Fifth Supplemental
Expert Report and Recommendations of

Peter Mayer, P.E.

Regarding Water Supply and Demand in the California American Water Company's Monterey Main System

Prepared for:

The Marina Coast Water District

August 18, 2022

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SCOPE OF INVESTIGATION

This report is intended as a fifth supplement to the report WaterDM submitted to the Marina Coast Water District on April 21, 2020 and supplemental reports WaterDM submitted on July 1, September 11, and November 25, 2020, and March 22, 2022 that expanded on the research, analysis, and forecasts prepared for the original report.

For this fifth supplement, I was specifically asked to:

1. Review and respond to the July 20, 2022 Phase 2 direct testimony provided by the California-American Water Company ("Cal-Am") as updated on July 25, 2022.[1]

2. Update and extend to 2050 the demand forecast WaterDM prepared for Cal-Am's Monterey Main System in a series of expert reports,[2] incorporating new information and data.

3. Review Cal-Am's available water supplies if the Amended and Restated Water Purchase Agreement is adopted or if it is not adopted.

My opinions are based on my understanding of the information available as of the date of this report and my experience evaluating municipal and industrial water supplies and demands and conservation measures. In forming my opinions, I also considered the documents, testimony, and other materials listed in Appendix A. Should additional information become available to me, I reserve the right to supplement this report based on any additional work that I may conduct based on my review of such materials.

[1] Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022.

[2] WaterDM. April 21, 2020. Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. July 1, 2020. Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. September 11, 2020. Second Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. March 22, 2022. Fourth Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

SUMMARY OF OPINIONS AND CONCLUSIONS

As a result of my review of the items listed in Appendix A and other related and relevant documents and reports, my own independent analysis, and my expertise in municipal and industrial water use, water management, and engineering, I offer the following supplemental analysis and opinions regarding Cal-Am's water demand and supply:

Since my prior reports, Cal-Am's water demand further declined as customers have become more efficient and system water losses have been reduced.

WaterDM concluded in its April 21, 2020 expert report that Cal-Am's per capita use would continue to decrease due to ongoing conservation program implementation, conservation pricing, and water loss control measures. This has proven true and the trend towards increased efficiency is expected to gradually continue. WaterDM's updated demand forecasts for this supplemental report include continuing population growth in the Cal-Am service area and gradual efficiency improvements.

Cal-Am's revised 2022 water demand forecast provided in Ian Crooks' testimony is overstated.

The new Cal-Am forecast ignores the impacts of future conservation, includes population that is not in Cal-Am's service area, and includes double counts, all of which improperly increase future demand. Furthermore, the forecast in Crooks' testimony differs radically from Cal-Am's independently prepared 2022 PUC 3-year rate case forecast, which projects a decline in demand in the near-term.

A more realistic demand forecast prepared by WaterDM projects Cal-Am's 2050 demands to be 11,160 AF, which is more than 3,400 AF lower than Cal-Am's overstated forecast.

The growth rate in WaterDM's forecast is based on Cal-Am's current stated service area population and on AMBAG's anticipated population growth through 2050 including additions from the RHNA. WaterDM's forecast includes the impacts of ongoing efficiency improvements from Cal-Am's conservation program and state mandates. The result is a 6.1% reduction in per capita use and the conservation of 774 AF over 25 years.

With the addition of 2,250 AF from the Pure Water Monterey Expansion, Cal-Am can meet future demand in 2050.

By adding this additional source and continuing its water conservation efforts, Cal-Am should have sufficient supplies that the local development moratorium can be lifted, while still complying with the State Water Board's limits on Cal-Am's annual Carmel River diversions. Key to the success of this approach will be making necessary physical and management improvements to Cal-Am's aquifer storage and recovery ("ASR") system so it performs as designed and approved by the CPUC. This includes use of the Monterey Pipeline and continuing and extending water conservation and efficiency measures. With prudent management and

investment, Cal-Am should be able to steadily build up ASR reserves, essential for managing through drought periods.

If the Amended and Restated Water Purchase Agreement is not adopted and water from the Pure Water Monterey Expansion is not available, Cal-Am would face supply short falls starting in 2025 without additional action. If this supply shortfall were to be met with an alternative water supply source such as desalination, a supply sized similarly to the Pure Water Monterey Expansion (2,000 – 3,000 AF) would be adequate to meet future demand based on WaterDM's continued efficiency forecast.

ANALYSIS

Overview

The purpose of this report is to review and respond to the testimony provided by Cal-Am on July 20, 2022 (updated July 25) and to update and extend to 2050 the demand forecast WaterDM prepared in a series of expert reports, incorporating new information and analyses.

In its April 21, 2020 report, WaterDM prepared forecasts for the Cal-Am Monterey Main System to estimate future average annual production, inclusive of treatment losses and non-revenue water.[3]

For this report, WaterDM revised its demand forecasts for Cal-Am using the same basic assumptions but incorporating actual demand and population in 2021, as reported by Cal-Am. WaterDM's revised forecasts were then extended through 2050 based on the AMBAG population forecast with RHNA additions from Cal-Am's July 2022 testimony.[4] These forecasts were used to compare against Cal-Am's available water supply to assess the necessary size and scope of proposed future supply projects.

Water Production and Demand

Annual Production

Annual water production for the Monterey System from 2000 – 2021 updated with data from Cal-Am's July 2022 testimony is shown in Figure 1 along with boxes added to indicate the influence of mandatory drought restrictions and recession. For the purposes of this report, total water production is assumed to be equivalent to the total annual water demand in the system inclusive of all water use, non-revenue water, and treatment losses.

[3] Non-revenue water is the industry-standard replacement term for the antiquated "unaccounted for" water category. Non-revenue water is the technical term used to describe water that produces no revenue to the supplier, and it includes physical losses from water system as well as authorized consumption such as hydrant flushing.

[4] Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022.

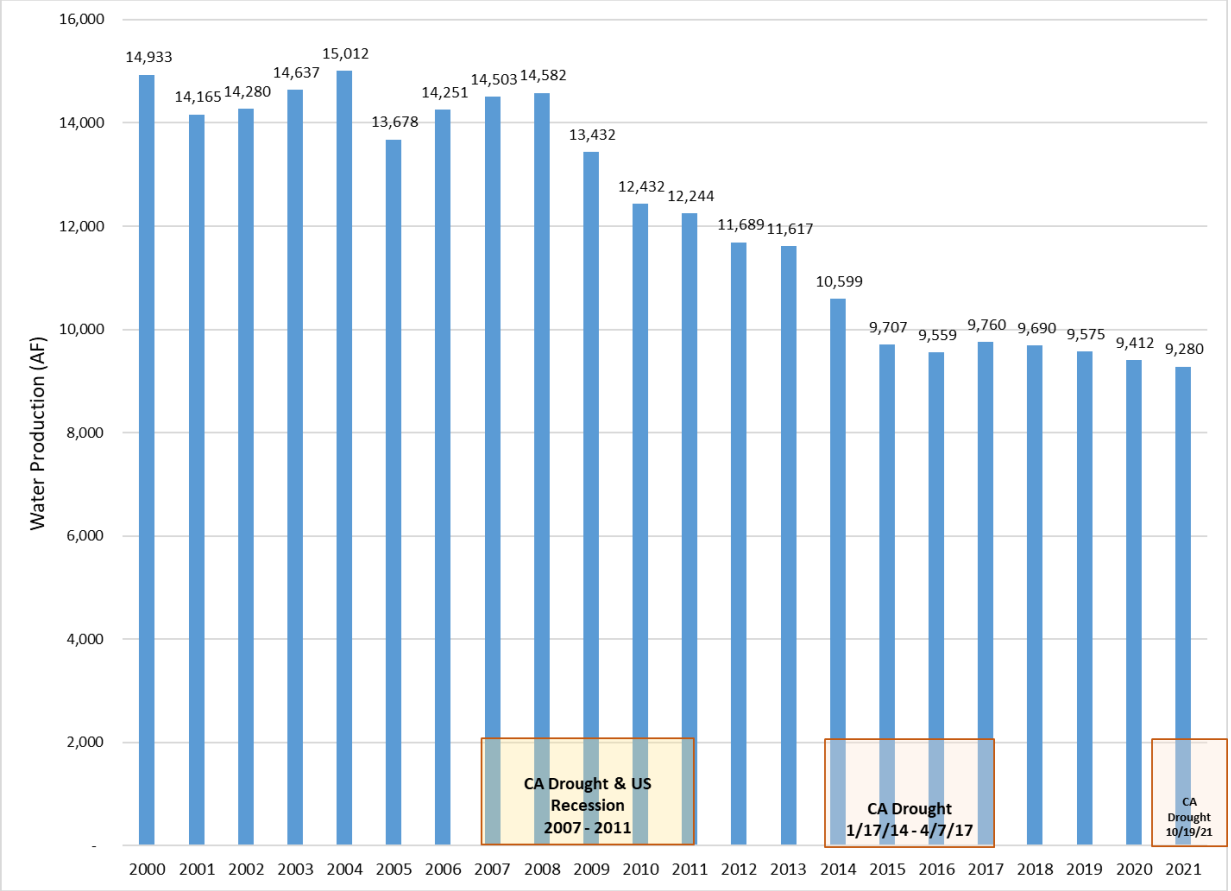

Figure 1: Cal-Am Monterey Main water production, 2000 - 2021[5]

From Figure 1 it is evident that water production in the Monterey System declined steeply from 2008 – 2016 and has continued to decline gradually since 2017. In this 8-year period, steep demand reductions occurred during years when California was in an officially declared drought paired with an economic recession. Production reductions also occurred in 2012 and 2013 which were non-drought and recession influenced years. Over the most recent five-year period, 2017 – 2021, water production in the Monterey Main service area averaged 9,543 AF per year. Over the most recent two-years, production averaged just 9,346 AF. Cal-Am water production in 2021 was the lowest in more than 20 years of records at 9,280 AF.

Comment on Data Sources

Recent data in Figure 1 comes from Cal-Am's July 2022 testimony. Additionally, Cal-Am publishes and regularly updates monthly and annual water deliveries for Monterey Main,

[5] Includes treatment and distribution losses. 2013 – 2021 from Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022. 2000 – 2012 From Monterey Peninsula Water Management District. 2019. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt, General Manager.

Hidden Hills, Ryan Ranch & Bishop on its website for the desalination project.[6] Monthly data going back to 2007 are available from the testimony of Ian Crooks (2012)[7]. I compared these published records with the production data set used in a 2020 Monterey Peninsula Water Management District report[8] and with Cal-Am's quarterly and annual reports to the California State Water Resources Control Board.

Treatment and distribution losses come from Table Eight of Cal-Am's quarterly reports to the State Water Resources Control Board pursuant to condition eight of SWRCB Order WR 2016-0016 and condition six of WR 2009-0060.

For the purposes of the demand forecasts prepared in this report, WaterDM used Cal-Am's production in 2020 and 2021 as reported in Ian Crooks' July 2022 testimony to establish the starting point for the demand forecast to develop the most realistic updated demand forecast possible for the Monterey Main System.

Monthly Deliveries

While not relied upon as the starting point for WaterDM's demand forecasts, Cal-Am's published delivery data were used to analyze the seasonality of demand on the Monterey Main System. Monthly production is shown in Figure 2 with the period of recent drought declaration highlighted. A linear trendline is also added.

[6] https://www.watersupplyproject.org/system-delivery (accessed 7/30/2022), and Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022.

[7] Direct Testimony of Ian Crooks Before the Public Utilities Commission of the State of California. Application 12-04-019 (Filed April 23, 2012). (p.9).

[8] Monterey Peninsula Water Management District. 2020. (MPWMD Report) Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019).

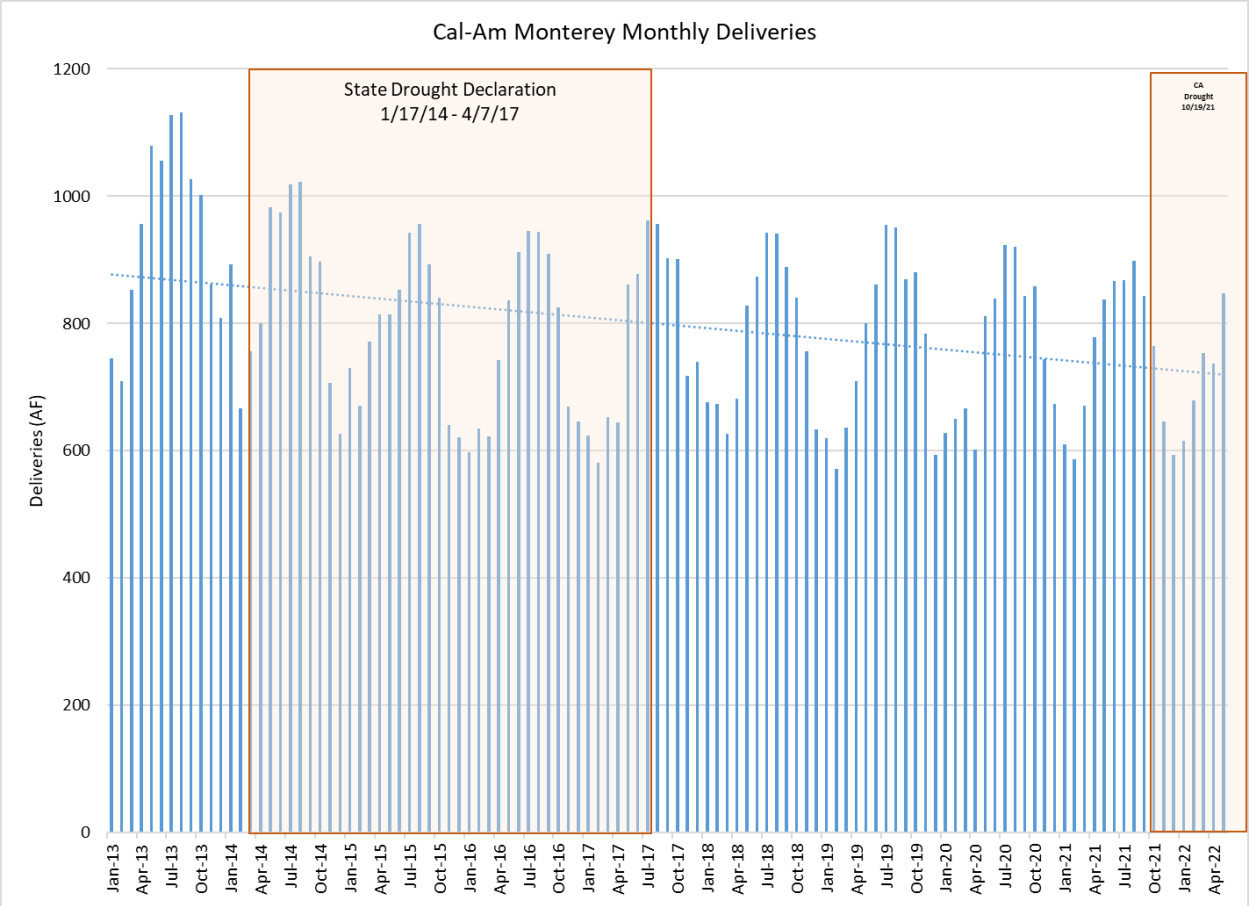

Figure 2: Cal-Am Monterey monthly deliveries

Using these published monthly data, I found the minimum and maximum month of delivery for each year. The average annual non-seasonal (predominantly indoor) deliveries for each year were calculated as the average water use in January, February, November, and December multiplied by 12. Seasonal production for each year was calculated by subtracting non-seasonal from total production. These data and results are shown as a chart in Figure 3 and in Table 1.

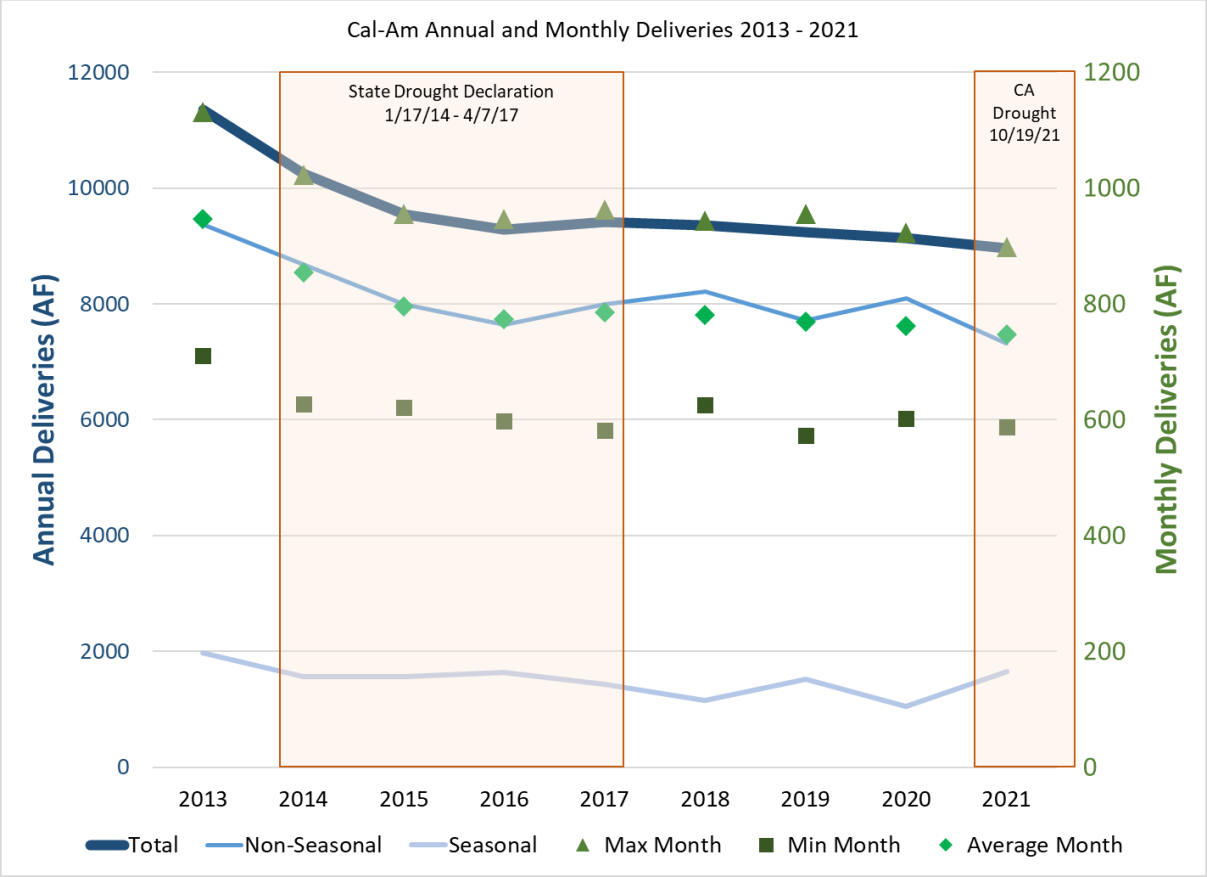

Figure 3: Cal-Am Monterey annual and monthly deliveries, 2013 - 2021[9]

Seasonal deliveries provide an estimate of summertime demand including outdoor irrigation and summertime tourism use. Non-seasonal deliveries provide an estimate of baseline indoor use and non-revenue water that occur throughout the year.

On average, seasonal deliveries accounted for 15.7% of Cal-Am's total across these nine years and ranged between 12.3% and 18.4%. Non-seasonal deliveries accounted for between 81.6% and 88.3% of usage from 2013 – 2021.

This analysis shows that the demand reductions achieved from 2013 - 2016 were largely in the non-seasonal category (predominantly indoor use). Seasonal demand did decline during this period, but not nearly as much as non-seasonal demand.

Both the minimum and the maximum month deliveries for each year have also been declining since 2013. The minimum month of delivery in 2021 was one of the lowest of any of the past nine years.

[9] From production data published at: https://www.watersupplyproject.org/system-delivery (accessed 7/25/2022).

Table 1: Cal-Am monthly deliveries and annual statistics[10]

Month	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	745	893	730	597	624	676	620	628	611	616
Feb	710	667	671	635	581	673	572	650	587	679
Mar	853	757	771	623	653	626	636	644	671	754
Apr	957	800	814	742	645	682	710	602	778	737
May	1079	982	814	836	861	828	801	811	838	848
Jun	1056	975	853	912	878	874	861	839	867	
Jul	1127	1018	942	946	962	943	955	923	868	
Aug	1131	1023	956	944	957	941	951	920	898	
Sep	1027	906	893	909	902	889	870	843	843	
Oct	1002	897	840	826	901	841	881	859	765	
Nov	861	707	640	670	717	756	784	744	647	
Dec	809	627	621	646	740	633	594	674	594	
Total Annual Deliveries	11,356	10,250	9,545	9,285	9,421	9,362	9,234	9,138	8,966	
Maximum Month	1131	1023	956	946	962	943	955	923	898	
Minimum Month	710	627	621	597	581	626	572	602	587	
Average Month	946.4	854.3	795.4	773.8	785.1	780.2	769.6	763.4	747.2	
Annual Non-Seasonal	9,375	8,682	7,986	7,644	7,986	8,214	7,710	8,088	7,315	
Annual Seasonal	1,981	1,568	1,559	1,641	1,435	1,148	1,524	1,049	1,652	
%Seasonal	17.4%	15.3%	16.3%	17.7%	15.2%	12.3%	16.5%	11.5%	18.4%	
Total Annual Production (from Figure 1)	11,617	10,599	9,707	9,559	9,760	9,690	9,575	9,412	9,280	
Difference between Production and Deliveries	261	349	162	274	339	328	341	275	314	
% Difference	2.3%	3.4%	1.7%	3.0%	3.6%	3.5%	3.7%	3.0%	3.5%	
System Per Capita (gpcd)	116.8	106.1	96.7	94.7	96.2	95.1	93.2	91.6	90.3	

Note on Data Differences

The volume of water produced by Cal-Am annually as shown in Figure 1 is based on Cal-Am's quarterly and annual reports to the State Water Resources Control Board (2017-2021) which

[10] From delivery data published at: https://www.watersupplyproject.org/system-delivery (accessed 7/25/2022) Includes: Monterey Main, Hidden Hills, Ryan Ranch & Bishop.

treat water loss explicitly. Prior years are based on the MPWMD Report and are higher than the delivery values reported on Cal-Am's website (Figure 2, Figure 3, and Table 1).

For the purposes of the demand forecasts prepared in this report, WaterDM used Cal-Am's production in 2020 and 2021 as reported in Ian Crooks' July 2022 testimony to establish the starting point for the demand forecast to develop the most realistic and updated demand forecast possible for the Monterey Main System.

Per Capita Water Use

WaterDM prepared an independent calculation of per capita water use based on the production volumes shown in Figure 1 and population data from Ian Crooks' testimony. System per capita use is calculated as the total volume of water produced at the source divided by the service area population and the number of days in the year. This calculation of system per capita use is based on production and thus inclusive of all water use, non-revenue water, and treatment losses.

System per capita use in the Cal-Am Monterey Main System in 2010 was 127.0 gpcd. This was the highest level of gpcd over the past 10 years. In 2021, system per capita use was 90.3 gpcd and in 2020 it was 91.6 gpcd. Twelve years of daily system per capita use for the Monterey Main System in shown in Table 2 and Figure 4. Per capita use has decreased in every year except for 2017.

Table 2: Per capita water use, 2010 - 2021

Year	Population	Production (AF)	Per Capita (GPCD)	Source of Production Data
2010	87,419	12,432	127.0	MPMWD Report
2011	87,866	12,244	124.4	MPMWD Report
2012	88,312	12,052	121.8	MPMWD Report
2013	88,759	11,617	116.8	Crooks July 2022 Testimony
2014	89,205	10,599	106.1	Crooks July 2022 Testimony
2015	89,652	9,707	96.7	Crooks July 2022 Testimony
2016	90,098	9,559	94.7	Crooks July 2022 Testimony
2017	90,545	9,760	96.2	Crooks July 2022 Testimony
2018	90,991	9,690	95.1	Crooks July 2022 Testimony
2019	91,717	9,575	93.2	Crooks July 2022 Testimony
2020	91,717	9,412	91.6	Crooks July 2022 Testimony
2021	91,717	9,280	90.3	Crooks July 2022 Testimony

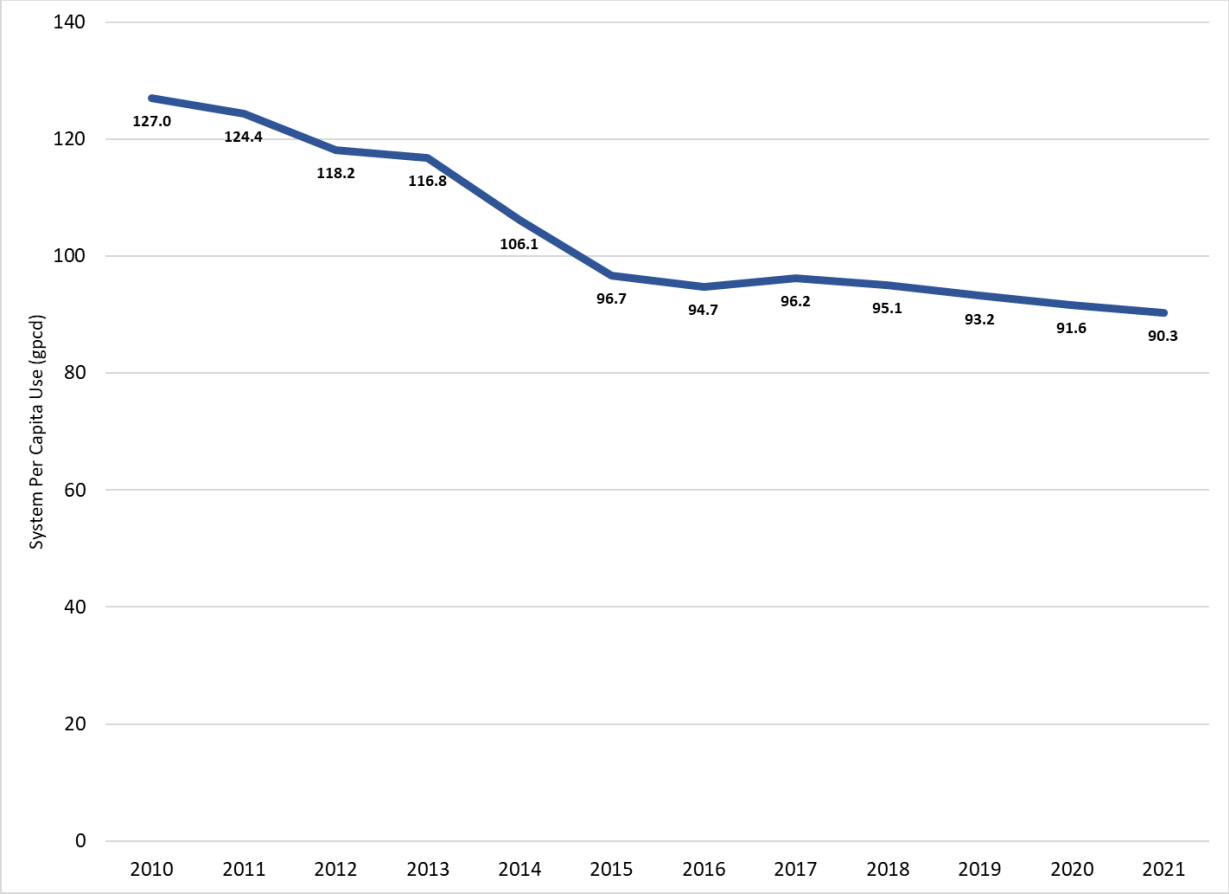

Figure 4: Cal-Am system-wide per capita use, 2010 - 2021

Water Demand by Sector

Cal-Am's 2021 water demand by sector is shown as a pie chart in Figure 5, based on data presented in Cal-Am's recent general rate cases.[11, 12] Residential use including single- and multi-family customers used 64% of the total produced in 2021. Commercial and industrial customers used 27%, the public / other sector used 5%, and non-revenue was 4%. Non-revenue water includes real and apparent water loss as well as authorized and unauthorized uses for which the utility does not collect revenue.

[11] Decision 21-11-018 November 18, 2021, Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service, Decision Approving and Adopting Settlement and Authorizing California-American Water Company's General Rate Increases for 2021, 2022, and 2023.

[12] Direct Testimony of David Mitchell. Application A.22-07-001. Public Utilities Commission of California. July 1, 2022, (Tables 38 and 39, p.36).

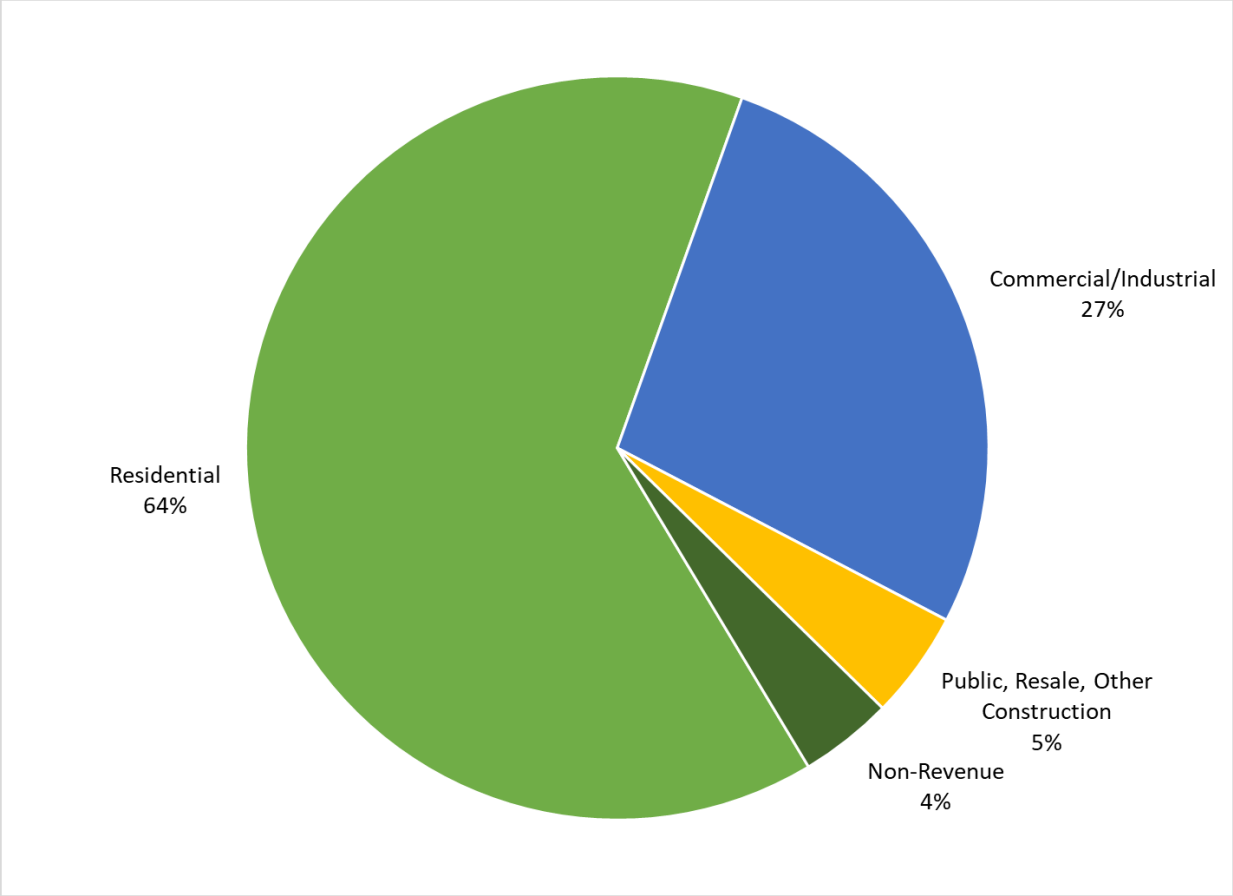

Figure 5: 2021 Cal-Am Monterey System demand by sector[13]

Updated Water Demand Forecast

Cal-Am's Updated Forecast

The updated demand forecast provided in Ian Crooks' July 2022 testimony extends Cal-Am's demand forecast out to 2050 and includes additional population growth from the RHNA, beyond the AMBAG forecast.[14] The updated forecast also includes questionable additions that could easily result in double counting demand such as a "Tourism Rebound" and "Legal Lots of Record" that both seem to be included within the population and economic growth forecasts. The forecast fails to include the impacts of Cal-Am's own ongoing water efficiency and state regulations to reduce demand. In Cal-Am's updated forecast, per capita water use is assumed to *increase* by 14% by 2050 – exactly the opposite to what has been happening and what the State of California has legislated. On top of these inflations, Cal-Am further pads its demand

[13] Direct Testimony of David Mitchell. A.22-07-001. Public Utilities Commission of California. July 1, 2022, Tables 38 and 39, p.36.

[14] Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022, (Table 5, p.24).

forecast with an additional 10% contingency buffer. Cal-Am's recent demand forecasts are shown in Figure 6 and summarized in Table 3.

Cal-Am's 2022 updated demand forecast[15] differs substantially from Cal-Am's own recent (and independently prepared) General Rate Case Application forecast which estimated demand for 2024.[16] The magnitude of the changes in demand and the differences in the forecasts are significant. On July 1, Cal-Am submitted an independently prepared demand forecast that estimated water demand in 2024 (including losses) to be 9,036 AF.[17] Then, just 19 days later on July 20 Cal-Am testified to the PUC that it needs 10,110 AF in 2025,[18] an increase of 12%. Cal-Am has consistently used less than this amount of water for eight years as shown in Table 1. The starting point of Cal-Am's 2022 updated demand forecast is too high.

Cal-Am has a poor track record with recent CPUC demand forecasts as shown in Figure 6. Cal-Am's 2017 demand forecast provided to the CPUC as part of the application for the proposed desalination plant predicted water use in 2020 would be 12,350 AF. In reality, Cal-Am's water use in 2020 was 9,412 AF as shown in Figure 1. Cal-Am's demand forecast was 2,938 AF (31.2%) higher than actual use, just three years after it was submitted. Errors of this magnitude are expensive for rate payers. Infrastructure projects sized based on an overstated demand forecast would almost certainly be sized larger than needed, imposing a costly and unnecessary burden on rate payers for years to come. Cal-Am's 2022 updated demand forecast repeats the same error of starting from an unrealistically high demand rather than the actual demand.

[15] Crooks, July 2022.

[16] Direct Testimony of David Mitchell. Application A.22-07-001. Public Utilities Commission of California. July 1, 2022

[17] Mitchell, July 1, 2022.

[18] Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022, (Table 5, p.24).

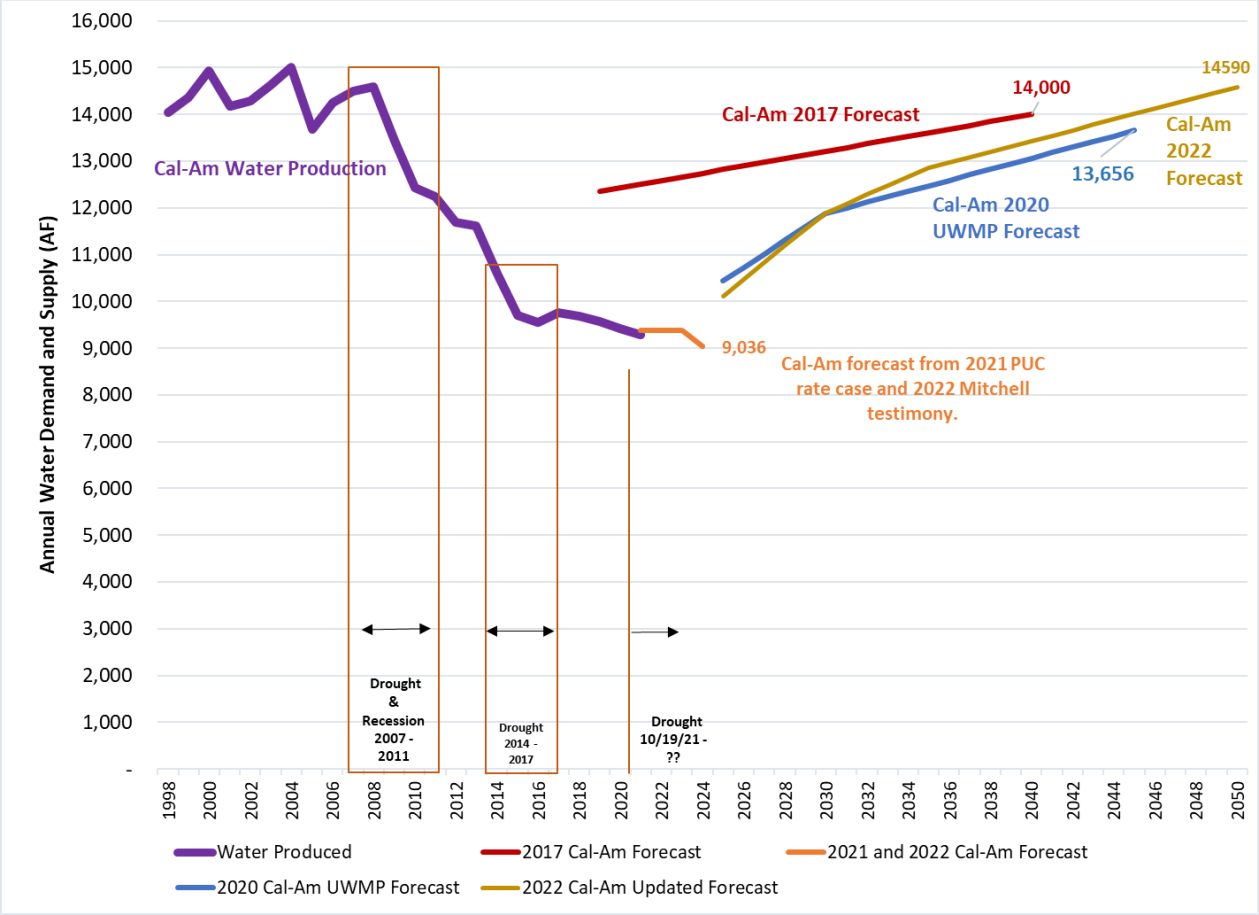

Figure 6: Cal-Am water production (1998 – 2021) and Cal-Am water demand forecasts

Table 3: Cal-Am demand forecasts and actual use

Forecast	Starting Year	Starting Volume	Starting Per Capita Use	Ending Year	Ending Volume	Ending Per Capita Use
2022 Ian Crooks Testimony	2025	10,110 AF	96.5 gpcd	2050	14,590 AF	110.0 gpcd
2021 and 2022 Cal-Am rate case testimony	2021	9,390 AF	91.4 gpcd	2024	9,036 AF	86.6 gpcd
2020 Cal-Am UWMP	2025	10,443 AF	99.6 gpcd	2045	13,656 AF	104.6 gpcd
2017 Cal-AM application to CPUC	2020	12,350 AF	120.0 gpcd	2040	14,000 AF	109.0 gpcd
2021 Cal-Am Actual Use and WaterDM Current gpcd forecast	***2021***	***9,280 AF***	***90.3 gpcd***	***2050***	***11,934 AF***	***90.3 gpcd***

Summary of Cal-Am Forecast Inflations

Based on WaterDM's analysis, Cal-Am's forecasted 2050 demand is improperly inflated by more than 2,500 AF. The Cal-Am forecast has been overstated through the following means, each of which is described below:

- Unlikely increasing per capita trend
- Improper RHNA inclusions, not within Cal-Am's service area
- Mis-categorization of multi-family housing as "Non-Residential"
- Tourism "bounce-back" lacks analysis, method, or supporting data and is based on events from 15 years ago
- Double counts of future demand as growth from "Legal Lots of Record" and "Pebble Beach Entitlements"

An overstated demand forecast can be very expensive for rate payers. If accepted without correction or modification, the inflated 2022 Cal-Am forecast could result in over-sizing of supply and delivery infrastructure and substantial unnecessary expenses to rate payers.

Unlikely Increasing Per Capita Trend

Cal-Am's 2022 updated forecast starts at an inflated level and results in a further overstated value for gpcd in the future. In 2021, Cal-Am customers used 90.3 gpcd. Cal-Am's 2022 updated forecast assumes 96.5 gpcd to start in 2025, which is 7% higher than current use. As shown in Figure 4, Cal-Am's per capita use has declined steadily since 2010. Cal-Am's starting point for the demand forecast assumes higher per capita use and thus less water efficiency than today. The starting point for Cal-Am's updated 2022 forecast is too high.

Next Cal-Am's 2022 forecast further rejects the impacts of water efficiency by projecting that per capita use in the future will *increase* over the next 30 years by 14% ending at 110 gpcd – higher than any previous Cal-Am forecast.

This significant increase in per capita use essentially means that Cal-Am expects its customers to become less and less efficient in the future. This doesn't square with Cal-Am's stated intent to spend more than $1.8 million over three years on its water conservation programs, nor does it comport with state regulations and policies that incentivize demand reductions.

A 2050 level of 110 gpcd is unlikely given that water use in 2021 was 90.3 gpcd. Such a dramatic and remarkable reversal in water use efficiency is inconsistent with the state and local directives and contradicts recent sworn testimony from Cal-Am in its current General Rate Case.

Customers in the Cal-Am Monterey service area are among the most water efficient in the state. Cal-Am's updated 2022 forecast unreasonably assumes that these customers will go from being the most efficient to becoming remarkably less water efficient in California over the next 30 years. This is unlikely to occur.

Improper RHNA Inclusions

Additional RHNA housing will increase Cal-Am's future population beyond the previous AMBAG forecast. But Cal-Am has improperly overstated the updated 2022 demand forecast by including additional RHNA housing that is not within their service territory. In his July 2022 testimony, Ian Crooks assumed 50% of the new RHNA housing units in the City of Seaside will be served by Cal-Am.[19] An estimate of 20% is conservative and the actual amount is likely less than 10%. Mr. Scherzinger will address this in his testimony.

Using 20% as an estimate for Cal-Am's portion of Seaside, WaterDM recalculated the RHNA units that are within the Cal-Am Monterey service area and found it to be 6,028 units rather than the 6,213 offered by Cal-Am.[20]

Cal-Am mis-categorizes multi-family housing as "non-residential"

The sectoral breakdown and associated volumes shown in Figure 5 above, which comes from Cal-Am's metered data and PUC rate case differs from the breakdown of residential and non-residential demand provided in Ian Crooks' July testimony as part of the 2050 demand forecast. Mr. Crooks' testimony (Table 5, p. 24) states the baseline residential sector demand (2017 – 2021) is 4,857 AF (51% of total) and the non-residential demand (including non-revenue water) is 4,686 AF (49% of total). This discrepancy is apparently due to Cal-Am's mis-categorization of multi-family housing as non-residential.

In Mr. Crooks' testimony, total demand appears correctly stated, but Cal-Am has understated residential demand and over-stated non-residential demand. WaterDM's analysis suggests this is caused by the inclusion of multi-family housing within the non-residential category.[21] This is a practice of some water utilities, but in the context of demand forecasting where future efficiency and growth are to be considered, it is best to either treat multi-family demand separately or to combine it with single-family residential demands.

The over statement of non-residential demand improperly accelerates the growth rate of the multi-family sector. That is because, in Cal-Am's updated 2022 demand forecast, growth in non-residential demand is accelerated by the "Service Area Employment" which grows much faster than the population. The mis-categorization of multi-family housing as "non-residential" contributes to Cal-Am's inflated demand forecast.

Tourism "Bounce-back"

Cal-Am has improperly added in 500 AF to its forecast for what is described as a "tourism bounce-back" from the "Great Recession" which occurred 15 years ago in 2007. Additional commercial demand in the Cal-Am service territory is anticipated along with population growth

[19] Crooks, July 2022, (p. 16).

[20] Crooks, July 2022, (p. 16).

[21] Crooks, July 2022, Table 5, (p. 24).

out to 2050, but that is not what Cal-Am has done. The flat addition of 500 AF to account for demand changes that are more than a decade old improperly inflates demand based on "discussions"[22] rather than data.

According to Mr. Crooks' testimony, hotel occupancy is only off by "12 to 15" percent but there is no attempt to connect the volume of 500 AF with this additional occupancy.[23] Furthermore, Mr. Crooks misquotes the source quotation found in CPUC D.18-09-017[24] which states, (emphasis added), "The Coalition of Peninsula Businesses bases part of its additional need on its assertion that the 'tourism industry intends to increase hotel occupancy by approximately 12 to 15 percent *over the next two decades* to re-attain the occupancy levels of decade ago.'" Cal-Am ignores this and forecasts the 500 AF increase to occur over the next 10 years.[25]

Mr. Crooks also oddly blamed the CDO moratorium for the tourism slump when he testified, "Although time has passed since the Great Recession, as a result of the CDO's moratorium, the recovery of the tourism industry has been slow."[26] Mr. Crooks did not explain how or why a moratorium of water taps might reduce visitors to a hotel or motel.

Cal-Am has improperly added 500 AF (~ 4% inflation) without real analysis, method, or supporting data based on events from 15 years ago or the CDO, or both. This problem has persisted in Cal-Am forecasts since at least 2017.

Legal Lots of Record

Cal-Am inflates its future demand by 1,180 AF in 2050 stating there is undeveloped residential and commercial land in its service area and there is a backlog of remodel development. There are numerous problems with these claims as they relate to future water demand.

First off, remodel development does not usually increase water use and frequently results in a decrease in use as older fixtures and appliances are replaced with more efficient models and stricter landscape codes are applied. It is not clear why Cal-Am assumes remodel development will increase demand, when it will likely do the opposite.

Second, not all of the Legal Lots of Record are in fact developable, a point Cal-Am ignored.[27]

Third, the 1,180 AF estimate is not based on any current analysis and instead originates in a 2009 Coastal Water Project environmental impact report.[28] The MPWMD observed in 2017 that

[22] Crooks, July 2022, (p. 23 line 1).

[23] Crooks, July 2022, (p. 22).

[24] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M229/K424/229424336.PDF

[25] Crooks, July 2022, Table 5, (p. 24)

[26] Crooks July 2022, (p. 24).

[27] Monterey Peninsula Water Management District. 2020. Presentation of Updated Regional Water Demand Forecasts Related to Association of Monterey Bay Area Government 2018 Regional Growth Forecast and Regional Housing Needs Allocation Plan: 2014-2023, and Inclusion of 2019 Water Year.

development of lots of record has occurred since the estimates were prepared in the early 2000s and that some vacant lots on improved parcels that were included in MPWMD's vacant lot study may never be split from the main property and developed.[29]

Undeveloped residential and commercial land could certainly be developed between 2025 and 2050 and thus require water, but Cal-Am has already included this water demand in its forecast. Thus, the addition of 1,180 AF amounts to a double count. Both AMBAG and RHNA have forecast future growth in the Cal-Am service area. Where else would this growth occur but on undeveloped residential and commercial land? Cal-Am's forecast already includes the water demand associated with development of these properties.

Ian Crooks admitted this double count problem when he testified, "Future development on Legal Lots of Record may have some overlap with growth projections prepared by AMBAG and future housing demands projected by AMBAG's RHNA plan for the AMBAG area."

It is clear, and Cal-Am admits, that Legal Lots of Record has overlap with the growth forecast by AMBAG and the RHNA plan. The result is the improper addition of 1,180 AF of future demand.

1989 Pebble Beach Entitlements

Pebble Beach entitlements amount to an additional 325 AF of water Cal-Am committed in 1989 to the Pebble Beach Company, but which have not been used to date. Like the Legal Lots of Record, this 325 AF is claimed to be needed for undeveloped lots in the Pebble Beach area. This amounts to an exaggeration of future demand at best and a double count at worst.

Undeveloped land owned by the Pebble Beach Company could certainly be developed between 2025 and 2050 and thus require water, but Cal-Am has already included this water demand with the population and commercial growth baked into its forecast. This future growth is treated by Cal-Am as outside of the AMBAG/RHNA realm, and no explanation other than the contractual obligation is offered.

Further, as of 2016, the Pebble Beach entitlements stood at 304 AF,[30] yet Cal-Am maintains 325 AF to be a "reasonable estimate". This "reasonable" estimate inflates Cal-Am's future demand forecast by at least 21 AF.

The addition of 325 AF to the demand forecast amounts to a double count unless Cal-Am establishes a sound reason for why growth in Pebble Beach falls outside of AMBAG/RHNA forecasts for the Cal-Am service area. Cal-Am's forecast likely already includes the water demand associated with development of these properties.

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[28] IBID.

[29] Monterey Penninsula Water Management District. 2020.

[30] Crooks July 2022. Attachment G, EIR/EIS 2018 of CalAm's MPWSP, (pp. 2-13).

WaterDM's Updated Forecast

For this report, WaterDM updated its two forecasts for the Cal-Am Monterey Main System which estimate future average annual production, inclusive of treatment losses and non-revenue water. The growth rate in each forecast is based on Cal-Am's current stated service area population and on AMBAG's anticipated population growth through 2050 including additions from the RHNA.[31],[32] Assuming 2.5 persons per unit, it is anticipated that the additional 6,028 RHNA units within Cal-Am's service territory will add 15,071 additional people by 2050. This RHNA population increase is incorporated into WaterDM's demand forecast. The total population of the Cal-Am service area in 2050 including the RHNA units is forecast to be 117,948.

The WaterDM forecasts are conservative and notably, both of these forecasts are higher than the forecasts Cal-Am itself produced for its most recent General Rate Case Application, which estimated demand for 2024 at 9,036 acre-feet per year as shown in Table 3.

- The "Current gpcd"[33] forecast assumed the 2021 rate of 90.3 gpcd continues into the future, without any increases in efficiency or conservation reductions. This forecast projects a demand of 11,934 AF in 2050.

- The "Continued efficiency" forecast includes the impacts of ongoing efficiency improvements from Cal-Am's conservation program and state mandates by applying reduction factors to seasonal and non-seasonal use by sector. The result is a 6.1% reduction in per capita use and the conservation of 774 AF over 25 years. The continued efficiency forecast projects a demand of 11,160 AF in 2050.

For this fifth supplemental report, the original forecasts were updated to reflect actual demands reported in 2020 and 2021 and to extend the forecast timeframe to 2050.

WaterDM's annual demand projections were built up from the analysis of historical production and deliveries presented above. The year 2022 is the first year of the projection, which then continues to produce average annual demands through 2050. Demand in 2021 was used as the starting point for WaterDM's revised forecast.

Production was split out by sector and future demand was increased proportionally with population and employment increases to 2050. The four sectors included in the model are:

- Residential (single-family + multi-family)
- Commercial and industrial

[31] This likely over-estimates Cal-Am's future growth because it includes new population in portions of the cities of Monterey, Seaside, and Del Rey Oaks within the Fort Ord Buildout that will be served water by the Marina Coast Water District, not Cal-Am.

[32] Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 25, 2022.

[33] gpcd = gallons per capita per day.

- Public, resale, other, construction
- Non-revenue water

The summed annual demand of these four categories equals the estimated water supply requirement under average future conditions. The model allows specific factors to be applied to the non-seasonal or seasonal component of annual demand for each demand category, to simulate the impacts of water efficiency and conservation programs.

WaterDM's continued efficiency forecast is shown in Figure 7 along with Cal-Am's updated 2022 forecast from Ian Crooks' testimony and the 3-year 2022 rate case forecast prepared by independent consultant David Mitchell.

Notably, WaterDM's 2022 – 2024 forecasts are higher than the most recent forecasts Cal-Am submitted for its General Rate Case in July 2022.[34]

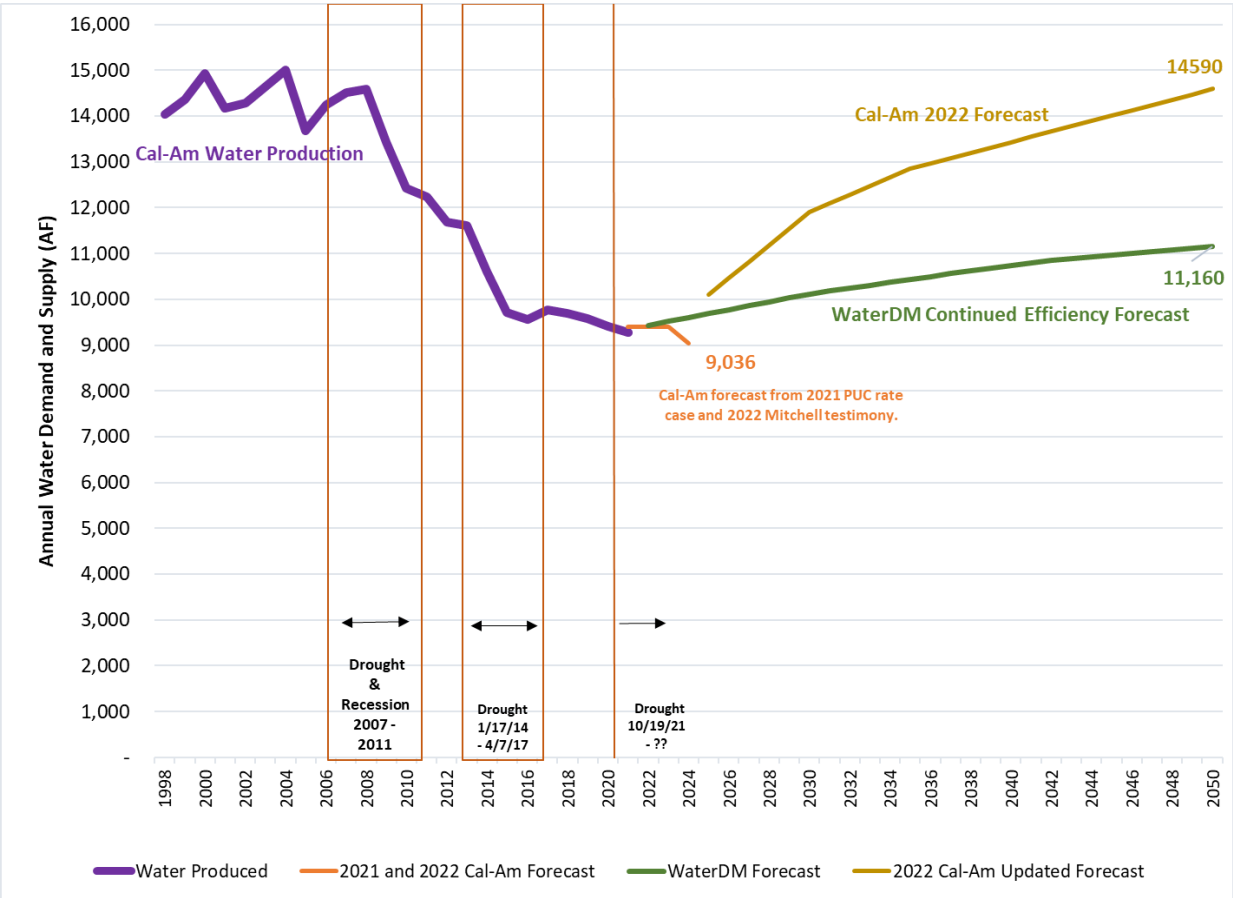

Figure 7: Cal-Am production 1998 – 2021 and demand forecasts prepared by WaterDM and Cal-Am, (2022 – 2050)

[34]Direct Testimony of David Mitchell. Application A.22-07-001. Public utilities Commission of California. July 1, 2022

Cal-Am has a habit of producing overstated water demand forecasts as evidenced in the 2017 forecast submitted to the PUC, shown in Figure 6. The 2017 forecast was the latest in a series of erroneous projections that continue to over-estimate needs as Cal-Am's water demand has declined over time. Cal-Am's shorter-term rate case forecasts produced by David Mitchell of the consulting firm M.Cubed have consistently proved more accurate than any other forecast Cal-Am has offered the PUC.

WaterDM's forecasts include all forecasted growth as well as the on-going impacts of water efficiency and avoid double counts. In comparison, Cal-Am's updated 2022 forecast remains unreasonably high largely because it assumes per capita use will increase, ignores the ongoing impacts of water conservation, and double counts growth.

Should projected RHNA growth fail to materialize in the Cal-Am service area, a distinct possibility given the limited opportunities and associated expenses, Cal-Am's future demand could be even lower than WaterDM has projected.

Water Supply Under Normal and Drought Conditions

Water Supply for the Monterey Main System

Cal-Am delivers water to its Monterey Main system from a diverse collection of water sources. Cal-Am has historically relied heavily on diversions from the Carmel River and Seaside Basin native groundwater to provide water to the Monterey Main system. Withdrawals from the Carmel River have now been reduced to mandated levels. In the future, when an additional supply source becomes available, withdrawals from the Seaside Basin should be reduced. Each of Cal-Am's water sources was evaluated to determine what level of production can reasonably be expected under normal conditions and during drought conditions.

Table 4 presents the water supply sources available to Cal-Am for the coming years under normal conditions and under drought conditions. Figure 8 shows how each source of supply contributed to Cal-Am's total production from 2000 – 2021 and the available sources of supply available into the future along with WaterDM's Continued Efficiency forecast. WaterDM's demand forecast includes all forecasted population growth in the Cal-Am service area (ABMAG+RHNA). WaterDM's forecasts are higher than the 3-year Cal-Am General Rate Case forecasts.

During normal years, Cal-Am has 10,050 AF of water supply available and with the addition of the Pure Water Monterey Expansion, this will grow to 12,300 AF. During a drought year Cal-Am currently has 8,550 AF of available supply (exclusive of stored supply and purchases), which will grow to 10,800 AF by 2026.

With the addition of the 2,250 AF from Pure Water Monterey Expansion, Cal-Am can steadily build up storage reserves even as population grows. By adding this additional source, Cal-Am should have sufficient supplies that the local development moratorium can be lifted, while still complying with the State Water Board's limits on Cal-Am's annual Carmel River diversions.

Key to the success of this approach will be continuing and extending water conservation and efficiency measures. Cal-Am's conservation-oriented rate structure and active water conservation program will help ensure efficient water use across the service area. The addition of landscape water budgets and strict water waste ordinances and enforcement should be considered as well.

Table 4: Annual Cal-Am Monterey Main System water supply sources under normal and drought conditions, 2022 - 2050

Water Source	Normal AF	Drought AF	Notes	Data Source
Carmel River – Cease and Desist Order	3,376 AF	3,376 AF	2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.	Cal-Am reports to the SWRCB
Carmel River – Permit 21330	200 AF	0 AF	Only available Dec. – May. Assumed not available during a drought.	Cal-Am reports to the SWRCB
Seaside Basin Native Groundwater	1,474 AF	1,474 AF	Reflects deferral of 700 AF payback for Cal-Am's over-pumping of the Seaside Basin until a replacement desalination supply is online. Once the Pure Water Monterey Expansion comes fully online payback may be possible.	Watermaster's annual reports.
ASR Recovered Water	1,300 AF	0 AF	Cal-Am must operate the system opportunistically and store water when possible. During a drought this water source is assumed to be unavailable to Cal-Am. But already stored ASR water would be available, if needed. ASR reserves as of March 2022 were 1,307.3 AF.[35]	Cal-Am reports to the SWRCB
Sand City Desalination Plant	200 AF	200 AF	300 AF capacity. Has averaged 209 AF over life of plant. During a drought it is possible this supply could produce more, but it was restricted in this analysis.	Cal-Am reports to the SWRCB
Pure Water Monterey	3,500 AF	3,500 AF	Starting in 2022, capable of delivering the full volume contracted to Cal-Am in a normal or a drought year.	Cal-Am reports
Pure Water Monterey Expansion	2,250 AF	2,250 AF	Starting in 2025, capable of delivering 2,250 AF to Cal-Am in a normal or a drought year.	TBD
Additional Withdrawal from storage (excluding ASR recovery)	As needed	As needed	Variable volume of additional recoveries from storage or Pure Water Monterey drought reserves taken as required.	Various
TOTAL	**10,050 AF in 2022 12,300 AF in 2025**	**8,550 AF in 2022 10,800 AF in 2025**[36]		

[35] March 11, 2022 Supplemental Testimony of Ian C. Crooks before the Public Utilities Commission of the State of California, (p. 4).

[36] Does not include stored supplies, potential purchases, and demand management options.

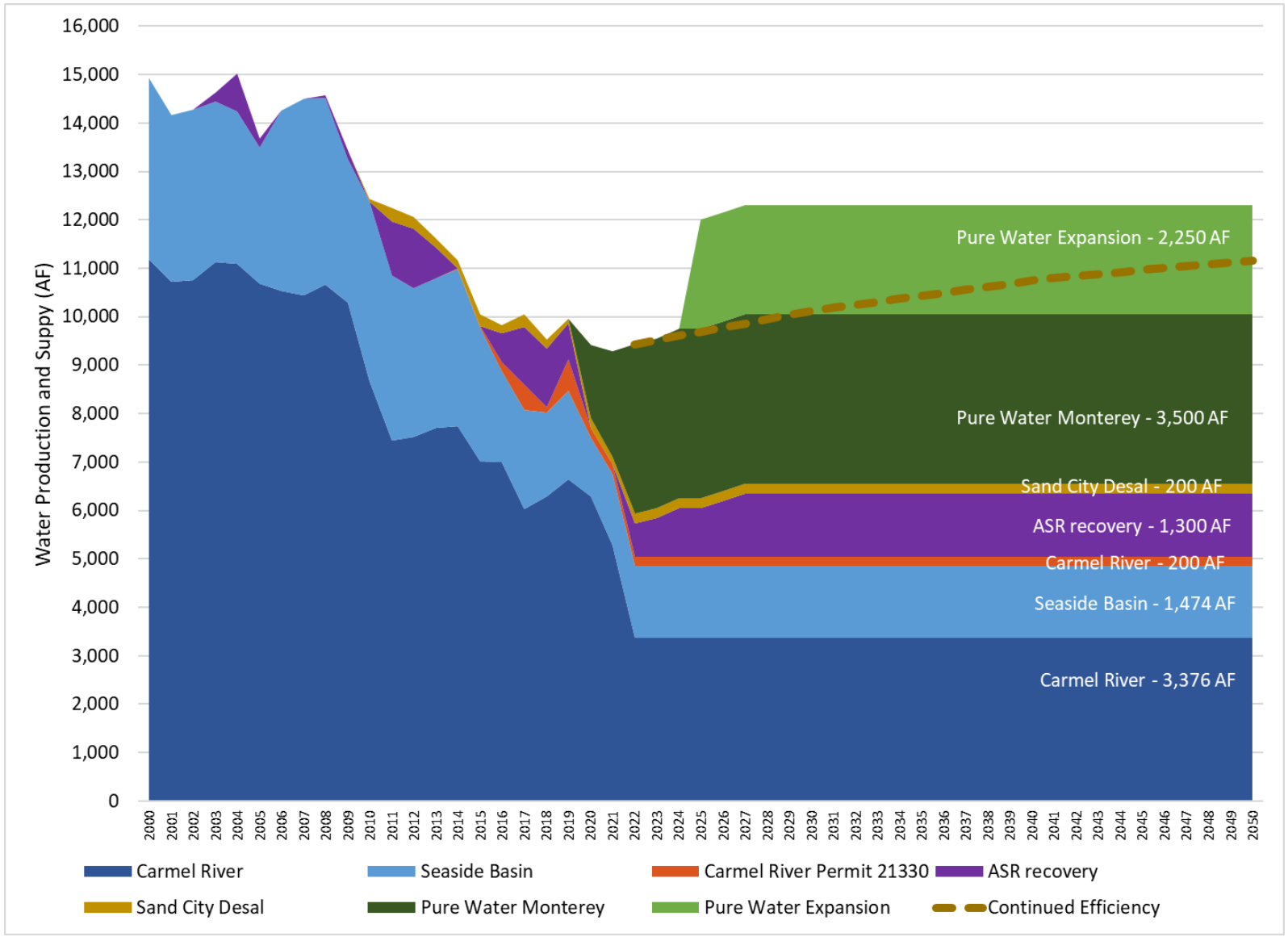

Figure 8: Cal-Am water production and future supply by source and WaterDM's Continued Efficiency forecast

Each source of water and the annual volume of available reliable supply during a normal year and drought year is described in detail in the sections below.

Carmel River

Diversions from the Carmel River, Cal-Am's primary water source, have been reduced in accordance with a cease-and-desist order from the State Water Resources Control Board. The original order, issued in 1995, determined that Cal-Am was extracting over 14,000 acre-feet per year from the river when it had a legal right to only 3,376 acre-feet. The State Water Resources Control Board determined that these illegal diversions were adversely affecting the river's population of federally threatened Central Coast steelhead and its riparian habitat. The Board ordered Cal-Am to develop or purchase alternative water supplies so it could end its illegal diversions.

Table 4 shows Carmel River production reduced to the mandated 3,376 AF in 2022. This is the volume to which Cal-Am has a legal right and is comprised of 2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.[37]

During a drought year it is assumed Cal-Am will have access to its full 3,376 AF legal entitlement.

Table 4 also shows an additional 200 AF of Carmel River supply under normal conditions based on Permit 21330.[38] Cal-Am's annual Progress Reports of Permitee to the State Water Resources Control Board show that it has withdrawn an average of 300 AF from 2019-2021 under this permit. During a drought it is assumed this supply will be unavailable.

Seaside Groundwater Basin – Native Groundwater

The Seaside Basin was over pumped by Cal-Am prior to the 2006 Seaside Groundwater Basin adjudication which imposed triennial reductions in operating yield until the basin's "Natural Safe Yield" is achieved. For Cal-Am, the last reduction occurred on October 1, 2021 and Cal-Am now has rights to 1,474 acre-feet per year. However, Cal-Am has over-drafted the Seaside Basin and has agreed to payback 700 AF of its 1,474 AF entitlement over 25 years or more "following final completion and acceptance of all MPWSP components"[39, 40] which means once a desalination supply comes online.

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[37] Monterey Peninsula Water Management District. 2020. (MPWMD Report) Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019), (p.3),

[38] "In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However, the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements." MPWMD Report, (p.3).

[39] Seaside Basin WaterMaster. 2008. Memorandum of Understanding between the Seaside Basin WaterMaster and California American Water, December 3, 2008.

The potential desalination supply will not be available for eight years at the earliest, but at Cal-Am's discretion, payback of 700 AF per year could begin sooner when the full capacity from the Pure Water Monterey Expansion is available to Cal-Am.

The Seaside Basin Watermaster's 2019 report to the Court overseeing the groundwater adjudication states that the total usable storage space in the entire Seaside Groundwater Basin is 52,030 AF. The report also describes the current allocation of that usable storage space among the Seaside Basin pumpers with Cal-Am allocated 28,733 acre-feet.[41] This allocation allows Cal-Am to bank water as described in the Seaside Basin Storage Reserve section below. This reserve will be an available supply "cushion" for Cal-Am to meet demand.

Aquifer Storage and Recovery

Cal-Am participates in an aquifer storage and recovery (ASR) project that allows for the capture of excess Carmel River flows through its wells along the river from December through May. This river water is then transferred through the new Monterey Pipeline and Crest Pipeline and injected into the Seaside Groundwater Basin for later extraction and use. This project operates with a series of ASR well sites capable of both injection and extraction. Ownership and operation of this source water project has various components split between Cal-Am and the Monterey Peninsula Water Management District.[42]

There are two water rights that support the ASR system: Permit 20808A which allows maximum diversion of 2,426 AF and Permit 20808C which allows up to 2,900 AF for a total potential maximum annual diversion of 5,326 AF.[43]

The ASR is a supply system that requires Cal-Am to capture and store water opportunistically. It can provide an important long-term supply if managed prudently so that storage can be built up well beyond the current 1,307 AF noted by Mr. Crooks.[44] In the coming five years, Cal-Am and its partners must work to remove operational constraints, take advantage of the increased conveyance capacity of the new Monterey Pipeline, upgrade existing river wells, and make other improvements to assure optimal operation of the system.

Cal-Am has taken steps to improve capacity by planning to install new Pure Water Monterey extraction wells in the Seaside Basin as addressed in Phase 1 of its CPUC application.

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[40] Seaside Basin WaterMaster. 2014. Amendment No. 1 to the Memorandum of Understanding between the Seaside Basin WaterMaster and California American Water, June 6, 2014.

[41] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019.

[42] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook, (p.7).

[43] MPWMD 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019), (p.3).

[44] Crooks July 2022, (p.35).

Attachment K to Ian Crooks' July 2022 testimony states that in 2025, when additional extraction wells are available, all four existing ASR wells will be available for injection.[45]

Cal-Am's 2018 FEIR/EIS stated, "Together, the ASR-3 and ASR-4 Wells provide the capacity to yield an additional 1,000 AF from the ASR system, resulting in a total capacity of 1,920 AF for Phases I and II combined (Denise Duffy & Associates, 2012). The Phase I and Phase II ASR projects correspond to MPWMD and CalAm's existing State Water Board Permits 20808A and 20808C, which authorize the diversion of up to 2,426 AF for ASR Phase I, and up to 2,900 AF for ASR Phase II (State Water Board, 2007, 2011)"[46] for an annual production total of 5,326 AF under both permits.

The 2018 FEIR/EIS goes on to state, "the estimated combined long-term average annual yield from ASR is 1,300 AF for the Phase I and Phase II projects (RBF, 2013)."[47]

WaterDM has assumed that starting in 2025 an average of 1,300 AF can be delivered from the ASR during normal years. During a drought, WaterDM conservatively assumed that Cal-Am will not be able to divert and inject any ASR water. Table 4 assumes 0 AF of ASR diversion and injection in drought years.

Sand City Desalination Plant

Cal-Am has an operating agreement for the Sand City Desalination Plant, a small facility designed to produce 300 acre-feet of water per year. Due to discharge permit requirements, to date the Sand City plant has never produced the full 300 AF and the maximum that it has ever produced was 276 AF in 2011. Over the life of the plant it has averaged 209 AF of production per year.[48] Table 3 assumes this facility can continue to produce 200 AF during drought years.[49] Once the Pure Water Monterey Expansion comes on line, Cal-Am can reduce its reliance on this source.

Crooks' July 2022 testimony states that Cal-Am is only able to take 94 AF from the Sand City Desalination Plant with the remaining 206 AF belonging to Sand City for new use. Much of the future new use, which has not materialized yet, will be for Cal-Am customers in Sand City. As Sand City growth occurs, it is assumed 200 AF of this supply will be available to Cal-Am into the future to serve what will eventually be Cal-Am customers in Sand City.

[45] Crooks, July 2022, Attachment K, (p 2).

[46] Crooks, July 2022, Attachment G, Excerpts from Cal-Am MPWWP FEIR/EIS - March 2018, (p. 2-19).

[47] IBID, (p. 2-20).

[48] MPWMD 2020.

[49] Ian Crooks' 3/11/22 testimony states Cal-Am is only allocated 94 AF from the Sand City Desalination plant with the remaining 206 AF allocated for growth in Sand City. However, until the growth and demand in Sand City materialize, Cal-Am can and has taken additional supply from this source. Furthermore, much of the future growth in Sand City is anticipated within Cal-Am's service area and thus eligible for reserved allocation.

Pure Water Monterey

Monterey One Water in partnership with the Monterey Peninsula Water Management District and Marina Coast Water District developed the Pure Water Monterey Groundwater Replenishment Project. The project provides a reliable source of water supply to replace illegally diverted Carmel River withdrawals and permanently supplement existing water supply sources for the Monterey Peninsula. The Pure Water Monterey project also makes available advanced treated water to the Marina Coast Water District.

The Pure Water Monterey Project is designed to produce 3,500 acre-feet per year of purified recycled water to compose a portion of Cal-Am's water supply and to assist in complying with the State Water Resources Control Board orders. The source waters for Cal-Am's 3,500 AF portion of the Pure Water Monterey Project are agricultural produce wash water and drainage flows from the Blanco Drain and Reclamation Ditch.

The Pure Water Monterey Project includes a 5 million gallon per day capacity water purification facility for treatment and production of purified recycled water that is conveyed and stored in the Seaside Basin using injection wells. Project conveyance facilities include the pipeline from the purification facility to injection wells in the Seaside Basin and a tank storage reservoir. This pipeline and tank storage are owned and operated by the Marina Coast Water District.

Once injected, the purified recycled water augments existing groundwater supplies to provide 3,500 acre-feet per year of water to Cal-Am for extraction and direct use. Pure Water Monterey is operational and Table 4 includes 3,500 AF of recovery from the Pure Water Monterey project during a continuous drought.

Pure Water Monterey Expansion

Monterey One Water and the MPWMD are developing an expansion of the Pure Water Monterey project to increase the capacity available to Cal-Am, which is the subject of Phase 1 of Cal-Am's PUC application. The Pure Water Monterey Expansion is expected to provide an additional 2,250 acre-feet per year to augment existing groundwater supplies.

The source water for the Pure Water Monterey Expansion is municipal wastewater and agricultural drainage water. Analysis of the water sources under four conditions including drought concluded that the project can reliably produce water under each circumstance and arguments to the contrary have been repeatedly and thoroughly rebutted by Monterey One Water and the MPWMD and their consultants.[50, 51]

WaterDM's analysis assumes that the full 2,250 AF will be available to Cal-Am in 2025 in normal and drought years. With the addition of this supply, Cal-Am could choose to reduce reliance from year to year on other sources such as the Seaside Basin.

[50] April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE, Monterey One Water.

[51] See also - Marina Coast Water District's Preliminary Response to Cal-Am's Presentation Materials dated 9/2/20.

Seaside Basin Groundwater Storage Reserve

Cal-Am is allocated 28,733 AF of total storage in the Seaside Groundwater Basin.[52] Ian Crooks' testimony on March 11, 2022 stated current ASR reserves to be 1,307.30 AF.[53]

Under the current Water Purchase Agreement, the first 1,000 AF of water produced in the Pure Water Monterey facility has been injected and stored as an operating reserve in the Seaside Basin. The operating reserve is owned by the Monterey Peninsula Water Management District and is available to ensure Cal-Am can recover 3,500 AF. An additional drought reserve of up to 1,750 AF is provided under the water purchase agreement. Banked storage provides a valuable and necessary buffer for Cal-Am to use if drought or higher demand than forecasted should occur.

Additional Supply and Reliability Considerations

Reliability, Cost of Desalination Not Considered

Mr. Crooks' July 2022 testimony applies intense scrutiny to the future reliability of the Pure Water Monterey Expansion yet fails to consider the future reliability and cost of the desalination facility Cal-Am has proposed.

Recent desalination projects in California have sometimes failed to produce expected volumes[54] and there many examples world-wide of production problems associated with desalination projects. Cal-Am need look no farther than the local Sand City Desalination plant on which it relies for an example of a facility that has failed to produce at its designed capacity. WaterDM's forecast includes only 200 acre-feet of annual production from the Sand City facility designed to produce 300 acre-feet annually.

Desalination is also the most expensive supply option currently available on the Monterey Peninsula and water from Cal-Am's proposed desalination project would cost at least three times as much as water from the Pure Water Monterey Expansion. The economic track record of desalination is problematic. Desalination plants must be paid for even if they do not produce any water. Victoria Australia's desalination facility, built in response to an intense drought, resulted in ongoing annual service payments of $649 million (Australian dollars), and "annual service payments rise every year, even if no water is ordered."[55]

Cal-Am justifies its need for desalination with an overstated demand forecast and chooses to ignore the negative long-term economic impacts to the community of oversizing such a project.

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[52] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019.

[53] March 11, 2022 Supplemental Testimony of Ian C. Crooks before the Public Utilities Commission of the State of California (p. 4).

[54] https://www.voiceofsandiego.org/topics/science-environment/desal-plant-producing-less-water-promised/

[55] https://www.dailymail.co.uk/news/article-5749621/Melbourne-desalination-plant-costs-tax-payers-eye-watering-649-million-year-operate.html

Cal-Am is far less interested in purchasing more recycled water, because that would be an operating cost in contrast to the desalination infrastructure, which would generate a profit for decades through the return on equity in water rates – paid by customers. This perhaps explains why Cal-Am fails to apply the same scrutiny to the reliability and expense of desalination that it used in its critique of the Pure Water Monterey recycled water projects.

Additional Demand Management

One item notably missing from Cal-Am's future water demand planning portfolio is additional demand management and water conservation. Cal-Am and the Monterey Peninsula Water Management District both operate robust water conservation programs documented in WaterDM reports,[56] but they have not implemented all of the best practices and options available to them.

WaterDM's April 21, 2020 report noted that the Monterey region has been regarded as a model for water conservation programs for many years. Cal-Am and the Monterey Peninsula Water Management District implement an array of effective demand management policies and programs that are likely to extend water efficiency gains. Cal-Am implements an active water conservation program including a steeply inclining four tier block rate pricing structure and customer incentives for installing drought tolerant landscapes and high-efficiency fixtures and appliances. Cal-Am also implements a rigorous utility-scale water loss control program aimed at reducing real losses in its distribution system. Local development regulations ensure that all new and remodeled buildings are equipped with high-efficiency fixtures and appliances.

Cal-Am's local efforts are in parallel to broader policy measures at the state level, designed to further increase efficiency. The State of California has implemented a series of laws and directives to ensure future water efficiency across the state including Assembly Bill 1668 and Senate Bill 60 which effectively mandate an ongoing reduction in per capita use. Cal-Am's continued compliance with these regulations and its active efforts to reduce customer water demand in the future are likely to gradually decrease per capita water use across the service area.

All of the measures currently implemented will be extremely helpful in increasing water efficiency in the region, but even more can be done to manage demand in the Monterey Main system.

Water Budgets to Manage Demand

One of the most effective methods for managing and reducing outdoor water use are customer-specific water budgets. A water budget represents a reasonable volume of usage for each customer, based on the specific needs and requirements of each customer and the available water supply. The water budget is a volumetric target based on the legitimate needs

[56] Expert Report of Peter Mayer, P.E., April 21, 2020. (pp.24-25).

of the customer and the available water supply and provides a customer-specific mechanism for monitoring compliance with demand management measures.[57]

Water budgets are a familiar concept in the region with Santa Cruz, Hayward, and Visalia all utilizing water budgets in some form. In Southern California water budgets are utilized by LADWP, Irvine Ranch, Eastern Municipal, and many other urban water providers.

The approach of using water budgets to manage demand was successfully implemented during California's last intense period of drought in 2016 by the California Water Company in its Visalia District. For the Visalia District, the mandated drought reduction goal was 32% below its 2013 residential per capita water use to be achieved by February 2016. This state-mandated goal served as motivation for the creation of customer level budgets, set at 32% reduction from 2013 usage.[58] Drought surcharges were based on the extent of overuse. Customers using less than their monthly budget could bank savings in that month and use it to offset excess use in a future billing period. The Visalia water budget program was successful in achieving the demand reduction goals.[59]

The water budgets implemented by Cal-Am need not be tied to the water rate or penalty structure and can be primarily informational. Even without a connection to the water rate structure, water budgets serve the dual purpose of communicating with customers what is a reasonable and expected volume of use during a time of shortage and informing Cal-Am and/or the Monterey Peninsula Water Management District every time usage exceeds a budgeted amount. This enables the customer to immediately act if their usage exceeds budgeted amounts and it empowers the utility to address any customer with usage that is deemed unreasonable given the supply limitations. This in turn enables demand management across the entire system, tuned to the desired level of consumption to the extent possible.

Other Demand Management Measures

Other measures that Cal-Am should consider for managing demand until additional supply comes online include:

- adjust irrigation schedules – particularly during peak summer months
- strictly enforce water waste ordinances
- eliminate all but essential line flushing and hydrant testing
- limits on all non-essential uses

[57] Mayer, P.W. et. al. 2008. Water Budgets and Rate Structures: Innovative Management Tools. Journal of the American Water Works Association. May 2008. Vol. 100, No. 5.

[58] Exceptions were made if the reduction resulted in a water budget that fell below a specified health-and-safety volume. If this happened, the larger health-and-safety budget was used instead. Visalia also offered an appeals and variance process.

[59] Bamezai, A. L. Maddaus, et. al. 2019. Use and Effectiveness of Municipal Irrigation Restrictions During Drought. Alliance for Water Efficiency. Chicago, IL.

- leak detection – utilize metering technology like AMI and adaptive technology like home flow monitoring to reduce customer-side leakage

Additional, more robust demand management planning may be required. Running out of water is not an acceptable option and an effective demand management plan must be readied by Cal-Am so that necessary measures can be implemented when and if they are needed in the coming years.

Maximum Month Demands

Mr. Crooks' July 22 testimony states that a desalination plant is "necessary to provide system firm capacity to ensure MMD can be met over the near-term and long-term planning horizon."[60] MMD refers to maximum monthly demand which for Cal-Am typically occurs in the summer months when customers increase use by about 21% over average.[61] There are several problems with Mr. Crooks' statement.

First off, the desalination plant may not be available to Cal-Am until 2030. It is inaccurate to consider desalination a solution for the "near-term" planning horizon, which, like Cal-Am's PUC rate forecast, is generally five years in the future or less. It is important not to confuse and conflate requirements for meeting the peak demand and annual demand planning practices. WaterDM addressed this issue in its first expert report of April 21, 2020 (pp. 37-39).

Meeting maximum monthly demand is usually accomplished by storing enough water ahead of time, not by producing enough water in the moment. Cal-Am's analysis appears to ignore the impact of available storage to help meet the MMD. Furthermore, a 21% difference between the average month and the maximum month is not a particularly large difference compared with many other providers that see a doubling of demand (or more) during summer months.

Perhaps most significantly, over the long-term, Cal-Am has based its calculation of MMD on a demonstrably overstated water demand forecast.

Peaking management approaches are available to Cal-Am to address maximum monthly and daily demands. In fact, peak demand management to shift the timing to off peak periods is already being practiced to some degree in the Cal-Am service area but could be expanded and adjusted if necessary to impact MMD.

Peak demand days usually occur during the hot and dry part of the year when outdoor irrigation occurs simultaneously across the service area. Currently Cal-Am restricts outdoor irrigation between 9 a.m. and 5 p.m. on any day. Irrigation is only permitted on two specific days per week (Wednesdays and Saturdays) unless the customer is equipped with a weather-responsive "smart" controller that automatically adjusts irrigation to meet prevailing climate conditions. These are all effective measures but focusing some irrigation demand on Wednesdays and Saturdays could have the unintended impact of creating peaks on those

[60] Crooks, July 2022. (p.26).

[61] Crooks, July 2022. (p.25).

particular days. Cal-Am does not report measured peak day demand data so it was not possible to determine if this is in fact the case. Spreading the irrigation demand more evenly through the week could help alleviate daily peak concerns.

Should peak demands become a concern in the future, Cal-Am has a variety of effective, low-cost management options available which do not require construction of a desalination facility.

Interim Supply Options

Over the next three years, until water from the Pure Water Monterey Expansion becomes available, it is possible Cal-Am will require additional supplies. These supplies could come in three ways: 1) withdrawal from stored reserves including 1,307 AF of ASR plus Pure Water Monterey reserves; 2) additional purchases; and/or 3) additional demand management.

Amended and Restated Water Purchase Agreement

Adoption of the Amended and Restated Water Purchase Agreement will provide Cal-Am with necessary additional water supply from the Pure Water Monterey Expansion to meet anticipated future growth

If the Amended and Restated Water Purchase Agreement is not adopted and water from the Pure Water Monterey Expansion is not available, Cal-Am would face supply short falls starting in 2025 without additional action. Without the Pure Water Monterey Expansion Cal-Am could face a supply shortfall of 1,110 AF in 2050.

If this supply shortfall were to be met with an alternative water supply source such as desalination, a supply sized similarly to the Pure Water Monterey Expansion (2,000 – 3,000 AF) would be adequate to meet future demand based on WaterDM's continued efficiency forecast.

SUMMARY

As a result of my review of the items listed in Appendix A and other related and relevant documents and reports, my own independent analysis, and my expertise in municipal and industrial water use, water management, and engineering, I offer the following supplemental analysis and opinions regarding Cal-Am's water demand and supply:

Since my prior reports, Cal-Am's water demand further declined as customers have become more efficient and system water losses have been reduced.

WaterDM concluded in its April 21, 2020 expert report that Cal-Am's per capita use would continue to decrease due to ongoing conservation program implementation, conservation pricing, and water loss control measures. This has proven true and the trend towards increased efficiency is expected to gradually continue. WaterDM's updated demand forecasts for this supplemental report include continuing population growth in the Cal-Am service area and gradual efficiency improvements.

Cal-Am's revised 2022 water demand forecast provided in Ian Crooks' testimony is overstated.

The new Cal-Am forecast ignores the impacts of future conservation, includes population that is not in Cal-Am's service area, and includes double counts, all of which improperly increase future demand. Furthermore, the forecast in Crooks' testimony differs radically from Cal-Am's independently prepared 2022 PUC 3-year rate case forecast, which projects a decline in demand in the near-term.

A more realistic demand forecast prepared by WaterDM projects Cal-Am's 2050 demands to be 11,160 AF, which is more than 3,400 AF lower than Cal-Am's overstated forecast.

The growth rate in WaterDM's forecast is based on Cal-Am's current stated service area population and on AMBAG's anticipated population growth through 2050 including additions from the RHNA. WaterDM's forecast includes the impacts of ongoing efficiency improvements from Cal-Am's conservation program and state mandates. The result is a 6.1% reduction in per capita use and the conservation of 774 AF over 25 years.

With the addition of 2,250 AF from the Pure Water Monterey Expansion, Cal-Am can meet future demand in 2050.

By adding this additional source and continuing its water conservation efforts, Cal-Am should have sufficient supplies that the local development moratorium can be lifted, while still complying with the State Water Board's limits on Cal-Am's annual Carmel River diversions. Key to the success of this approach will be making necessary physical and management improvements to Cal-Am's aquifer storage and recovery system so it performs as designed and approved by the CPUC. This includes use of the Monterey Pipeline and continuing and extending water conservation and efficiency measures. With prudent management and investment, Cal-Am should be able to steadily build up ASR reserves, essential for managing through drought periods.

If the Amended and Restated Water Purchase Agreement is not adopted and water from the Pure Water Monterey Expansion is not available, Cal-Am would face supply short falls starting in 2025 without additional action. If this supply shortfall were to be met with an alternative water supply source such as desalination, a supply sized similarly to the Pure Water Monterey Expansion (2,000 – 3,000 AF) would be adequate to meet future demand based on WaterDM's continued efficiency forecast.

Appendix A – Materials Considered[62]

Bamezai, A., L. Maddaus, et. al. 2019. Use and Effectiveness of Municipal Irrigation Restrictions During Drought. Alliance for Water Efficiency. Chicago, IL.

California-American Water Company. 2022. Phase 2 Direct Testimony of Ian C. Crooks. Public Utilities Commission of the State of California. Application 21-11-024. July 20, 2022, updated July 25, 2022.

California-American Water Company. 2022. Direct Testimony of David Mitchell. Application A.22-07-001. Public Utilities Commission of California. July 1, 2022.

California-American Water Company. 2022. Supplemental Testimony of Ian C. Crooks before the Public Utilities Commission of the State of California. March 11, 2022.

California-American Water Company. 2020. State Water Resources Control Board Order WR 2016-0016 / WR 2009-0060, 4th Quarterly Report for the 2019-2020 Water Year Addressing Operations for the Period of July 1, 2020 to September 30, 2020.

California-American Water Company. 2021. (U-210-W) Application to Obtain Approval of the Amended and Restated Water Purchase Agreement for the Pure Water Monterey Groundwater Replenishment Project. Supplemental Testimony of Ian Crooks, filed March 11, 2022.

California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook

California-American Water Company. 2012. Direct Testimony of Ian Crooks Before the Public Utilities Commission of the State of California. Application 12-04-019 (Filed April 23, 2012).

California Department of Water Resources. 2020. Urban Water Management Plan Guidebook 2020 (Aug. 2020 draft).

Marina Coast Water District. 2020. Marina Coast Water District's Preliminary Response to Cal-Am's Presentation Materials dated 9/2/20.

Mayer, P.W. et. al. 2008. Water Budgets and Rate Structures: Innovative Management Tools. Journal of the American Water Works Association. May 2008. Vol. 100, No. 5.

Monterey One Water. Aug. 20, 2020. Letter from Paul A. Sciuto, General Manager, to Mr. Tom Luster, California Coastal Commission.

Monterey One Water. April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE.

Monterey Peninsula Water Management District. 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019)

[62] Materials Considered also includes all materials cited in the footnotes of this Report.

Monterey Peninsula Water Management District. 2020. Presentation of Updated Regional Water Demand Forecasts Related to Association of Monterey Bay Area Government 2018 Regional Growth Forecast and Regional Housing Needs Allocation Plan: 2014-2023, and Inclusion of 2019 Water Year.

Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudoin. Subject: Draft Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project (Draft Supplemental EIR)

Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

Seaside Basin WaterMaster. 2008, 2014. Amendment No. 1 to the Memorandum of Understanding between the Seaside Basin WaterMaster and California American Water, Dated December 3, 2008; amended June 6, 2014.

State of California Water Code Sections 10631 (effective Jan. 1, 2020) and 10635 (effective Jan. 1, 2019).

WaterDM. April 21, 2020. Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. July 1, 2020. Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. September 11, 2020. Second Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.

WaterDM. March 22, 2022. Fourth Supplemental Expert Report and Recommendations of Peter Mayer, P.E. Regarding Water Supply and Demand in the California American Water Company's Monterey Main System.