted by model based on surface water losses to groundwater storage between Barstow and Waterman Fault.
(5) Discharge of Mojave River at Afton, CA from water years 1932 through 1952 by William Hardt and published by USGS in Open - File Report, "Hydrologic Analysis of Mojave River Basin California using Electric Analog Model" dated August 18, 1971. Water Years 1979 and 1980 estimated by Mojave Basin Area Watermaster. All other water year discharge values as reported by USGS station Mojave River at Afton, CA (10263000).
(6) USGS station Mojave River at Afton, CA (10263000). No reported data for 1931-1952. Water Years 1979 and 1980 estimated by Mojave Basin Area Watermaster.
(7) Flow at Waterman Fault less flow at Afton (includes estimated flows for 1932-1952 and 1979-1980; see footnote 5).
(8) Flow at Waterman Fault less flow at Afton (excludes estimated flows for 1932-1952, but includes estimated flows for 1979-1980; see footnote 6).

ATTACHMENT 1

Table 5-1 from Watermaster Annual Report

Production Safe Yield Update
Based on Long-Term Average Natural Water Supply and Outflow,
and Imports, Consumptive Use, and Production for 2018

TABLE 5-1

SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND 2017-18 IMPORTS AND CONSUMPTIVE USE

(ALL AMOUNTS IN ACRE-FEET)

		Este	Oeste	Alto	Centro	Baja	Basin Totals
WATER SUPPLY							
Surface Water Inflow		1,700	1,500	68,500 [1]	33,600 [2]	17,358 [3]	72,652 [4]
Subsurface Inflow		0	0	1,000	2,000	1,581 [5]	0 [6]
Deep Percolation of Precipitation		0	0	3,500	0	100	3,600
Imports[7]		2,000	0	2,234	2,262	0	6,496
	TOTAL	**3,700**	**1,500**	**75,234**	**37,862**	**19,039**	**82,748**
CONSUMPTIVE USE AND OUTFLOW							
Surface Water Outflow		0	0	33,600 [2]	16,406 [8]	5,372 [9]	5,372
Subsurface Outflow		200	800	2,000	1,581 [5]	0	0
Consumptive use							
Agriculture[10]		2,327	1,208	1,311	8,895	17,664	31,405
Urban[10,11]		1,500	1,724	40,603	7,557	6,338	57,722
Phreatophytes		0	0	11,000	3,000	2,000	16,000 [12]
	TOTAL	**4,027**	**3,732**	**88,514**	**37,439**	**31,374**	**110,499**
Surplus / (Deficit)		(327)	(2,232)	(13,280)	423	(12,335)	(27,751)
Total Estimated Production[13]		5,055	3,944	77,686	20,665	24,524	131,874
PRODUCTION SAFE YIELD[14]		**4,728**	**1,712**	**64,406**	**21,088**	**12,189**	**104,123**

[1] Average discharge of Mojave River at The Forks, 1931-1990 (The Forks is the addition of reported values from USGS stations at West Fork Mojave River Near Hesperia, CA (10261000) and Deep Creek Near Hesperia, CA (10260500). Includes 3,000 af of ungaged inflow (Judgment, 1996).

[2] Estimated based on reported flows at USGS gaging station, Mojave River at Victorville Narrows and 1991-2018 Transition Zone water balance (Watermaster Engineer, 2019).

[3] Estimated from reported flows at USGS gaging station, Mojave River at Barstow. Includes 16,406 af of Mojave River surface flow across the Waterman Fault estimated by "Evaluations of Potential Mojave River Recharge Losses between Barstow and Waterman Fault", Wagner & Bonsignore, 2012 (see Appendix A, Table 6), and 747 af of local surface inflow from Kane Wash and Boom Creek, and 205 af from washes (Wagner, 2011).

[4] Represents the sum of Este (1,700 af), Oeste (1,500 af), Alto (68,500 af) and Baja (747 af from Kane Wash and Boom Creek, 205 af from washes).

[5] Stamos, 2001 (USGS).

[6] Inter subarea subsurface flows do not accrue to the total basin water supply.

[7] Imports for Este are from the Big Bear Area Regional Wastewater Authority; Alto are from Lake Arrowhead Community Services District and pre-purchased groundwater storage for HDPP; Centro are the average make-up water purchases, 1995-2018.

[8] Estimated from reported flows at USGS gaging station, Mojave River at Barstow (see note #2 above).

[9] Based on USGS station Mojave River at Afton, CA (10263000) reported discharge for 1931, 1953-2018. Water Years 1979 and 1980 estimated by Mojave Basin Area Watermaster.

[10] 2018 Consumptive Use Analysis by Watermaster.

[11] Includes consumptive use of "Minimals Pool" (estimated Minimal's production is 7,077 af).

[12] From USGS Water-Resurces Investigation Report 96-4241 "Riparian Vegetation and Its Water Use During 1995 Along the Mojave River, Southern California" 1996.

[13] Water production for 2017-18. Included in the production values are the estimated minimal producer's water use by Subarea.

[14] Imported State Water Project water purchased by MWA is not reflected in the above table.

ATTACHMENT 2

TABLE C-1 of Judgment

Subarea Hydrological Inventory Based On Long-Term Average Natural Water Supply and Outflow And Current Year Imports and Consumptive Use

--SAMPLE CALCULATION--
TABLE C-1 OF JUDGMENT

Mojave Basin Area Adjudication
Subarea Hydrological Inventory Based On
Long-Term Average Natural Water Supply and Outflow
and Current Year Imports and Consumptive Use
(All Amounts in Acre-Feet)

WATER SUPPLY	Este	Oeste	Alto	Centro	Baja	Basin Totals
Surface Water Inflow						
Gaged	0	0	65,000	0	0	65,000
Ungaged	1,700	1,500	3,000	37,300 [1]	14,300 [2]	6,500 [3]
Subsurface Inflow	0	0	1,000	2,000	1,200	0 [4]
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600
Imports						
Lake Arrowhead CSD	0	0	1,500	0	0	1,500
Big Bear ARWWA	2,000	0	0	0	0	2,000
TOTAL	3,700	1,500	74,000	39,300	15,600	78,600
CONSUMPTIVE USE AND OUTFLOW						
Surface Water Outflow						
Gaged	0	0	0	0	8,200	8,200
Ungaged	0	0	37,300 [1]	14,000 [5]	0	0
Subsurface Outflow	200	800	2,000	1,200	0	0
Consumptive Use						
Agriculture	6,800	2,900	16,300	20,300	30,200	76,500
Urban	1,900	1,200	36,300	9,500	9,700	58,600
Phreatophytes	0	0	5,100	900	1,500	7,500 [6]
Exports	0	0	0	0	0	0
TOTAL	8,900	4,900	97,000	45,900	49,600	150,800
Surplus / (Deficit)	(5,200)	(3,400)	(23,000)	(6,600)	(34,000)	(72,200)
Total Estimated Production (Current Year) [7]	15,700	7,600	98,900	46,500	54,300	223,000
PRODUCTION SAFE YIELD (Current Year) [7]	**10,500**	**4,200**	**75,900**	**39,900**	**20,300**	**150,800**

[1] Estimated from reported flows at USGS gaging station, Mojave River at Victorville Narrows.

[2] Includes 14,000 acre-feeet of Mojave River surface flow across the Waterman Fault estimated from reported flows at USGS gaging station, Mojave River at Barstow and 300 acre-feet of local surface inflow from Kane Wash.

[3] Represents the sum of Este (1,700 af), Oeste (1,500 af), Alto (3,000 af) and Baja (300 af from Kane Wash).

[4] Inter subarea subsurface flows do not accrue to the total basin water supply.

[5] Estimated from reported flows at USGS gaging station, Mojave River at Barstow.

[6] Estimated by Bookman-Edmonston.

[7] For purposes of this Table, the current year is 1990.

ATTACHMENT 3

TABLE 1
Subarea Hydrological Inventory Based On
Long-Term Average Natural Water Supply and Outflow
And 1996-97 Imports and Consumptive Use

Consumptive Water Use Study and Update of
Production Safe Yield Calculations for the Mojave Basin Area

Albert A. Webb Associates
February 16, 2000

TABLE 1

MOJAVE BASIN AREA ADJUDICATION
SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND 1996-97 IMPORTS AND CONSUMPTIVE USE

(ALL AMOUNTS IN ACRE-FEET)

	Este	Oeste	Alto	Centro	Baja	Basin Totals
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	65,500	0	0	65,500
Ungaged	1,700	1,500	3,600	34,700 [1]	14,400 [2]	7,200 [3]
Subsurface Inflow	0	0	1,175	2,000	1,200	0 [4]
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600
Imports						
Lake Arrowhead CSD	0	0	1,620	0	0	1,620
Big Bear Area RWA	2,630	0	0	0	0	2,630
TOTAL	**4,330**	**1,500**	**75,395**	**36,700**	**15,700**	**80,550**
CONSUMPTIVE USE AND OUTFLOW						
Surface Water Inflow						
Gaged	0	0	0	0	8,200	8,200
Ungaged	0	0	34,700 [1]	14,000 [5]	0	0
Subsurface Outflow	825	350	2,000	1,200	0	0
Consumptive use						
Agriculture	3,900	2,300	7,900	13,000	20,800	47,900
Urban [6]	2,200	1,300	40,700	8,500	7,900	60,600
Phreatophytes	0	0	11,000	3,000	2,000	16,000 [7]
Exports	0	0	0	0	0	0
TOTAL	**6,925**	**3,950**	**96,300**	**39,700**	**38,900**	**132,700**
Surplus / (Deficit)	(2,595)	(2,450)	(20,905)	(3,000)	(23,200)	(52,150)
Total Estimated Production (Current Year) [8]	9,751	6,502	90,767	36,375	43,879	187,274
PRODUCTION SAFE YIELD (Current Year) [9]	**7,156**	**4,052**	**69,862**	**33,375**	**20,679**	**135,124**

[1] Estimated from reported flows at USGS gaging station, Mojave River at Victorville Narrows.

[2] Includes 14,000 acre-feet of Mojave River surface flow across the Waterman Fault estimated from reported flows at USGS gaging station, Mojave River at Barstow, and 400 acre-feet of local surface inflow from Kane Wash and Boom Creek.

[3] Represents the sum of Este (1,700 ac.ft.), Oeste (1,500 ac.ft.), Alto (3,600 ac.ft.) and Baja (400 ac.ft. from Kane Wash and Boom Creek).

[4] Inter subarea subsurface flows do not accrue to the total basin water supply.

[5] From reported flows at USGS gaging station, Mojave River at Barstow.

[6] Includes consumptive use of "Minimals Pool".

[7] From USGS Water-Resurces Investigation Report 96-4241 "Riparian Vegetation and Its Water Use During 1995 Along the Mojave River, Southern California" 1996.

[8] Based on data in "Fourth Annual Report of the Mojave Basin Area Watermaster, Water Year 1996-97" April 1, 1998. Included in the production values are the estimated minimal producer's water use by Subarea.

[9] For 1996-97 Water Year. Imported State Water Project water purchased by MWA (4,501 acre-feet) is not reflected in the above table.

ATTACHMENT 4

Figure 3-10 from Watermaster Annual Report

Transition Zone Water Balance

Transition Zone Water Balance

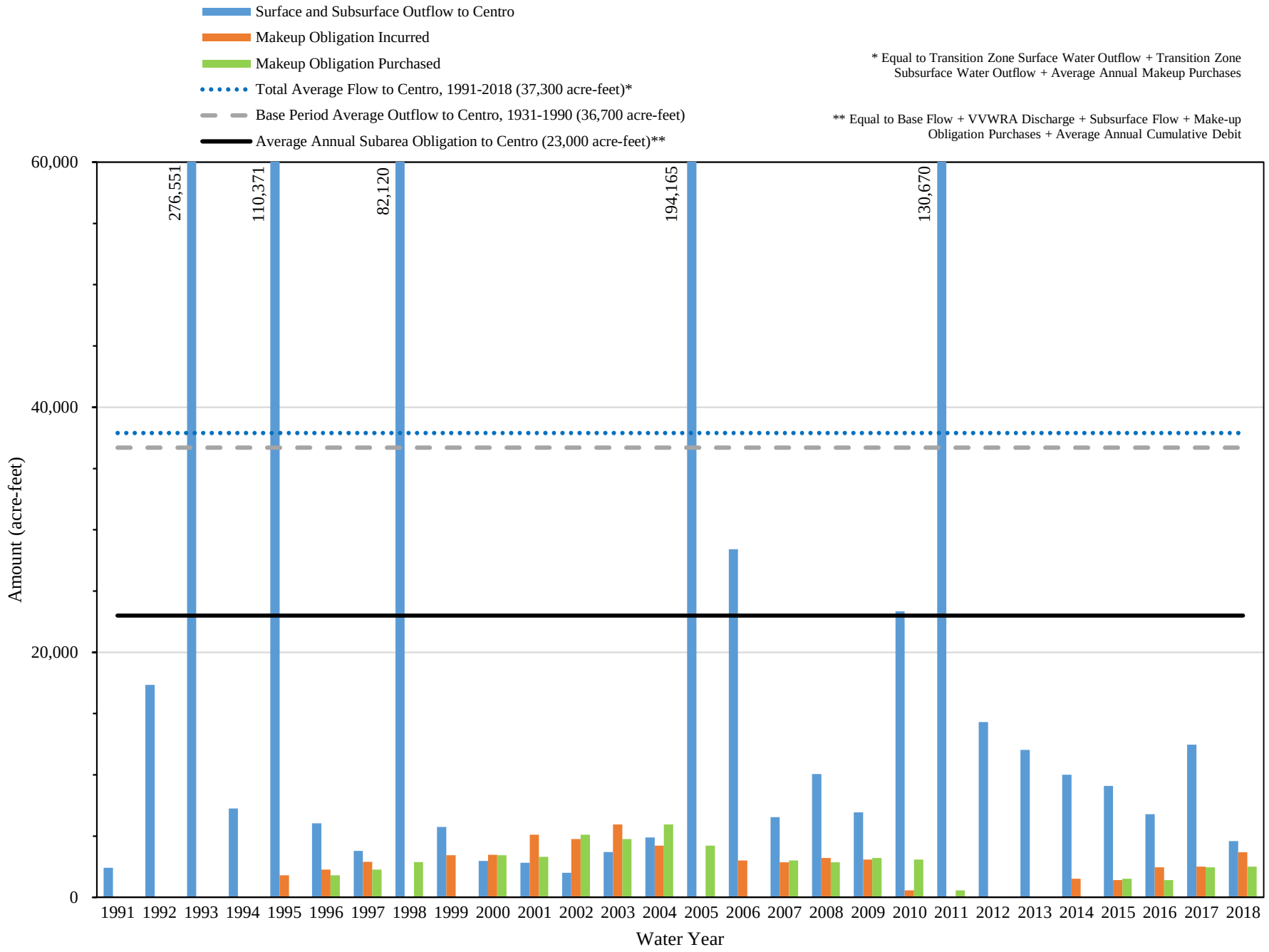
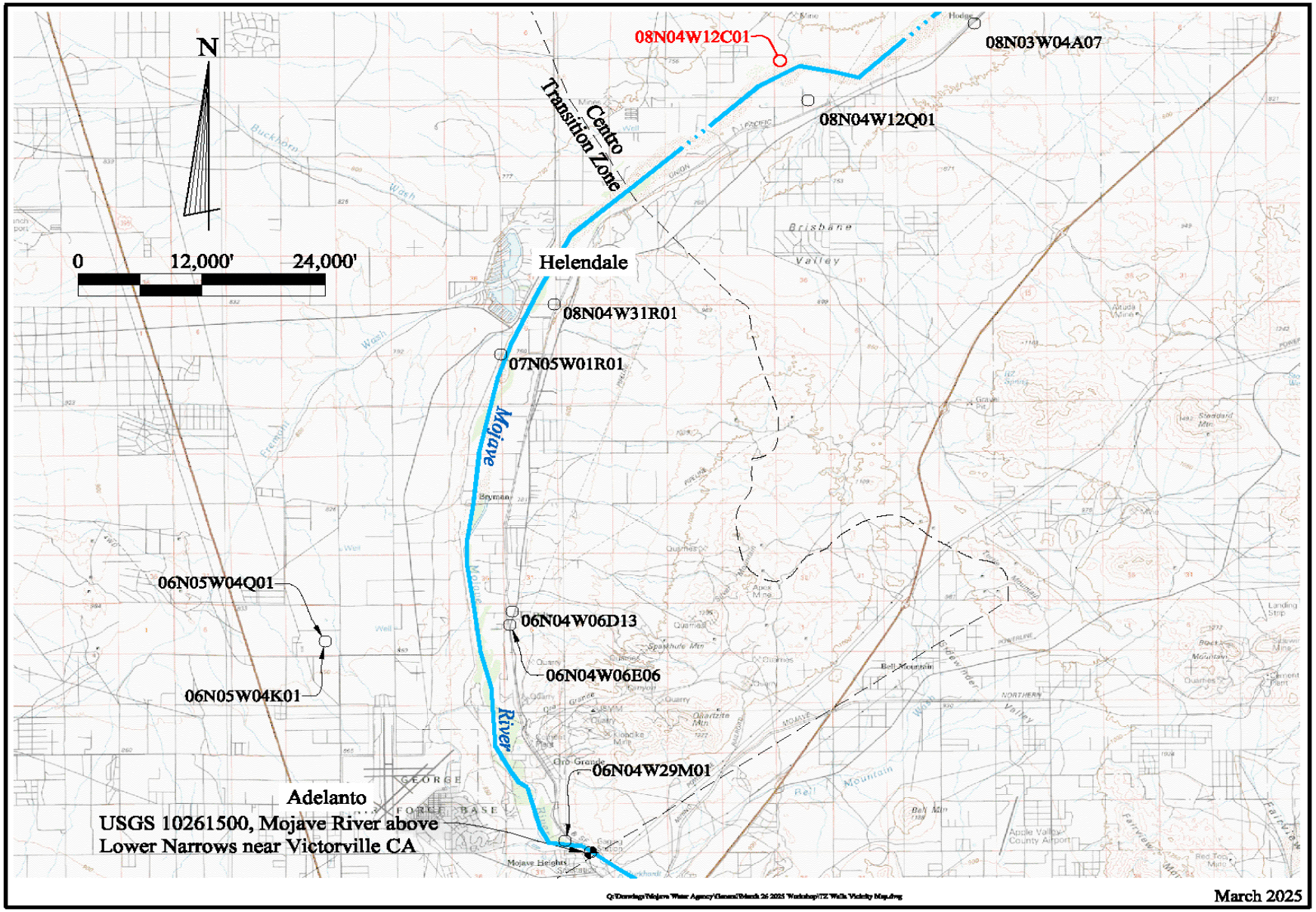


FIGURE 3-10

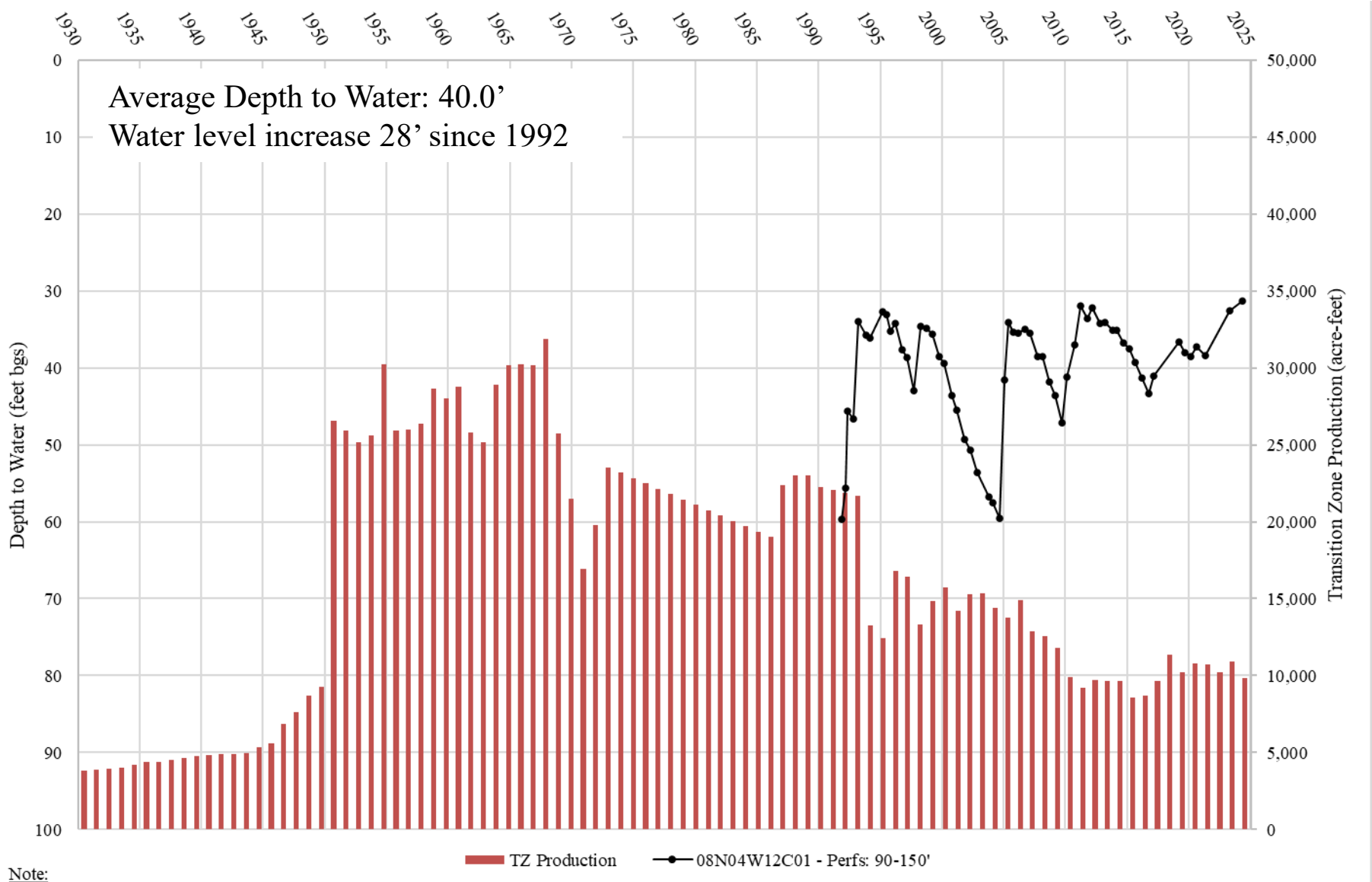
ATTACHMENT G

Map Showing Location of Presented Well



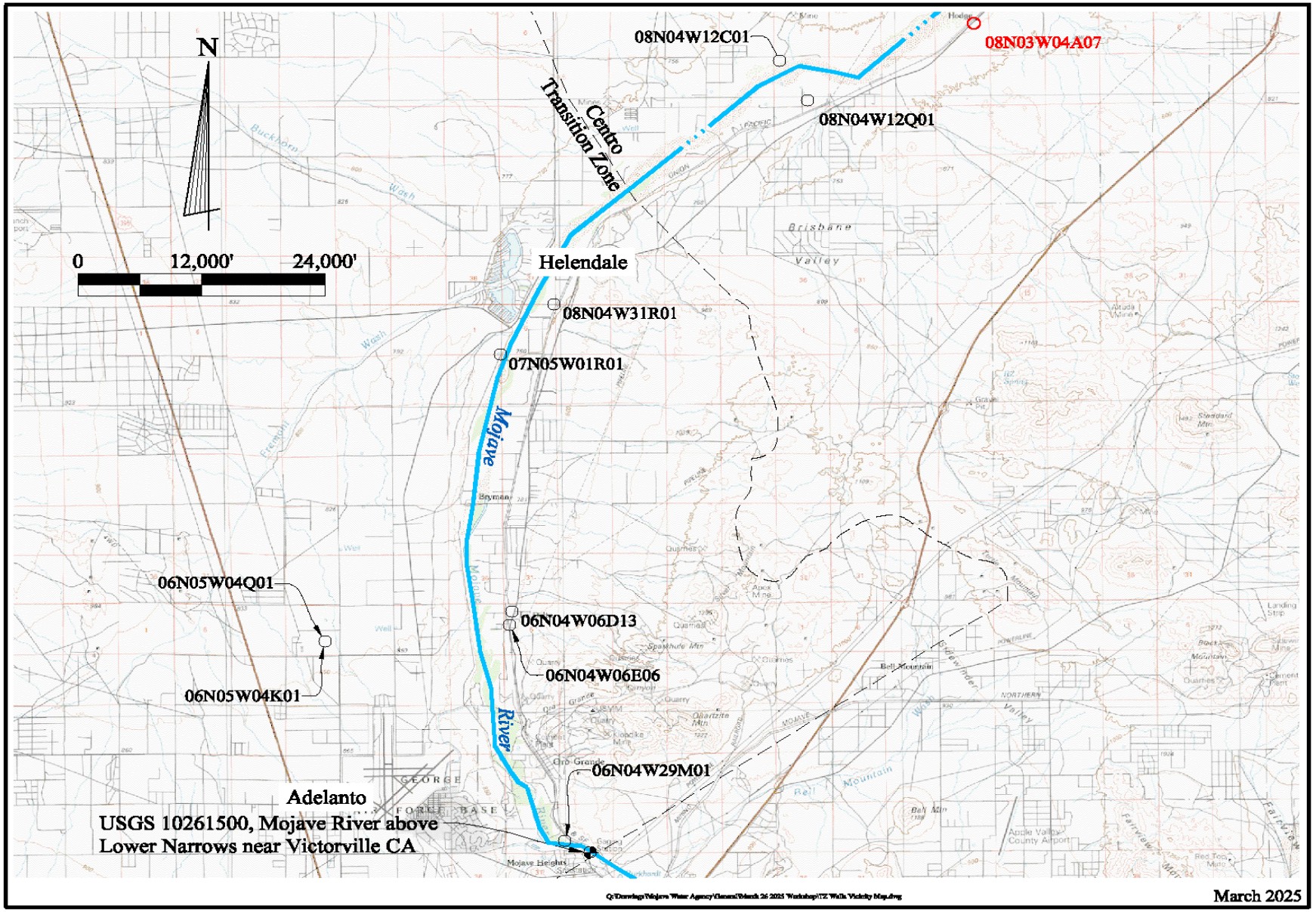
MOJAVE BASIN AREA WATERMASTER

Transition Zone Production &Water Level for Well 08N04W12C01 (Centro)



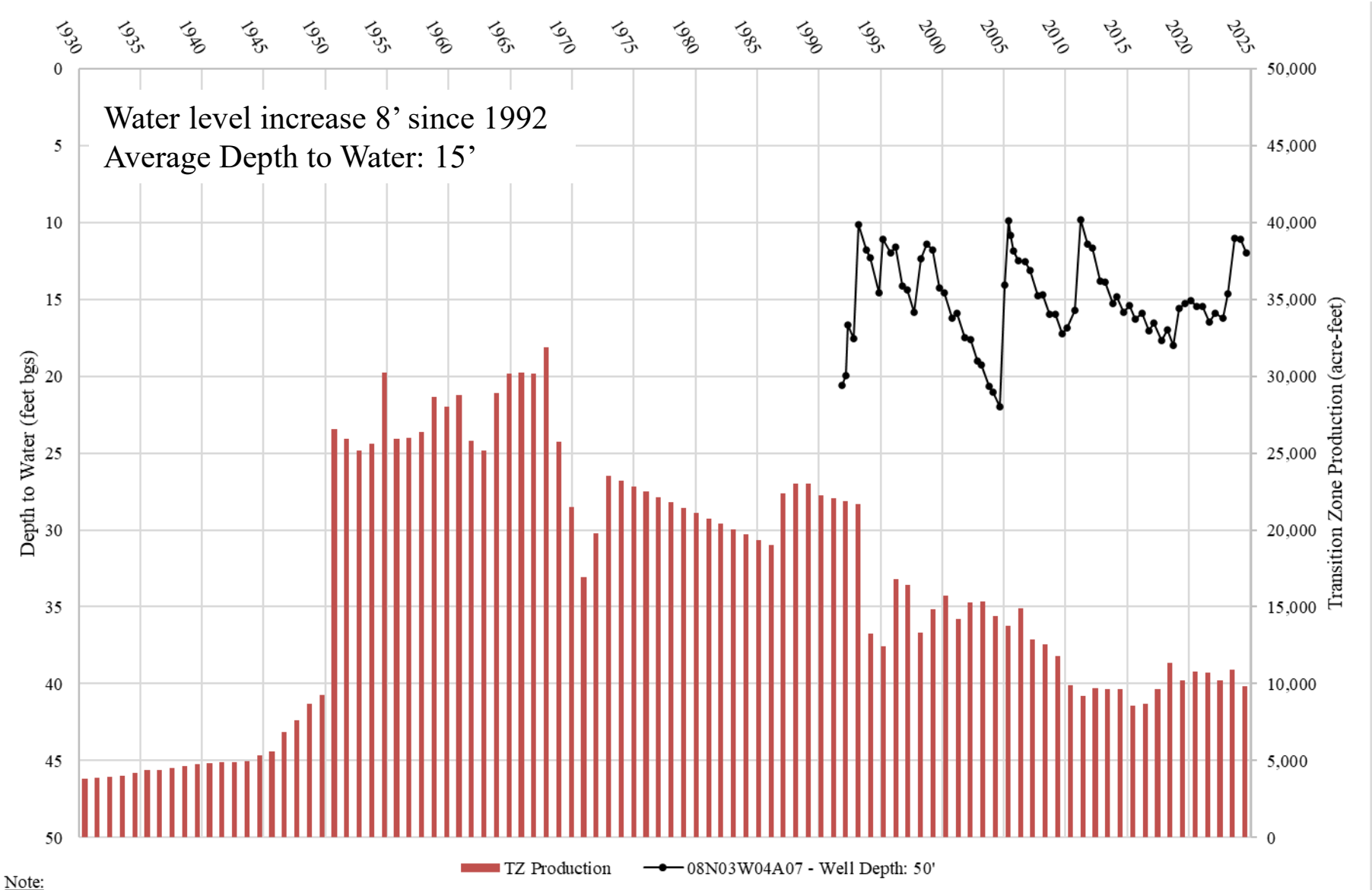
Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.

Map Showing Location of Presented Well



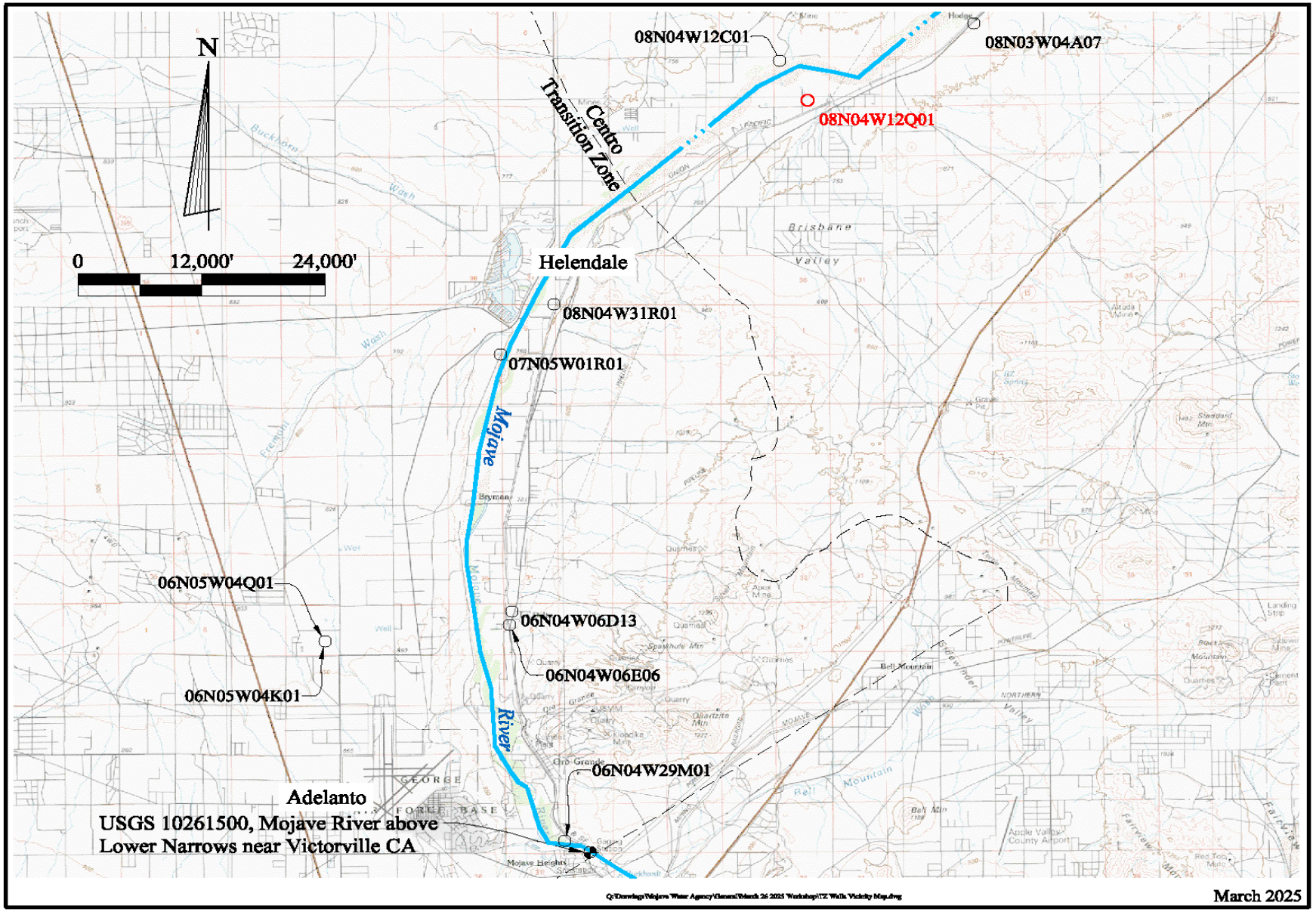
MOJAVE BASIN AREA WATERMASTER

Transition Zone Production & Water Level for Well 08N03W04A07 (Centro)

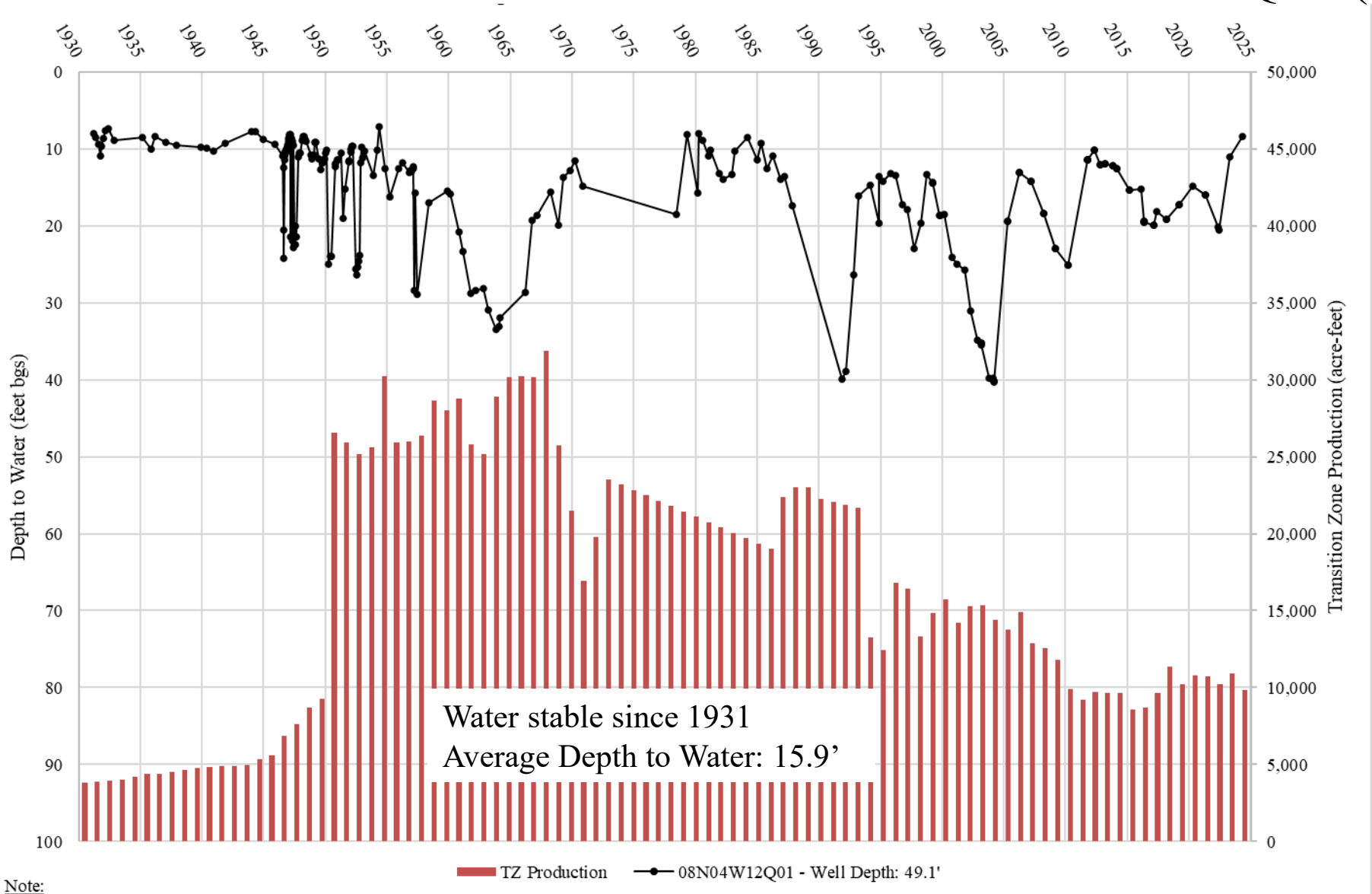


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.

Map Showing Location of Presented Well

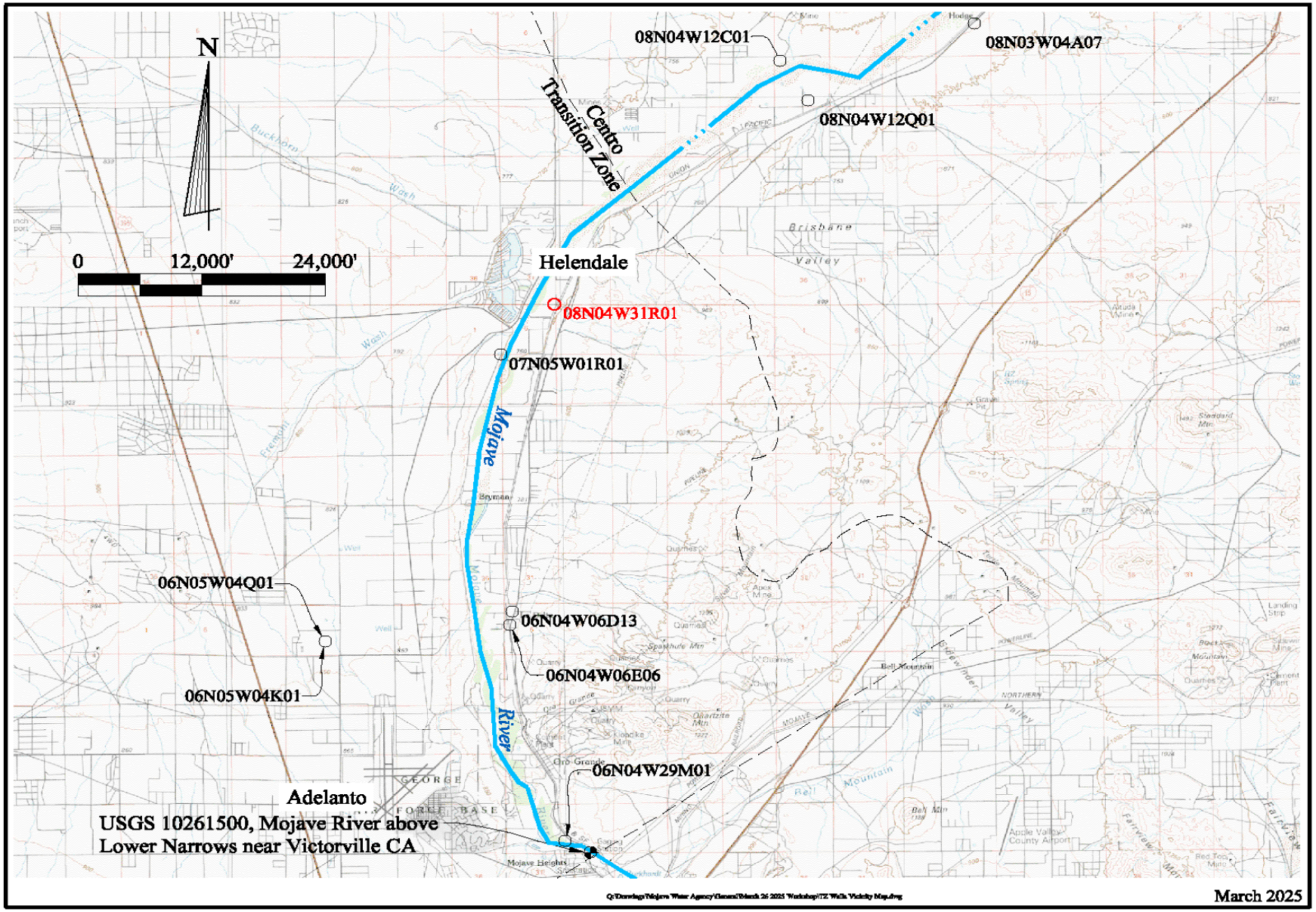


Transition Zone Production &Water Level for Well 08N04W12Q01 (Centro)

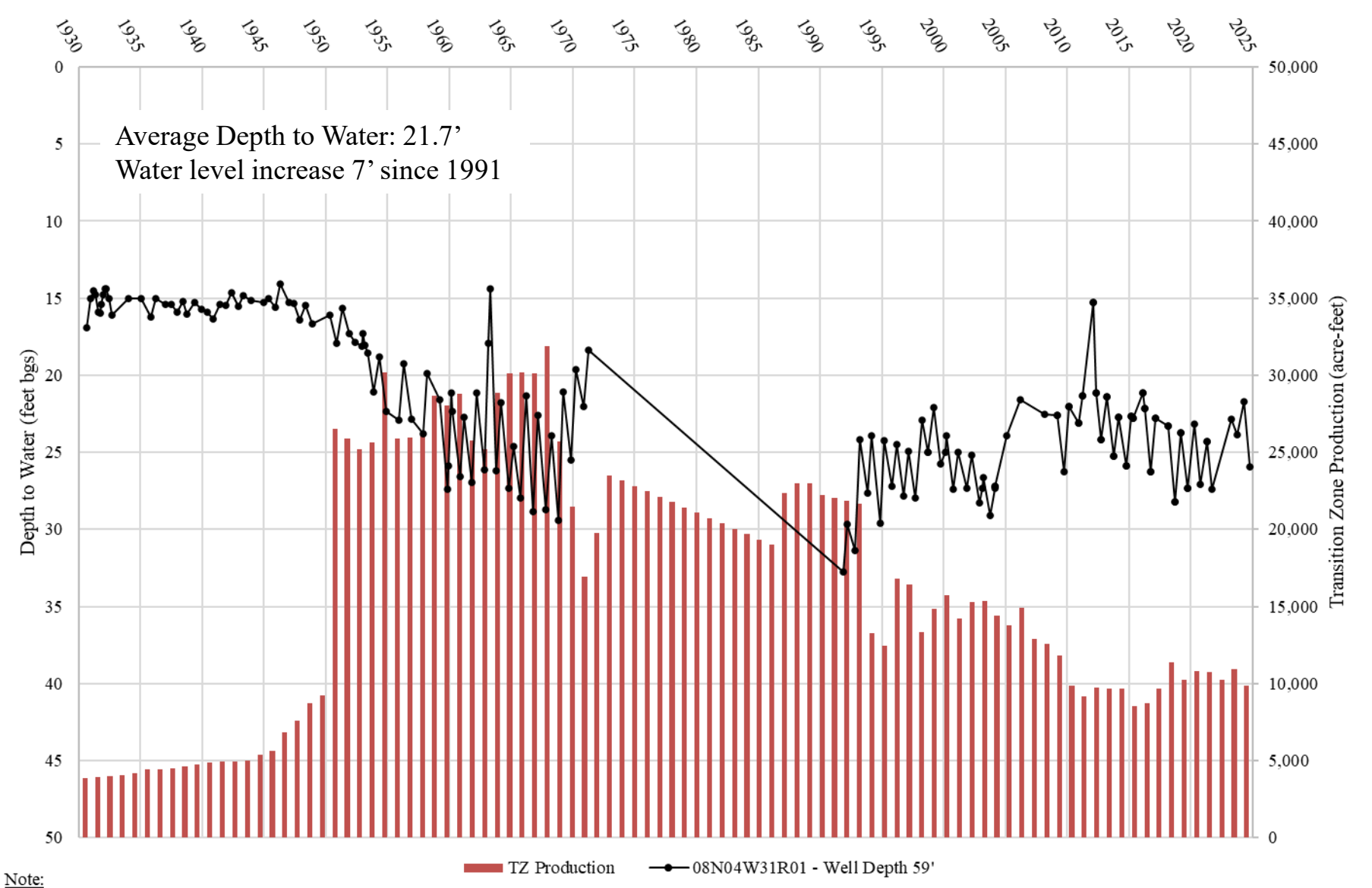


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.
Water levels potentially influenced by pumping of well or wells in the vicinity.

Map Showing Location of Presented Well

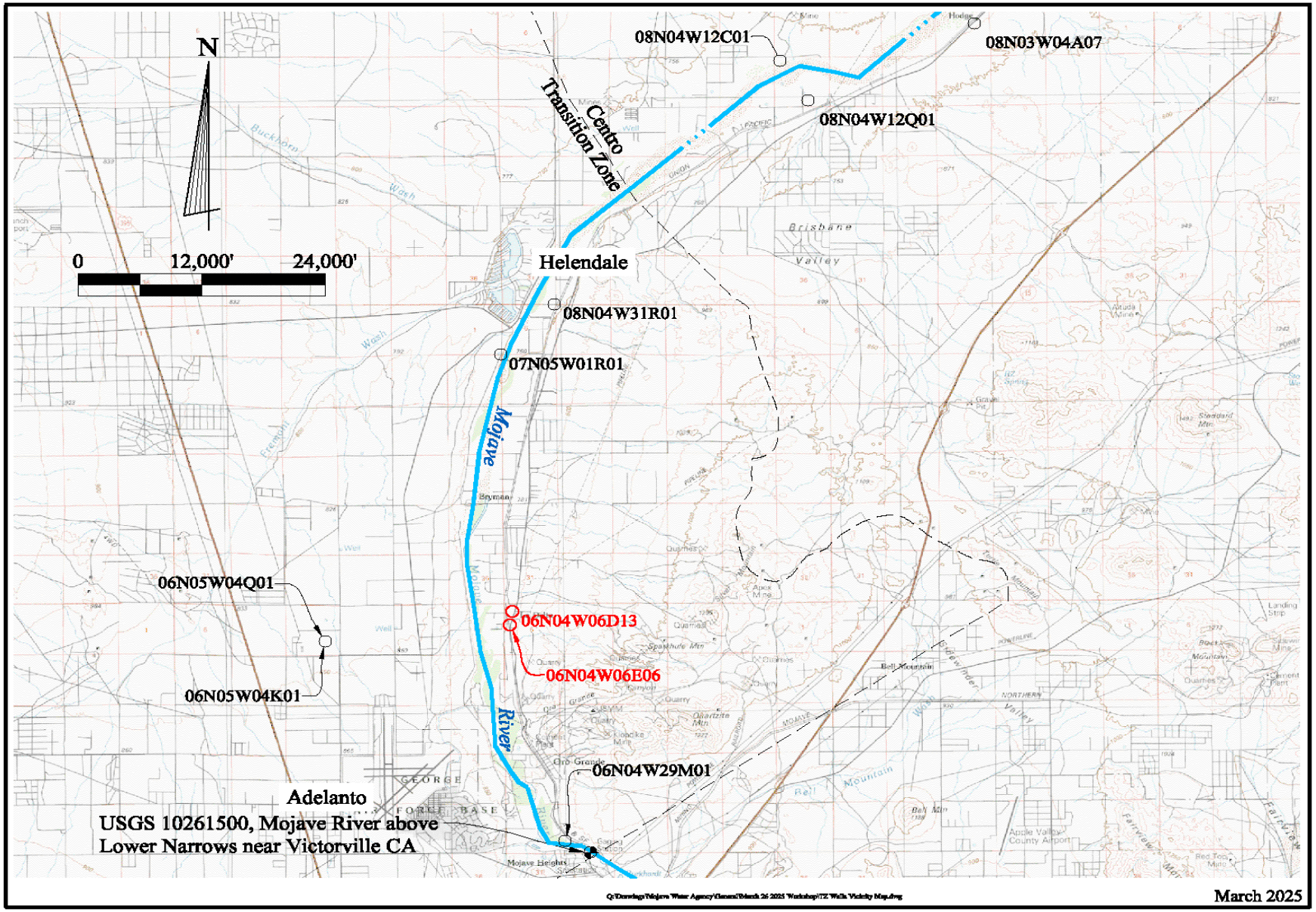


Transition Zone Production & Water Level for Well 08N04W31R01

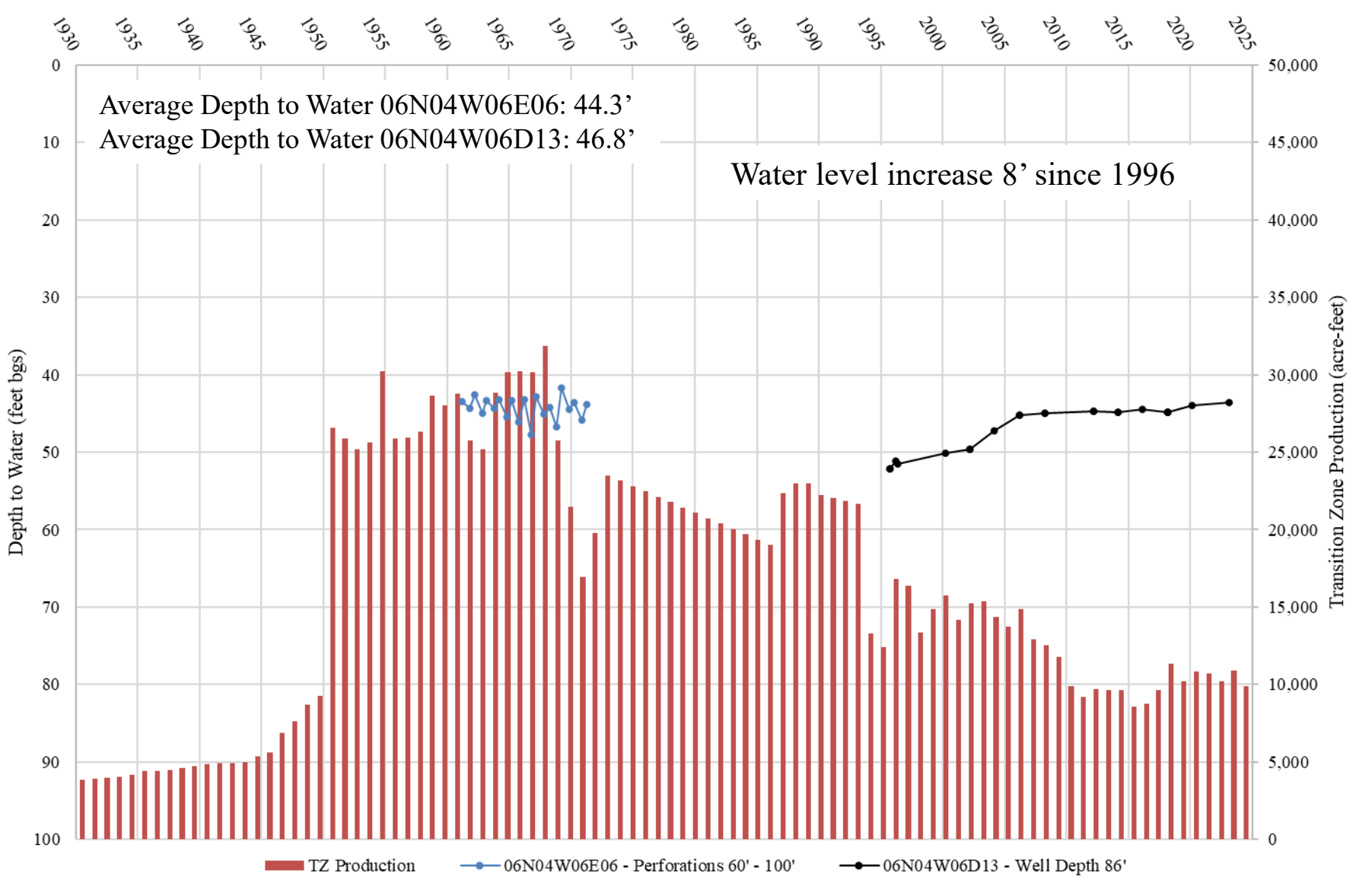


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.
Water levels potentially influenced by pumping of well or wells in the vicinity.

Map Showing Location of Presented Well

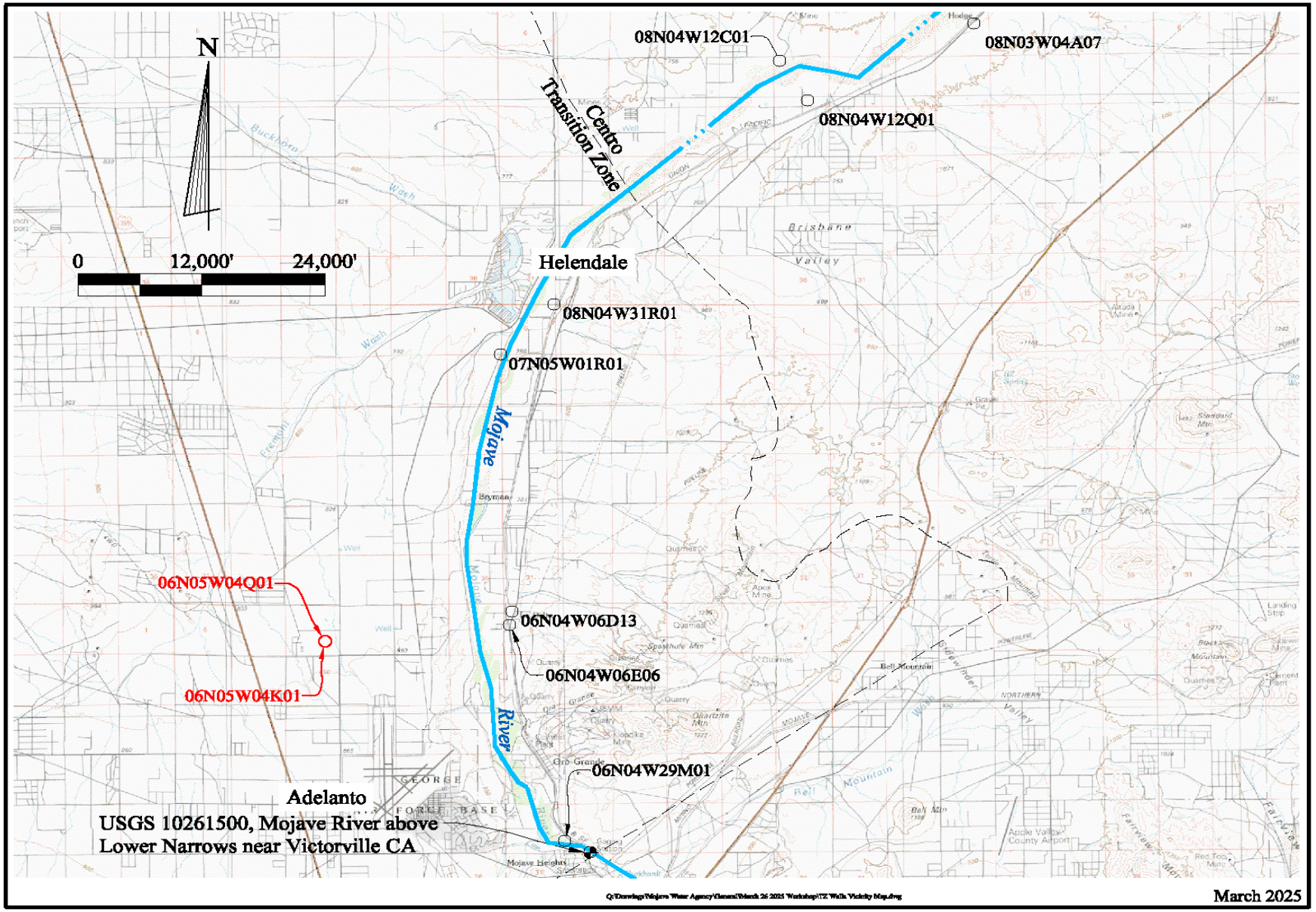


Transition Zone Production & Water Level for Well 06N04W06E06 & D13

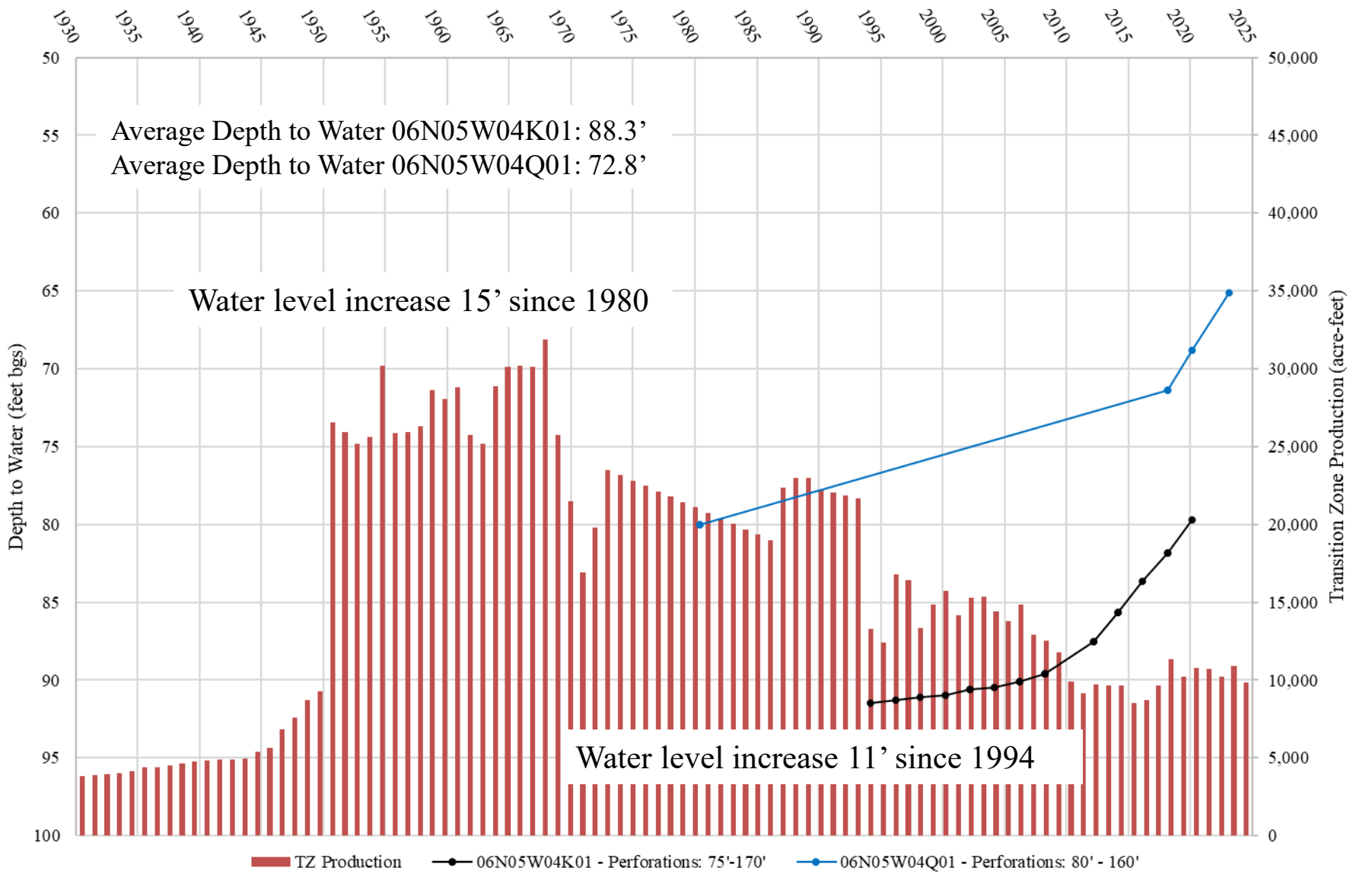


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.

Map Showing Location of Presented Well

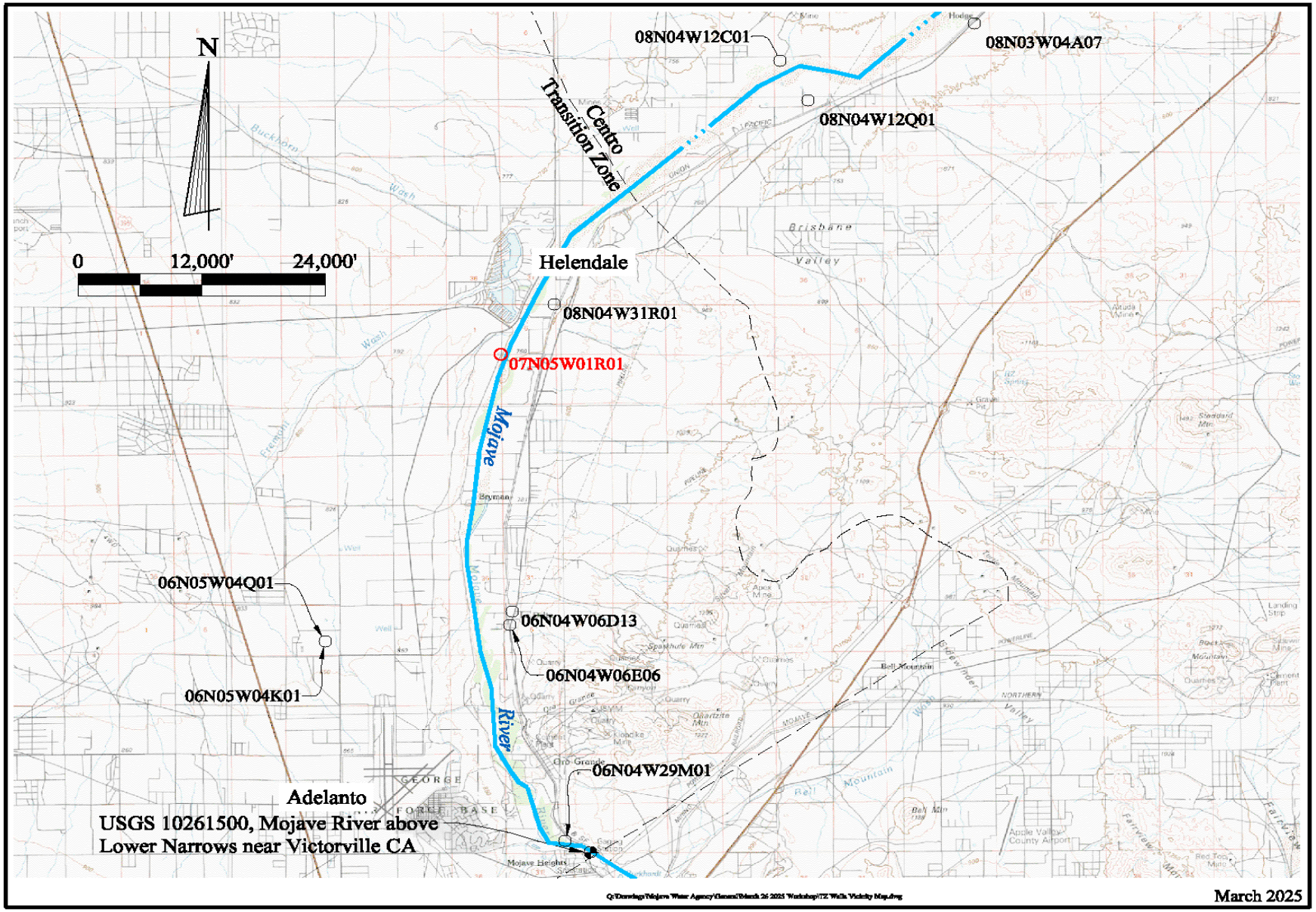


Transition Zone Production & Water Level for Well 06N05W04K01 & Q01

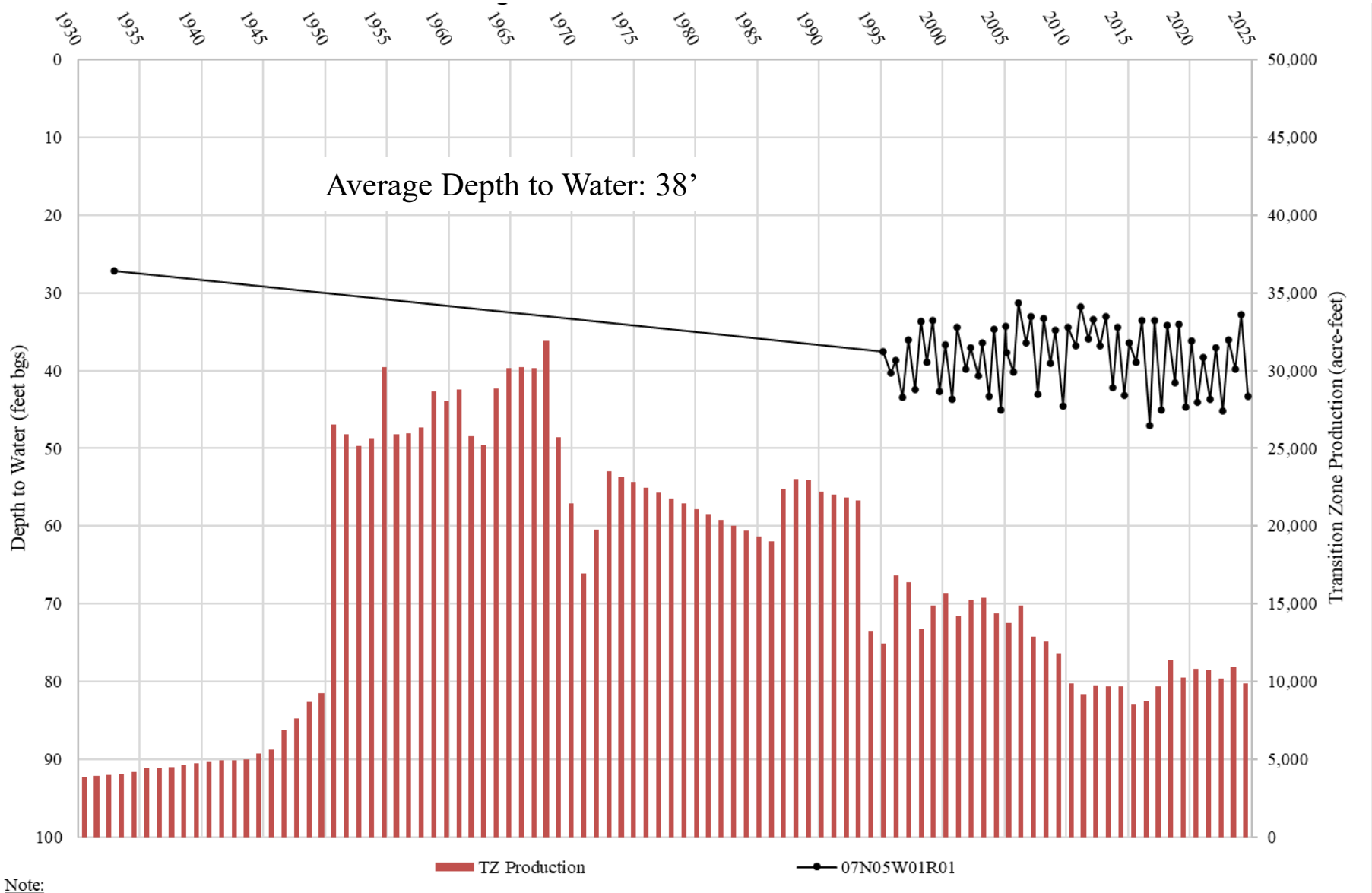


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.

Map Showing Location of Presented Well

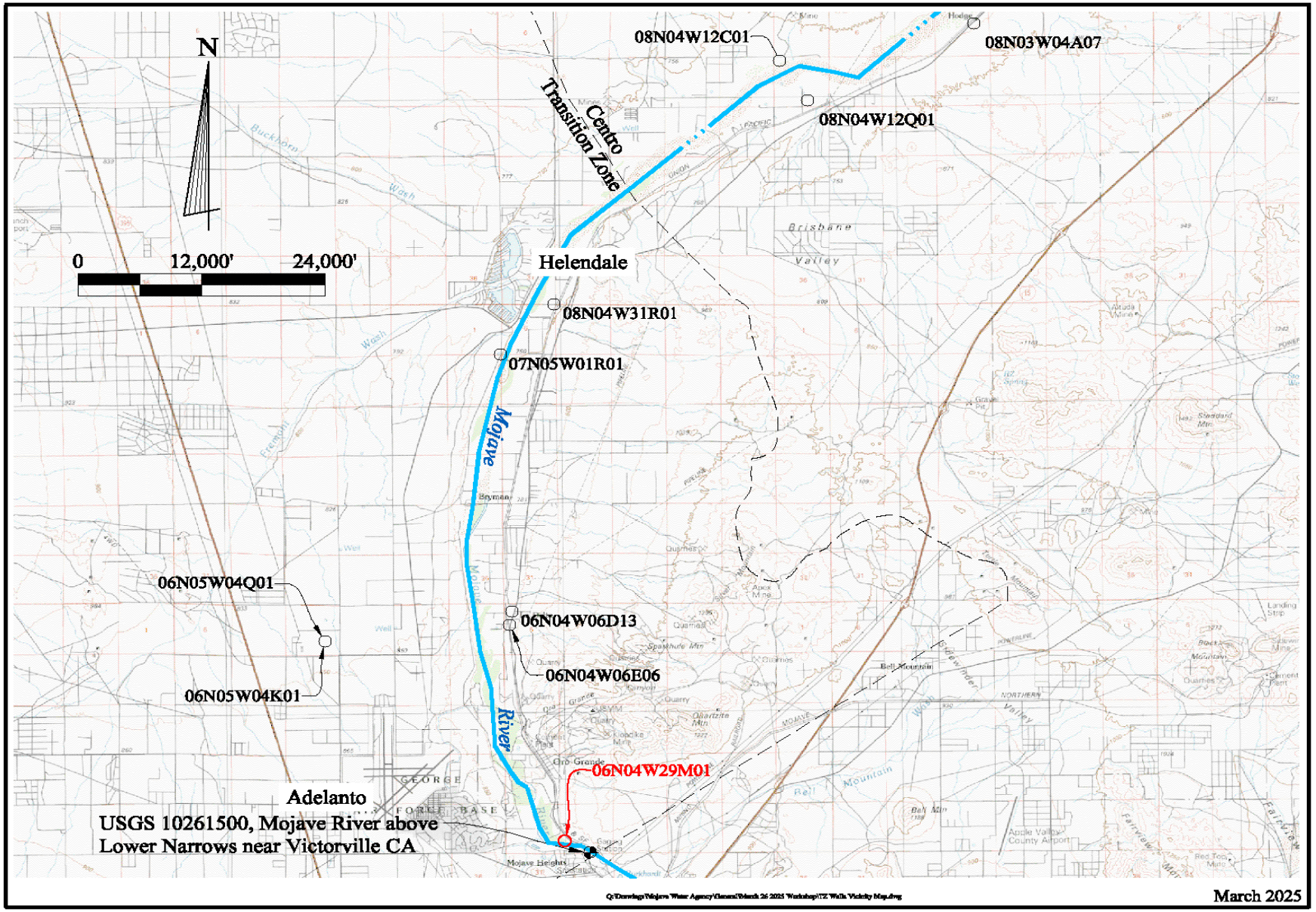


Transition Zone Production & Water Level for Well 07N05W01R01

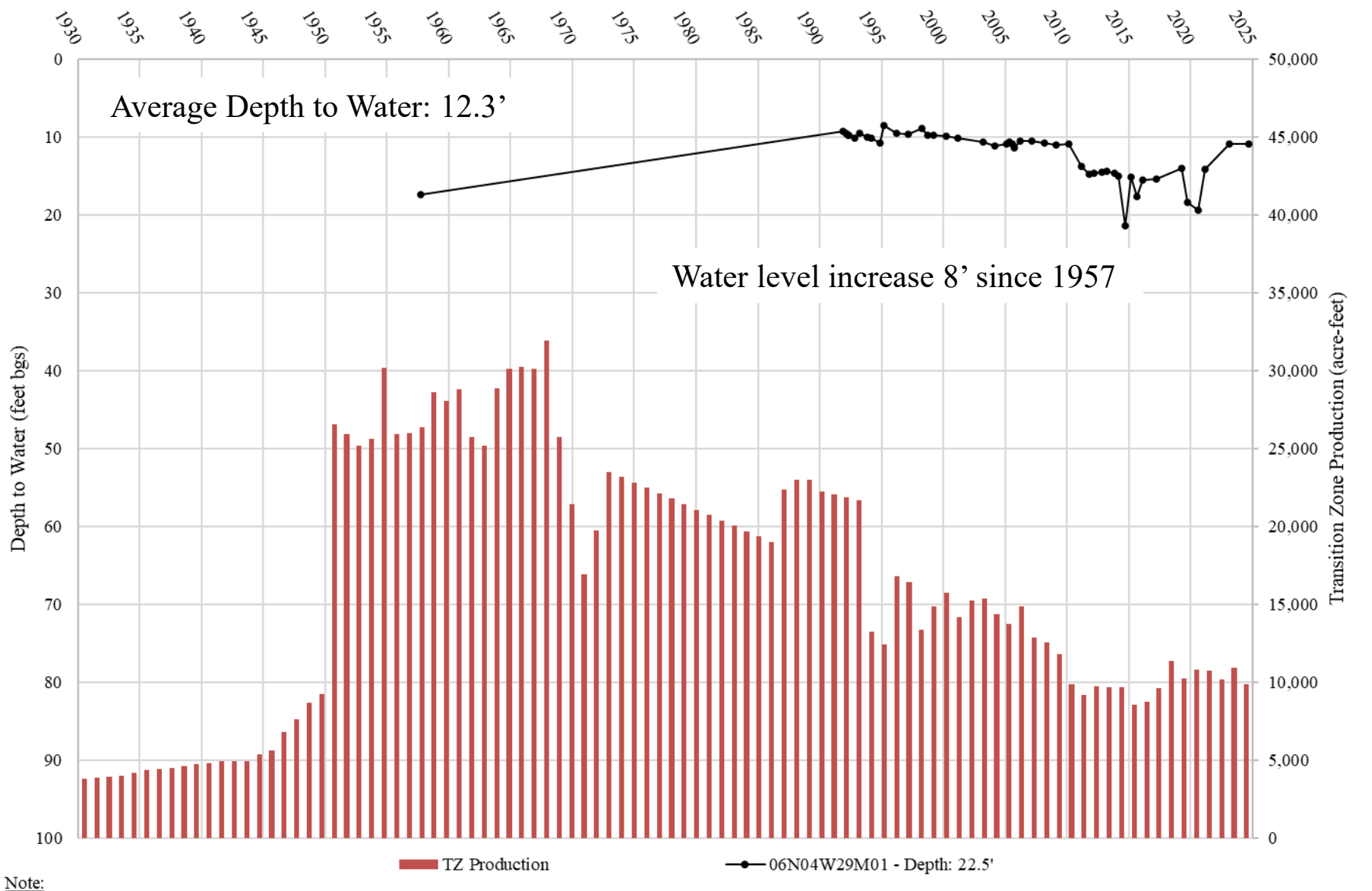


Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.
Water levels potentially influenced by pumping of well or wells in the vicinity.

Map Showing Location of Presented Well

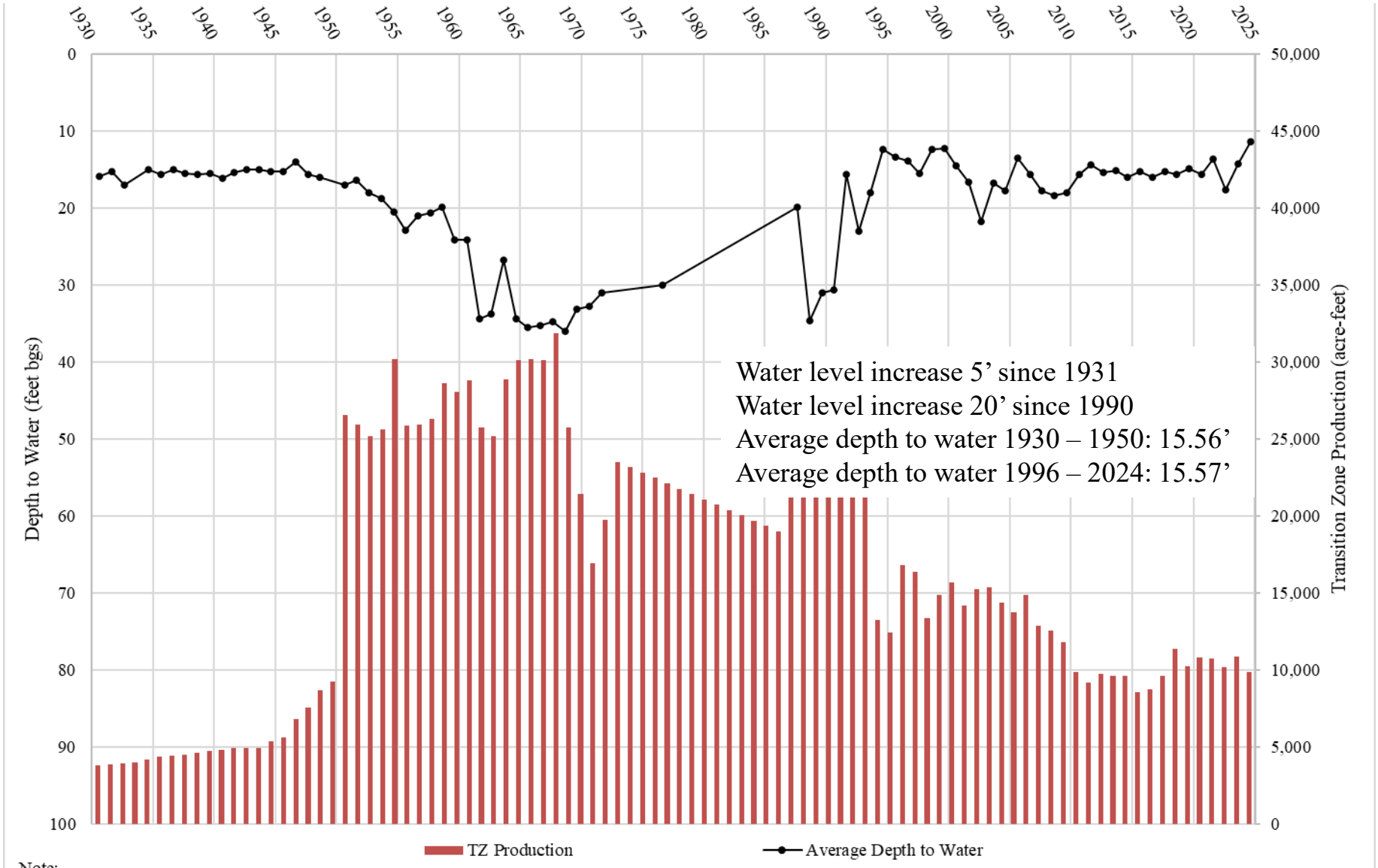


Transition Zone Production &Water Level for Well 06N04W29M01



Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.
Water levels potentially influenced by pumping of well or wells in the vicinity.

Transition Zone Production & Average Water Level for **ALL** Wells



Note:
1931 - 1993 data from USGS "Simulation of Ground-Water Flow in the Mojave River Basin, California", Stamos. 2001
1994 - 2023 data from Mojave Watermaster.

Average of 41 wells in the Transition Zone less 50' depth to water

ATTACHMENT H

TABLE 4-3

STATUS OF ALTO SUBAREA OBLIGATIONS
WATER YEARS 2014-15 THROUGH 2023-24

Water Year	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**
Average Annual Obligation in acre-feet	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
Status at Beginning of Water Year										
Cumulative Obligation	483,000	506,000	529,000	552,000	575,000	598,000	621,000	644,000	667,000	690,000
Cumulative Flow	468,411	490,268	511,465	533,205	554,196	577,480	600,435	622,857	646,122	674,269
Net cumulative Credit (Debit)	(14,589)	(15,732)	(17,535)	(18,795)	(20,804)	(20,520)	(20,565)	(21,143)	(20,878)	(15,731)
Flow During Water Year										
Base Flow	5,418	4,851	4,031	3,662	4,533	5,185	4,791	3,337	9,690	8,636
Subsurface Flow	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Other Water	12,926	12,940	13,262	12,824	13,077	13,719	13,346	15,095	14,274	14,290
Makeup Water Purchased	1,513	1,406	2,447	2,505	3,674	2,051	2,285	2,833	2,183	0
Total Flow	**21,857**	**21,197**	**21,740**	**20,991**	**23,284**	**22,955**	**22,422**	**23,265**	**28,147**	**24,926**
Minimum Obligations	23,263	23,644	24,245	24,665	25,335	25,240	25,255	25,448	25,359	23,644
Makeup Obligation Incurred	**1,406**	**2,447**	**2,505**	**3,674**	**2,051**	**2,285**	**2,833**	**2,183**	**0**	**0**
Status at End of Water Year										
Cumulative Obligation	506,000	529,000	552,000	575,000	598,000	621,000	644,000	667,000	690,000	713,000
Cumulative Flow	490,268	511,465	533,205	554,196	577,480	600,435	622,857	646,122	674,269	699,195
Net Cumulative Credit (Debit)	(15,732)	(17,535)	(18,795)	(20,804)	(20,520)	(20,565)	(21,143)	(20,878)	(15,731)	(13,805)
Minimum Obligation for Next Year										
Annual Minimum	18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400
+ 1/3 of Cumulative Debit	5,244	5,845	6,265	6,935	6,840	6,855	7,048	6,959	5,244	4,602
+ Additional to reduce Cumulative Debit to Annual Obligation	0	0	0	0	0	0	0	0	0	0
Alternative Minimum [1]	---	---	---	---	---	---	---	---	---	---
Minimum Obligation for Next Year	**23,644**	**24,245**	**24,665**	**25,335**	**25,240**	**25,255**	**25,448**	**25,359**	**23,644**	**23,002**

1) Annual Minimum minus Cumulative Credit but not less than 15,000 acre-feet.

ATTACHMENT I

TECHNICAL MEMORANDUM

To: Mojave Basin Area Watermaster

From: Kapo Coulibaly, PhD, P.G

Date: May 30, 2025

Re: **Statistical Analysis of Groundwater Levels in The Transition Zone**

In October 2024, the Superior Court of California, County of Riverside ordered the Watermaster to provide a statistical analysis of the groundwater levels in the Transition Zone. The goal being to establish the trends in groundwater level changes.

1. Approach

The Mann-Kendall (MK) statistical test was used to establish groundwater level trends. This approach was chosen for two reasons:

- The purpose of the MK test is to statistically assess if there is a monotonic upward or downward trend of the variable of interest over time.
- Unlike linear regression it does not require that the data or the residual be normally distributed

The MK test was applied to the depth to water of 39 shallow wells from 1990 to 2024, 40 wells from 1996 to 2024 and 7 wells from 1931 to 1990.

2. Results

a. Period from 1990 to 2024

Of the 39 wells analyzed 34 wells had trends that were significant at the 95% confidence level (pvalue < 0.05). Of these wells 31 (80%) exhibit a negative correlation with time, meaning the depth to water got smaller over time, in other words the groundwater levels have been rising between 1990 and 2024.
The correlation derived from the MK test can be classified as Very Strong, Strong, Moderate, Weak, or Negligible. The number of wells in each category was respectively: 5, 8, 13, 5, and 0 for the rising water level trend.

b. Period from 1996 to 2024

Of the 40 wells analyzed 33 wells had trends that were significant at the 95% confidence level (pvalue < 0.05). Of these, 29 showed an upward water level trend.
The number of wells in the categories Very Strong, Strong, Moderate, Weak, or Negligible were respectively 5, 5, 16, 3,0. Only 4 wells show moderate to strong downward trend for water levels.

c. Period from 1931 to 1990

Only 7 wells had data for this period and 4 of them have a lot of missing data making the results of the MK test unreliable. Of the remaining 3 only one showed a significant trend at the 95% confidence level, which was a groundwater level downward trend.

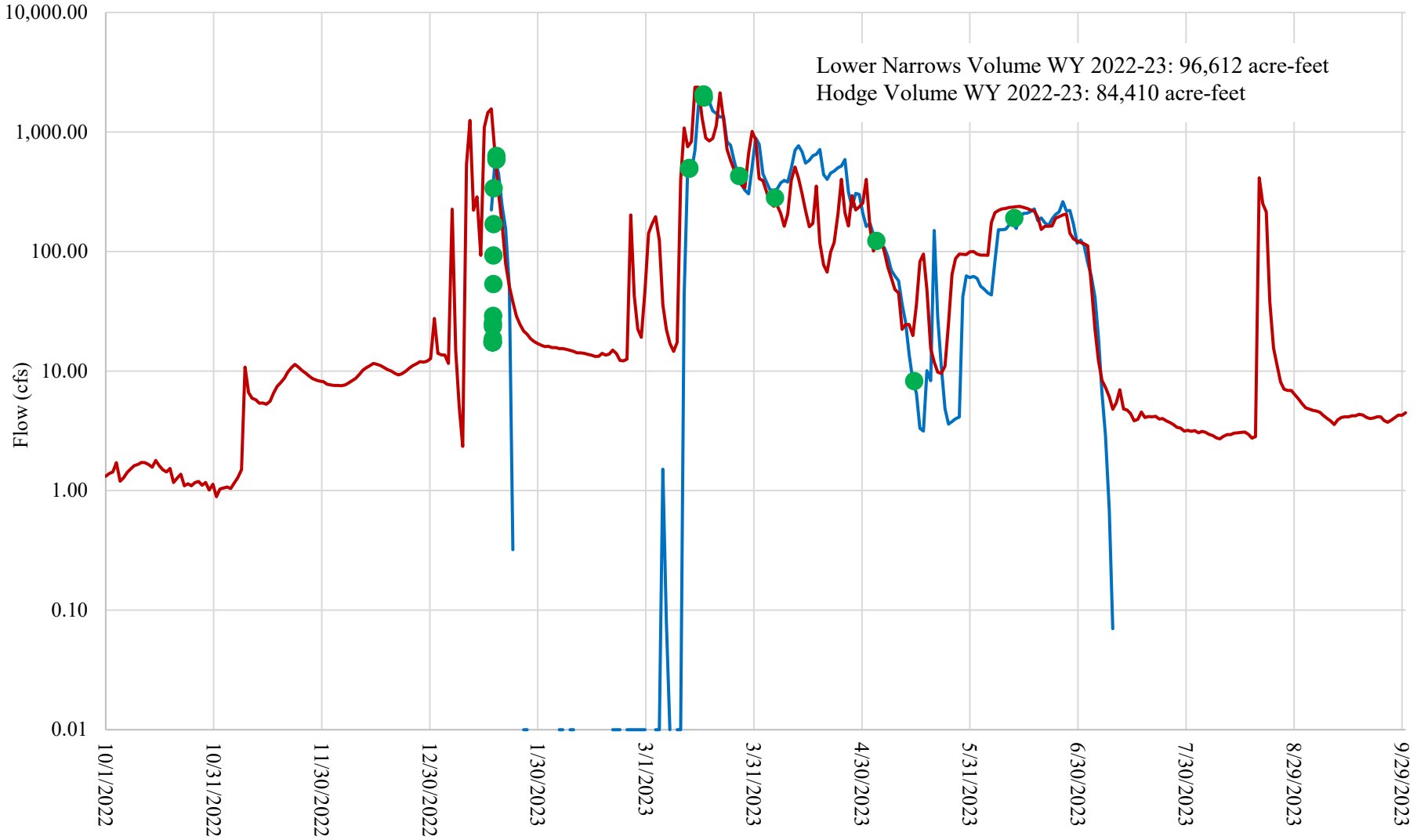
3. Conclusion

The MK test analysis shows that approximately 70% (1996-2024) to 80% (1990-2024) of the shallow wells in the Transition Zone show either a rise of groundwater levels (Moderate to very strong upward trend) or no change (weak to negligible trend) for the periods from 1996 to 2024 and 1990 to 2024.

ATTACHMENT J

Mojave River Discharge near Hodge and at Lower Narrows

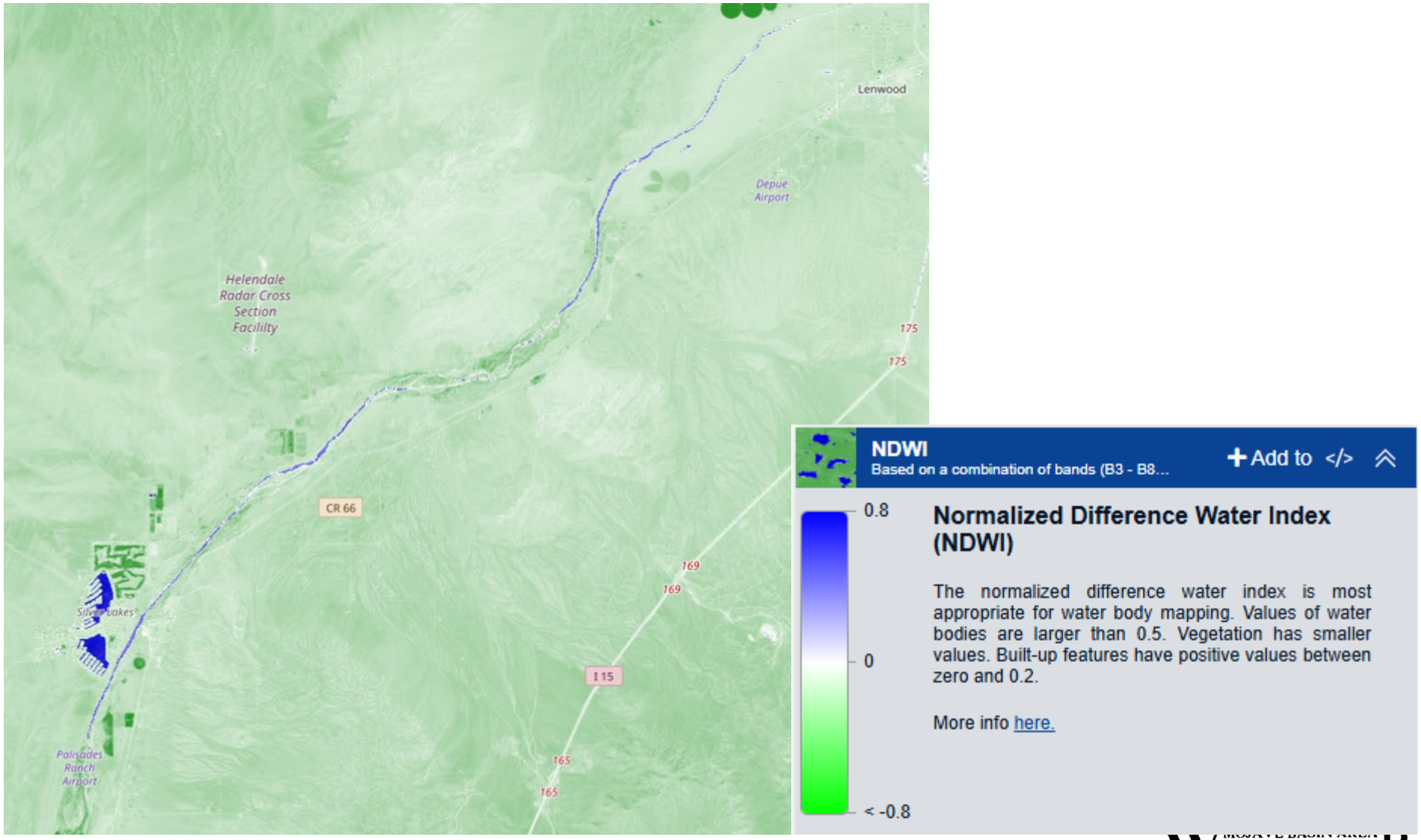
Water Year 2022-2023



Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

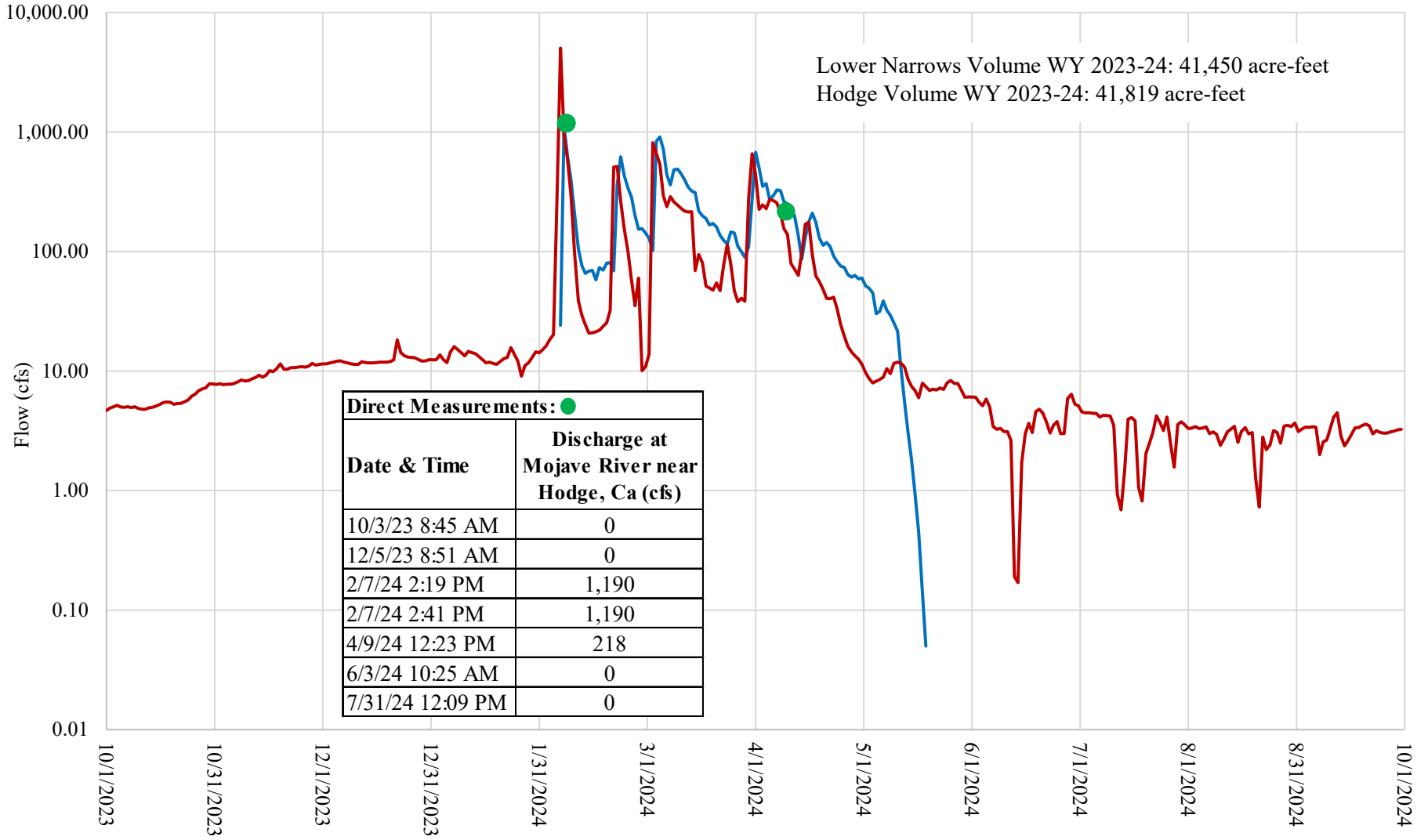
MOJAVE BASIN AREA WATERMASTER

Sentinel-2 NDWI imaging near Helendale Fault on April 28, 2023



Mojave River Discharge near Hodge and at Lower Narrows

Water Year 2023-2024



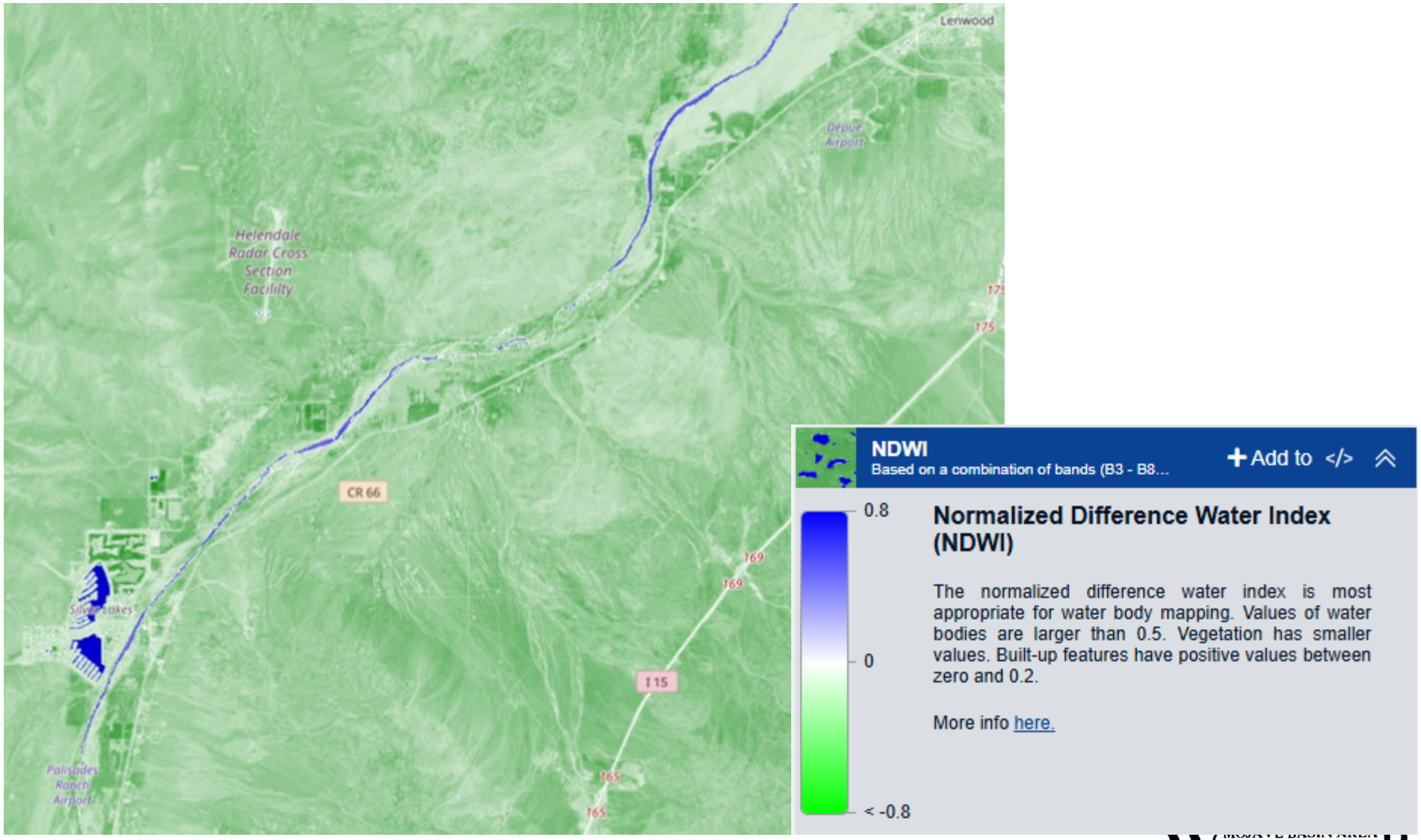
Direct Measurements:	
Date & Time	**Discharge at Mojave River near Hodge, Ca (cfs)**
10/3/23 8:45 AM	0
12/5/23 8:51 AM	0
2/7/24 2:19 PM	1,190
2/7/24 2:41 PM	1,190
4/9/24 12:23 PM	218
6/3/24 10:25 AM	0
7/31/24 12:09 PM	0

USGS 10262000 Mojave River near Hodge, CA

USGS 10261500 Mojave River at Lower Narrows near Victorville, CA

Direct Measurements USGS 10262000 Mojave River near Hodge, CA

Sentinel-2 NDWI imaging near Helendale Fault on April 2, 2024



ATTACHMENT K

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen

Martin Berber, P.E.
Patrick W. Ervin, P.E.
David P. Lounsbury, P.E.
Vincent Maples, P.E.
Leah Orloff, Ph.D, P.E.
David H. Peterson, C.E.G., C.H.G.
Ryan E. Stolfus

MEMORANDUM

To: Mojave Basin Area Watermaster

From: Robert C. Wagner, P.E. and David H. Peterson, C.Hg

Date: April 16, 2025

Re: **Review of Subsurface Flow at the Alto-Centro Subarea Boundary Mojave Basin Area**

This memorandum presents a review of previous studies performed to estimate the annual subsurface flow across the Alto-Centro Subarea boundary. In addition, groundwater data reviewed were used to calculate the annual flow across the Helendale fault, which generally defines the subarea boundary. This review relied on existing maps and data; field investigation or well testing were not performed. The sources reviewed are listed in the References.

Hydrogeologic Setting of the Alto Transition Zone - Centro Boundary (Helendale Fault)

The setting of the area reviewed is shown on the attached geologic map from a study of the Helendale fault by the U.S. Geological Survey (USGS; Stamos and others, 2003, Figure 2). Groundwater flow through the shallow (Floodplain) and deeper alluvial (Regional) aquifers has been evaluated at the Alto Transition Zone (TZ) - Centro Subarea boundary in several prior studies. These prior studies have generally concluded that the Helendale fault, which generally defines the Alto-Centro subarea boundary, does not impede groundwater flow in the shallow Floodplain aquifer. In California Department of Water Resources Bulletin 84 (DWR; 1967), analysis of groundwater levels concluded that the Helendale fault impedes groundwater flow in the deeper, older alluvium (i.e., Regional aquifer), but not within the recent channel deposits of the Mojave River. The study also noted that upstream of the fault, rising water (i.e., an upward gradient) contributes to the Mojave River, while downstream, this condition is reversed.

A 1971 study by Hardt (USGS) also noted that water levels in wells adjacent to the Mojave River near the Helendale fault indicated that the fault impeded flow in the deeper, older alluvium (Regional aquifer), but not within the overlying Mojave River deposits (Floodplain aquifer). Since most pumping and development is from the shallow river deposits of the Floodplain aquifer, Hardt concluded that ground-water movement was little affected by the Helendale fault. Hardt also noted that the fault acts as a barrier in the older alluvium (Regional aquifer) and causes water to move upward to the land surface on the south (upstream) side of the fault, which in part accounts for the abundance of phreatophytes upstream of the fault.

Review of well hydrographs prepared by Mojave Water Agency and U.S. Geological Survey for various years generally indicate that water levels in most wells through the Alto TZ remained stable or rose slightly since the early 1990s, indicating that groundwater storage within the Transition Zone has remained relatively stable or has increased slightly. Hydrographs show a period from about 2000 to 2005 when water levels in wells upstream and south of the fault steadily declined up to about seven feet, but rebounded after a large storm event in 2005. Overall, gradients have remained relatively constant.

In the electric analog model of the Mojave basin, Hardt (1971) developed values for transmissivity (the flow through a vertical strip through the aquifer one foot wide) of the Floodplain aquifer, based on an empirical relationship between specific capacity of a well (the pumping yield per foot of drawdown) and transmissivity. This was obtained mainly by estimating transmissivity of the materials from information on well drillers reports. Hardt notes that the values of transmissivity developed by this method are approximate, and dependent on factors such as the accuracy of the drillers descriptions and estimates of well yield, in addition to construction (efficiency) of the well. Transmissivity developed by this method was about 100,000 gallons per day (gpd) per foot in the channel deposits (i.e., Floodplain aquifer), and much lower, about 5,000 to 25,000 gpd per foot in the adjacent and underlying older alluvium (Regional aquifer). The transmissivity estimates developed by Hardt (1971) have subsequently been used or cited in subsequent studies by USGS and by private consultants.

In 2003, the USGS released a report of the geohydrologic study of the Helendale fault (Stamos and others, 2003). In that study, multi-point wells (piezometers) were installed in four locations near the fault. The USGS performed a well pumping test in one of the wells (8N/4W-20Q12) and monitored the response in the piezometers. The USGS also performed single well (slug) tests to estimate aquifer transmissivity. The pumping test yielded a calculated transmissivity 1,346 gpd per foot for the Floodplain aquifer, much lower than the transmissivities estimated by Hardt (1971) or Stamos and others (2001). However, the USGS concluded that the tested well may have been located in less permeable materials that were not representative of the overall Floodplain aquifer. The single well (slug) test data also did not agree well with prior studies or well test and so were used only as a relative comparison between the wells for the study.

In a 2013 study of the Centro and Baja subareas, Todd Engineers also used the relationship between specific capacity and transmissivity to estimate transmissivities from well logs. They assumed unconfined aquifer conditions and used a conversion factor of 1,500 to estimate a range of 50,000 to 100,000 gpd/ft for the Floodplain aquifer. The estimates assumed an aquifer thickness of 150 feet, similar to the conditions at the subarea boundary.

Prior Estimates of Subsurface Flow Across the Alto-Centro Subarea Boundary

Early investigations of the Mojave River Groundwater Basin by Department of Water Resources, (DWR; Weber, 1967) estimated groundwater flow from the upper Mojave Basin (Alto, Este, Oeste) to the middle Mojave at 2,000 acre-feet per year (AFY). The subsurface flows across

the subarea boundary were calculated using a form of Darcy's equation. In this equation, the flow across the boundary in gallons per day Q = TIW; where W is the width of aquifer at the basin boundary in feet; T (transmissivity) is the hydraulic conductivity of the aquifer material times the saturated thickness of the aquifer, expressed in gallons per day per foot of aquifer width; and I is the slope of the groundwater surface (i.e., the gradient).

In a 2001 groundwater model by USGS (Stamos and others), Hardt's 1971 transmissivity data were used as initial input to the model and subsequently adjusted during model calibration. From the 2001 USGS groundwater model simulation, flow across the Helendale fault was calculated to range from 2,444 AFY in 1930 to 720 AFY in 1994, with an average of 1,566 AFY over that period. However, the same report cites an estimate by Gregory Mendez of the USGS that as much as 5,000 to 6,000 AFY of groundwater may actually flow through the Floodplain aquifer across the fault, with an additional 1,200 AFY in the deeper Regional Aquifer.

In a 2003 study of the Transition Zone hydrogeology by URS Corporation, the prior estimates of flow by Weber (1987) at 2,000 AFY and USGS (2001) of 1,556 AFY were presented, as well as an independent calculation of flow across the Helendale fault, using previously developed transmissivity values. In their study, URS estimated that average flow across the Helendale fault, using 1998 water levels, was about 3,358 AFY in the Floodplain Aquifer and about 1,220 in the deeper Regional Aquifer across the Helendale fault.

Updated Estimate of Flow Across Alto TZ-Centro Boundary

As part of the current review, we also performed an estimate of groundwater flow across the Helendale fault. Our analysis used water levels and gradients calculated from USGS regional water table maps and MWA hydrographs (see attached 2025 hydrograph map) for the period from 2006 to 2016, and the cross-sectional area of the Floodplain aquifer measured from Cross Section A-A' (see attached) in the 2003 USGS Helendale fault study (Stamos and others, 2003). In addition, we used MWA monitoring data from 2024 to evaluate recent conditions. We compared Floodplain aquifer thickness shown on the USGS cross section (denoted by symbols Qra and Qya) to unpublished cross sections we prepared (Wagner & Bonsignore, 2024) as part of MWA's groundwater model update and found good agreement. Additionally, a transmissivity of 100,000 gpd per foot was used, based on information presented in Hardt (1971) and was divided by an aquifer thickness of 150 feet to obtain a hydraulic conductivity (k) of 666 gallons/day or equivalently, 89 ft/day.

Gradients were estimated from measurements taken from relatively small-scale USGS regional water table maps and so are considered approximate. From the period of 2006 to 2016, water levels near the cross section varied from about 2,391 to 2,396 feet and gradients in the vicinity of the USGS cross section generally ranged from about 0.0024 to 0.0043. The results of our analysis are shown in the following table:

Subsurface Flows at USGS Cross Section A-A' (Stamos and others, 2003; see attachments)

Year	Groundwater Elevation Near Fault (Well Number)	Measurement Date	Average Gradient	Wells and Elevations Used for Gradient Calculation/Distance	Flow through Section, AFY
2006	2,395 (20Q11)	4/21/2006	0.0043	6N1(2,463) – 29E6(2,401) 2.69 mi.	3,411
2010	2,394 (19G4)	3/29/2010	0.0041	6N1(2,459) - 29E6 (2,401)/ 2.69 mi.	3,253
2012	2,396 (19G4)	3/13/2012	0.0029	6N1(2,444) - 29E6 (2,402)/ 2.69 mi.	2,301
2014	2,392 (20Q13)	3/3/2014	0.0030	6F7 (2,438) – 29E6 (2,402)/ 2.27 mi.	2,380
2016	2,391 (20Q13)	3/8/2016	0.0031	6F7 (2,438)- 29E6 (2,401)/ 2.27 mi.	2,459
2018	2,390 (20Q11)	Annual Averages	0.0041	6F7 (2,434) - 29E6 (2,385) / 2.27 mi.	3,253
2020	2,391 (20Q11)		0.0042	6F7 (2,436)- 29E6 (2,386) / 2.27 mi.	3,332
2022	2,390 (20Q11)		0.0042	6F7(2,436) - 29E6 (2,386) / 2.27 mi.	3,332
2024	2,392 (20Q11)		0.0041	6F7 (2,437) - 29E6 (2,388)/ 2.27 mi.	3,253
Averages	2,393		0.0038		2,997

Note: Water level data from 2006 – 2016 from USGS; data from 2018 – 2024 are from MWA. Gradient calculations for 2018 to 2024 were based on average water levels for the year.

The subsurface flow analysis performed above indicates that flow through the Helendale fault has exceeded 2,000 AFY for the period reviewed. While our analysis relied primarily on water-table maps by USGS published through 2016 and MWA well monitoring data from 2018 to 2024, water levels in wells south and upstream of the fault (Alto TZ) have only changed slightly over time. Since water levels and gradients have been small over time, changes in flow through the subarea boundary are also expected to be small.

Discussion and Conclusions

As previously discussed, calculation of flow using Darcy's Law requires three inputs; cross sectional area, gradient, and permeability/transmissivity. Of these, cross sectional area and gradient can be determined or calculated from well data and water levels. In the analysis, we calculated the area of the saturated Floodplain aquifer using the USGS cross section and an average groundwater elevation of about 2,393 feet. This was the approximate average water level during the period analyzed, although variations in water levels might introduce a few percent of error into the calculations.

Somewhat more difficult to measure is transmissivity, which was obtained from the references reviewed and was based on the approximate relationship between the pumping yield and drawdown observed in newly completed wells, often during initial development. Ideally, transmissivity data would be obtained by controlled, constant-rate pumping tests in several locations, in wells that fully penetrate the aquifer (i.e., at least 150 feet deep in this area). However, without these types of tests, the use of specific capacity data to estimate transmissivity is a broadly accepted method in hydrogeologic studies and is a typical method used in development of groundwater models.

As shown above, the calculated subsurface flow has averaged about 2,997 acre feet per year at Helendale Fault and has been as high as 3,411 acre feet and as low as 2,301 acre feet. The average is at nearly 3,000 acre feet per year, which is about 50% higher than the 2,000 acre feet per year assumed for the Judgement. Additionally, MWA monitoring data for well 08N04W20Q11, located just upstream of the Helendale fault indicates that water levels are little changed since 2018.

Attachments

Geologic Map and Explanation Sheet from Stamos and others, USGS, 2003 (Figure 2)
Cross Section A-A' from Stamos and others, USGS, 2003 (Figure 3)
Alto Subarea Transition Zone Hydrographs 2025 – MWA

References

Albert A. Webb Associates, 2000, Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area: Unpublished report to the Mojave Basin Area Watermaster, dated February 16, 2000, 234p.

Hardt, W.F., 1971, Hydrologic Analysis of Mojave River Basin, California, Using Electric Analog Model: U.S. Geological Survey Open File Report 72-157, 91p.

Mojave Water Agency, 2025, Alto Subarea Transition Zone Hydrographs 2025: unpublished well hydrograph maps prepared by Mojave Water Agency staff.

Richard C. Slade & Associates LLC, 2011, Review of Subsurface Data for Northern Transition Zone, Mojave Water Agency: Unpublished Technical Memorandum to Mojave Water Agency, dated May 31, 2011, 44p.

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. Geological Survey Water-Resources Investigations Report 01-4002, Version 3, 137p., with illustrations.

Stamos, C.L., Cox, B.F., Izbicki, J.A., and Mendez, G.O., 2003, Geologic Setting, Geohydrology and Ground-Water Quality near the Helendale Fault in the Mojave River Basin, San Bernardino County, California: U.S. Geological Survey Water-Resources Investigations Report 03-4069, 53p.

Todd Engineers with Kennedy/Jenks Consultants, 2013, Final Report, Conceptual Hydrogeological Model and Assessment of Water Supply and Demand for the Centro and Baja Management Subareas, Mojave River Groundwater Basin: Unpublished report to the Mojave Water Agency, dated July 2013, 291p. with Appendices.

URS Corporation, 2003, Mojave River Transition Zone Recharge Project, Phase I Report, Transition Zone Hydrogeology: Unpublished report to the Mojave Water Agency, dated March 13, 2003, 112 p., with tables and illustrations.

U.S. Geological Survey, 1996-2016, Regional Water Table in the Mojave River and Morongo Groundwater Basins, Southwestern Mojave Desert, California: Scientific Investigations Maps/Reports prepared by various authors, scale 1:170,000.

Wagner & Bonsignore Consulting Engineers, 2024, Draft geologic cross sections and explanatory text for the Baja and Centro Subareas, Mojave River Groundwater Basin: unpublished consultants report to Mojave Water Agency, 18 sheets (cross sections) and 18p (text).

Weber, E.M. (Supervising Geologist), 1967, Mojave River Groundwater Basins Investigation: California Department of Water Resources, Bulletin 84, 196p, with figures and tables.

Figures from Stamos and others, 2003, USGS Water-Resources Investigations Report 03-4069

Geologic Setting, Geohydrology, and Ground-Water Quality near the Helendale Fault in the Mojave River Basin, San Bernardino County, California

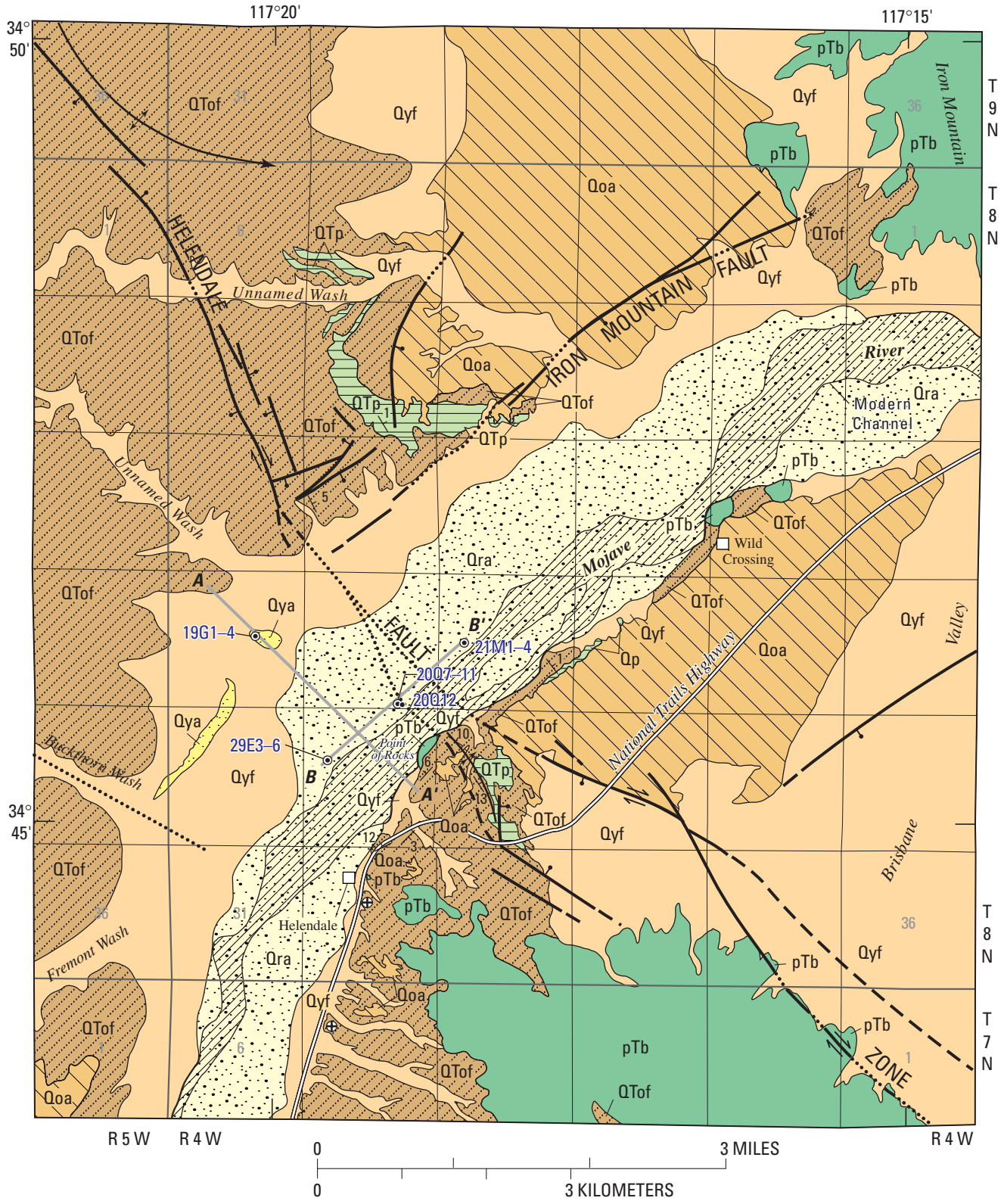
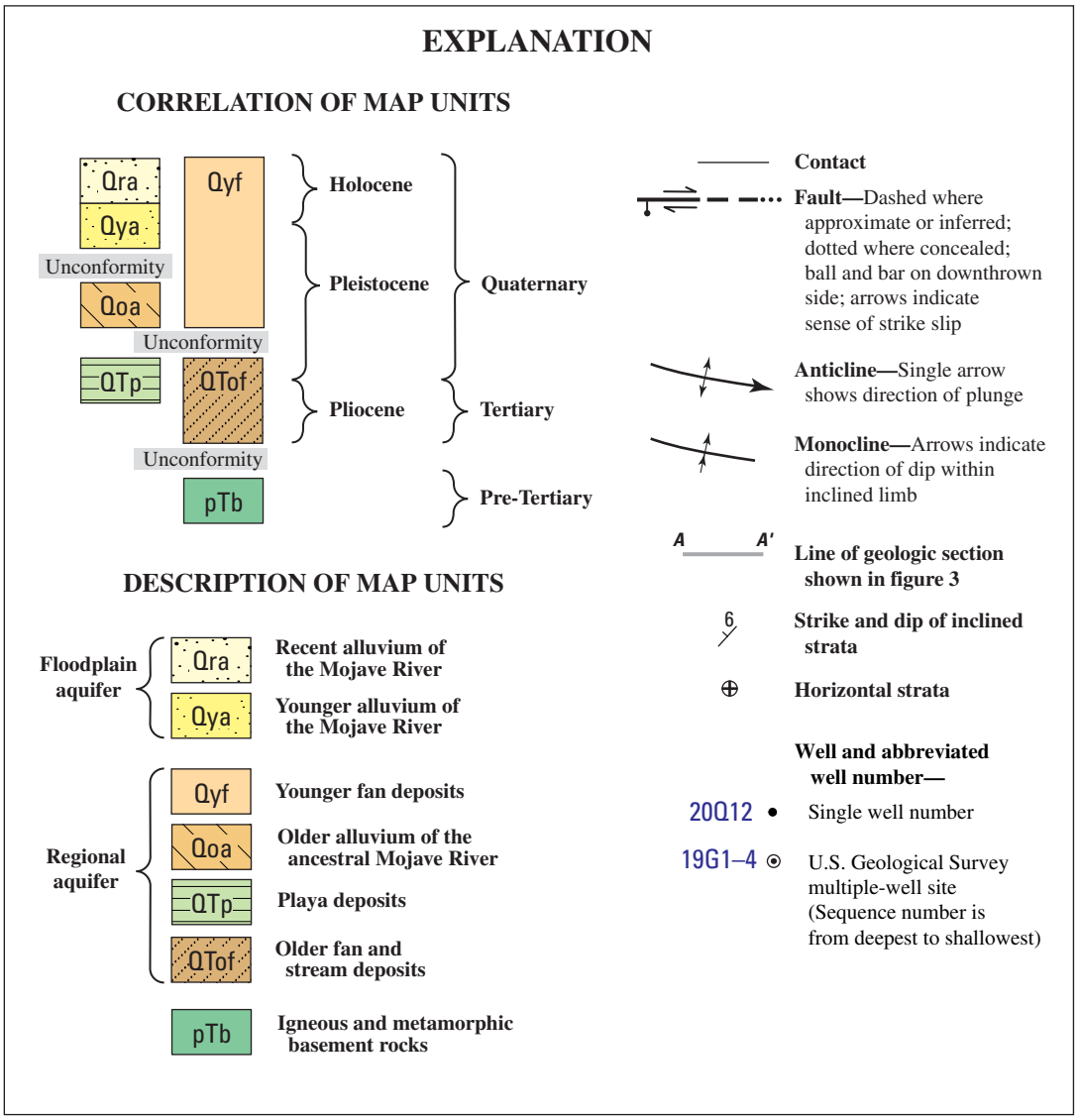


Figure 2. Surface geology, line of cross sections *A–A'* and *B–B'*, and location of the multiple-well monitoring sites near Helendale, San Bernardino County, California.

Reference: Stamos and others, USGS, 2003



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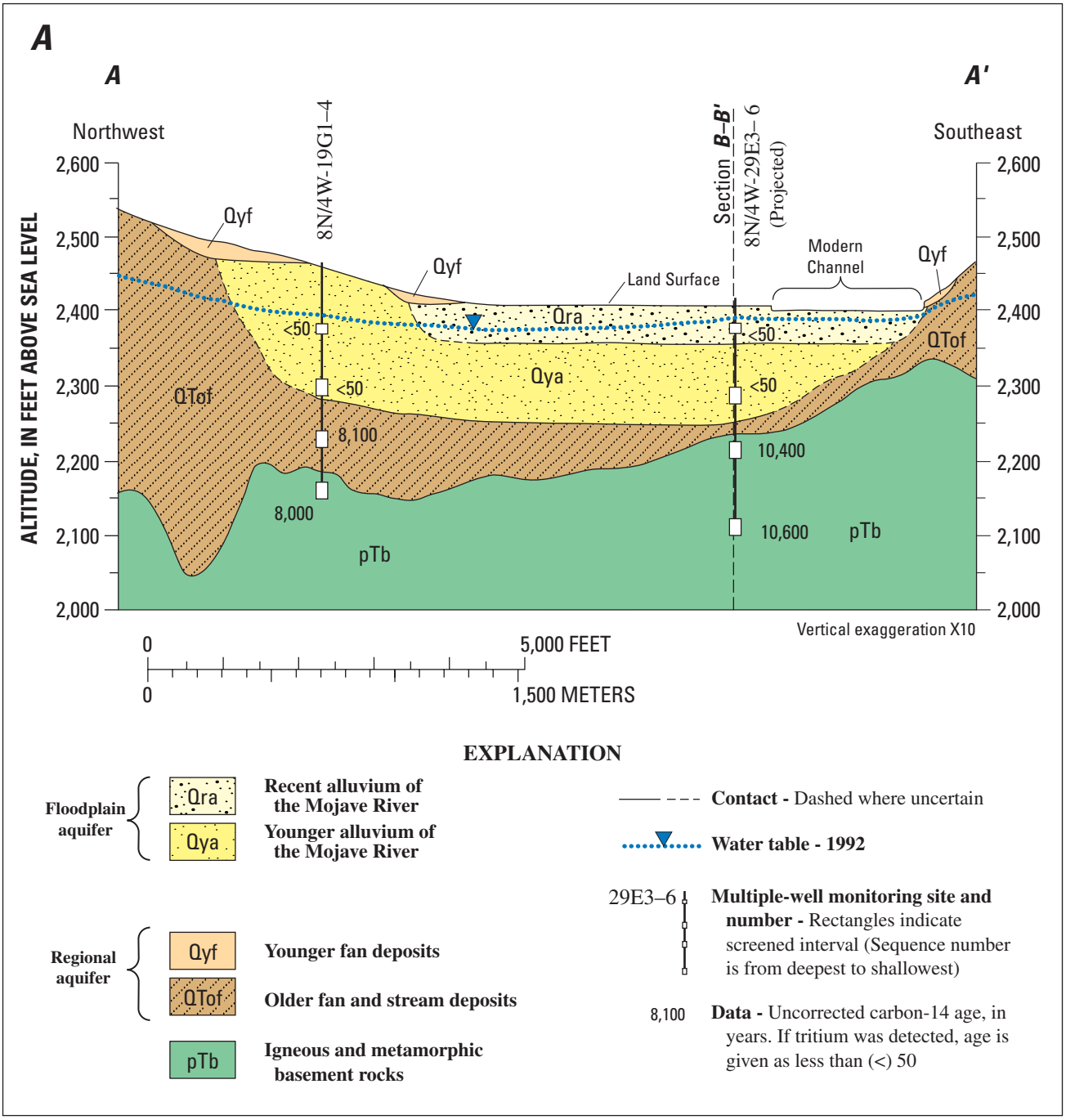
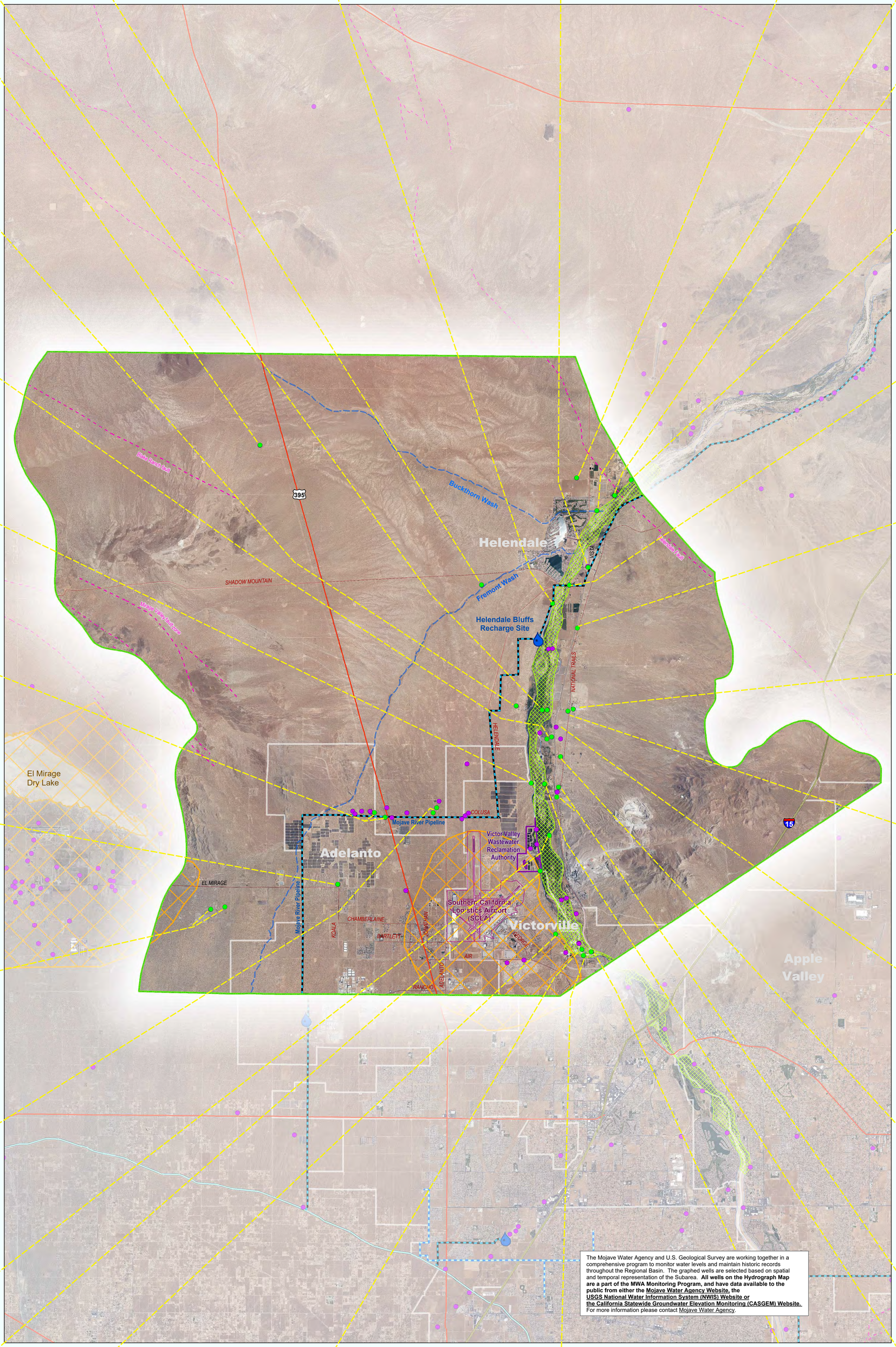


Figure 3. Geologic cross sections near Helendale, San Bernardino County, California, (*A*) cross section *A–A'*, and (*B*) cross section *B–B'*.

Mojave Water Agency, 2025

Alto Subarea Transition Zone Hydrographs 2025

Alto Subarea Transition Zone Hydrographs 2025



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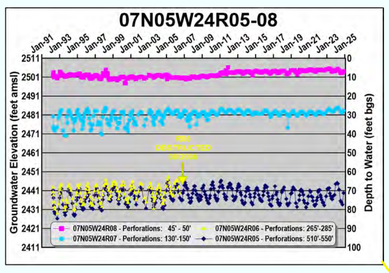

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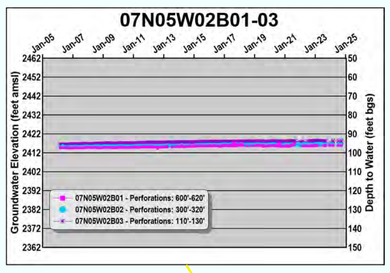

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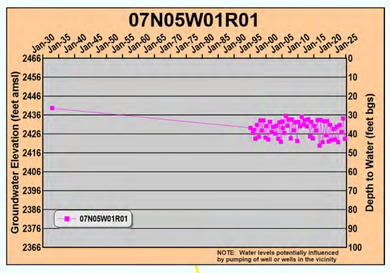

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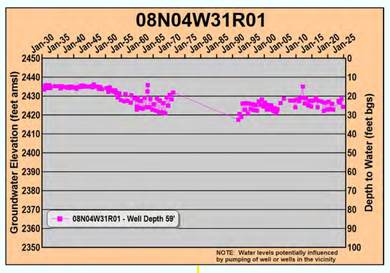

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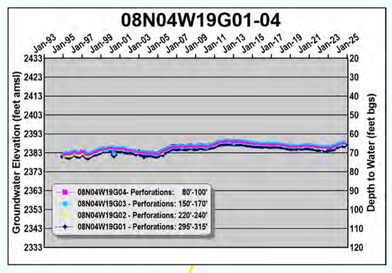

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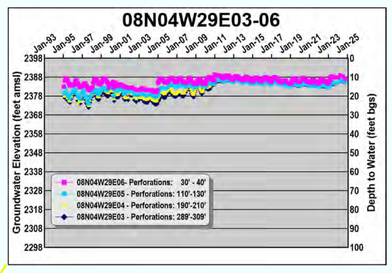

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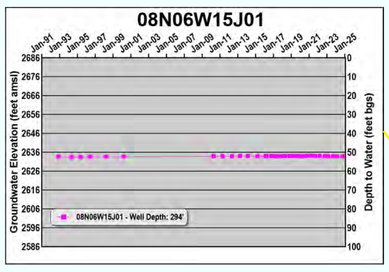

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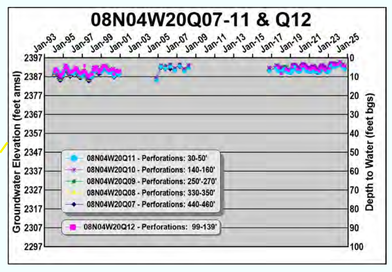

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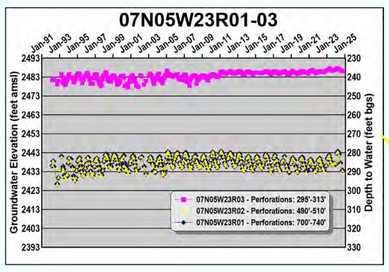

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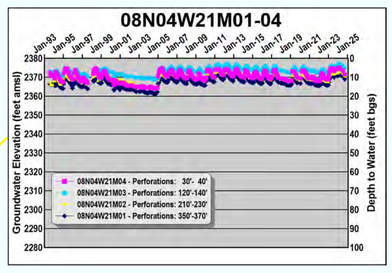

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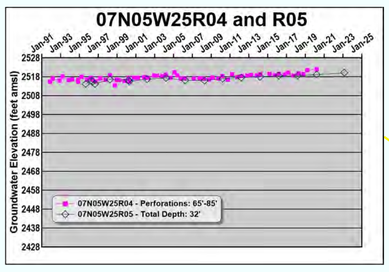

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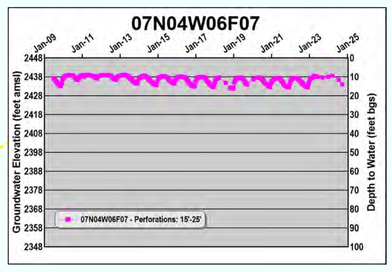

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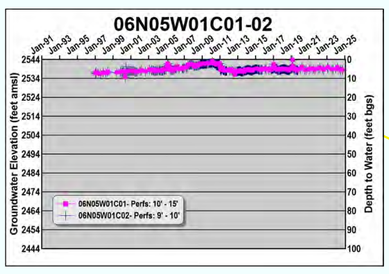

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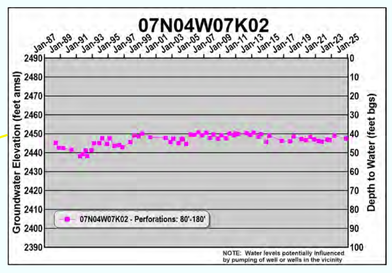

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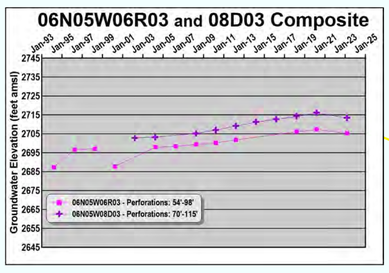

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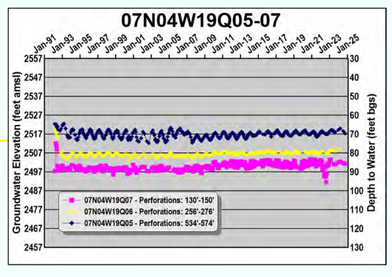

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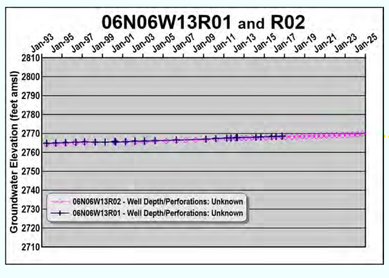

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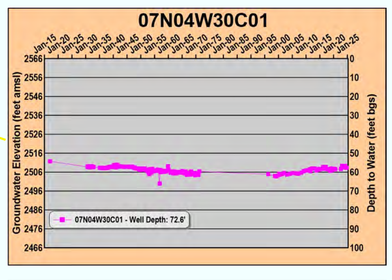

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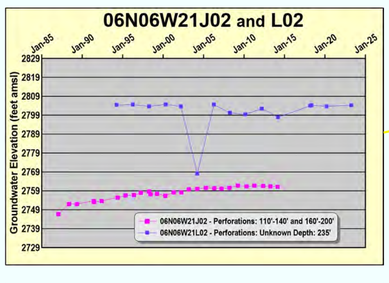

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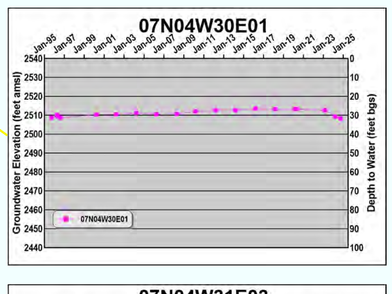

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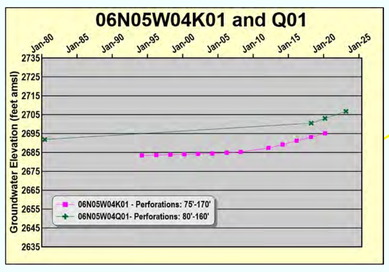

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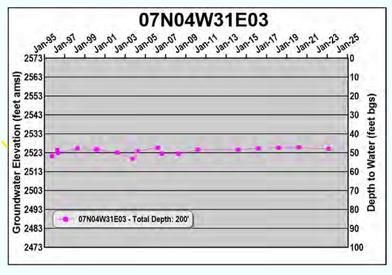

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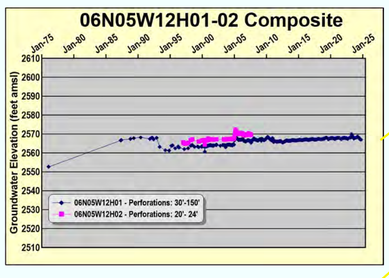

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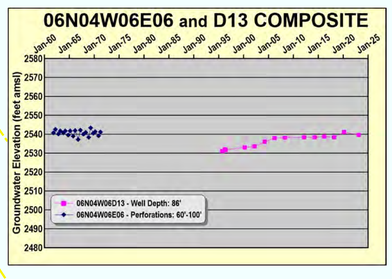

The Mojave Water Agency and U.S. Geological Survey are working together in a comprehensive program to monitor water levels and maintain historic records throughout the Regional Basin. The graphed wells are selected based on spatial and temporal representation of the Subarea. **All wells on the Hydrograph Map are a part of the MWA Monitoring Program, and have data available to the public from either the Mojave Water Agency Website, the USGS National Water Information System (NWIS) Website or the California Statewide Groundwater Elevation Monitoring (CASGEM) Website.** For more information please contact Mojave Water Agency.

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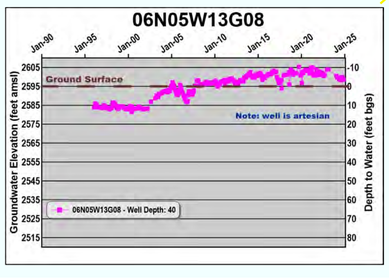

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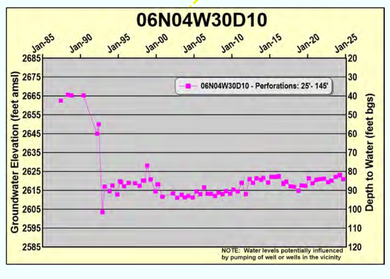

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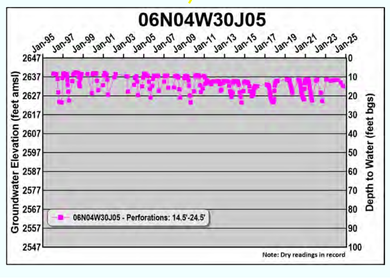
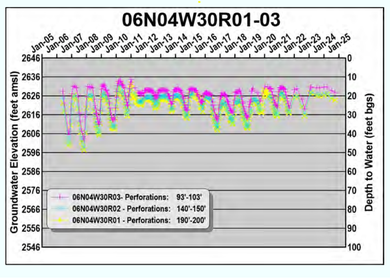


06N04W30R01-03



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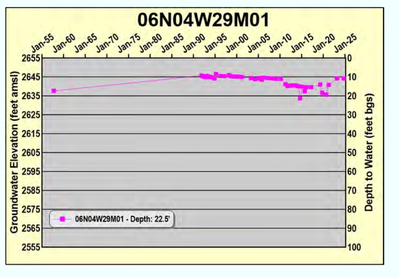

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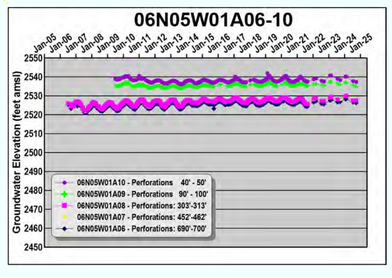


Mojave Water Agency

Data Sources:
MWA, US Census
USGS/NWIS,
DWR Bulletin 84 1967
Date: January 2024
Mojave Water Agency
Water Resources Department

- Graphed Wells
- MWA Monitoring Program Wells
- MWA Potable Pipeline
- MWA Recharge Pipeline
- CA Geologic Faults (CGS, USGS)
- USGS Perched Water Table

- Recent record
- Long-term record (begins ~1950 to ~ 1980)
- Very long-term record (begins ~1920)

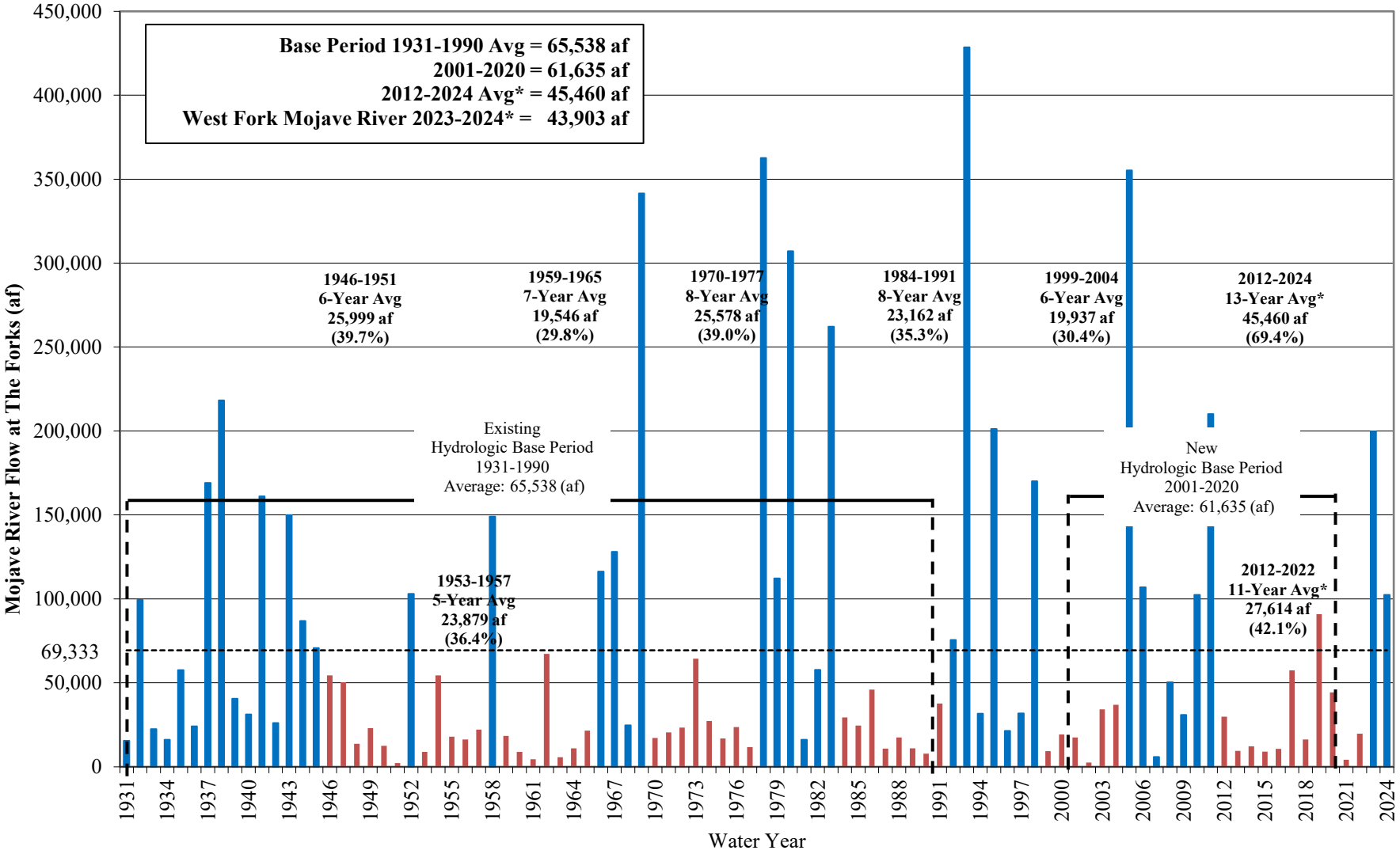
0 0.5 1 2
Miles

N

ATTACHMENT L

* Preliminary data, subject to revision.

Mojave River Flow at The Forks
Water Years 1931 - 2024



Note: Discharge of Mojave River at The Forks from the addition of values as reported from USGS stations at West Fork Mojave River Near Hesperia, CA (10261000), and Deep Creek Near Hesperia, CA (10260500) from 1931-1971, the greater of 10260500 and Mojave River Below Forks Reservoir Near Hesperia, CA (10261100) from 1972-1974, and the addition of West Fork Mojave River Above Mojave River Forks Reservoir Near Hesperia, CA (10260950) and 10260500 from 1975-Present.

ATTACHMENT M

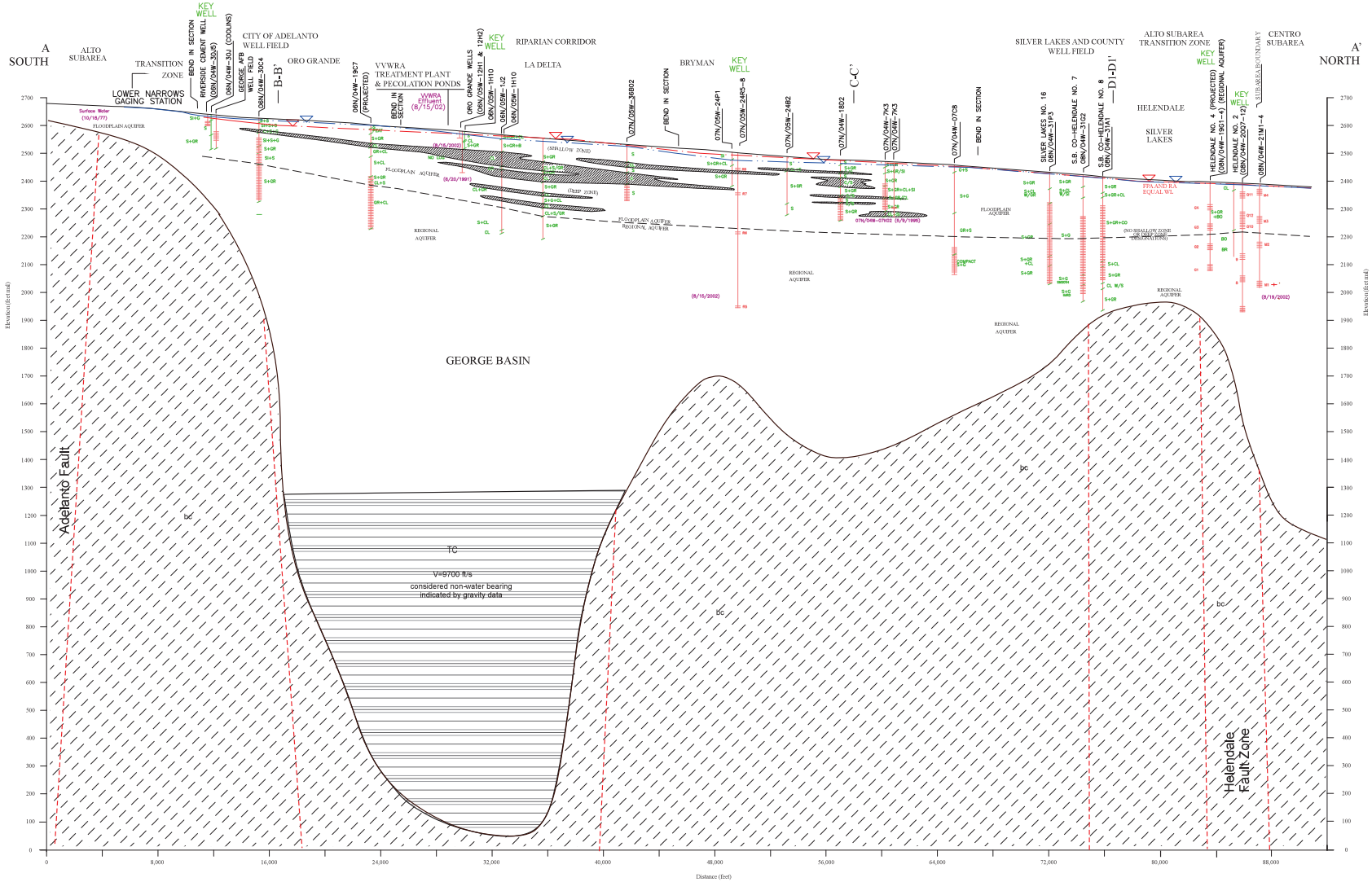


Figure 10
HYDROGEOLOGIC
CROSS SECTION A1-A1'

URS