WATER DEMAND COMMITTEE

ITEM:　　**ACTION ITEM**

3.1　　**CONSIDER RECOMMENDATION TO BOARD TO ADOPT THE MPWMD 2022 WATER SUPPLY AND DEMAND FORECAST**

Meeting Date:	**September 9, 2022**	**Budgeted:**	**N/A**
From:	**David J. Stoldt,** **General Manager**	**Program/** **Line Item No.:**	**N/A** **N/A**
Prepared By:	**David J. Stoldt**	**Cost Estimate:**	**N/A**

General Counsel Review: N/A
CEQA Compliance: This action does not constitute a project as defined by the California Environmental Quality Act Guidelines section 15378

SUMMARY: Attached as **Exhibit 3.1-A** are excerpts of the District testimony on supply and demand in the ongoing proceeding A.21-11-024 at the California Public Utilities Commission (CPUC). It is based on the 2022 AMBAG Regional Growth Forecast. Using a fully-vetted third-party growth forecast is a very objective way for projecting water demand increase. AMBAG implemented an employment-driven forecast model for the first time in the 2014 forecast and contracted with the Population Reference Bureau (PRB) to test and apply the model again for the 2018 Regional Growth Forecast (RGF). To ensure the reliability of the population projections, PRB compared the employment driven model results with results from a cohort-component forecast, a growth trend forecast, and the most recent forecast published by the California Department of Finance (DOF). All four models resulted in similar population growth trends. As a result of these reliability tests, AMBAG and PRB chose to implement the employment-driven model again for the 2022 Regional Growth Forecast.

Houses nor lots use water, people do. The portion of the AMBAG Regional Growth Forecast that forecasts population captures that water demand for residential purposes. Hence, the housing envisioned for Legal Lots of Record or within Pebble Beach is affiliated with the population growth forecast.

Similarly, economic growth is captured in the AMBAG Regional Growth Forecast by the growth in jobs. Both Cal-Am[1] and the District have utilized job growth as a proxy for non-residential water demand growth. Hence, the commercial growth envisioned for Legal Lots of Record, within Pebble Beach, or due to increased tourism is affiliated with the growth in the jobs forecast.

Exhibit 3.1-B is the AMBAG Regional Growth Forecast.

As shown in **Exhibit 3.1-C**, three years of pre-Covid water consumption patterns were mapped to recent five-year historical water production, thereby capturing production (also can be termed "water supply required" to serve the system) by jurisdiction and by residential/non-residential use. Then the

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[1] Phase 2 Direct Testimony of Ian C. Crooks, Attachment A, 2022 Urban Water Management Plan, p.4-7: "For non-residential customers, water use will increase at the rate of employment growth forecasted by AMBAG."

forecast residential water production demand is based on the third-party AMBAG population forecast and the forecast non-residential water demand is based on the AMBAG commercial jobs growth forecast. This approach is a rigorous approach to future water supply planning. The back-up methodology to how the District forecast of demand was performed and will be discussed more fully at the Committee meeting.

RECOMMENDATION: Staff recommends the Committee recommend that the excerpted testimony be developed into a formal report titled "MPWMD 2022 Water Supply and Demand Forecast" and presented to the full Board for adoption at its September 19, 2021 meeting.

DISCUSSION: Much attention has been paid to the recent Regional Housing Needs Allocation or "RHNA" numbers. How does the District's forecast incorporate the RHNA numbers?

The AMBAG Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP-SCS)[2] Table 1-3, page 1-9 shows Monterey County housing units assumed through 2045, an increase of 26,151. The source cited is the AMBAG Regional Growth Forecast (RGF) included as Appendix A to that document, and the numbers are the same as in Table 9, page A-37 of the RGF[3]. Page A-36 of the RGF says there is expected 42,200 new housing units for the region by 2045, 26,200 in Monterey County. The 6th Cycle RHNA Plan[4], Table 1, page 2 shows 33,274 total units in the region, with Monterey County's total adding up to 20,295 which is less than what is accounted for in the MTP-SCS and the RGF. Therefore, the 6th Cycle RHNA Plan is within the RGF. And as stated by AMBAG in their document: "The 2045 MTP/SCS includes an updated RHNA. The 6th Cycle Regional Housing Needs Determination (RHND) from HCD to AMBAG is 33,274 units."[5]

EXHIBITS
3.1-A Excerpts of District Testimony in A.21-11-024
3.1-B AMBAG 2022 Regional Growth Forecast
3.1-C Back-up to District Demand Forecast Methodology

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[2] Phase 2 Direct Testimony of David J. Stoldt, Attachment F
[3] Phase 2 Direct Testimony of David J. Stoldt, Attachment H
[4] Phase 2 Direct Testimony of Ian C. Crooks, Attachment B
[5] AMBAG 2045 MTP/SCS, Moving Forward Monterey Bay 2045, p.4-38

EXHIBIT 3.1-A

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) to Obtain Approval of the Amended and Restated Water Purchase Agreement for the Pure Water Monterey Groundwater Replenishment Project, Update Supply and Demand Estimates for the Monterey Peninsula Water Supply Project, and Cost Recovery	Application No. 21-11-024 (Filed November 29, 2021)

PHASE 2 DIRECT TESTIMONY OF DAVID J. STOLDT

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**MONTEREY PENINSULA WATER
MANAGEMENT DISTRICT**

August 19, 2022

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3   Q22:   Does MPWMD have a demand forecast of its own to share?

4   A22:   Yes.   Similar to Cal-Am, MPWMD's forecast is based on the AMBAG 2022 Regional

5   Growth Forecast and uses current production, a measure of the total water required before losses or

6   fire flows, as the base.   Where MPWMD's forecast differs is that it uses the most recent 5-year

7   average for production as the current base and it removes the double-counting that is inherent in the

8   Cal-Am estimates.   Starting with three years of Cal-Am consumption data (2017, 2018, and 2019

9   – pre-COVID), MPWMD allocated consumption for residential and non-residential by

10 political jurisdiction, based on the proportionate percentages of each then mapped the current base

11 production to the same proportions.[47]

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13 Assuming all prospective population and housing growth is captured in AMBAG's Regional

14 Growth Forecast, and all commercial economic expansion occurs at the same rate as AMBAG's

15 employment projections, MPWMD offers the following water demand forecast:

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27 [47] See Attachment M hereto, Data and Methodology to Support MPWMD Forecast of Water Demand, for background
    and detail.

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Table 5

Water Required to Meet AMBAG 2022 Regional Growth

Water Required for Population Growth[48]

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County[49]	TOTAL
Population in 2020	28,170	15,265	3,949	33,537	1,662	385	8,916	91,884
Population in 2045	29,639	15,817	3,984	38,316	2,650	1,198	9,916	101,520
Increase	5.2%	3.6%	0.9%	14.2%	59.4%	211.2%	11.2%	10.5%
Acre-Feet in 2020	1,675	908	413	1,015	92	21	2,221	6,345
Acre-Feet by 2045	1,762	941	417	1,160	146	65	2,471	6,961
AF Served by Others[50]	9	-	-	72	11	-	75	167
Net AF in 2045	1,753	941	417	1,087	135	65	2,396	6,795

Water Required for Employment Growth[51]

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County[52]	TOTAL
Jobs in 2020	40,989	8,016	3,566	10,476	748	2,092	4,300	70,187
Jobs in 2045	45,509	8,445	3,915	11,543	834	2,259	4,721	77,226
Increase	11.0%	5.4%	9.8%	10.2%	11.5%	8.0%	9.8%	10.0%
Non-Residential AF in 2020	1,547	332	225	336	22	66	853	3,380
Non-Residential AF in 2045	1,718	349	247	370	24	71	936	3,716
Increase	171	18	22	34	3	5	83	336

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[48] See Attachment H, AMBAG 2022 Regional Growth Forecast, Adopted June 2022.

[49] To estimate unincorporated County population, use Cal-Am service area population reported in SWRCB Urban Water Supplier Monthly Reports (Raw Dataset), May 2022 value, minus urban areas. Estimate 1,000 residents added by 2045. https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.html.

[50] This represents the portion of new residents in the jurisdiction who will reside in units served by water other than Cal-Am's Main system. Non-Residential water demand served by others has not been designated.

[51] See Attachment H, AMBAG 2022 Regional Growth Forecast, Adopted June 2022.

[52] California Employment Development Department, Monthly Labor Force Data for Cities and Census Designated Places. November 15, 2019. Sum of Carmel Valley Village CDP and Del Monte Forest CDP. Escalated at same rate as Carmel-by-the-Sea.

These AMBAG Regional Growth Forecast values can be converted to a long-term water demand forecast in the following manner:

Table 6

Calculation of Future (Year 2045) Water Demands

	Base Year (2020)	Estimate For 2045 AMBAG	AF per Year
Net Water for Population	6,345 AF	6,795 AF	18.00
Water for Non-Residential	3,380 AF	3,716 AF	13.44
Total	9,725 AF	10,511 AF	31.44

This future year growth rate, applied annually, results in the following water demand forecast:

Table 7

MPWMD Water Demand Forecast

	2020	2025	2030	2035	2040	2045	2050	2055
Water Demand - AF	9,725	9,882	10,039	10,196	10,353	10,511	10,668	10,825

Q23:   Does the supply to meet this demand forecast need to be increased by a "peaking factor" of 1.21 to meet the Maximum Month Demand (and Peak Hourly Demand), as asserted in Crooks' Phase 2 Direct Testimony, page 26, lines 12-19?

A23:   As explained later in my testimony about "Water Supply", it is not necessary to provide additional supplies if water resources saved or stored can be utilized to meet peak demands. Instead, stored water can be accessed with increased production well capacity, rather than over-building supplies. It is always in the ratepayer's interest to build one or two additional production wells for

$3 million each, rather than a $321 million[53] desalination plant if stored water can be utilized to meet peak demands. Please see Answers 42 and 43 of my testimony.

V.   WATER SUPPLY

Q24:   Without including a proposed desalination facility, what are the other available sources of water supply to the Cal-Am Main system?

A24:   MPWMD is in general agreement with Cal-Am about the Carmel River and Seaside sources of supply, but disagrees with Cal-Am's view of Pure Water Monterey Expansion, Aquifer Storage and Recovery (ASR), and the Sand City Water Supply Project. Available sources of supply are shown in Table 8 below and are described in the discussion that follows.

Table 8

Monterey Peninsula Available Supply

(Acre-Feet Annually)

Supply Source	w/ PWM Expansion
Pure Water Monterey	3,500
PWM Expansion	2,250
Carmel River	3,376
Seaside Basin	774
Aquifer Storage & Recovery (ASR)	1,300
Sand City Desalination Plant	210
Table 13 Water Rights	0
Malpaso Water Rights	58
Total Available Supply	**11,468**

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[53] From Attachment C-3 of Advice Letter AL 1220-A, September 10, 2019. Proposed costs for Cal-Am desalination plant have not been updated for many years. Given current inflation, supply chain issues, and increased construction cost environment, the desalination plant costs should be updated.

VI.   SUPPLY v. DEMAND

Q36:   How do you evaluate whether future water supply beyond a Pure Water Monterey Expansion, such as a desalination plant, is needed for the Monterey Peninsula?

A36:   By comparing future supplies available inclusive of Pure Water Monterey Expansion and comparing to the expected long-term water demand.[62]

Q37:   What does your future Supply versus Demand analysis show?

A37:   It shows that the addition of the Pure Water Monterey Expansion meets the region's demand needs for over 30 years and a new Cal-Am desalination plant, or some other alternative, is not needed.

Q38:   What do MPWMD's results show?

A38:   Here, as shown below, we evaluated AMBAG's 2022 Regional Growth Forecast, specifically the subregional population forecast as a proxy for residential water demand, and the subregional employment forecast, using job growth as a proxy for commercial (non-residential) water demand. AMBAG implemented an employment-driven forecast model for the first time in the 2014 forecast and contracted with the Population Reference Bureau (PRB) to test and apply the model again for the 2018 Regional Growth Forecast (RGF). To ensure the reliability of the population projections, PRB compared the employment driven model results with results from a

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[62] See Attachment Q hereto, Evaluation of Water Supply Available versus Water Demand.

cohort-component forecast, a growth trend forecast, and the most recent forecast published by the California Department of Finance (DOF). All four models resulted in similar population growth trends. As a result of these reliability tests, AMBAG and PRB chose to implement the employment-driven model again for the 2022 Regional Growth Forecast.

Using this methodology, the total water demand increase in the 25-year AMBAG Forecast period is 786 AF or 31.44 AFY. Applying the 31.44 AFY linearly across a 30-year horizon results in the demands shown in the figure below showing expected supply versus demand.

Figure 5

Water Supply Available

vs.

Water Demand for AMBAG 2022 Regional Growth Forecast
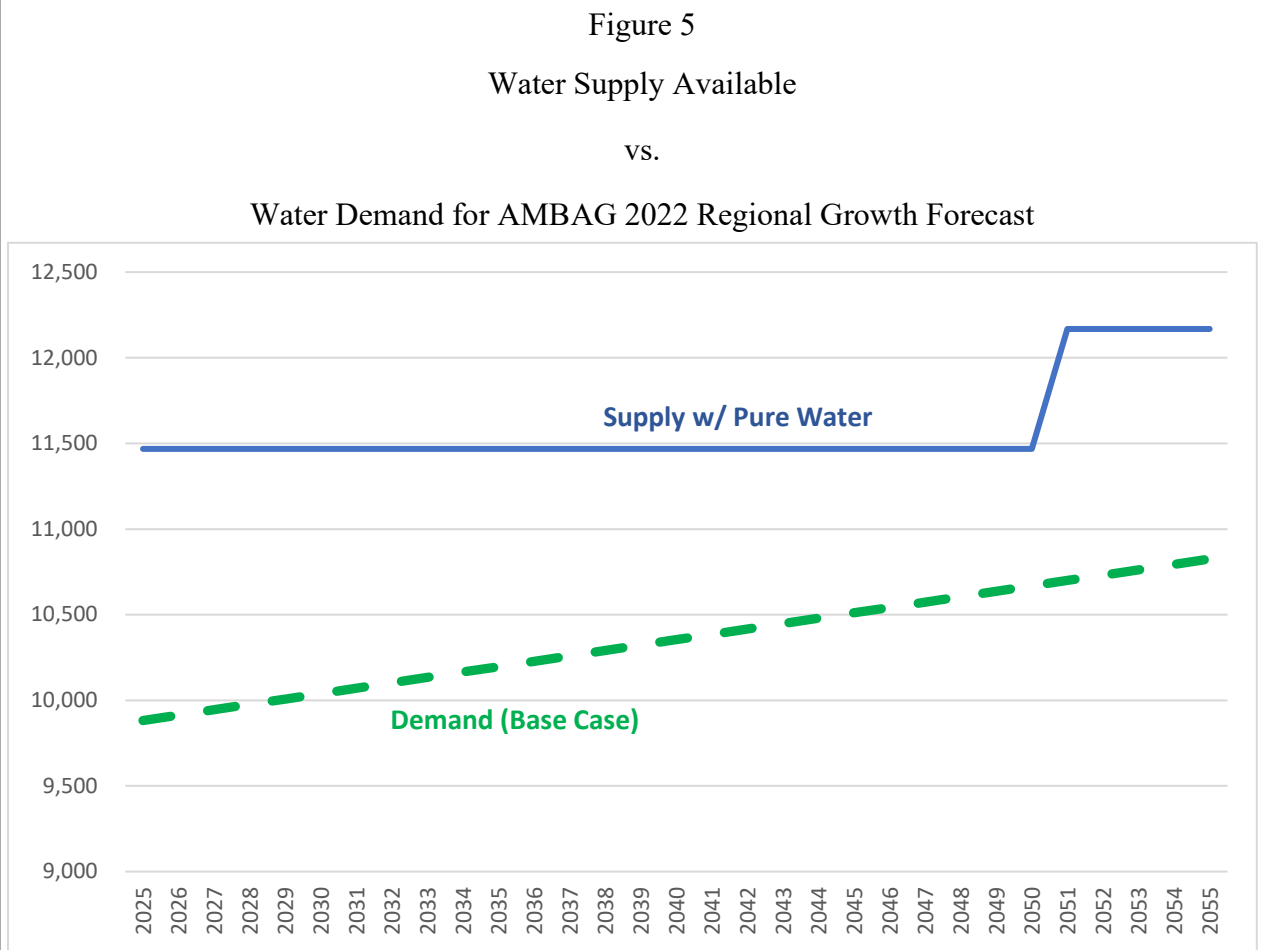
Q39:   Are available supplies sufficient to serve forecasted demands?

A39:   Yes. For more than 30 years.

Q40: What if your water demand forecast missed something and is too low?

A40: MPWMD also analyzed a demand forecast 25% higher, at 39.3 AF per year of average growth. That result is shown in Figure 6, below:

Figure 6

Water Supply Available

vs.

Water Demand for AMBAG 2022 Regional Growth Forecast

Plus 25% for Forecasting Error
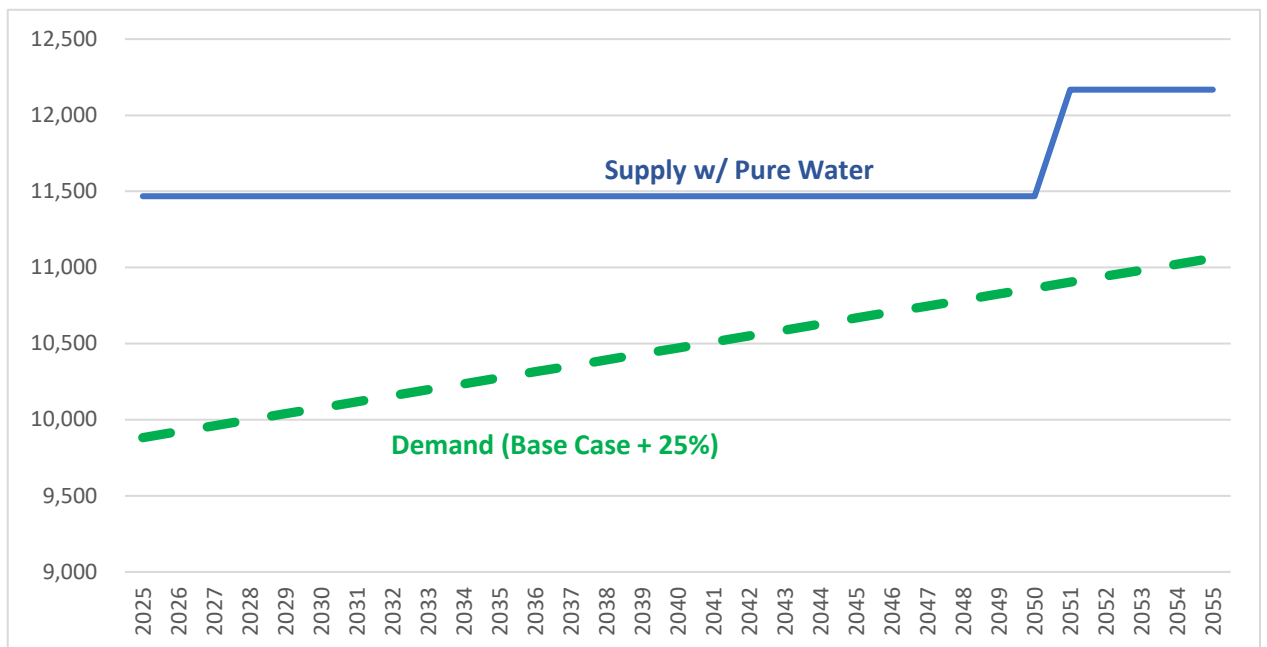
Q41: Did MPWMD test its forecast further?

A41: Yes. MPWMD also analyzed a demand forecast 50% higher, at 47.2 AF per year of average growth. At that level, available supplies (with Pure Water Monterey Expansion, without a desalination plant) exceed water demand for over 30 years. In fact, MPWMD's model shows that at 63 AF per year of average growth – 200% of or twice the water forecasted to be required for the AMBAG 2022 Regional Growth Forecast – supplies are available for over 30 years.

Q42:   Cal-Am said that one can only rely on 90% of its supply and needs a 10% contingency.[63] Is a contingency necessary?

A42:   A contingency can be achieved by having additional stored water available to call upon at any time. This can be achieved by building up available storage in the early years where supply exceeds demand. As seen in Figures 4 and 5 above, and in the last columns of Attachment Q, in the initial years following completion and availability of Pure Water Monterey Expansion (2025) the available supplies exceed demands by over 1,500 AF per year. In the very first year, more than 10% of available supplies (1,147 AF) can be stored to satisfy any contingency.

Water for available storage is shown below:

Table 9

Water Available for Storage

(With Pure Water Monterey Expansion, without Desalination)

Year	Storage Available Base Case Demand	Storage Available Base Case Demand + 25% Error		Year	Storage Available Base Case Demand	Storage Available Base Case Demand + 25% Error
2025	1,586	1,586		2041	1,083	957
2026	1,555	1,547		2042	1,052	918
2027	1,523	1,507		2043	1,020	879
2028	1,492	1,468		2044	989	839
2029	1,460	1,429		2045	957	800
2030	1,429	1,390		2046	926	761
2031	1,397	1,350		2047	894	721
2032	1,366	1,311		2048	863	682
2033	1,334	1,272		2049	831	643
2034	1,303	1,232		2050	800	604
2035	1,272	1,193		2051	1,469	1,264
2036	1,240	1,154		2052	1,437	1,225
2037	1,209	1,114		2053	1,406	1,186
2038	1,177	1,075		2054	1,374	1,146
2039	1,146	1,036		2055	1,343	1,107
2040	1,114	997		Total	38,046	34,392

[63] Phase 2 Direct Testimony of Ian C. Crooks, in A.21-11-024, July 20, 2022, p. 29 at line 17 and p. 69 at line7.

Q43: That's a lot of potential stored water. What else can stored water be used for?

A43: In addition to eliminating a need for a 10% supply contingency from bigger construction, the stored water can be used for peaking to meet maximum month demands (MMD), maximum day demand (MDD), and peak hourly demand (PHD) without building more supply projects. As I stated earlier, it is always in the ratepayer's interest to build one or two additional production wells for $3 million each, rather than a $321 million desalination plant if saved or stored water can be utilized to meet peak demands.

Stored water can also be used as a drought reserve and to provide protective water levels in the Seaside Groundwater Basin, as mentioned by Crooks[64] and Cook[65]. In fact, the average water to storage in the base case above in Table 9 is 1,268 AFY – far in excess of recommended protective water levels for the basin.[66]

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[64] Phase 2 Direct Testimony of Ian C. Crooks, in A.21-11-024, July 20, 2022, p. 31 at line 14 and p. 69 at line 9.
[65] Phase 2 Direct Testimony of Christopher Cook, in A.21-11-024, July 20, 2022, p. 3 beginning at line 7.
[66] Phase 2 Direct Testimony of Ian C. Crooks, in A.21-11-024, July 20, 2022, p. 68 at line 23, and of Christopher Cook, p. 3 at line 17.

Exhibit 3.1-B

A

Regional Growth Forecast

2022 Regional Growth Forecast

Technical Documentation

Association of Monterey Bay Area Governments
Scheduled for Adoption June 2022

2022 Regional Growth Forecast

Contents

2022 Regional Growth Forecast

List of Figures & Tables

Executive Summary

As the Metropolitan Planning Organization (MPO), the Association of Monterey Bay Area of Governments (AMBAG) carries out many planning functions for the tri-county area including development and maintenance of the regional travel demand model (RTDM), long range transportation planning and programming and acting as a regional forum for dialogue on issues facing the region. Most of AMBAG's projects are carried out in support of these major functions, including but not limited to the regional growth forecast. AMBAG develops the forecast with a horizon year that matches the planning timeline of the Metropolitan Transportation Plan (MTP) and the model years for the Regional Travel Demand Model (RTDM). In addition to informing regional planning processes, the forecast is used by local jurisdictions and special districts to inform local and subregional planning.

The last regional growth forecast was adopted in 2018. AMBAG staff began the process of developing a new forecast in spring 2019. This new forecast is referred to as the 2022 Regional Growth Forecast (2022 RGF).

In preparation for this forecast, AMBAG staff conducted a review of recently completed population, housing and employment forecasts. The results of this review indicated that most of the other MPOs in California are using a methodology that emphasizes employment growth as the primary driver of long-term population change at the regional scale. The traditional approach to forecasting population uses a cohort-component approach that considers three factors: births, deaths and migration. While birth and death data are readily available and trends are relatively predictable over time, migration tends to be much more difficult to track and forecast as it is heavily influenced by political and economic climates. For the development of the new forecast, AMBAG chose to progress towards a more contemporary approach that places a greater emphasis on employment. The assumption is that the economy is a reliable predictor of population growth.

AMBAG implemented an employment-driven forecast model for the first time in the 2014 forecast and contracted with the Population Reference Bureau (PRB) to test and apply the model again for the 2018 RGF and the 2022 RGF. To ensure the reliability of the population projections, PRB compared the employment-driven model results with results from a cohort-component forecast, a growth trend forecast, and the most recent forecast published by the California Department of Finance (DOF). All four models resulted in similar population growth trends. As a result of these reliability tests, AMBAG and PRB chose to implement the employment-driven model again for the 2022 RGF.

To disaggregate the forecast for each jurisdiction, AMBAG and PRB used the most current data available to update a series of shift-share models and replicate the methodology used in the prior forecast.

This technical document provides a description of the methodology for the development of the regional growth forecast figures in addition to the methodology for disaggregation of those figures. The regional and subregional forecast figures for population, jobs and housing were accepted by the AMBAG Board of Directors at the November 18, 2020 meeting.

Summary of the Forecast

The 2022 RGF projects that the region will add 65,500 jobs between 2015 and 2045, for a total of just over 442,800 jobs by 2045. The regional growth rate is slightly slower than nation- and state-level forecasts, reflecting historical growth rates that have tended to be slightly slower than either the state or nation. Furthermore, job growth is expected across most employment sectors. The fastest-growing industries include Site-Based Skilled Trade, Health Care and Social Assistance, and Other Services. Conversely, Retail is expected to be the slowest-growing industry. Notably, while many models for the U.S. predict declines in agricultural job growth, the AMBAG region is experiencing steady agricultural job growth.

This forecast projects that the region's population will grow by approximately 107,500 people between 2015 and 2045, for a total population of just under 869,800 in 2045. This is slightly lower than prior forecasts and follows the slowing growth rates seen at both the state and national level. This revised growth trend also reflects the most current population estimate for the region. As a result of declining fertility, stalled improvements in life expectancy, and falling international migration, the 2020 population estimate was more than 16,000 lower than prior forecasts predicted. In addition to slower growth, the new forecast predicts an older age distribution, with a larger proportion of the population age 65 and older.

An aging population affects the household and housing unit forecasts. While population growth will slow, which reduces future housing demand, older people are more likely to live alone or in small households. This shift offsets the lower population forecast with a slight upward effect on housing demand. The net result is that the region is expected to build just over 42,200 housing units by 2045, for a total of approximately 304,900 units.

Section 1: Process for Forecast Completion

Following the preparation of the regional forecast figures, AMBAG staff began the process of disaggregating the figures to each of the jurisdictions using historical data to develop a baseline disaggregated forecast. The initial results were a purely quantitative application of the methodology. These preliminary draft disaggregated numbers were presented for discussion purposes at one-on-one meetings held by AMBAG staff with each of the jurisdictions, the Local Agency Formation Commissions,

the Fort Ord Reuse Authority, the University of California, Santa Cruz and the California State University, Monterey Bay. AMBAG staff also provided materials for these meetings that outlining the data sources and methodology for the regional forecast figures as well as the preliminary draft disaggregated forecast figures. The intent of the first round of meetings was to gather information and data that was then used to make adjustments to the forecast. (See Attachment 1 for a list of meeting dates, times and attendees.)

These preliminary draft disaggregated numbers were adjusted based on information and feedback provided by each jurisdiction. In addition, new data became available. The release of vintage 2020 estimates from the California Department of Finance showed 2019 population approximately 7,000 lower than in the preliminary estimate, although housing estimates were relatively stable. These updates necessitated minor revisions to the regional forecast.

Staff updated the regional growth forecast to reflect the most current information. The entire revised forecast, regional and subregional, was re-circulated for a second round of comments. After the second round of comments were received, AMBAG staff incorporated additional input and prepared a revised draft of the disaggregated forecast figures. Staff circulated the revised population, employment and housing forecast which incorporated additional comments from the Board of Directors. The final draft was accepted for planning purposes only by the AMBAG Board of Directors at its meeting on November 18, 2020. The final growth forecast is scheduled for adoption along with the 2045 Metropolitan Transportation Plan/Sustainable Communities in June 2022.

Section 2: Development of the Regional Growth Forecast

In spring 2019, AMBAG asked PRB to prepare regional employment, population and housing projections to 2045. This section documents the findings of the work by PRB and includes a summary of the methodology, a description of the projections and an explanation of past, current and projected job growth in the region.

Summary of the 2022 Regional Growth Forecast

The 2022 RGF projects that the region will add 65,500 jobs between 2015 and 2045, for a total of just over 442,800 jobs by 2045. (See Table 1) The regional growth rate is similar to national forecasts but slightly slower than state-level forecasts. Furthermore, job growth is expected across most employment sectors. The fastest-growing industries include Site-Based Skilled Trade, Health Care and Social Assistance, and Other Services. Conversely, Retail is expected to be the slowest-growing industry. Notably, while many models for the U.S. predict declines in agricultural job growth, the AMBAG region is experiencing steady agricultural job growth.

2022 Regional Growth Forecast

This forecast projects that the region's population will grow by approximately 107,500 people between 2015 and 2045, for a total population of just under 869,800 in 2045. (See Table 1) This is slightly lower than prior forecasts and follows the slowing growth rates seen at both the state and national level. This revised growth trend also reflects the most current population estimate for the region. Despite an upward revision to the estimate, the revised DOF population estimate for 2015 was more than 3,000 lower than prior forecasts predicted. As such, an adjustment was made in this forecast of population growth to account for the sharp fall in fertility rates and international migration that occurred during the recession years that have not fully rebounded. In addition to slower growth, the new forecast predicts an older age distribution, with a larger proportion of the population age 65 and older.

An aging population affects the household and housing unit forecasts. While population growth will slow, which reduces future housing demand, older people are more likely to live alone or in small households. This shift offsets the lower population forecast with a slight upward effect on housing demand. The net result is that the region is expected to build just over 42,200 housing units by 2045, for a total of approximately 304,900 units. (See Table 1)

Table 1: Forecast Summary

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045
Population	710,598	719,561	732,708	762,241	774,729	800,726	824,992	842,189	857,828	869,776
Change		8,963	13,147	29,533	12,488	25,997	24,266	17,197	15,639	11,948
% Change		1%	2%	4%	2%	3%	3%	2%	2%	1%
Households	228,260	234,869	236,059	238,862	243,863	253,106	262,493	269,175	273,462	276,730
Change		6,609	1,190	2,803	5,001	9,243	9,387	6,682	4,287	3,268
% Change		3%	1%	1%	2%	4%	4%	3%	2%	1%
Housing	247,080	256,467	260,256	262,660	267,812	277,645	288,386	296,352	301,307	304,900
Change		9,387	3,789	2,404	5,152	9,833	10,741	7,966	4,955	3,593
% Change		4%	1%	1%	2%	4%	4%	3%	2%	1%
Jobs				377,335	406,280	410,017	418,132	425,845	434,147	442,824
Change				25,600	28,945	3,737	8,115	7,713	8,302	8,677
% Change					8%	1%	2%	2%	2%	2%

Sources: Jobs data for 2000-2015 are from California Employment Development Department and InfoUSA; population, household, and housing data for years 2000-2020 are from the U.S. Census Bureau and the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Regional Growth Forecast Methodology

As shown in the flow chart below, the forecast uses a model that predicts employment growth using a shift-share model based on local data as well as state and national trends. Population growth is then driven by employment growth. Household and housing growth are driven by population growth, demographic factors and external factors (explained below). This approach was vetted and approved by the AMBAG Board of Directors in 2014 for use in the metropolitan transportation plan, Moving Forward 2035 Monterey Bay. While the methodology for the 2022 RGF remains the same, the models

2022 Regional Growth Forecast

have been updated to include current data, a revised base year of 2015 and a new horizon year of 2040.

Figure 1: Regional Growth Forecast Process

Local job growth by industry is driven by projected state and national trends	Job growth trends influence population growth	Demographic and external factors influence group quarters and household population	Demographic factors influence household formation rates	Vacancy rates and number of households influence housing growth

Employment → Population → Group Quarters / Household Population → Households → Housing Units

1. <u>Employment</u>: Employment is measured as the number of jobs by place of work. Employment growth by industry is driven by projected national and statewide trends for all industries in the region using a shift-share model.

2. <u>Population</u>: Population is the total resident population of the region.
   Job growth trends influence population growth. The forecast of total population is based on historical trends in the ratio of population to employment in the AMBAG region.
   Projections of demographic characteristics (i.e., population by age, sex, and race/ethnicity) in the 2022 RGF relied on a proportional approach based on demographic projections from the California Department of Finance (DOF).

3. <u>Household Population and Group Quarters</u>: Household population is the population that lives in a housing unit. Group quarters population is the population that lives in a group living arrangement such as a dorm, barracks, correctional institution, or congregate care facility. Demographic factors (e.g., age, sex, race/ethnicity) and external factors (e.g., major group quarters facilities like colleges and universities, correctional facilities, etc.) influence the household population and group quarters population.

4. <u>Households/Occupied Housing Units:</u> A household is a person, or group of people, living in a house. Because a household, by definition, occupies a housing unit, households are equivalent to and synonymous with occupied housing units.
   Household projections are driven by household formation rates. Household formation rates are calculated as the ratio of households divided by the household population. Household formation rates are the inverse of average household size.

5. <u>Housing Units</u>: Housing is the total number of housing units, including both occupied and vacant structures. Housing includes primary residences, second homes, accessory dwelling

units, vacation rentals, farmworker housing, and any other habitable structure—including unauthorized units. The only type of dwelling excluded from the housing inventory is group quarters (dorms, barracks, congregate care, etc.).

Housing projections are driven by the household population projection, demographic characteristics of the household population (age, sex, race/ethnicity), household formation rates, and housing vacancy rates. Vacancy rates are calculated as the share of all units (including vacation rentals, unauthorized dwellings, etc.) that are not currently occupied.

Data sources include the California Department of Finance, California Employment Development Department, the U.S. Bureau of Labor Statistics and the U.S. Census Bureau.

For more information on the definitions of housing and group quarters, see Attachment 4.

Step 1: Employment

The AMBAG region is projected to add 65,500 jobs between 2015 and 2045, for a total of just over 442,800 jobs by 2045. The 2015 base year data were re-benchmarked to reflect revisions to county totals published by the California Employment Development Department, as well as an employer database from InfoUSA, and extensive ground-truthing conducted by AMBAG staff. (See Table 2 and Figure 2.) Employment grew faster in the 2015-2020 time period than had been anticipated in the 2018 RGF, but is expected to return to a slow-growth trend.

2022 Regional Growth Forecast

Table 2: Forecast Comparison of Employment

Forecast	2010	2015*	2020	2025	2030	2035	2040	2045
2018 RGF	308,300	337,600	351,800	363,300	374,100	384,800	395,000	N.A.
% Change		10%	4%	3%	3%	3%	3%	N.A.
2022 RGF		377,335	406,280	410,017	418,132	425,845	434,147	442,824
% Change			8%	1%	2%	2%	2%	2%

*Sources: Data for years 2010 and 2015 are from the California Employment Development Department. *In the 2022 RGF, data for 2015 were re-benchmarked using updated estimates from the California Employment Development Department, an employer database InfoUSA, and extensive ground-truthing. Forecast years were prepared by AMBAG and PRB.*

Figure 2: AMBAG Region Employment Forecast
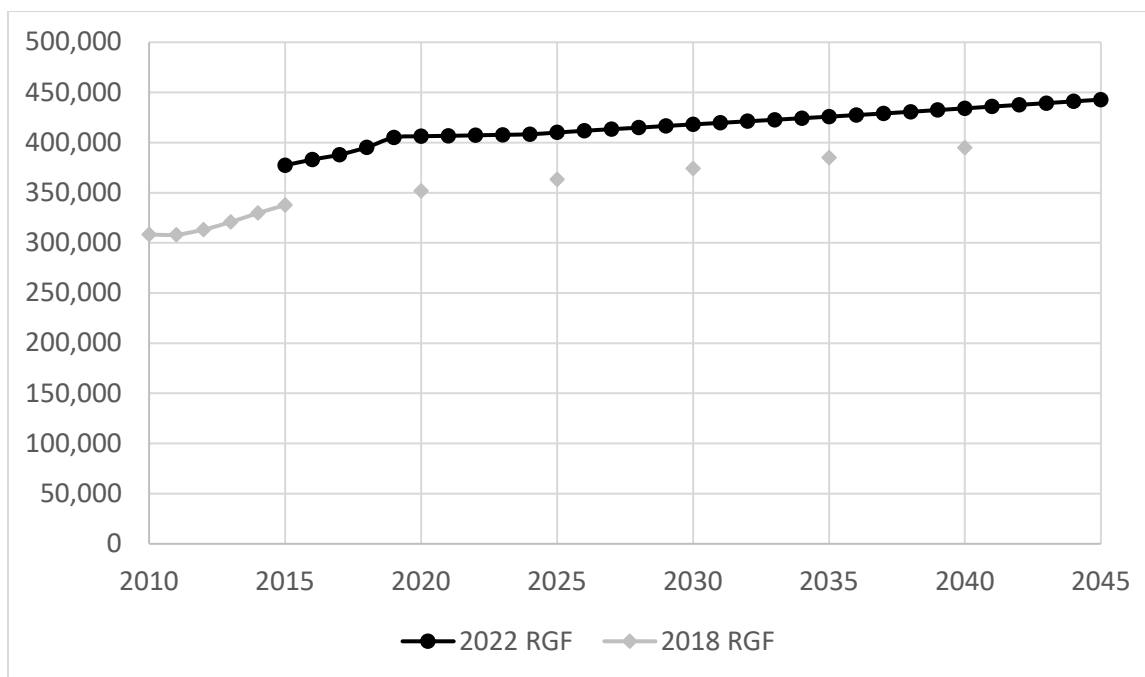
Sources: Data for years 2010-2014 are from the California Employment Development Department. In the 2022 RGF, data for 2015 were re-benchmarked using updated estimates from the California Employment Development Department, an employer database InfoUSA, and extensive ground-truthing. Forecast years were prepared by AMBAG and PRB.

Job projections to 2045 were developed for each major NAICS industry category by projecting the AMBAG region share of state job growth based on the analysis of trends in the period from 2005 to 2019. The NAICS industries were then grouped into major industry sectors for the transportation model. Industry categories are described in Attachment 2.

The AMBAG region experienced job growth slower than the state, and similar to the nation between 2000 and 2019. (See Figure 3.) The region is projected to experience job growth at a slightly slower rate than the state and nation. The primary reason for this below-average job growth is the region's below-

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average concentration in fast-growing sectors such as information and professional services. The region also has a below-average exposure to growth in foreign trade.

Figure 3: Employment Change
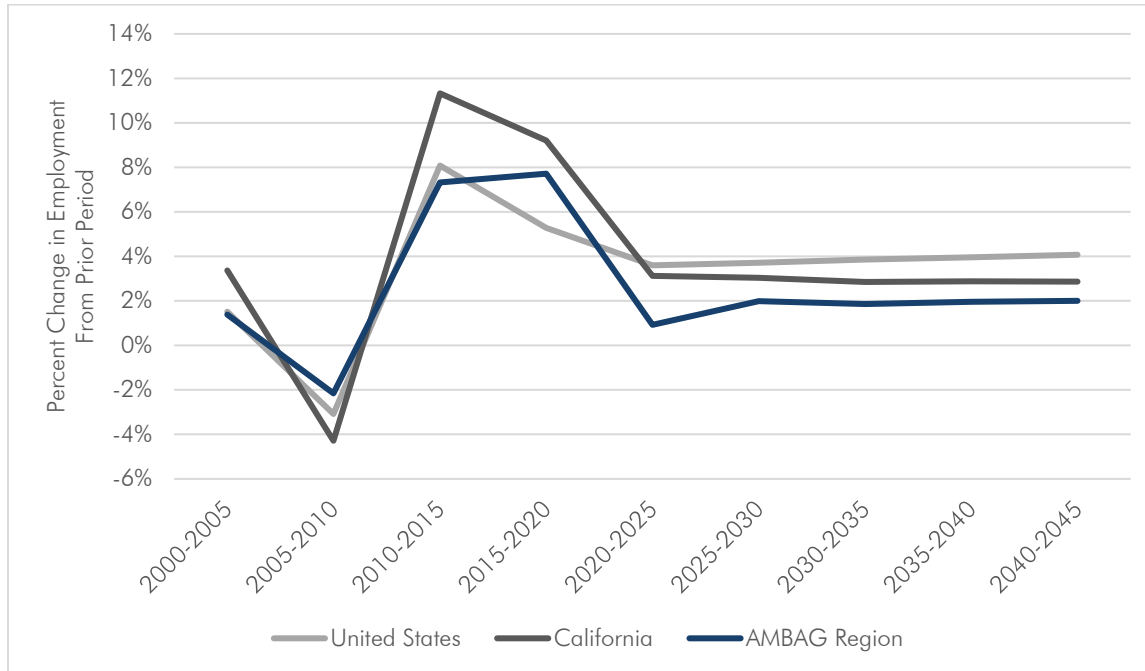
Sources: Data for years 2000-2015 from the U.S. Bureau of Labor Statistics and California Employment Development Department. Forecast years were prepared by AMBAG and PRB with input from U.S. Bureau of Labor Statistics, Employment by Major Industry Sector: 2014-2024; California Department of Transportation, California County-Level Economic Forecast 2014-2040, September 2014; and from the California Employment Development Department, Industry Employment Projections.

Positive growth factors include above-average performance relative to state trends in tourism and agriculture. Agriculture has shown strong growth for several years, and new crops such as cannabis as well as new investments in processing facilities, portend that the industry will continue to grow. However, any job growth due to new crops may be mitigated by losses due to increased mechanization in agriculture and agricultural processing.

Method for Producing the Employment Forecast

The AMBAG region job projections were developed using three guiding principles:

1. The AMBAG region projections were based on projections of job growth in the nation and state. The national and state projections provide the **pool of job opportunities** and the AMBAG region projections reflect historical trends in the **share** of national and state job growth that will locate in the AMBAG region.

2022 Regional Growth Forecast

2. The AMBAG region **share** of national and state job growth is determined by the industry composition of job growth and the projected share of job growth locating in the AMBAG region. If national and state job growth is concentrated in sectors where the AMBAG region has a competitive advantage, the region's projected job growth will be higher than if national and state job growth is concentrated in sectors where the region has a below-average share of jobs and a relatively poor competitive position.

3. The analysis of competitive advantage is focused on sectors in the AMBAG region **economic base.** The region's economic base consists of those sectors that sell a high proportion of goods and services to customers outside the region. They export goods and services to customers in world and national markets and markets throughout California. Key examples of economic base sectors in the AMBAG region are agriculture a]nd tourism. The UC Santa Cruz campus and state prison are also examples of activities that do not primarily serve local residents.

U.S. and California Job Growth to 2045

The starting point for the AMBAG projections is an examination of future U.S. and California job growth for total jobs and major industry sectors. The U.S. job growth projections are based on the most recent forecast from the U.S. Bureau of Labor Statistics and an extrapolation of growth trends to 2045. California job growth projections are based on an industry-level forecast published by the California Department of Transportation, as well as data from the California Employment Development Department and PRB.

The California industry projections identify the structure of job growth as an input to AMBAG region job projections. The resulting projections of job growth are shown below.

The nation is expected to add 41 million jobs between 2015 and 2045 for an increase of 27 percent. Growth, nationwide, is expected to be fairly constant throughout the forecast period. The state of California is projected to experience job growth that is slightly faster than the nation's job growth in the early years of the forecast and to slow down to a rate more similar to the national growth rate by 2045.

The state is projected to see a 26 percent increase in total jobs between 2015 and 2045. The pattern of California industry job growth is shown below and was used in developing AMBAG region job projections. (See Table 3)

2022 Regional Growth Forecast

Table 3: California Jobs by Major Industry (000s)

	2010	2015	2020	2045	Avg. Annual Growth Rate		
					2010-2015	2015-2020	2015-2045
Agriculture	382.8	422.3	426.8	433.1	2.0%	0.2%	0.5%
Mining	24.6	26.4	22.8	23.8	1.4%	-2.9%	-2.1%
Construction	560.0	732.1	892.9	996.2	5.5%	4.1%	6.4%
Manufacturing	1,247.9	1,303.0	1,340.4	1,439.2	0.9%	0.6%	2.0%
Wholesale	629.7	691.0	699.2	789.8	1.9%	0.2%	2.7%
Retail	1,516.5	1,660.1	1,683.3	1,812.5	1.8%	0.3%	1.8%
Transp., Warehousing, Utilities	466.9	557.8	682.2	717.9	3.6%	4.1%	5.2%
Information	428.4	488.6	562.0	714.0	2.7%	2.8%	7.9%
Financial Serv.	758.8	800.8	840.1	1,096.7	1.1%	1.0%	6.5%
Prof. & Business Serv.	1,224.1	1,431.6	1,591.7	1,861.8	3.2%	2.1%	5.4%
Educ. & Health Serv.	2,993.9	3,526.1	3,988.6	4,792.4	3.3%	2.5%	6.3%
Leisure & Hospitality	1,500.8	1,828.3	2,056.8	2,348.2	4.0%	2.4%	5.1%
Other services (excl. gov't)	483.6	543.6	583.3	797.4	2.4%	1.4%	8.0%
Government	2,448.4	2,463.0	2,636.6	2,959.3	0.1%	1.4%	3.7%
Self Employed	1,192.6	1,180.9	1,275.7	1,519.6	-0.2%	1.6%	5.2%
Total Jobs	**15,859.0**	**17,655.6**	**19,282.4**	**22,301.7**	**2.2%**	**1.8%**	**4.8%**

Sources: Data for years 2005, 2010 and 2015 from the Employment Development Department. Forecast years were prepared by PRB with input from California Department of Transportation, California County-Level Economic Forecast 2018-2050, September 2019 and from the California Employment Development Department, California Industry Employment Projections.

The projections show substantial differences in the expected growth rate among industries between 2015 and 2045 and these differences tell a story about where job growth is expected and where job levels will remain flat or decline. These differences directly influenced the AMBAG region job projections described below.

It is important to note that the statewide projections listed above were completed before the start of the coronavirus pandemic. The net result is unknown at this time, and projections will be updated as new information becomes available. AMBAG will begin the next update to the Regional Growth Forecast will begin in 2023.

2022 Regional Growth Forecast

The AMBAG Region Economy and Job Growth

The previous section provided an overview of the current trends in the California economy. As previously noted the AMBAG region's job projections are based on an analysis of the regional economy and its relationship to the growth forecasted for California. The national and state projections provide the **pool of job opportunities** and the AMBAG region forecast reflects judgments about the **share** of national and state job growth that will locate in the AMBAG region. What follows is a description of the current structure of the regional economy as well as the resulting job projections based on the region's share of industries.

The database used for analysis and projections consists of annual industry employment data from 1990 through 2019, from the California Employment Development Department. for each of the three counties in the region and added together to produce an AMBAG region jobs database.

In addition to the historical time-series, AMBAG re-benchmarked the 2015 employment data to more accurately reflect local employment, and grouped the data to eleven categories for modeling purposes. This process is described in more detail in the "Sub-County Employment Database and Re-benchmarking" section, below. Industry definitions are included in Attachment 2.

The largest sectors are Other Services (including hotels, restaurants, and personal services), Health Care and Social Assistance, and Retail. (See Figure 4.)

Figure 4: Jobs by Industry Sector in 2015, AMBAG Region
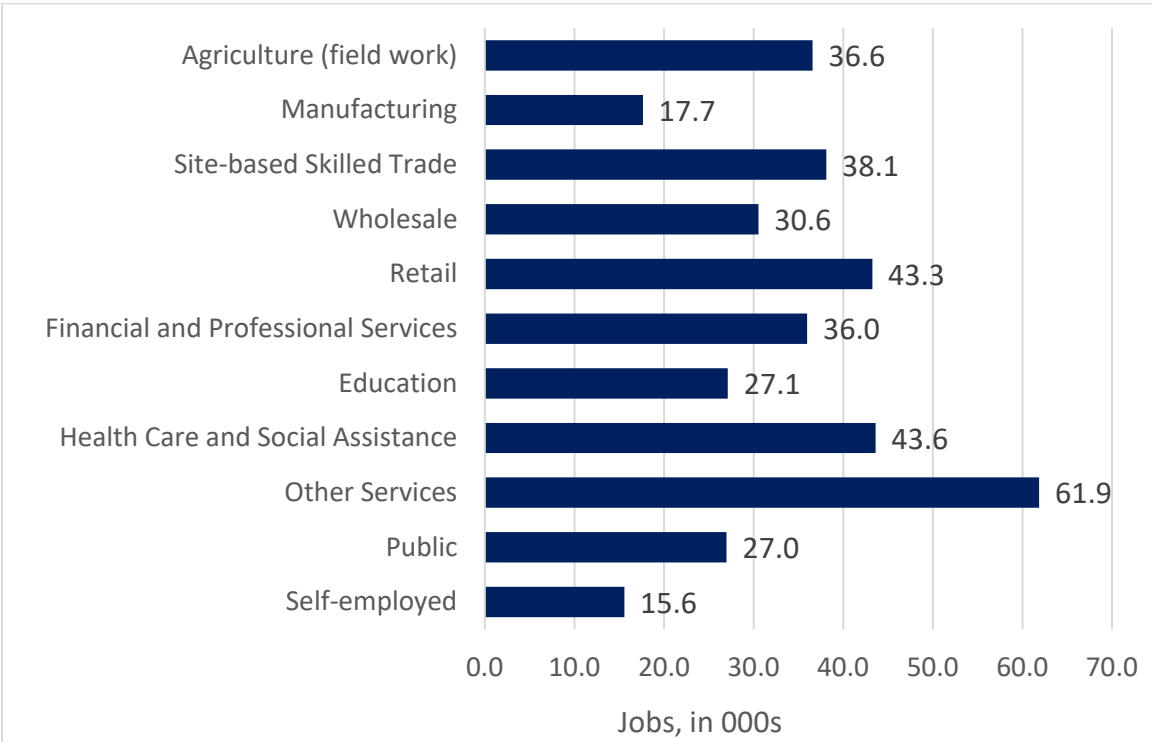
2022 Regional Growth Forecast

Sources: Data from the California Employment Development Department, InfoUSA, and AMBAG.

The AMBAG regional economy has an industry structure that is quite different in some ways than the statewide structure or the industry structure in regions like Southern California or the San Francisco Bay Area. One difference is the large share of jobs in Agriculture. Nineteen percent of total jobs in the AMBAG region are in Agriculture compared to just over two percent statewide. Other sectors with above average shares in the region include Public, Other Services, and Self Employed. Conversely, the AMBAG region has a below average share of jobs in the fast-growing, high wage Financial and Professional Services sectors.

AMBAG Region Forecast Job Trends, by Industry

The AMBAG region is expected to have moderate job growth between 2015 and 2040.

Table 4: AMBAG Region Jobs by Major Industry (000s)

	2015	2020	2025	2030	2035	2040	2045	Avg. Annual Growth Rate 2015-2020	2015-2045
Agriculture	36,600	40,100	40,100	40,200	40,300	40,500	40,600	1.8%	0.3%
Manufacturing	17,700	19,700	19,800	19,900	20,000	20,100	20,200	2.2%	0.3%
Site-based Skilled Trade	38,100	42,900	43,700	44,900	45,600	46,600	47,700	2.4%	0.6%
Wholesale	30,600	33,300	32,800	33,200	33,500	33,800	34,100	1.7%	0.3%
Retail	43,300	42,100	42,200	42,500	43,000	43,500	44,000	-0.6%	0.0%
Financial and Professional Services	36,000	37,100	37,400	38,500	39,600	40,800	41,900	0.6%	0.4%
Education	27,100	29,900	30,100	30,700	31,400	32,200	33,100	2.0%	0.5%
Healthcare and Social Assistance	43,600	47,400	48,900	50,200	51,500	52,900	54,400	1.7%	0.6%
Other Services	61,900	68,500	69,100	71,200	73,200	75,200	77,300	2.0%	0.6%
Public	27,000	29,700	29,800	30,200	30,700	31,200	31,900	1.9%	0.4%
Self-employed	15,600	15,700	16,200	16,600	16,900	17,300	17,700	0.1%	0.3%
Total	377,300	406,300	410,000	418,100	425,800	434,100	442,800	1.5%	0.4%

Sources: Data for years 2015 from the California Employment Development Department, InfoUSA, and AMBAG. Forecast years were prepared by AMBAG and PRB.

Note: Parts may not sum to total due to independent rounding.

The industry-level trends in the AMBAG Region are as follows:

- Agricultural job growth has been strong for the past 10 years, and while the rate of growth is expected to slow, the region's agricultural industry will still grow faster than state or national projections.
- The region lost Manufacturing jobs during the recession, but recent years have seen a turnaround. Growth is expected to be slow but steady in future years.

2022 Regional Growth Forecast

- Site-based Skilled Trade (which includes construction) saw steep job losses during the recession and a bounce-back through 2019. Future growth is expected to be moderate.
- The Wholesale and Retail sectors both lost jobs in recession years, and retail has continued to decline. Growth is expected to remain low through the forecast.
- Financial and Professional Services is expected to grow at a moderate rate.
- Education has grown rapidly in recent years, but growth will likely slow as population growth slows.
- Healthcare and Social Assistance has seen steady growth, even in recession years. This is expected to continue as the population ages and demand for health services increases.
- Other Services (including hotels, restaurants, and personal services) lost jobs in the AMBAG region during the recession, but growth rebounded between 2010 and 2015. Growth is expected to be moderate in the future.
- The Public sector, locally, lost jobs between 2008 and 2013 as a result of the recession. Those losses began to reverse in 2014, and the sector is expected to see modest growth in the future.
- Self-employment tends to be counter-cyclical as people who lose their wage-and-salary job during a recession may turn to self-employment. Growth forecasts are based primarily on population growth.

Step 2: Population

The region is projected to add approximately 107,500 people between 2015 and 2045, for an increase of 14 percent. The 2045 projected regional population of 869,776 is lower than the 883,300 residents projected for year 2040 in the 2018 RGF. (See Table 5 and Figure 6) This lower population forecast reflects slower growth than anticipated since the 2010 Census due to record low birth rates, stalled improvements in life expectancy, and lower migration rates. This slower growth in population is possible, despite faster growth in employment, due to changing unemployment and labor force participation rates.

Table 5: Comparison of Forecasts for Population

Forecast	2010	2015	2020	2025	2030	2035	2040	2045
2018 RGF	732,708	762,676	791,600	816,900	840,100	862,200	883,300	N.A.
% Change		4%	4%	3%	3%	3%	2%	N.A.
2022 RGF	732,708	762,241	774,729	800,726	824,992	842,189	857,828	869,776
% Change		4%	2%	3%	3%	2%	2%	1%

Sources: Data for years 2010-2020 are from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

2022 Regional Growth Forecast

Figure 5: AMBAG Region Population Forecast
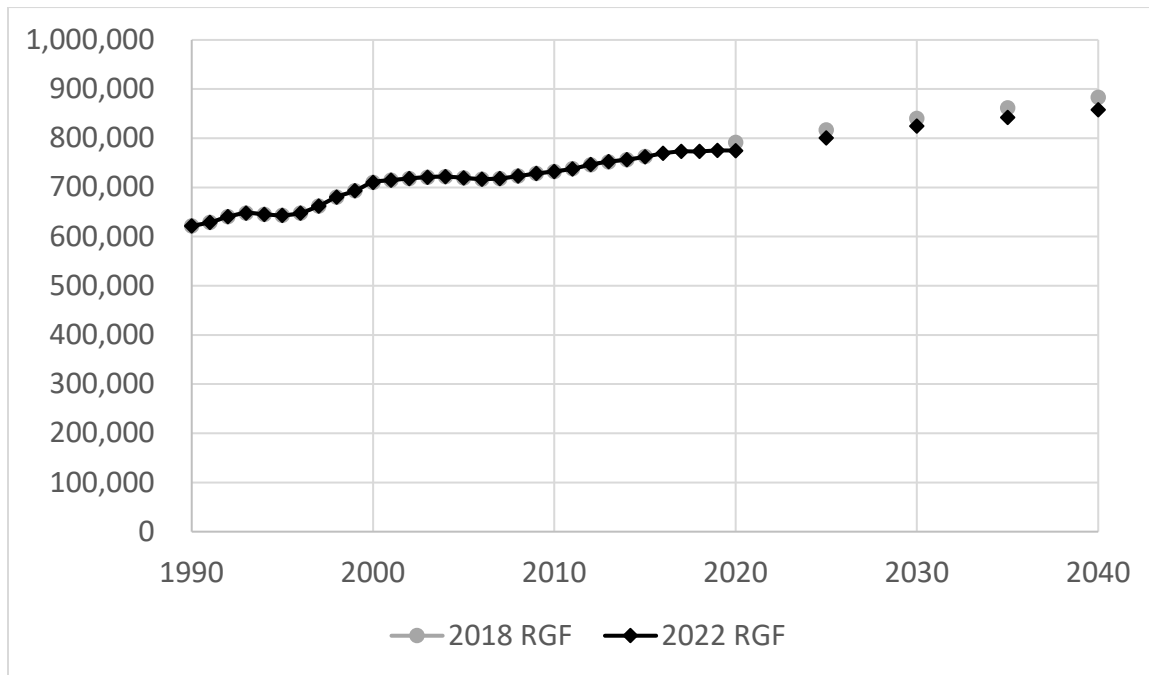
Sources: Data for years 1990-2020 are from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Despite the lower population forecast, it is expected that AMBAG will continue to see population and housing growth associated with job growth outside of the region. In particular, job growth in Silicon Valley, combined with high housing prices, is expected to lead to an increase in the number of commuters to Bay Area jobs that live in the AMBAG region.

Method for Producing the Population Forecast

In preparing for this forecast, PRB tested a variety of methods for the population forecast, each of which produced similar results. (Findings are summarized in Attachment 3.) As a result of this review, PRB and AMBAG staff determined that the employment-driven population growth forecast model used in the 2014 RGF was suitable for the 2018 RGF.

Benchmark Population

All population projections are benchmarked to the 2010 Census counts which include people whose primary residence on "Census Day" (April 1, 2010) is within the region, regardless of citizenship status. It is recognized that the AMBAG region is home to a sizeable seasonal population (seasonal workers, who often work in agricultural occupations, and their families). Seasonal worker populations have

historically been found to be "hard to count" (HTC) in official statistics.[1] In an encouraging development, the 2010 Census was more effective than prior decennial census efforts in reaching, and enumerating, HTC areas. Specifically, "Census 2010 coverage of households in the HTC tracts in the San Joaquin Valley and Central Coast counties… was significantly improved from previous decennials," but some undercount remained a problem.[2]

The timing of data collection has also historically been a challenge for counting seasonal workers in the AMBAG region. Migratory workers are counted based on their location on Census Day. If the agricultural work cycle is in a lull in March and April, but ramps up at other times of the year, the worker population may be lower on Census Day than it is at other times of the year. However, it has been observed through informal surveys (i.e., for the AMBAG Regional Agricultural Vanpool Feasibility Study) that the seasonal population in the AMBAG region has been moving towards a trend of year-round residence, particularly with regard to agricultural jobs.

Given these two trends – better enumeration of HTC populations and a trend toward year-round residence – the seasonal population is increasingly likely to be counted in the decennial Census and in California Department of Finance demographic estimates. That said, seasonal workers who were not present on Census Day would not have been counted in the AMBAG region, and undercount remains a problem for seasonal populations, nationwide. Thus, to the extent that seasonal workers are present and counted in official statistics, they are also included in this forecast.

The AMBAG region population projections were benchmarked against prior decennial Census and employment data, and derived by anticipating that the regional population to job ratio will move in line with the statewide trend as it has in the past.

U.S., California and AMBAG Region Demographic and Economic Trends to 2045
The AMBAG region has an above-average share of residents who live in group quarters and are not tied to the regional job market. This trend has continued since 1990 although the mix of group quarters residents has changed. (See Figures 6 and 7.) Changes in group quarters population, such as growth at the region's universities, will play a role in regional growth through 2045.

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[1] U.S. General Accounting Office. "Key Efforts to Include Hard-to-Count Populations Went Generally as Planned; Improvements Could Make the Efforts More Effective for Next Census" (December 2010), accessed at http://www.gao.gov/new.items/d1145.pdf on October 4, 2016.
[2] California Rural Legal Assistance, Inc. "2010 Census Enumeration of Immigrant Communities in Rural California: Dramatic Improvements but Challenges Remain" (November 2010), accessed at http://www.crla.org/sites/all/files/content/uploads/Census/Census10-JBS-CRLA.pdf on October 4, 2016.

2022 Regional Growth Forecast

Figure 6: Group Quarters as a Percent of Population
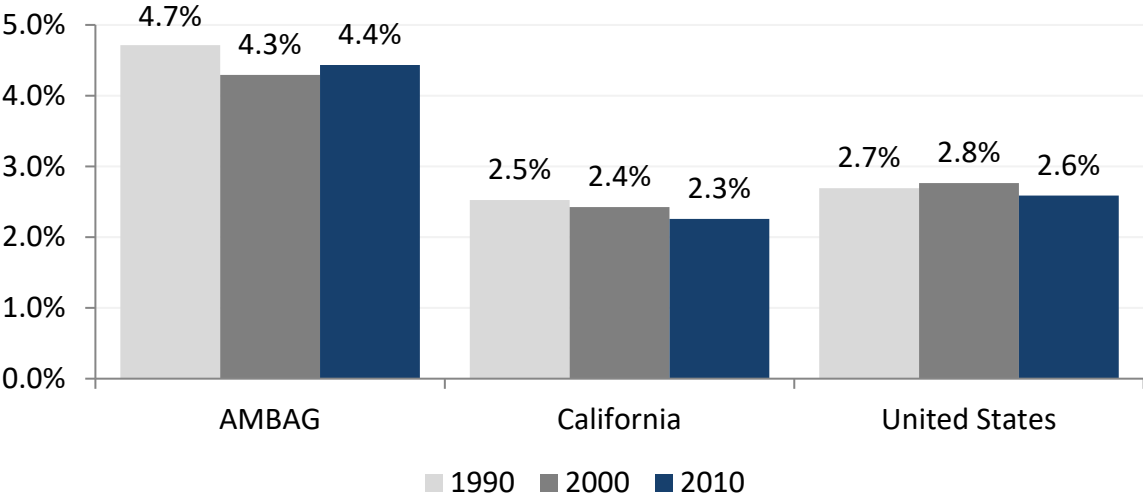
Sources: U.S. Census Bureau, California Department of Finance

In 1990 there was a substantial military group quarters presence around the Fort Ord base. Since then the military population has declined due to the closure of the base, but that group quarters population has been offset by an increase at colleges (primarily UC Santa Cruz and CSU Monterey Bay) and an increase in the state prison population. In future years it will be important to continue watching the development and growth of military institutions in the region. There is still a strong military and naval presence in Monterey County including the Presidio area as well as Fort Hunter Liggett in the southern portion of the County.[3]

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[3] While Fort Hunter Liggett has a small permanent population, they are a large training facility and host a substantial amount of trainees every year. Not only will it be important to follow the FHL plans for expansion from a population perspective, but it will also be important to consider the presence of the FHL in transportation planning given the Fort's heavy reliance on Highway 101.

Figure 7: AMBAG Group Quarters Population in 2010
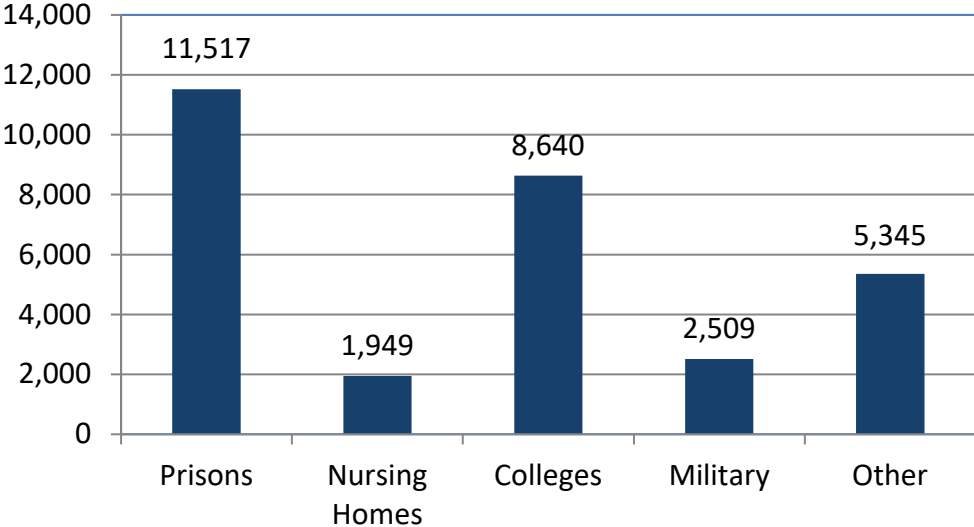
Source: U.S. Census Bureau, Census 2010

The AMBAG region, the state, and the nation all have about 2 residents per job, and that is expected to continue to 2045.

AMBAG residents commute to jobs outside the region, principally to jobs in Santa Clara County. This net out-commuting means there are residents in the region not connected to AMBAG region job growth. Net out-commuting surged between 1990 and 2000 as the "dot.com boom" pushed Silicon Valley (Santa Clara County) job levels higher, and has continued to rise as people to search for cheaper housing in portions of the AMBAG region. (See Figure 8.)

Figure 8: Net Out-Commuting from AMBAG Region
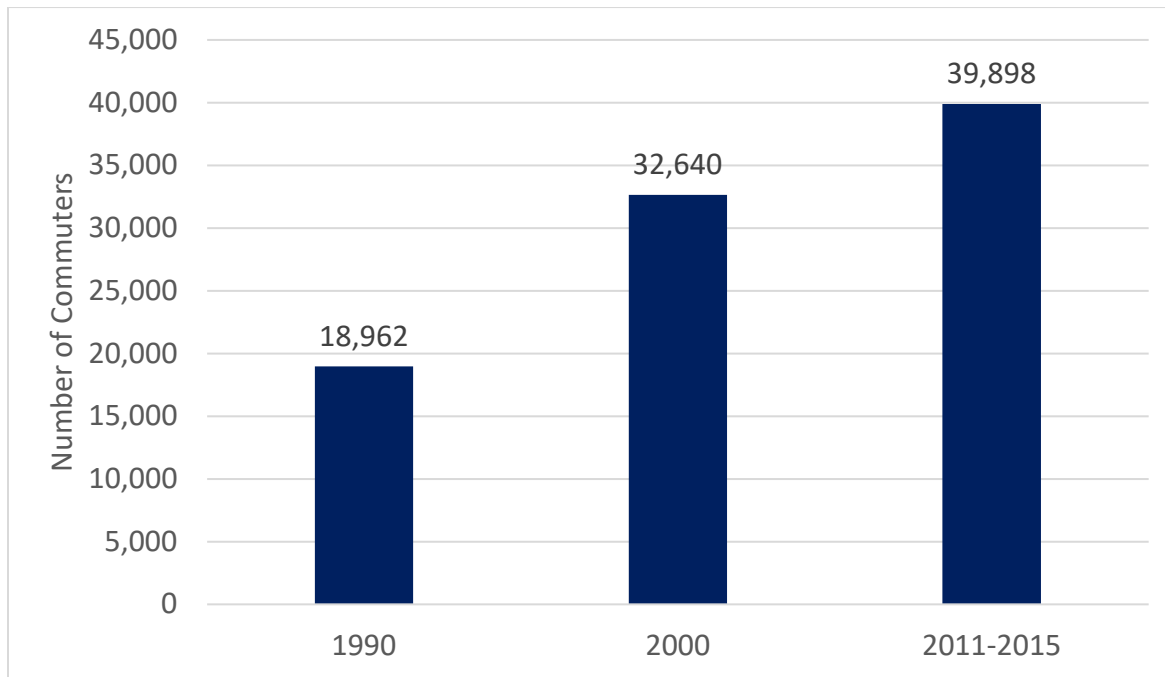
Sources: 1990 & 2000 - Census Journey to Work and 2011-2015 - American Community Survey Special Tabulations for the Census Transportation Planning Package.

AMBAG Region Forecast Population Trends

As described above (see Table 5), the region is projected to add approximately 2,700 residents per year between 2015 and 2045. This is less than the average of just under 8,900 between 1990 and 2000 and above the recession-affected growth of 2,200 between 2000 and 2010. Recent growth from 2015-2020 has averaged 2,500 per year, close to the projected long-term growth rate.

Step 3: Housing and Households

The region is projected to add approximately 42,200 housing units by 2045, for a total of approximately 304,900 for an increase of 16 percent. The 2045 projected regional housing stock of 304,900 is slightly higher than the 305,293 housing units projected for year 2040 in the 2018 RGF, reflecting slower population growth.

Table 6: Comparison of Forecasts for Housing

Forecast	2010	2015	2020	2025	2030	2035	2040	2045
2018 RGF	261,394	262,660	273,606	282,368	290,225	297,851	305,293	N.A.
% Change		0%	4%	3%	3%	3%	2%	N.A.
2022 RGF	260,256	262,660	267,812	277,645	288,386	296,352	301,307	304,900
% Change		1%	2%	4%	4%	3%	2%	1%

2022 Regional Growth Forecast

Sources: Data for years 2010-2020 are from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Figure 9: AMBAG Region Housing Forecast
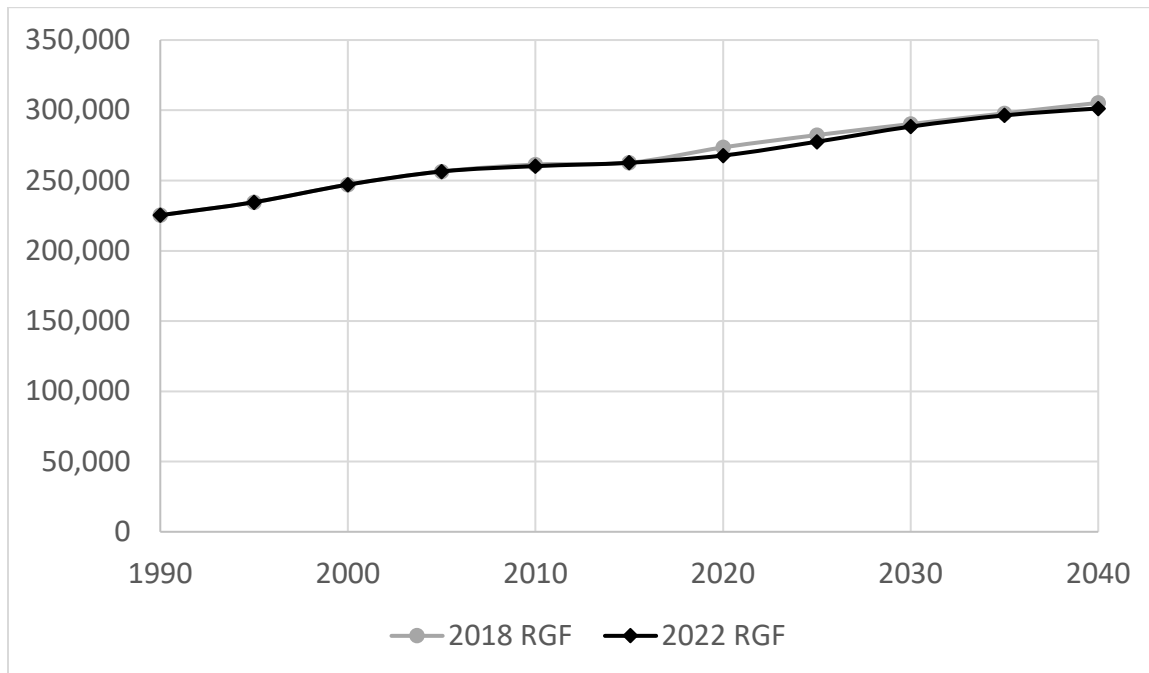
Sources: Data for 1990-2020 from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Method for Producing the Housing Forecast

The housing forecast begins with a household forecast, and the household forecast is driven by demographic factors such as the size and structure of the population. Demographic factors (e.g., gender, age, and race/ethnicity) and external factors (e.g., major group quarters facilities like colleges and universities, correctional facilities, etc.) influence household population and household formation rates (i.e., the number of people per household). Household formation rates predict future demand for housing. That predicted demand, combined with expected vacancy rates, drives the forecast for housing growth.

AMBAG Region Forecast Housing Trends

As described above (see Table 5), the region is projected to add approximately 2,700 residents per year between 2015 and 2045. Taking average household size and vacancy rates into account, the resulting housing growth is expected to be just over 1,000 per year between 2015 and 2045. This is similar to the recent growth of 1,000 housing units per year between 2000 and 2015.

It is worth noting that several jurisdictions in the AMBAG region have historically had relatively high vacancy rates, reflecting a mix of vacation rentals and second homes, particularly in coastal

communities. In recent years, there is some evidence that more homeowners may be participating in the vacation rental market via platforms such as Airbnb and VRBO. It is unclear whether these new services will result in higher vacancy rates as more housing units become primarily vacation rentals or lower vacancy rates as short-term rental units shift demand away from units that are intended to be available for rental most (or all) of the year. AMBAG will continue to monitor this trend for future forecasts.

Section 3: Development of the Subregional Forecast

Following the preparation of the regional forecast figures, AMBAG staff began the process of disaggregating the figures to the county and city level using historical data. This section summarizes that process and the results.

Summary of the 2022 Subregional Forecast

The 2022 RGF projects that the region will add about 65,500 jobs between 2015 and 2045, for a total of just over 442,800 jobs by 2045. Of that growth, 58 percent (approximately 38,200 jobs) is expected to be in Monterey County, 7 percent (approximately 4,500 jobs) is expected to be in San Benito County and 35 percent (approximately 22,800 jobs) is expected to be in Santa Cruz County.

This forecast projects that the region's population will grow by approximately 107,500 people between 2015 and 2045, for a total population of just under 869,800 in 2045. Of that growth, 57 percent (approximately 61,100 people) is expected to be in Monterey County, 23 percent (approximately 25,200 people) is expected to be in San Benito County and 20 percent (approximately 21,200 people) is expected to be in Santa Cruz County.

To house the region's expected population growth, this forecast shows an increase of just over 42,200 housing units by 2045, for a total of approximately 304,900 units. Of that growth, 62 percent (approximately 26,200 houses) is expected to be in Monterey County, 18 percent (approximately 7,500 houses) is expected to be in San Benito County and 20 percent (approximately 8,600 houses) is expected to be in Santa Cruz County. Housing growth rates do not exactly parallel population growth rates because of local variations in average household size and vacancy rate, and because some population (e.g., at UCSC and CSUMB) is expected to be housed in group quarters facilities.

Details of the population, housing, and job growth forecasts for each jurisdiction, as well as population and housing forecasts for the two universities, can be found in Attachment 5.

Subregional Allocation Methodology

Unlike the regional forecast, in which employment growth drives population and housing growth, the employment forecast is separate from the population and housing forecast in the subregional allocation. This separation reflects differing economic and demographic forces at the regional and local levels.

Figure 10: Subregional Allocation Process

County-level employment by industry is driven by historical trends.	Jurisdiction growth is a share of county growth.
Employment	

Population growth is driven by historical trends, developments in the pipeline, and external factors.	Demographic and external factors influence group quarters and household population.	Demographic factors influence household formation rates.	Vacancy rates and number of households influence housing growth.
Population	**Group Quarters** / **Household Population**	**Households**	**Housing Units**

1. Employment trends: Employment is measured as the number of jobs by place of work.
    For the county-level forecast, employment growth by industry is driven by historical trends (i.e., shift-share model). Total growth across the three counties is constrained by the region-level forecast. For each jurisdiction (cities and unincorporated balance of county), employment growth by industry is a constant share of the jurisdiction's parent county's growth in that industry.

2. Population trends: Population is the total resident population of the region.
    The jurisdiction level forecast is driven by three factors:
    a. Historical trends (i.e., shift-share model)
    b. Anticipated future developments such as housing projects under development that are likely to be occupied within the forecast horizon
    c. External factors (e.g., universities, military, correctional facilities)

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Each county's population forecast is a sum of the jurisdiction-level forecasts. All levels (county, city, unincorporated area) are constrained by the region-level forecast.

3. Household Population and Group Quarters: Household population is the population that lives in a housing unit. Group quarters population is the population that lives in a group living arrangement such as a dorm, barracks, correctional institution, or congregate care facility. Demographic factors (e.g., age, race/ethnicity) and external factors (e.g., major group quarters facilities like colleges and universities, correctional facilities, etc.) influence the household population and household formation rates (i.e., the number of people per household).

4. Households/Occupied Housing Units: A household is a person, or group of people, living in a house. Because a household, by definition, occupies a housing unit, households are equivalent to and synonymous with occupied housing units.
   Household projections are driven by household formation rates. Household formation rates are calculated as the ratio of households divided by the household population. Household formation rates are the inverse of average household size.

5. Housing Units: Housing is the total number of housing units, including both occupied and vacant structures. Housing includes primary residences, second homes, accessory dwelling units, vacation rentals, farmworker housing, and any other habitable structure—including unauthorized units. The only type of dwelling excluded from the housing inventory is group quarters (dorms, barracks, congregate care, etc.).
   Housing projections are driven by the household population projection, demographic characteristics of the household population (age, sex, race/ethnicity), household formation rates, and housing vacancy rates. Vacancy rates are calculated as the share of all units (including vacation rentals, unauthorized dwellings, etc.) that are not currently occupied.

Data sources include the California Department of Finance, the California Employment Development Department, InfoUSA, and the U.S. Census Bureau.

For more information on the definitions of housing and group quarters, see Attachment 4.

This process resulted in draft estimates at the jurisdictional level that were used for discussion purposes with staff at each of the cities and counties within the region. In addition to the cities and counties, staff met with the Local Agency Formation Commissions (LAFCOs) for each county, the Fort Ord Reuse Authority, the University of California, Santa Cruz (UCSC) and California State University, Monterey Bay (CSUMB) to discuss the results. Adjustments were made to the forecast based on these conversations to incorporate growth on the basis of planned developments, specific and General Plan research and economic development plans. The process of revision and meeting with local jurisdictions one-on-one was repeated several times to reach a consensus on the forecast.

Step 1: Employment

The 2022 RGF projects that the region will add about 65,500 jobs between 2015 and 2045, for a total of just over 442,800 jobs by 2045. Of that growth, 58 percent (approximately 38,200 jobs) is expected to be in Monterey County, 7 percent (approximately 4,500 jobs) is expected to be in San Benito County and 35 percent (approximately 22,800 jobs) is expected to be in Santa Cruz County.

Figure 11: Employment by County 2015-2045
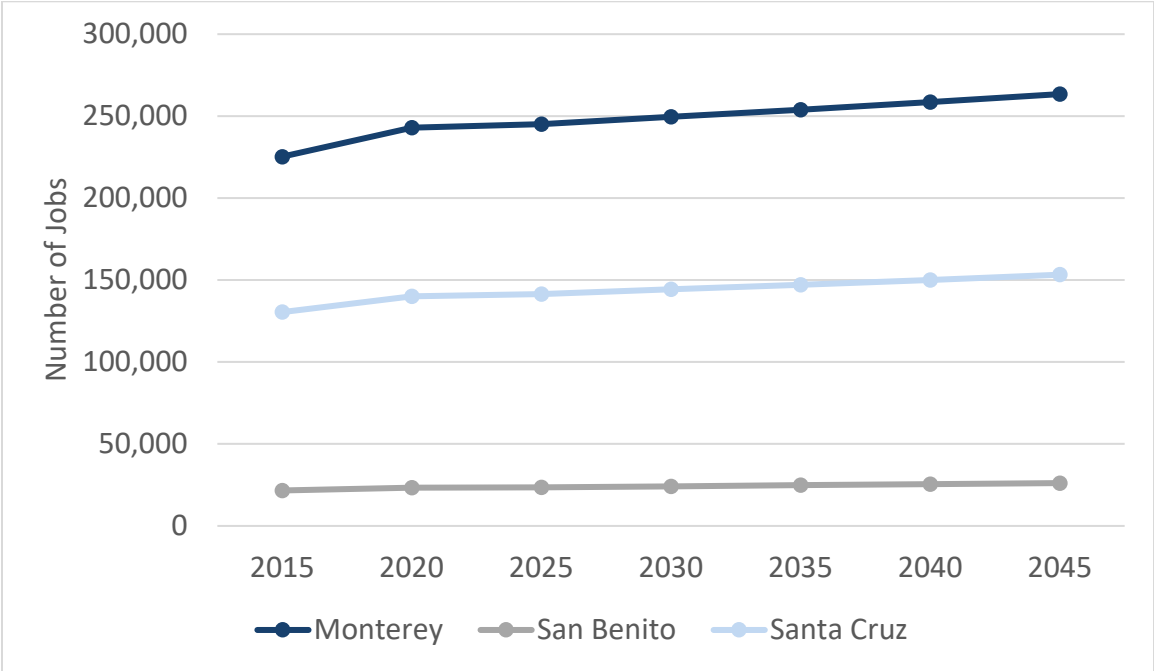
Sources: California Employment Development Department, InfoUSA, AMBAG, forecast by PRB and AMBAG.

Method for Producing the County and Sub-County Employment Forecast

The subregional employment forecast incorporated a two-step process: a county-level forecast and a jurisdiction-level allocation.

In order to disaggregate the tri-county regional industry employment forecast by county, AMBAG staff selected what is known as a Classical Shift-Share model. The Classical Shift-Share formula is similar to the Implicit Shift-Share formula used to disaggregate the population forecast, except that it is comprised of three mathematical functions rather than two. In this case, they are referred to as the regional share, industry mix and competitive shift functions. The regional share function estimates what employment growth in a certain industry would look like in the local area (i.e., county) if it were to grow at the same rate as the total all-industry employment in the region as a whole. The second industry mix function then adjusts for the difference in the rate of employment growth in a certain industry, compared to all industry employment. The industry mix function is calculated using regional

employment values. The third function, known as the competitive shift, adjusts the estimate to account for faster or slower industry employment growth in the county, compared to the region.

Figure 12: Classical Shift-Share Equation

$$E_i^{t+n} = E_i^t \left[\frac{R_A^{t+n}}{R_A^t} + \left(\frac{R_i^{t+n}}{R_i^t} - \frac{R_A^{t+n}}{R_A^t} \right) + \alpha \left(\frac{E_i^t}{E_i^{t-m}} - \frac{R_i^t}{R_i^{t-m}} \right) \right]$$

E = local Value $\quad R$ = Regional Value

i = industry $\quad A$ = All industries

Sub-County Employment Database and Re-benchmarking

To produce the subregional employment component of the forecast and to support transportation modeling, AMBAG created an address-level database for all employers in the AMBAG region in 2015. The database combined industry employment data from the California Employment Development Department (EDD) with employer data from InfoUSA. The InfoUSA data are derived from dozens of sources including but not limited to postal records, white pages listings, new business registrations, utility connections, real estate data (deeds & assessments) and industry directories. The database is then verified and supplemented with regular phone surveys. InfoUSA database is used by many other regional Councils of Governments to conduct forecast work and is a reputable source of data.

Staff compared records from EDD with those from InfoUSA. Where both sources matched, one record was retained, unedited. Where records differed, staff conducted extensive research (using AMBAG's land use inventory, web-based investigation, and field research) to determine the proper industry code and employment level for the record and retained the most accurate record (typically the higher reported number). As a result of the editing and reconciliation process, the address-level inventory differs from EDD industry totals.

While there are differences across all industries, edits to agricultural records were extensive. Staff review of address-level records showed that many establishments listed as "agriculture" by EDD are, in the AMBAG region, engaged in food processing (manufacturing), storage (warehousing), or retail (farm stands). Agricultural recategorization is described in more detail in Attachment 2.

It is also important to note that the AMBAG estimate of agricultural jobs differs from estimates of the agricultural workforce (91,433 in 2016) described in "Farmworker Housing Study and Action Plan for Salinas Valley and Pajaro Valley." The reasons for this difference are both temporal and definitional. The industry estimates are annual-average estimates of jobs (a job is a paid position at a company) for 2015. The Farmworker Housing Study figures are 2016 estimates of all workers who were ever employed during the year, including those who worked part-time or part-year. If a company has high turnover or seasonal work, that company's number of workers (all year) would be higher than their average number of jobs. For example, if a company typically has 10 paid positions, but in peak season brings on another 10 for three months, the annual average number of jobs is 12.5 (10 x (9/12months) +

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20 x (3/12months) = 12.5/month) but there were 20 unique workers at peak (original 10 plus additional 10).

Thus, in this case, the farmworker study estimates are higher than jobs estimates for three key reasons:

- Agricultural employment grew slightly between 2015 and 2016.
- Worker estimates take peak seasonal employment into account, while EDD industry estimates are annual averages.
- Some companies that identify as agricultural are more accurately classified as food processing (manufacturing), storage (warehousing), or retail (farm stands).

Sub-County Disaggregation Method for Employment
The address-level database, described above, was used to calculate the share of employment for each industry in each jurisdiction in 2015. This percent share was then carried forward to future years in order to calculate the number of jobs located in each jurisdiction by industry. While the County level totals use the Classical Shift-Share method as described above, the sub-county level forecast is a constant share approach. However, because the sub-county level forecasts are based on the County totals by industry the Classical Shift-Share method does influence the sub-county trends.

A preliminary draft forecast was distributed to planning staff at each jurisdiction. AMBAG staff held one-on-one meetings to gather comments and additional information from planning staff at each jurisdiction. (See Attachment 1 for a list of meeting dates, times, locations and attendees.) Staff then used economic studies, entitled development, the establishment of enterprise zones and other information from local planners to supplement the employment assumptions at the jurisdictional level. These comments and additional pieces of information were incorporated into the final forecast.

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Table 7: Subregional Employment Forecast

Geography	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045 Numeric	%
AMBAG Region	**377,335**	**406,280**	**410,017**	**418,132**	**425,845**	**434,147**	**442,824**	**65,489**	**17%**
Monterey County	**225,268**	**243,015**	**245,054**	**249,613**	**253,918**	**258,553**	**263,437**	**38,169**	**17%**
Carmel-By-The-Sea	3,353	3,566	3,593	3,674	3,752	3,833	3,915	562	17%
Del Rey Oaks	705	748	753	774	794	815	834	129	18%
Gonzales	5,764	6,326	6,382	6,533	6,660	6,788	6,920	1,156	20%
Greenfield	7,227	7,882	7,948	8,061	8,177	8,298	8,423	1,196	17%
King City	7,573	8,195	8,248	8,371	8,511	8,669	8,832	1,259	17%
Marina	6,107	6,548	6,621	6,765	6,899	7,055	7,217	1,110	18%
Monterey	38,133	40,989	41,527	42,506	43,452	44,465	45,509	7,376	19%
Pacific Grove	7,470	8,016	8,061	8,152	8,244	8,343	8,445	975	13%
Salinas	73,009	78,874	79,577	81,079	82,505	84,044	85,683	12,674	17%
Sand City	1,966	2,092	2,102	2,151	2,188	2,224	2,259	293	15%
Seaside	9,667	10,476	10,589	10,833	11,062	11,290	11,543	1,876	19%
Soledad	8,532	9,010	9,079	9,161	9,235	9,333	9,462	930	11%
Unincorporated	55,762	60,293	60,574	61,553	62,439	63,396	64,395	8,633	15%
San Benito County	**21,631**	**23,263**	**23,572**	**24,203**	**24,802**	**25,475**	**26,126**	**4,495**	**21%**
Hollister	14,428	15,492	15,728	16,207	16,655	17,121	17,613	3,185	22%
San Juan Bautista	515	557	569	580	588	603	612	97	19%
Unincorporated	6,688	7,214	7,275	7,416	7,559	7,751	7,901	1213	18%
Santa Cruz County	**130,436**	**140,002**	**141,391**	**144,316**	**147,125**	**150,119**	**153,261**	**22,825**	**17%**
Capitola	11,666	12,250	12,376	12,633	12,902	13,181	13,454	1,788	15%
Santa Cruz	40,840	43,865	44,317	45,594	46,863	48,203	49,636	8,796	22%
Scotts Valley	9,458	10,109	10,185	10,345	10,489	10,637	10,797	1339	14%
Watsonville	26,403	28,514	28,765	29,156	29,505	29,896	30,303	3,900	15%
Unincorporated	42,069	45,264	45,748	46,588	47,366	48,202	49,071	7,002	17%

Sources: Data for 2015 from InfoUSA and the California Employment Development Department.
Forecast years were prepared by AMBAG and PRB.

Step 2: Population

This forecast projects that the region's population will grow by approximately 107,500 people between 2015 and 2045, for a total population of just under 869,800 in 2045. Of that growth, 57 percent (approximately 61,100 people) is expected to be in Monterey County, 23 percent (approximately 25,200 people) is expected to be in San Benito County and 20 percent (approximately 21,200 people) is expected to be in Santa Cruz County.

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Figure 13: Population in Monterey, San Benito and Santa Cruz Counties 1940-2045
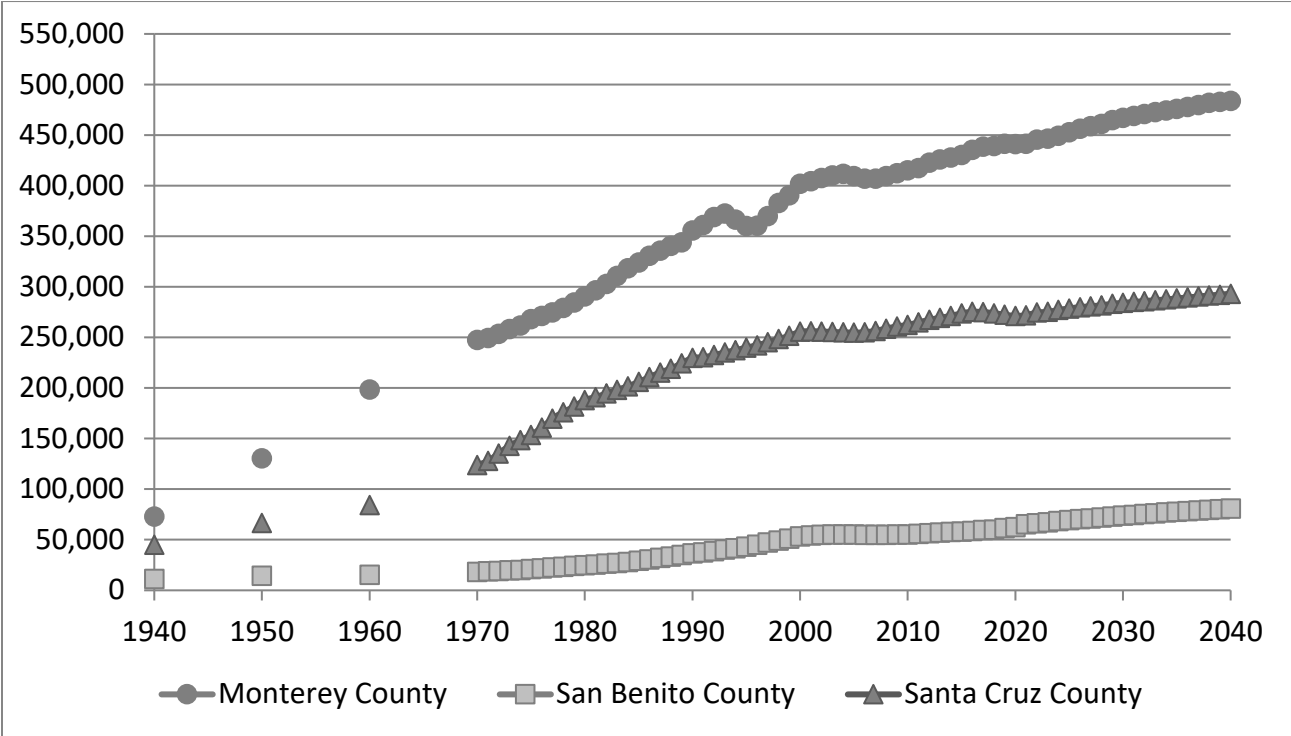
Sources: Data for years 1940-2020 are from the U.S. Census Bureau and California Department of Finance. Forecast years were prepared by AMBAG and PRB.

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Table 8: Subregional Population Forecast

Geography	2015	2020	2025	2030	2035	2040	2045		%
AMBAG Region	**762,241**	**774,729**	**800,726**	**824,992**	**842,189**	**857,828**	**869,776**	107,535	14%
Monterey County	**430,310**	**441,143**	**452,761**	**467,068**	**476,028**	**483,884**	**491,443**		4%
Carmel-By-The-Sea	3,854	3,949	3,946	3,954	3,964	3,974	3,984	130	3%
Del Rey Oaks	1,663	1,662	1,693	1,734	1,859	2,330	2,650		9%
Gonzales	8,441	8,506	9,650	13,492	14,630	15,398	15,711	7,270	86%
Greenfield	17,172	18,284	19,342	19,734	19,961	20,202	20,433		9%
King City	13,736	14,797	15,376	16,101	16,689	16,881	17,064	3,328	24%
Marina	21,057	22,321	23,723	25,126	26,713	28,433	30,044		3%
Marina balance	20,037	21,371	22,293	22,841	23,238	23,768	24,237	4,200	21%
CSUMB (portion)	1,020	950	1,430	2,285	3,475	4,665	5,807		9%
Monterey	28,086	28,170	28,044	28,650	29,032	29,342	29,639	1,553	6%
Monterey balance	24,095	24,749	24,623	25,229	25,611	25,921	26,218		9%
DLI & Naval Postgrad	3,991	3,421	3,421	3,421	3,421	3,421	3,421	-570	-14%
Pacific Grove	15,460	15,265	15,290	15,395	15,530	15,676	15,817		2%
Salinas	158,059	162,222	166,226	170,459	173,393	175,358	177,128	19,069	12%
Sand City	361	385	430	516	756	1,012	1,198		2%
Seaside	33,815	33,537	34,497	35,107	35,634	36,582	38,316	4,501	13%
Seaside balance	25,835	26,345	27,285	27,850	28,317	29,205	30,881		0%
Fort Ord (portion)	4,163	3,083	3,083	3,083	3,083	3,083	3,083	-1080	-26%
CSUMB (portion)	3,817	4,109	4,129	4,174	4,234	4,294	4,352		4%
Soledad	24,597	25,301	26,112	26,824	27,697	28,419	29,133	4,536	18%
Soledad balance	16,298	17,190	18,001	18,713	19,586	20,308	21,022		9%
SVSP & CTF	8,299	8,111	8,111	8,111	8,111	8,111	8,111	-188	-2%
Unincorporated	104,009	106,744	108,432	109,976	110,170	110,277	110,326		6%
Unincorp balance	101,468	104,203	105,891	107,435	107,629	107,736	107,785	6,317	6%
CSUMB	2,541	2,541	2,541	2,541	2,541	2,541	2,541		0%
San Benito County	**58,138**	**62,353**	**69,324**	**73,778**	**77,638**	**80,788**	**83,366**	**25,228**	**43%**
Hollister	37,314	40,646	42,604	43,327	44,421	45,345	45,599		2%
San Juan Bautista	1,945	2,112	2,269	2,315	2,374	2,410	2,436	491	25%
Unincorporated	18,879	19,595	24,451	28,136	30,843	33,033	35,331		7%
Santa Cruz County	**273,793**	**271,233**	**278,641**	**284,146**	**288,523**	**293,156**	**294,967**	**21,174**	**8%**
Capitola	10,224	10,108	10,485	10,794	10,957	11,049	11,126		9%
Santa Cruz	64,223	64,424	68,845	72,218	75,257	78,828	79,534	15,311	24%
Santa Cruz balance	46,947	45,324	47,845	49,118	49,957	50,828	51,534		0%
UCSC	17,276	19,100	21,000	23,100	25,300	28,000	28,000	10,724	62%
Scotts Valley	11,946	11,693	11,718	11,837	11,867	11,868	12,010		1%
Watsonville	52,410	51,515	52,918	54,270	55,138	55,786	56,344	3,934	8%
Unincorporated	134,990	133,493	134,675	135,027	135,304	135,625	135,953		1%

Sources: Data for 2015-2020 are from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Method for Producing the County and Sub-County Population Forecast

In order to disaggregate the tri-county regional population forecast, PRB and AMBAG implemented the Implicit Shift-Share method. This particular technique was chosen because it provides a relatively simple, yet rigorous, method for estimating the future geographic distribution of the regional population based on historic estimates of local and regional population growth.

The Implicit Shift-Share formula is comprised of two distinct mathematical functions. These are sometimes known as the regional share and the local shift. The regional share function calculates what the total population growth in the local area (i.e., a city or county) would be if that area were to grow at the same rate as the region as a whole. The second function then adjusts for historic changes in the local area's share of the total regional population. Combined with an accurate estimate of the size of the base population obtained from the 2010 Decennial Census, the regional share and local shift functions provide a reasonable estimate of the future local area population, taking into account past changes in the percentage share of the regional population. Historical data are from the Department of Finance. The Department of Finance does benchmark their historical estimates to the Decennial Census for 1990, 2000 and 2010.[4]

Figure 14: Implicit Shift-Share Equation

$$E^{t+n} = E^t \left(\frac{R^{t+n}}{R^t} \right) + \alpha R^{t+n} \left(\frac{E^t}{R^t} - \frac{E^{t-m}}{R^{t-m}} \right)$$

E = Local Value $\qquad$ R = Regional Value

To produce jurisdiction-level forecast, AMBAG and PRB compiled a database of historical population by jurisdiction. This database included information on population growth (or decline) as well as details for "special" populations (e.g., college students, military personnel, prisoners). (Special populations are described in more detail in the section "Adjustments for Special Populations," below.)

AMBAG and PRB compiled historical data[5] to track trends in, and relied upon institutional/facility plans to produce the population forecast for the following areas:

- Marina:
  - Fort Ord (portion)

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[4] Department of Finance, E-8 Historical Population and Housing Estimates for Cities, Counties and the State, 1990-2000, August 2008; Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2010, September 2011 and Department of Finance, E-1 Population Estimates for Cities, Counties and the State, 2011 and 2012, August 2009.

[5] Sources include the California Department of Finance, U.S. Census Bureau and institutional records.

- o CSUMB (portion)
- Monterey
    - o Defense Language Institute and Naval Postgraduate School
- Seaside
    - o Fort Ord (portion)
    - o CSUMB (portion)
- Soledad
    - o SVSP & CTF
- Balance of County
    - o CSUMB (portion)
- Santa Cruz
    - o UCSC

AMBAG and PRB then applied the implicit shift-share methodology to the balance of population in each jurisdiction to produce a draft of the first forecast increment. The benchmark period for the shift-share model was 2010-2015, and the model was applied to produce the draft forecast.

Forecast years, for this initial draft, presumed that each jurisdiction maintained a constant share of the region's population. This approach, using shift-share for the first increment, and constant-share thereafter, was implemented in the 2014 RGF and 2018 RGF to ensure that jurisdictions that experienced population loss during the benchmark period would not continue to decline. This forecast assumption is reasonable given that any jurisdiction may experience a period of temporary population decline, even when the long-term trend has been stability or growth.

Further initial adjustments were made to reflect population growth associated with housing under construction or in the permit pipeline.

AMBAG staff then met with representatives from each jurisdiction to ground truth the forecast with respect to anticipated future growth and development in the pipeline. (See Attachment 1 for a full list of meetings.)

Step 3: Housing

To house the region's expected population growth, this forecast shows an increase of just over 42,200 housing units by 2045, for a total of approximately 304,900 units. Of that growth, 62 percent (approximately 26,200 houses) is expected to be in Monterey County, 18 percent (approximately 7,500 houses) is expected to be in San Benito County and 20 percent (approximately 8,600 houses) is expected to be in Santa Cruz County. Housing growth rates do not exactly parallel population growth rates because of local variations in average household size and vacancy rate, and because some population (e.g., at UCSC and CSUMB) is expected to be housed in group quarters facilities.

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Table 9: Subregional Housing Forecast

Geography	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045 Numeric	%
AMBAG Region	**262,660**	**267,812**	**277,645**	**288,386**	**296,352**	**301,307**	**304,900**	**42,240**	**16%**
Monterey County	**139,177**	**141,764**	**146,716**	**153,852**	**159,100**	**162,612**	**165,328**	**26,151**	**19%**
Carmel-By-The-Sea	3,417	3,437	3,437	3,442	3,450	3,453	3,459	42	1%
Del Rey Oaks	741	741	762	809	848	1,052	1,195	454	61%
Gonzales	1,987	1,987	2,399	3,630	4,182	4,474	4,626	2,639	133%
Greenfield	3,794	3,981	4,359	4,766	5,047	5,164	5,238	1,444	38%
King City	3,283	3,432	3,672	4,002	4,282	4,356	4,403	1,120	34%
Marina	7,334	7,784	8,277	8,837	9,265	9,521	9,693	2,359	32%
Marina balance	7,334	7,784	8,277	8,832	9,205	9,445	9,617	2,283	31%
CSUMB (portion)	0	0	0	5	60	76	76	76	--
Monterey	13,637	13,705	13,705	13,920	14,209	14,402	14,549	912	7%
Monterey balance	13,205	13,273	13,273	13,488	13,777	13,970	14,117	912	7%
DLI & Naval Postgrad	432	432	432	432	432	432	432	0	0%
Pacific Grove	8,184	8,201	8,214	8,267	8,336	8,400	8,463	279	3%
Salinas	43,001	43,411	45,552	48,673	50,968	52,229	53,150	10,149	24%
Sand City	176	189	198	228	333	446	526	350	199%
Seaside	10,913	10,920	11,437	11,925	12,248	12,604	13,192	2,279	21%
Seaside balance	8,908	8,942	9,429	9,888	10,190	10,531	11,107	2,199	25%
Fort Ord (portion)	1,119	1,119	1,119	1,119	1,119	1,119	1,119	0	0%
CSUMB (portion)	886	859	889	918	939	954	966	80	9%
Soledad	3,927	4,137	4,433	4,733	5,024	5,240	5,426	1,499	38%
Soledad balance	3,927	4,137	4,433	4,733	5,024	5,240	5,426	1,499	38%
SVSP & CTF	0	0	0	0	0	0	0	0	--
Unincorporated	38,783	39,839	40,271	40,620	40,908	41,271	41,408	2,625	7%
Unincorp balance	38,783	39,839	40,238	40,569	40,592	40,616	40,616	1,833	5%
CSUMB	0	0	33	51	316	655	792	792	--
San Benito County	**18,262**	**19,913**	**21,721**	**23,333**	**24,773**	**25,452**	**25,775**	**7,513**	**41%**
Hollister	10,757	11,917	12,501	13,177	13,701	14,054	14,122	3,365	31%
San Juan Bautista	750	819	878	918	951	965	975	225	30%
Unincorporated	6,755	7,177	8,342	9,238	10,121	10,433	10,678	3,923	58%
Santa Cruz County	**105,221**	**106,135**	**109,208**	**111,201**	**112,479**	**113,243**	**113,797**	**8,576**	**8%**
Capitola	5,537	5,554	5,786	5,970	6,009	6,017	6,017	480	9%
Santa Cruz	23,535	23,954	24,988	25,578	25,974	26,295	26,525	2,990	13%
Santa Cruz balance	23,005	23,424	24,422	24,970	25,342	25,663	25,892	2,887	13%
UCSC	530	530	566	608	632	632	633	103	19%
Scotts Valley	4,691	4,739	4,798	4,846	4,869	4,887	4,930	239	5%
Watsonville	14,131	14,226	14,829	15,629	16,108	16,347	16,519	2,388	17%
Unincorporated	57,327	57,662	58,807	59,178	59,519	59,697	59,806	2,479	4%

Sources: Data for 2015-2020 are from the California Department of Finance. Forecast years were prepared by AMBAG and PRB.

2022 Regional Growth Forecast

Method for Producing the County and Sub-County Housing Forecast

In order to convert county level population forecast figures into the forecast of housing units, staff created a set of demographic profiles that describe the age, sex, race, and ethnicity characteristics of the future population. The basis for the demographic profiles is a set of detailed population projections developed by the California Department of Finance in 2019.[6] The profiles were developed by calculating the share of total projected population within each county that may be attributed to each age, sex, race and ethnic category. The population age distribution for the AMBAG Region is shown in Figure 15 below. County-specific demographic patterns from the Department of Finance forecast were applied to AMBAG-projected total population for each county.

Figure 15: Population Size and Age Structure of AMBAG Region in 2015 and 2045
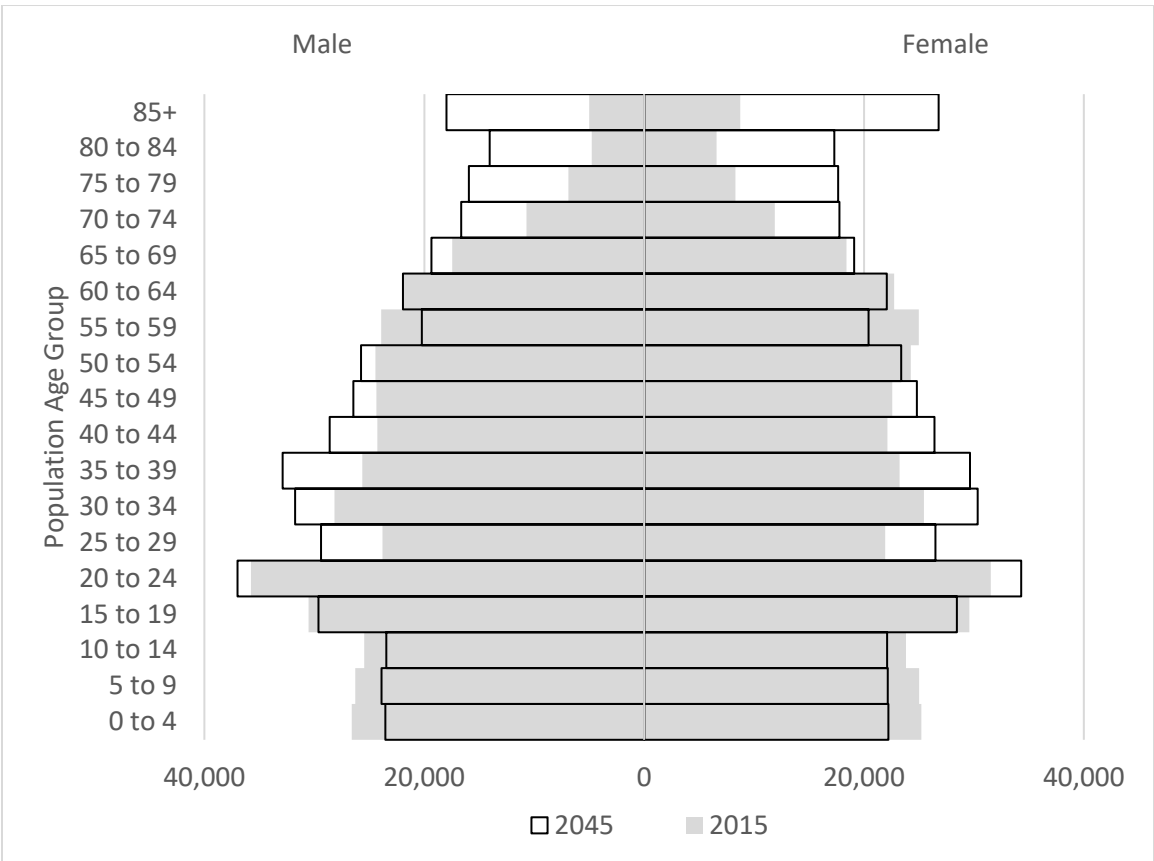
Source: 2015 data from the California Department of Finance, 2045 data from AMBAG and PRB.

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[6] In January 2020, DOF published State and County Population Projections. These have not been re-benchmarked to the 2020 Census.

2022 Regional Growth Forecast

The first step toward translating the county demographic projections into forecasted housing was to subtract the group quarters population from the total population. (For an explanation of Group Quarters, see Attachment 4.) Staff calculated a set of group quarters rates by dividing the group quarters population in each age, sex, race and ethnic category as provided by the 2010 Census[7] by the total 2010 age, sex, race and ethnic population in each county. The team then updated these 2010 rates to reflect 2020 population and group quarters population estimates from the Department of Finance. In order to estimate the group quarters population in each county, staff multiplied the group quarters rates within each category by the total population in each category. This population was then removed from the total population to provide an estimate of the number of people living in households, by demographic subgroup.

Next, to generate estimates of the total number of households in each county, staff calculated a set of head of householder rates. These also are frequently referred to as "headship rates" or "household formation rates." As with the group quarters rates, these are derived from 2010 Census data.[8] To generate the head of householder rates, staff divided the 2010 estimates of the number of individuals within each age, race and ethnic category who were reported to be the head of a household by the total number of individuals within each age, race, and ethnic population category less the group quarters population.[9] By multiplying the base-year household population estimates for each category by the head of householder rates, staff derived a new set of head of household estimates, which were controlled to published data from the California Department of Finance. Note that for each head of household there is, by definition, one household. Thus, by adding up all of the head of householders, the staff was able to generate estimates of the total number of households within each county.[10]

Finally, vacant units were added to the total number of households in order to obtain an estimate of housing units. Vacancy data was obtained from the U.S. Census Bureau for 1990, 2000 and 2010, and

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[7] U.S. Census Bureau, 2010 Decennial Census, Summary File 1, Table QTP-12.

[8] U.S. Census Bureau, 2010 Decennial Census, Summary File 2, Table PCT-12.

[9] The householders data for the "Some other race alone, not Hispanic or Latino" and "Native Hawaiian and Other Pacific Islander alone, not Hispanic or Latino" categories of population in San Benito County was suppressed because there was not a population of greater than 100. For these ethnic categories the regional rate was used instead given the lack of data on this population.

[10] The Census does include "second dwelling units" or accessory units within their counts of households if the unit has its own bathroom and kitchen facilities. However, there are likely illegal "granny units" that are not counted through this process.

from the Department of Finance for intercensal years.[11] To better understand what a normal housing vacancy rate might be, staff reviewed historical data on residential vacancy for the last two decades. Once a vacancy rate was established, this was used to calculate the total number of vacant housing units (the number of occupied units being equal to the number of households). By adding together estimates of the total number of vacant and occupied housing units, staff derived estimates of the total housing stock within each county.

Forecasting Sub-County Population, Households and Housing Units

To derive a city-level forecast of population, household population, households, and housing units, staff used a simplified version of the methodology described above. The MPO is not required to develop detailed demographic characteristics for city-level estimates. As such the household and housing unit conversion was done using aggregate group quarters and household formation rates for each city, as reported in the 2010 Census and with trends through 2020 from the Department of Finance.[12] Vacancy rates were derived from a 30-year average as reported by the Department of Finance.[13] The Department of Finance does benchmark their estimates to the decennial Census.

Some of the jurisdictions within the region show a declining population over the last 10 to 20 years. Because the Implicit Shift-Share method was used for projecting 2025 population and the method reflects the change in population over time, for those jurisdictions that have experienced population decline there would be a continuation of that decline reflected for the year 2025. Instead of showing a decline, the 2025 share of the regional population calculated for these jurisdictions was held constant. This has the effect of showing an increase in population to 2025 even if recent trends were toward population decline. There is too little information to know whether short-term declines will continue, so instead of assuming continual decline, growth was held at a constant. AMBAG will continue to monitor these trends.

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[11] Department of Finance, E-8 Historical Population and Housing Estimates for Cities, Counties and the State, 1990-2000, August 2008; and Department of Finance, E-5 Population and Housing Estimates for Places, 2001-2010, with 2000 Benchmark, September 2011.

[12] U.S. Census Bureau, 2010 Decennial Census, Summary File 1, Tables QTP-12 and PCT-12.

[13] Department of Finance, E-8 Historical Population and Housing Estimates for Cities, Counties and the State, 1990-2000, August 2008; Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2010, September 2011 and Department of Finance, E-5 Population Estimates for Cities, Counties and the State, 2010-2016, July 2016.

Section 4: Demographic History of the AMBAG Region

The AMBAG region grew at a faster rate than California in the 1960s and 1970s and grew at approximately the same rate as the state in the 1980s (24% in AMBAG region, 26% statewide). Both the state and the AMBAG region grew at the same rate in the 1990s (14%). The AMBAG region's growth fell far below the statewide average between 2000 and 2010, increasing by only three percent while the state grew by 10 percent. From 2010 to 2020 both the state and the AMBAG region grew at similar rates (7% and 6%, respectively).

AMBAG Region: 1970 to 1990

Between 1970 and 1990 the AMBAG region population grew by more than 110,000 each decade, increasing by 29 percent from 1970 to 1980 and by 24 percent from 1980 to 1990. Growth slowed in the 1990s. The slowdown can be attributed, in part, to the closure of Fort Ord in 1994, which is described in more detail in the "Adjustments" section, below. These population losses greatly affected the growth rates of the communities of Marina and Seaside prior to 2000. Concurrent civilian job losses affected population growth in the AMBAG region more broadly. The AMBAG region population grew by 88,500 (14%) between 1990 and 2000.

AMBAG Region: 2000 to 2010

In the following decade, population growth slowed considerably. The AMBAG region population grew by only 22,100 (3%) during the decade between 2000 and 2010. This pattern of slowing population growth reflects an aging population and lower net migration into the AMBAG region. Lowered net migration could be due to several factors including but not limited to water resource constraints, the after-effects of the closure of Fort Ord, as well as increasing housing costs followed by a major recession.

AMBAG Region: 2010 to 2020

In the five years since the decennial census, population growth began to return to historical levels. The AMBAG region population grew by just over 42,000 (6%) during the period between 2010 and 2020. This recovery in population growth reflects post-recession recovery.

Demographic History of AMBAG Counties

Population growth details for all three counties are shown below. County-specific summaries follow the charts.

Figure 16: Population Growth Rates in Monterey County, San Benito County, Santa Cruz County, AMBAG Region and California (statewide) 1940-2020
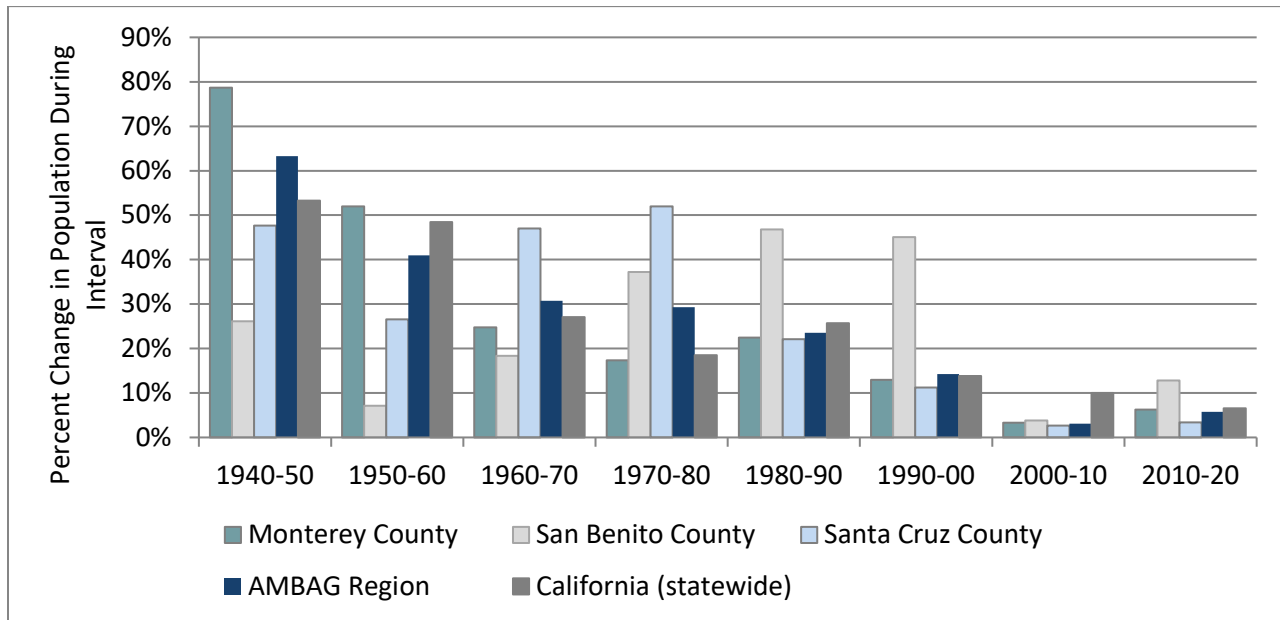
Source: California Department of Finance

Monterey County

Between 1960 and 2000, Monterey County has grown at a rate slower than the AMBAG region as a whole. From 2000-2010 and 2010-2020 Monterey County grew at the same rate in the region. (See Figure 16, above.)

As a result of the closure of Fort Ord, Monterey County experienced a population decline in the middle of the 1990s, yet population growth rebounded later in the decade. The county registered 13 percent growth (an increase of 46,100) between 1990 and 2000. (See Figures 2 and 3)

The 1990s also saw the opening of two large institutions: California State University, Monterey Bay and Salinas Valley State Prison. Both are described in more detail in the Special Populations section below.

While the County as a whole grew, six of the county's thirteen jurisdictions experienced population loss during the 1990s (Carmel-By-The-Sea, -4%; Del Rey Oaks, -1%, Marina, -29%, Monterey, -7%, Pacific Grove, -4%, Seaside, -15%). Conversely, the population of Salinas grew by nearly 34,000 during the decade. Soledad also grew at a rapid clip (16,000 population) largely as the result of Salinas Valley State Prison opening in 1996.

The following decade saw much slower growth, with an increase of less than 13,300 (3%) between 2000 and 2010. Five jurisdictions lost population (Carmel-By-The-Sea, -9%; Del Rey Oaks, -2%,

Monterey, -6%, Pacific Grove, -3%, unincorporated Monterey County, -1%). The city of Seaside remained virtually unchanged.

From 2010 to 2020, the cities of Greenfield, King City, Marina, and Sand City all had estimated growth of greater than 10 percent. Only the city of Soledad is estimated to have lost population.

San Benito County

While San Benito County grew at a rate much slower than the AMBAG region prior to the 1970s, the county saw rapid population growth in the 1970s, 1980s, and 1990s, a dip in the early 2000s, and a return to rapid growth 2010-2020. (See Figure 16, above.)

San Benito County registered rapid population growth, adding more than 16,500 population (45%) between 1990 and 2000. During this decade the city of Hollister nearly doubled in population (78%) while the population of San Juan Bautista declined (-1%).

San Benito's population growth slowed to four percent (2,000 population) between 2000 and 2010. The trend of the 1990s was reversed. Hollister grew by only one percent while San Juan Bautista increased by 20 percent.

From 2010 to 2020 San Benito County grew faster than the region, with Hollister and San Juan Bautista growing by 16% and 13%, respectively.

Santa Cruz County

Santa Cruz County grew at a rate faster than the AMBAG region in the 1960s and 1970s, but grew more slowly in every other decade from 1940-2020. (See Figure 16, above.)

Santa Cruz County grew by more than 25,800 (11%) between 1990 and 2000. The fastest-growing jurisdiction in Santa Cruz County between 1990 and 2000 was Watsonville (42%) followed by Scotts Valley (31%). Capitola's population fell during the decade (-1%).

The County's growth slowed considerably, adding just under 6,800 population (3%) between 2000 and 2010. The fastest-growing jurisdiction in Santa Cruz County between 2000 and 2010 was Watsonville (16%, including the annexation area, 11% without) followed by Santa Cruz (10%). Scotts Valley, which grew rapidly during the 1990s, showed only two percent population growth during the decade. Capitola's population fell during the decade (-1%).

In recent years, no jurisdiction in Santa Cruz has grown by more than 10 percent. The fastest growing city, Santa Cruz, grew by 7% between 2010 and 2020.

Adjustments for Special Populations

In small area demographic analysis, some populations grow or decline as a result of exogenous factors, rather than in response to demographic or economic conditions. For example, uniformed military populations, college populations, and prison populations may grow or decline as new facilities are added or older facilities are phased out of use. These population changes involve facilities that are outside the authority of local land use agencies and that change based on policy, rather than demographic, factors.

Changes in these facilities can result in population "shocks" that affect the rate of population change within an area, independent of larger demographic and economic trends.

As a result of their unique characteristics, these populations are referred to as "special populations" and are often treated separately in forecasting.

Special populations include people associated with military bases, tourists, prisons, and colleges and universities. The size of a special population may have no connection to the general trends affecting the area. A special population can be stable for long periods of time, balloon quickly, and deflate, or, in the case of military bases, disappear rapidly through a closure program. It is best to develop a detailed understanding of the nature of the special population and set out the projection for it separately.[14]

Over the past two decades, the AMBAG region has been home to several "special populations" including the military resident population at Fort Ord, the Defense Language Institute and Naval Postgraduate School, students at UCSC and CSUMB, and inmates at SVSP.

In the preliminary forecast, AMBAG staff began the shift-share analysis at 1996 to address the population "shocks" resulting from the closure of Fort Ord and the opening of both California State University Monterey Bay and the Salinas Valley State Prison. While this adjustment was effective at addressing some of the special population concerns, it has a key weakness: it does not allow for independent forecasting of special populations.

The following discussion provides a method for addressing that issue.

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[14] Merc, Stuart. "Projections and Demand Analysis." Planning and Urban Design Standards. published by the American Planning Association. Sept 2012. http://books.google.com/books?id=NXpncFYj73QC&pg=PA299&lpg=PA299&dq=%22special+populatio n%22+forecasting&source=bl&ots=L2fSbUMT8R&sig=uV05NN3-rNYcpCr97xU2hTpYt6s&hl=en&sa=X&ei=eEC5UMT8O42tqAGAvIDQCQ&ved=0CG0Q6AEwCQ#v=onepa ge&q=%22special%20population%22%20forecasting&f=false

History of Special Populations in the AMBAG Region

Fort Ord

Established in 1917, Fort Ord was eliminated during the Base Realignment and Closure Act of 1990, closing in 1994. This resulted in the loss of more than 30,000 residents in Monterey County, primarily in the jurisdictions of Marina and Seaside, as described in the Fort Ord Reuse Plan:

> *Fort Ord has been a significant presence in Monterey County since 1917… maintained a large military population numbering approximately 14,500 military personnel and 17,000 family members of active-duty personnel… the resident population of Fort Ord totaled 31,270 in 1991.*[15]

In addition…

> *The on-post resident population was divided between the two municipalities of Marina and Seaside. Through 1990, 17,139 people (56%) were within the Seaside city limits and 13,321 people (44%) were within the Marina city limits (Harding Lawson Associates, 1991, Workplan remedial investigation/feasibility study, Fort Ord, CA).*[16]

These population losses greatly affected the communities of Marina and Seaside. However, the forecast was developed using the 2000 to 2015 time period as a historical reference. By 2000 abnormalities in growth rates caused by the closure of Fort Ord had self-corrected. The Fort Ord Reuse Authority's mandate for overseeing the area ended in June 2020. Beginning with the 2022 RGF, the area will be projected as any other potential development in the AMBAG region, based on plans and permits.

Defense Language Institute and Naval Postgraduate School

The Army Language School, later renamed the Defense Language Institute, has been a presence in Monterey County since the end of World War II. The number of people living in group quarters at the Institute and Postgraduate School has been stable, at approximately 4,000, in recent years. Because of this stability, the 2018 RGF presumes no change to the population of these two institutions in future years.

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[15] Fort Ord Reuse Plan, Volume 1: Context and Framework. June 1997.
[16] Fort Ord Reuse Plan, Volume 2: Reuse Plan Elements. June 1997.

2022 Regional Growth Forecast

University of California, Santa Cruz

Founded in 1965, the University of California, Santa Cruz grew to 9,800 students by the 1991-92 academic year, 10,885 students by the 1999-2000 academic year, and 16,300 full-time equivalent students in the 2009-2010 academic year.[17] In meetings with AMBAG staff, UCSC staff indicated that they expect growth of 300-500 students per year, resulting in a 2040 student forecast of 28,000 (the 2022 RGF holds this level constant from 2040-2045).

It is important to note that these projections reflect full-time equivalent students, and actual headcounts will likely be higher.

California State University, Monterey Bay

Founded in 1995, California State University Monterey, Bay grew to 2,265 students during the 1999-2000 school year and 4,000 students by 2010.[18] Although not created by the Fort Ord Reuse Plan, the University is a significant component of the Base Reuse Plan and as it continues to grow will help to stimulate the economic development of the Fort Ord Area. The most recent master plan projects full-time equivalent student enrollment of 12,000 by 2025.[19] In meetings with AMBAG staff, CSUMB staff indicated that they expect growth to 12,700 full-time equivalent students by 2045.

It is important to note that these projections reflect full-time equivalent students, and actual headcounts will likely be higher.

In addition, discussions with CSUMB staff suggested that some group quarters (student) dormitory housing in the "East Campus" unincorporated area would convert to faculty/family housing over time. This transition is reflected through the growth of group quarters population in the Marina area of the CSUMB campus, decline of group quarters in Unincorporated Monterey County—and transition of those formerly group quarters structures into family housing (i.e. increase in households and housing units).

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[17] University of California, Santa Cruz Department of Planning and Budget. http://planning.ucsc.edu/irps/thirdWeek.asp accessed December 2012. Figures based on 3-quarter average measured in the spring quarter of the academic year.

[18] California State University Monterey Bay historical timeline http://about.csumb.edu/node/4287 accessed November 2012.

[19] Recirculated Draft Environmental Impact Report for the California State University Monterey Bay 2007 Master Plan. July 2008.

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Salinas Valley State Prison and Soledad Correctional Training Facility

Opened in 1996, Salinas Valley State Prison has a design capacity of 3,888.[20] According to annual reporting by the California Department of Finance, the facility had a resident population of 4,100 at the beginning of the 2000s decade and a population of 3,630 on January 1, 2010.[21] The facility has a maximum capacity of 4,400, according to the 2010 Master Plan Annual Report.[22]

Opened in 1946, Soledad Correctional Training Facility has a design capacity of 3,301. According to annual reporting by the California Department of Corrections and Rehabilitation and counts from the 2000 and 2010 decennial census, the facility had a resident population of between 6,000 and 7,200 during the decade. [23]

Because both facilities currently house group quarters populations in excess of their design capacity, no future population growth is shown at these facilities in the 2018 RGF. Population totals are held constant at their 2015 levels.

Table 10: Historical Special Population Counts

	1990	2000	2010	2015
Fort Ord Military Population	31,270*	0	0	0
Defense Language Institute and Naval Postgraduate School	n/a	n/a	4,227	4,004
University of California, Santa Cruz	9,800**	10,885	16,332	17,276
California State University, Monterey Bay	0	2,265	4,000	6,368
Salinas Valley State Prison	0	4,100	3,630	3,592
Soledad Correctional Training Facility	0	7,120	6,148	4,707

* Estimate.

**1990 figure for University of California, Santa Cruz reflects data from the 1991-92 academic year, the earliest year reported.

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[20] California Department of Corrections and Rehabilitation website for Salinas Valley State Prison. Figure reported for fiscal year 2009-2010. http://www.cdcr.ca.gov/Facilities_Locator/SVSP-Institution_Stats.html accessed December 9, 2012.

[21] California Department of Finance. Exclusion and Dorm Report. November 2012.

[22] Master Plan Annual Report: Calendar Year 2010. California Department of Corrections and Rehabilitation. January 2011.

[23] California Department of Corrections and Rehabilitation website for Soledad Correctional Training Facility. Figure reported for fiscal year 2007 http://www.cdcr.ca.gov/Facilities_Locator/CTF-Institution_Stats.html accessed December 9, 2012. Population counts derived from institutionalized group quarters counts from Census 2000 and Census 2010, U.S. Census Bureau.

2022 Regional Growth Forecast

Adjustments to the Population Projections

Developing Special and Non-Special Population Estimates

Special populations provide a challenge to the population projections because their growth and decline are often not determined by factors that impact the rates of change of the general population. This is particularly true of college students, prison inmates, and military personnel and their dependents. Residents of nursing homes, while also a special population, share many of the characteristics of the general population, and their growth and decline often mirror the demographic changes of the larger community. To deal with the special population issue, a common procedure applied in population projections is to exclude the special populations by using group quarters data and to project the adjusted population separately, i.e., the total population minus the special population. At the end of the projection module, the special population is added back to the projected adjusted population to produce the projected total population. The special population is either held constant or projected separately.[24]

Thus, projections for AMBAG jurisdictions (Marina, Santa Cruz, Seaside, Soledad and unincorporated Monterey County) should be adjusted to account for special populations independent of the non-special population trends.

To accomplish this, special populations should be subtracted from the census year population estimates used in developing the shift-share model population shares. Independent projections of the special populations (e.g., from master plan documents) should then be addressed separately in the population forecast.

Incorporating Special Populations into the Final Projections

As noted above, Fort Ord has closed, and thus major military populations can be assumed to be constant throughout the remainder of the forecast.

For the universities and the prison, master plan documents provide useful information about expected future populations. These population plans can be used to fill in horizon-year projections, which are then kept constant for any remaining years of the AMBAG forecast. Additionally, staff worked closely with UCSC to develop conservative estimates for growth after the horizon year of their long-range development plan.

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[24] Rayer, Stephan. MISER Population Projections for Massachusetts, 2000–2020. July 2003. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&ved=0CEUQFjAD&url=http%3A%2F%2Fwww.umass.edu%2Fmiser%2Fpopulation%2FDocuments%2FMAProjMethodology.doc&ei=-ke5UNPKDMmdqgH0h4GgDQ&usg=AFQjCNF6tP0wQ9CqtSb8X7-EUtMm9rmMrw&sig2=8pz3atGy03rNWjtvjbdjeg

Translating Population Growth into Housing

Special population adjustments for Fort Ord require no special processing, as the military population on Fort Ord is not expected to change in future years.

However, university populations for UCSC and CSUMB pose a special case. While housing will be provided by the universities, it is likely that many students will live in group quarters (described in more detail in Attachment 4), but at least some students will reside in housing "in town" as part of the resident population of surrounding jurisdictions. For this reason, university population projections and housing projections were completed separately from the jurisdiction population projections.

Population projection adjustments for SVSP and SCTF require no special processing for housing unit projections. These populations will be classified as group quarters, and thus are not considered in housing calculations.

Adjustments for Annexations

The shift-share approach outlined above presumes that most population change is a result of demographic and economic forces that can be represented by the rate of change over time. The shift-share approach is intended for use with jurisdictions that retain consistent geographic boundaries over time. Because the shift-share method presumes constant geographic boundaries, annexations, which by definition change jurisdiction boundaries, pose a unique problem. Adjustment techniques are needed to address these cases. Between 1990 and 2010 there was one heavily populated annexation in the AMBAG region. This case, the Watsonville annexation, is described in more detail below. (In 2008 Salinas also annexed the North of Boronda Future Growth Area, which had a population of approximately 100. This annexation, which affected the overall jurisdiction population by less than 0.1%, was not modeled separately.)

History of Annexations in the AMBAG Region

In 2000 the city of Watsonville annexed a portion of unincorporated Santa Cruz County. Known as the Freedom-Carey annexation, the change was recorded in July 2000, after the 2000 decennial Census.

Historical population estimates for the City of Watsonville, unincorporated Santa Cruz County and Freedom-Carey annexation area are shown in Table 11 below.

The data for 2000 reflect reports published by the Local Agency Formation Commission with respect to the annexation area. Data for 1990 were derived using trend extrapolations based on the rate of growth in associated census tracts (1106 and 1107). Similarly, data for 2010 were derived using trend extrapolations based on the rate of growth in associated census tracts (1105.02, 1106 and 1107).

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If the annexation of 2,022 residents were simply attributed to the population growth of Watsonville between 2000 and 2010, it would account for forty percent of the growth in the city's population during that period of time. Conversely, the loss of the annexed population would account for more than half of the decline in unincorporated population between 2000 and 2010.

Since the shift reflects an administrative boundary change, not a demographic one, the shift-share model was adjusted accordingly.

Table 11: Historical Population Estimates for the Watsonville Annexation Area

	1990	2000	2010
City of Watsonville	31,099	44,246	51,199
Excluding Annexation Area	31,099	44,246	49,229
Unincorporated County of Santa Cruz	130,086	135,345	129,739
Excluding Annexation Area	128,426	133,323	129,739
Annexation Area	1,660	2,022	1,970

Sources: Analysis by PRB of data from the U.S. Census Bureau.

Adjusting the Watsonville and Unincorporated Santa Cruz County Projections

In order to ensure that the population shift resulting from annexation does not skew the shift-share results for Watsonville or unincorporated Santa Cruz County, population projections for Watsonville, unincorporated Santa Cruz County, and the annexation area were estimated separately.

To complete this adjustment, the estimated annexation area population was subtracted from the unincorporated Santa Cruz County population totals in 1990 and 2000. Similarly, the projected population from the annexation area population was added to Watsonville in 2010.

Independent shift-share projections were developed for each of the three sub-areas: Watsonville excluding the annexation area, unincorporated Santa Cruz County excluding the annexation area and the annexation area.

To complete the projections, the annexation area projected population growth was added to Watsonville. Unlike the special population projections described above, there are no further adjustments needed to translate the resulting population projections into housing projections.

Exhibit 3.1-C

CALIFORNIA AMERICAN WATER

MONTEREY DISTRICT

CUSTOMERS & CONSUMPTION BY POLITICAL JURISDICTION

1000 Gallons

Oct 2018 to Sep 2019

CITY CODE	JURISDICTION	RESIDENTIAL CONNECTIONS	RESIDENTIAL USE	MULTI-RES CONNECTIONS	MULTI-RES USE	COMM/IND CONNECTIONS	COMM/IND USE	GOLF COURSE CONNECTIONS	GOLF COURSE USE	PUB AUTHORITY CONNECTIONS	PUB AUTHORITY USE	OTHER CONNECTIONS	OTHER USE	NON REVENUE CONNECTIONS	NON REVENUE USE	TOTAL CONNECTIONS	TOTAL (1000 GAL)	TOTAL (AF)
	CITY																	
1	Monterey	7,918	266,136.80	566	215,865.04	1,533	310,347.83	0	0.00	289	120,095.24	21	3,816.22	0	0.00	10,327	916,261.13	2,811.90
2	Pacific Grove	5,846	198,431.41	388	64,946.75	511	65,085.19	1	3,329.57	72	15,794.74	13	372.85	0	0.00	6,830	347,960.51	1,067.85
3	Carmel	2,818	110,552.71	153	9,960.04	370	62,518.26	0	0.00	49	3,580.14	3	1,189.41	0	0.00	3,393	187,800.55	576.34
4	Seaside	5,562	212,609.56	286	62,734.48	588	76,044.00	0	0.00	69	15,898.78	8	42.18	1	48.17	6,514	367,377.17	1,127.44
5	Del Rey Oaks	726	23,999.15	4	269.32	64	6,652.31	0	0.00	7	64.93	1	0.00	0	0.00	803	30,985.71	95.09
7	Sand City	102	3,234.69	7	2,664.56	236	17,300.02	0	0.00	3	179.28	4	802.32	0	0.00	352	24,180.87	74.21
CITY TOTAL		22,973	814,964.31	1,403	356,440.20	3,303	537,947.61	1	3,329.57	489	155,613.10	50	6,222.97	1	48.17	28,219	1,874,565.92	5,752.83
	COUNTY																	
6	Mtry Co. CV	1,359	70,401.40	100	16,327.40	127	22,573.78	0	0.00	5	11,552.07	4	51.42	3	456.20	1,598	121,362.27	372.45
8	In Crml San. Dist	2,652	124,302.30	80	21,895.50	186	31,849.18	0	0.00	16	11,113.04	5	1,015.53	0	0.00	2,940	190,175.55	583.63
9	Out Crml San. Dist	1,885	97,970.75	100	21,042.81	195	58,612.69	0	0.00	22	6,199.25	5	9.35	0	0.00	2,207	183,834.85	564.17
A	Mtry Co. Monterey	277	14,512.62	10	1,291.49	4	320.59	1	31,716.76	6	7,183.74	0	0.00	0	0.00	297	55,025.20	168.87
C	MPCC DMF	2,032	94,314.56	10	694.62	55	22,353.16	1	48.17	4	266.70	0	0.00	1	1.12	2,104	117,678.32	361.14
D	Mtry Co. PB	736	79,206.68	14	2,469.01	55	28,886.94	1	11.60	2	159.66	4	5,908.85	0	0.00	812	116,642.74	357.96
G	Rancho Fiesta	23	1,769.88	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	23	1,769.88	5.43
H	Rancho Del Monte	416	25,637.73	15	1,313.46	3	240.54	0	0.00	0	0.00	0	0.00	0	0.00	434	27,191.73	83.45
J	PB - LCP	19	2,248.75	0	0.00	1	26.40	0	0.00	0	0.00	0	0.00	0	0.00	20	2,275.15	6.98
COUNTY TOTAL		9,399	510,364.68	330	65,034.28	625	164,863.28	3	31,776.53	55	36,474.46	19	6,985.15	4	457.32	10,434	815,955.69	2,504.08
	OTHER																	
F	Well Irrigation CV	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	5.38	1	13.30	3	18.68	0.06
OTHER TOTAL		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	5.38	1	13.30	3	18.68	0.06
CV-SS-SCD TOTAL		32,371	1,325,328.99	1,734	421,474.48	3,928	702,810.89	4	35,106.10	543	192,087.56	71	13,213.51	6	518.78	38,656	2,690,540.30	8,256.96
E	Ryan Ranch	1	8.37	0	0.00	192	15,936.33	0	0.00	5	209.34	2	0.00	0	0.00	200	16,154.05	49.57
I	Hidden Hills	447	28,993.78	0	0.00	9	128.55	0	0.00	0	0.00	1	70.98	0	0.00	456	29,193.31	89.59
L	Bishop	340	25,595.07	0	0.00	60	10,503.09	0	0.00	0	0.00	13	51.75	0	0.00	413	36,149.91	110.94
RR-HH-Bishop Total		788	54,597.23	0	0.00	260	26,567.97	0	0.00	5	209.34	16	122.73	0	0.00	1,069	81,497.27	250.11
The number of Connections includes Fire Services														**All Jurisdictions =**		39,725	2,772,037.57	8,507.07

CALIFORNIA AMERICAN WATER

MONTEREY DISTRICT

CUSTOMERS & CONSUMPTION BY POLITICAL JURISDICTION

1000 Gallons

Oct 2017 to Sep 2018

CITY CODE	JURISDICTION	RESIDENTIAL CONNECTIONS	USE	AF	MULTI-RES CONNECTIONS	USE	AF	COMM/ IND /GOLF CONNECTIONS	USE	AF	GOLF COURSE CONNECTIONS	USE	PUB AUTHORITY CONNECTIONS	USE	AF	OTHER CONNECTIONS	USE	AF	NON REVENUE CONNECTIONS	USE	AF	TOTAL CONNECTIONS	TOTAL (1000 GAL)	TOTAL (AF)
	CITY																							
1	Monterey	7,901	277,778.90	852.47	560	215,758.25	662.14	1,570	325,177.38	997.93	0	0.00	258	121,289.57	372.22	31	3,429.49	10.52	0	0.00	0.00	10,320	943,433.59	2,895.29
2	Pacific Grove	5,852	205,144.30	629.56	386	67,629.32	207.55	551	78,588.60	241.18			72	16,956.91	52.04	16	656.05	2.01	0	0.00	0.00	6,877	368,975.19	1,132.34
3	Carmel	2,815	117,195.57	359.66	152	10,401.30	31.92	402	62,228.22	190.97	0	0.00	49	3,771.35	11.57	2	484.10	1.49	0	0.00	0.00	3,420	194,080.53	595.61
4	Seaside	5,542	237,863.49	729.98	285	65,745.97	201.77	585	85,517.27	262.44	0	0.00	63	16,958.29	52.04	8	66.13	0.20	1	47.20	0.14	6,484	406,198.34	1,246.58
5	Del Rey Oaks	726	27,755.78	85.18	4	254.44	0.78	74	6,347.26	19.48	0	0.00	6	68.94	0.21	1	0.00	0.00	0	0.00	0.00	812	34,426.41	105.65
7	Sand City	102	3,698.36	11.35	7	2,912.30	8.94	246	19,463.83	59.73	0	0.00	3	158.33	0.49	6	635.94	1.95	0	0.00	0.00	363	26,868.77	82.46
CITY TOTAL		22,938	869,436.40	2,668.20	1,394	362,701.58	111.31	3,427	577,322.55	1,771.74	0	0.00	451	159,203.39	488.58	63	5,271.70	16.18	1	47.20	0.14	28,275	1,973,982.82	6,057.93
	COUNTY																							
6	Mtry Co. CV	1,354	76,135.75	233.65	101	14,904.60	45.74	135	22,925.85	70.36	0	0.00	5	14,717.95	45.17	6	1,499.38	4.60	3	390.82	1.20	1,604	130,574.35	400.72
8	In Crml San. Dist	2,681	137,482.72	421.92	81	23,140.59	71.02	202	32,958.04	101.14	0	0.00	16	14,584.71	44.76	3	902.95	2.77	0	0.00	0.00	2,983	209,069.01	641.61
9	Out Crml San. Dist	1,882	106,410.06	326.56	99	22,153.20	67.99	213	58,289.92	178.89	0	0.00	22	16,055.58	49.27	6	42.11	0.13	0	0.00	0.00	2,222	202,950.87	622.83
A	Mtry Co. Monterey	253	13,161.75	40.39	10	1,096.99	3.37	4	27,654.90	84.87	1	0.00	5	7,446.85	22.85	0	0.00	0.00	0	0.00	0.00	272	49,360.49	151.48
C	MPCC DMF	2,010	100,222.20	307.57	10	773.73	2.37	61	23,882.21	73.29	1	0.00	4	258.35	0.79	0	0.00	0.00	1	0.00	0.00	2,087	125,136.49	384.03
D	Mtry Co. PB	733	90,136.76	276.62	15	2,841.27	8.72	63	28,024.60	86.00	1	0.00	2	204.49	0.63	5	1,897.75	5.82	0	0.00	0.00	819	123,104.87	377.79
G	Rancho Fiesta	23	2,012.07	6.17	0	0.00	0.00	0	0.00	0.00	0	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	23	2,012.07	6.17
H	Rancho Del Monte	415	26,988.79	82.83	15	1,470.65	4.51	4	330.52	1.01	0	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	434	28,789.96	88.35
J	PB - LCP	19	2,734.00	8.39	0	0.00	0.00	1	109.19	0.34	0	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	20	2,843.19	8.73
COUNTY TOTAL		9,370	555,284.10	1,704.10	331	66,381.03	203.72	682	194,175.22	595.90	3	0.00	54	53,267.93	163.47	20	4,342.19	13.33	4	390.82	1.20	10,463	873,841.29	2,681.72
	OTHER																							
F	Well Irrigation CV	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0	0.00	0.00	2	0.90	0.00	1	10.55	0.03	3	11.44	0.04
OTHER TOTAL		0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0	0.00	0.00	2	0.90	0.00	1	10.55	0.03	3	11.44	0.04
CV-SS-SCD TOTAL		32,308	1,424,720.50	0.00	1,725	429,082.61	1,316.81	4,109	771,497.77	2,367.64	3	0.00	505	212,471.32	652.05	85	9,614.79	0.01	6	448.57	1.38	38,740	2,847,835.55	8,739.69
E	Ryan Ranch	1	3.21	0.01	0	0.00	0.00	204	14,100.67	43.27	0	0.00	5	290.43	0.89	3	0.00	0.00	0	0.00	0.00	212	14,394.31	44.17
I	Hidden Hills	444	31,442.85	96.49	0	0.00	0.00	10	624.10	1.92	0	0.00	0	0.00	0.00	1	75.16	0.23	0	0.00	0.00	454	32,142.12	98.64
L	Bishop	318	25,750.64	79.03	0	0.00	0.00	55	9,459.29	29.03	0	0.00	0	0.00	0.00	12	30.89	0.09	0	0.00	0.00	385	35,240.82	108.15
RR-HH-Bishop Total		762	57,196.70	175.53	0	0.00	0.00	269	24,184.06	74.22	0	0.00	5	290.43	0.89	16	106.05	0.33	0	0.00	0.00	1,051	81,777.25	250.97
			2,929,612.80	8,990.65																**All Jurisdictions =**			39,791	2,929,612.80	8,990.65

CalAmCtrlDiv 8/1/2022 WY 17-18 Consumption with AF

CALIFORNIA AMERICAN WATER

MONTEREY DISTRICT

CUSTOMERS & CONSUMPTION BY POLITICAL JURISDICTION

1000 Gallons

Oct 2016 to Sep 2017

CITY CODE	JURISDICTION	RESIDENTIAL CONNECTIONS	RESIDENTIAL USE	MULTI-RES CONNECTIONS	MULTI-RES USE	COMM/IND CONNECTIONS	COMM/IND USE	GOLF COURSE CONNECTIONS	GOLF COURSE USE	PUB AUTHORITY CONNECTIONS	PUB AUTHORITY USE	OTHER CONNECTIONS	OTHER USE	NON REVENUE CONNECTIONS	NON REVENUE USE	TOTAL CONNECTIONS	TOTAL (1000 GAL)	TOTAL (AF)
	CITY																	
1	Monterey	7,942	277,579.23	565	225,080.62	1,519	319,939.68	0	0.00	290	112,545.80	22	1,763.62	0	0.00	10,338	936,908.95	2,875.27
2	Pacific Grove	5,833	198,475.25	386	66,975.09	508	69,155.12	1	24,219.76	72	17,896.24	12	637.29	0	0.00	6,813	377,358.75	1,158.07
3	Carmel	2,810	106,452.87	152	10,343.02	374	60,795.57	0	0.00	49	3,459.68	2	200.25	0	0.00	3,386	181,251.39	556.24
4	Seaside	5,542	244,682.86	289	72,288.53	580	85,322.28	0	0.00	68	16,459.85	8	100.82	1	4.85	6,488	418,859.19	1,285.43
5	Del Rey Oaks	727	28,243.27	4	317.00	64	6,174.92	0	0.00	7	62.30	1	0.00	0	0.00	803	34,797.49	106.79
7	Sand City	98	3,453.49	7	2,391.33	243	18,807.64	0	0.00	3	126.49	4	607.28	0	0.00	355	25,386.23	77.91
CITY TOTAL		22,951	858,886.96	1,403	377,395.58	3,288	560,195.21	1	24,219.76	490	150,550.36	49	3,309.27	1	4.85	28,183	1,974,561.99	6,059.71
	COUNTY																	
6	Mtry Co. CV	1,355	74,461.10	100	15,492.06	125	18,059.67	0	0.00	5	12,434.11	5	493.60	3	377.57	1,593	121,318.10	372.31
8	In Crml San. Dist	2,681	135,774.49	82	22,783.26	182	31,085.23	0	0.00	16	10,552.69	2	1,180.34	0	0.00	2,963	201,376.00	618.00
9	Out Crml San. Dist	1,883	100,926.42	98	23,996.27	199	54,996.19	0	0.00	22	10,185.27	5	39.79	0	0.00	2,207	190,143.94	583.53
A	Mtry Co. Monterey	275	13,672.91	11	1,284.42	4	303.83	1	30,644.07	5	6,588.50	0	0.00	0	0.00	296	52,493.72	161.10
C	MPCC DMF	2,004	92,776.59	10	605.68	57	24,700.04	1	52.88	4	254.10	0	0.00	1	0.00	2,077	118,389.28	363.32
D	Mtry Co. PB	722	74,266.70	15	2,706.19	57	25,318.30	1	6.96	2	194.01	4	826.24	0	0.00	801	103,318.39	317.07
G	Rancho Fiesta	23	1,422.88	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	23	1,422.88	4.37
H	Rancho Del Monte	417	27,270.26	14	1,299.21	4	238.96	0	0.00	0	0.00	0	0.00	0	0.00	435	28,808.43	88.41
J	PB - LCP	20	2,763.32	0	0.00	1	63.06	0	0.00	0	0.00	0	0.00	0	0.00	21	2,826.38	8.67
COUNTY TOTAL		9,380	523,334.67	329	68,167.09	629	154,765.26	3	30,703.90	55	40,208.68	16	2,539.96	4	377.57	10,416	820,097.12	2,516.79
	OTHER																	
F	Well Irrigation CV	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	3.22	1	89.68	3	92.90	0.29
OTHER TOTAL		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	3.22	1	89.68	3	92.90	0.29
CV-SS-SCD TOTAL		32,332	1,382,221.64	1,732	445,562.67	3,918	714,960.47	4	54,923.66	544	190,759.04	67	5,852.44	6	472.11	38,602	2,794,752.00	8,576.78
E	Ryan Ranch	0	0.00	0	0.00	179	16,265.54	0	0.00	5	283.93	2	0.00	0	0.00	185	16,549.47	50.79
I	Hidden Hills	442	31,168.23	0	0.00	8	53.85	0	0.00	0	0.00	1	71.66	0	0.00	451	31,293.73	96.04
L	Bishop	321	29,116.99	0	0.00	54	10,048.52	1	0.00	0	0.00	11	61.71	0	0.00	387	39,227.21	120.38
RR-HH-Bishop Total		763	60,285.21	0	0.00	241	26,367.91	1	0.00	5	283.93	14	133.37	0	0.00	1,023	87,070.42	267.21
														All Jurisdictions =		39,625	2,881,822.42	8,843.99

Consumption by Political Jurisdiction
1000 Gallons
Water Years 2017, 2018, 2019 Combined

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County	TOTAL
Total	2,843,701.50	1,094,294.45	563,132.47	1,192,434.70	100,209.61	76,435.87	2,713,264.22	8,583,472.82
Percent of Total								
Residential	1,478,210.42	801,602.12	364,905.51	895,924.89	80,838.96	18,354.73	1,960,633.41	5,600,470.04
Percent of Total	17.2%	9.3%	4.3%	10.4%	0.9%	0.2%	22.8%	
Non-Residential	1,365,491.08	292,692.33	198,226.96	296,509.81	19,370.65	58,081.14	752,630.81	2,983,002.78
Percent of Total	15.9%	3.4%	2.3%	3.5%	0.2%	0.7%	8.8%	

Notes:

1) Source: Cal-Am Customers & Consumption by Political Jurisdiction annual reports
2) Residential includes "Residential" and "Multi-Res" categories
3) Non-Residential is Total minus Residential
4) Monterey includes Ryan Ranch
5) County includes Hidden Hills and Bishop

Allocation of Production
Based on 5-Year Average (2017-2021)
Water Years 2017, 2018, 2019 Combined

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County	TOTAL
Residential	1,674.80	908.21	413.43	1,015.08	91.59	20.80	2,221.38	6,345.28
Non-Residential	1,547.09	331.62	224.59	335.94	21.95	65.81	852.72	3,379.72

Notes: Based on 5-year average production of: 9,725 AF

Water Required to Meet
AMBAG Regional Growth Forecast

Water Required for Population Growth

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County	TOTAL
Population in 2020	28,170	15,265	3,949	33,537	1,662	385	8,916	91,884
Population in 2045	29,639	15,817	3,984	38,316	2,650	1,198	9,916	101,520
Increase	5.2%	3.6%	0.9%	14.2%	59.4%	211.2%	11.2%	10.5%
Acre-Feet in 2020	1,675	908	413	1,015	92	21	2,221	6,345
Acre-Feet by 2045	1,762	941	417	1,160	146	65	2,471	6,961
AF Served by Others	9	-	-	72	11	-	75	167
Net AF in 2045	1,753	941	417	1,087	135	65	2,396	6,795

Water Required for Employment Growth

	Monterey	Pacific Grove	Carmel-by-the-Sea	Seaside	Del Rey Oaks	Sand City	County	TOTAL
Jobs in 2020	40,989	8,016	3,566	10,476	748	2,092	4,300	70,187
Jobs in 2045	45,509	8,445	3,915	11,543	834	2,259	4,721	77,226
Increase	11.0%	5.4%	9.8%	10.2%	11.5%	8.0%	9.8%	10.0%
Non-Residential AF in 2020	1,547	332	225	336	22	66	853	3,380
Non-Residential AF in 2045	1,718	349	247	370	24	71	936	3,716
Increase	171	18	22	34	3	5	83	336