

Stanislaus County Employees' Retirement Association

**Actuarial Experience Study for
July 1, 2015 through June 30, 2018**

Produced by Cheiron

February 2019

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Transmittal Letter	i
Section I Executive Summary	1
Section II Certification	3
Section III Economic Assumptions	4
A. Price Inflation.....	4
B. Wage Inflation	7
C. Discount Rate.....	8
Section IV Demographic Assumptions.....	14
A. Merit Salary Increases.....	14
B. Retirement Rates	16
C. Termination Rates	25
D. Disability Rates	33
E. Mortality Rates.....	38
F. Other Demographic Assumptions.....	43
 <u>Appendices</u>	
Appendix A Summary of Proposed Assumptions.....	45
Appendix B Summary of Prior Assumptions.....	56

February 20, 2019

Board of Retirement
Stanislaus County Employees' Retirement Association
832 12th Street, Suite 600
Modesto, CA 95353

Dear Members of the Board:

The purpose of this report is to present an Actuarial Experience Study of the Stanislaus County Employees' Retirement Association (StanCERA, the Fund, the Plan) covering actuarial experience from July 1, 2015 through June 30, 2018. The report includes analyses and recommendations of economic and demographic assumptions to be used beginning with the July 1, 2018 actuarial valuation.

If you have any questions about the report or would like additional information, please let us know.

Sincerely,
Cheiron



Graham A. Schmidt, ASA, FCA, MAAA, EA
Consulting Actuary



Jonathan Chipko, FSA, FCA, MAAA, EA
Consulting Actuary



STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018

SECTION I – EXECUTIVE SUMMARY

Actuarial assumptions (economic and demographic) are intended to be long-term in nature, and should be both individually reasonable and consistent in the aggregate. The purpose of this experience study is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for StanCERA, and if not, to recommend adjustments. It is important to note that frequent and significant changes in the actuarial assumptions are not typically recommended, unless there are known fundamental changes in expectations of the economy, or with respect to StanCERA's membership or assets that would warrant such frequent or significant changes.

SUMMARY OF ECONOMIC ASSUMPTION ANALYSIS

The specific economic assumptions analyzed in this report are price inflation, wage inflation, COLA growth, and the discount rate. These assumptions have a significant impact on the contribution rates in the short-term and the risk of negative outcomes in the long-term.

The economic assumptions recently adopted by the Retirement Board include a 7.00% long-term rate of return on Plan assets, an annual increase in prices measured by the Consumer Price Index (CPI) of 2.75%, annual wage increase equal to 25 basis points greater than price increases (3.00% in total), and a post-retirement COLA average growth rate of 2.60%.

The discount rate assumption is slightly more conservative than the long-term (20-year) capital market assumptions from a survey of investment consultants. Other data presented in this report indicate that the discount rate and other economic assumptions adopted by the Retirement Board are reasonable.

However, the Plan's investment consultant (Verus) projects lower returns for the next 10 years, averaging 6.8%, for StanCERA's current target portfolio. If the current target asset allocation is maintained and Verus's projections are realized, the Board can expect a pattern of actuarial losses from the assets in the near term. However, we would expect these losses to be offset by liability gains over the same time period, since Verus's inflation assumption (2.0%) is significantly lower than the Plan's assumption (2.75%), resulting in lower than expected pay and COLA increases.

SUMMARY OF DEMOGRAPHIC ASSUMPTION ANALYSIS

This experience study specifically analyzes and makes the following recommendations for the demographic assumptions.

- **Merit salary increases** – Adjustments to the rates at lower service levels for General members.
- **Retirement rates** – Lower rates for pre-PEPRA General members from ages 55-60. Adopt CalPERS rates for PEPRA members (General and Safety).
- **Termination rates** – No changes to overall rates, increase likelihood of reciprocity.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

SECTION I – EXECUTIVE SUMMARY

- **Disability rates** – Adopt CalPERS State Safety rates for Safety service-connected disability rates, update CalPERS non-service connected disability rates for General members.
- **Mortality rates** – Update adjustments to the CalPERS base tables and the generational mortality improvement scales (from the 2015 to the 2018 tables).
- **Other assumptions changes** – Reduce terminal payload for vacation cash outs, increase expected commencement age for General reciprocal transfers, update administrative expense assumption.

The changes in the economic assumptions increase costs overall, with a decrease due to the inflation rate somewhat offsetting an increase due to the discount rate. Among the demographic assumptions, the recommendation to change mortality assumptions has the largest impact on contribution rates, reducing rates substantially. The recently completed mortality study by the Society of Actuaries found that mortality rates had improved slower than previously anticipated and recommended future projections of mortality improvement commensurate with recent experience in the short-term tapering to a steady long-term expected rate. The recommended change to mortality rates for StanCERA reflects both the changes in StanCERA experience since the last experience study and the application of the recommended lower rates of improvement projected in the future.

The recommended changes to retirement and disability rates, as well as the changes to the terminal payload and assumed commencement age also would decrease contribution rates, while the changes to assumed merit salary increases and reciprocity rates would increase overall contribution rates.

Further information about impact of these changes to overall contribution rates can be found below:

Stanislaus County Employees' Retirement Association Assumptions Changes Impact				
	Gross Normal Cost %	Administrative Expense %	Amortization of UAL %	Gross Contribution
Mortality Assumption Change	-0.30%	0.00%	-1.34%	-1.64%
Retirement Assumption Change	0.02%	0.00%	-0.03%	-0.01%
Disabled Assumption Change	-0.43%	0.00%	0.02%	-0.41%
Merit Pay Assumption Change	0.54%	0.00%	-0.18%	0.36%
Reciprocity Assumption Change	0.35%	0.00%	-0.19%	0.16%
Vacation Pay Load Assumption Change	-0.23%	0.00%	-0.54%	-0.77%
Economic Assumptions Change	0.48%	0.07%	1.22%	1.77%
Impact of All Changes	0.43%	0.07%	-1.04%	-0.54%

The body of this report provides additional detail and support for our conclusions and recommendations.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

SECTION II – CERTIFICATION

The purpose of this report is to provide the results of an Actuarial Experience Study of the Stanislaus County Employees' Retirement Association (StanCERA) covering actuarial experience from July 1, 2015 through June 30, 2018. This report is for the use of the StanCERA Retirement Board in selecting assumptions to be used in actuarial valuations beginning June 30, 2018.

In preparing our report, we relied on information (some oral and some written) supplied by StanCERA. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for the StanCERA Retirement Board for the purposes described herein. This report is not intended to benefit any other party, and Cheiron assumes no duty or liability to any such party.

Graham A. Schmidt, ASA, FCA, MAAA, EA
Consulting Actuary

Jonathan Chipko, FSA, FCA, MAAA, EA
Consulting Actuary

SECTION III – ECONOMIC ASSUMPTIONS
PRICE INFLATION

The economic assumptions used in actuarial valuations are intended to be long-term in nature, and should be both individually reasonable and consistent with each other. The specific assumptions analyzed in this report are:

- **Price inflation** – used indirectly as an underlying component of other economic assumptions.
- **Wage inflation** – across the board wage growth used to project benefits and to amortize the unfunded liability as a level percentage of expected payroll.
- **COLA growth** – rate at which inflation-linked post-retirement COLAs are expected to change.
- **Discount rate** – used both to project long-term asset growth and to discount future cash flows in calculating the liabilities and costs of the Plan.

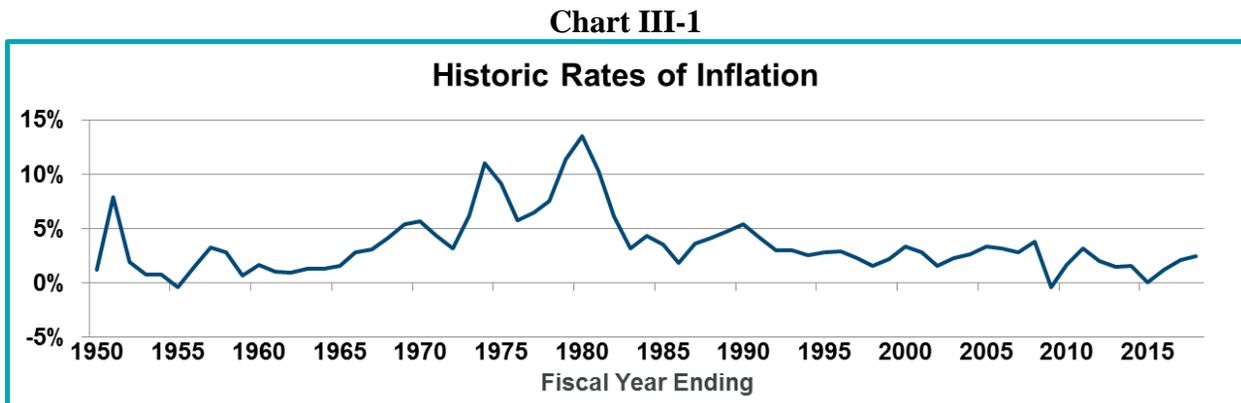
In order to develop recommendations for each of these assumptions, we considered historical data, both nationally and for the Plan, and expectations for the future, as expressed by the Plan's and other external investment consultants and the Board.

PRICE INFLATION

Long-term price inflation rates are the foundation of other economic assumptions. In a growing economy, wages and investments are expected to grow at the underlying inflation rate plus some additional real growth rate, whether it reflects productivity in terms of wages or risk premiums in terms of investments.

Historical Data

Chart III-1 below shows inflation for the U.S. by individual year since 1950.



Over the 50 years ending June 2018, the geometric average inflation rate for the U.S. has been about 4.0%, but this average is heavily influenced by the high inflation rates in the 1970s and

STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018

SECTION III – ECONOMIC ASSUMPTIONS
PRICE INFLATION

early 1980s. Over the last 30 years, the geometric average inflation rate has been 2.6%, and it has been only 1.4% over the last ten years.

Future Expectations

A measure of the market consensus of expected future inflation rates is the difference in yields between conventional treasury bonds and Treasury Inflation-Protected Securities (TIPS) at the same maturity. Table III-1 shows the yields on both types of bonds and the break-even inflation rate as of December 2018. Break-even inflation is the level of inflation needed for an investment in TIPS to “break even” with an investment in conventional treasury bonds of the same maturity.

Table III-1

Break-Even Inflation Based on Treasury Bond Yields			
Time to Maturity	Conventional Yield	TIPS Yield	Break Even Inflation
5 Years	2.68%	1.08%	1.60%
10 Years	2.83%	1.02%	1.81%
20 Years	2.98%	1.11%	1.87%

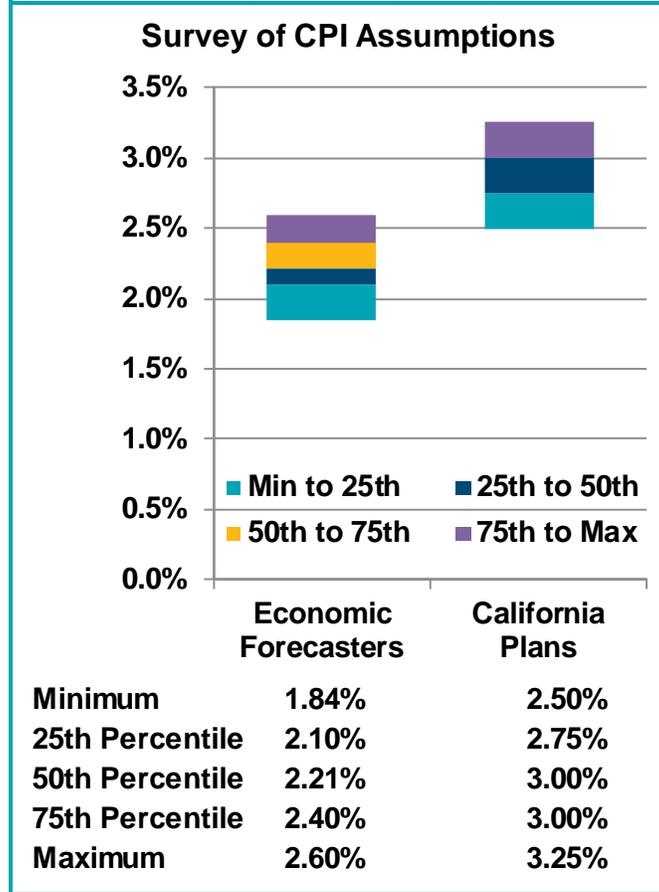
Data Source Federal Reserve, Constant Maturity Yields, Monthly Series

The Federal Reserve Bank of Philadelphia publishes a quarterly survey of professional economic forecasters that includes their forecasts of inflation over the next 10 years. The survey for the fourth quarter of 2018 shows a median inflation forecast of 2.21%; a minimum forecast of about 1.8% and a maximum forecast of 2.6%.

Chart III-2 on the next page shows the distribution of the professionals forecasts for average inflation over the next 10 years compared to assumptions used by our internal survey of California public pension plans.

SECTION III – ECONOMIC ASSUMPTIONS
PRICE INFLATION

Chart III-2



Finally, Verus, the Board's investment consultant, uses an inflation assumption of 2.0% for the next 10 years. A broader survey of 10 investment consultants, as published by Horizon Actuarial Services in 2018, reflects a 2.24% average assumption over the next 10 years and 2.47% over the next 20 years.

Based on all of these considerations, we believe a reasonable range for long-term price inflation for use in the Plan's actuarial valuations is between 2.0% and 3.0%. Therefore, we agree with the Board's recent action to reduce the assumption from 3.00% to 2.75%. If, at the time of the next review of economic assumptions, the markets and forecasters continue to indicate lower expectations of future inflation, further reductions in the assumption could be considered.

STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018

SECTION III – ECONOMIC ASSUMPTIONS
WAGE INFLATION

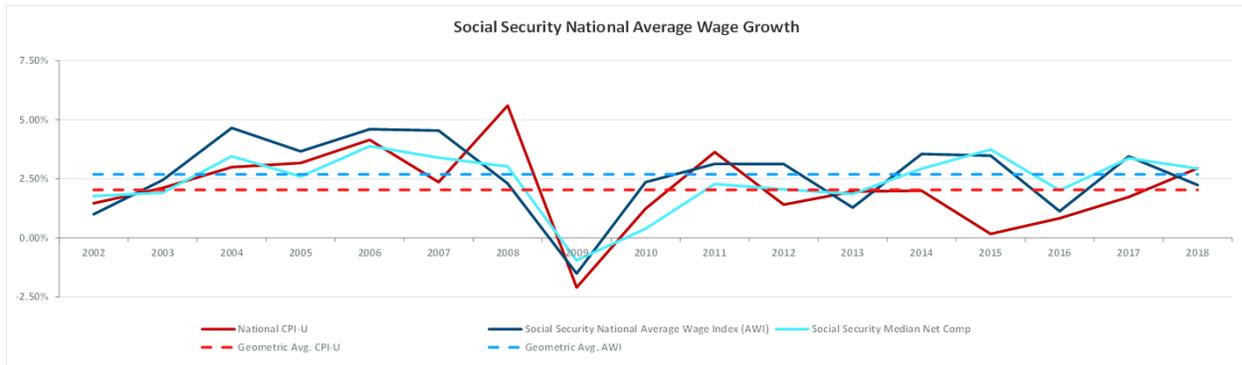
WAGE INFLATION

Wage inflation can be thought of as the annual across-the-board increase in wages. Individuals often receive salary increases in excess of the wage inflation rate, and we study these increases as a part of the merit salary scale assumption. Wage inflation generally exceeds price inflation by some margin reflecting the history of increased purchasing power.

Wage inflation is used in the actuarial valuation as the minimum expected salary increase for an individual and, for purposes of amortizing the unfunded actuarial liability, the rate at which payroll is expected to grow over the long term, assuming a stable active member population.

Chart III-3 shows the increase in national average wages (as reported by the Social Security Administration) compared to inflation from 2002 through 2018.

Chart III-3



Over this period, national wage inflation averaged approximately 2.7% compared to annual price inflation of 2.00%, making real wage increases about 0.7% above inflation. However, over the same time period the increase in the median real wage was only 0.3% per year, as much of the growth in wages was clustered at the top end of the wage scale.

It is acceptable to assume some additional level of base payroll increase beyond general inflation. Potential reasons contributing to the increase may include the presence of strong union representation in the collective bargaining process, competition in hiring among other similar employers, and regional factors – such as the local inflation index exceeding the national average, as has sometimes proven the case in parts of California. Also, the Social Security

**SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE**

Administration projects real wage growth of 0.6% - 1.8% going forward in their Social Security solvency projections. However, governmental entities remain under financial stress, and other areas of employee compensation – most notably health care costs and pension contributions – have continued to increase faster than the CPI.

Cheiron agrees with the Board's recent action to maintain a small non-inflationary base payroll growth assumption of 0.25% annually. As a result, the annual expected increase in base payroll would be 3.00%, reduced from 3.25% in the June 30, 2017 valuation. This increase will be applied to all continuing active members, and to starting pay for new entrants when projections of future populations are required. This increase will also be used in the calculation of the unfunded liability amortization payment as a level percentage of payroll.

COLA GROWTH

Members of StanCERA – other than those in Tier 3 - are eligible to receive automatic Cost of Living Adjustments (COLAs), based on the growth in the Bay Area Consumer Price Index (CPI-U) and a 3% cap on the annual COLA increase. Any increase in the CPI above the maximum increase can be banked for future years in which the change in the CPI is below the maximum increase.

It is necessary to determine an assumed rate of COLA growth, reflecting both inflation (i.e., the growth in the CPI), and the interaction of the CPI with the COLA cap and banking mechanism. Simulations of inflation show us that the average growth in the COLA is expected to be below the cap, even if the expected increase in the CPI is equal to or higher than the cap itself. This is because if there is not a significant bank already in existence (such as in the early years of retirement) and there are years in which inflation is below the cap, this shortfall will not be made up in future years.

We have produced statistical simulations of inflation and then modeled how the COLA maxima and the banking process interact with the changes in CPI. For a given long-term estimate of inflation, we used a 30% autocorrelation factor with 1.5% annual inflation volatility. A starting inflation level of 3.50% was used in the simulations, to reflect the most recent level of Bay Area inflation.

Based on the results of these simulations, and using the 2.75% inflation assumption adopted by the Board, which we believe to be reasonable, we recommended a COLA growth assumption of 2.60%.

DISCOUNT RATE

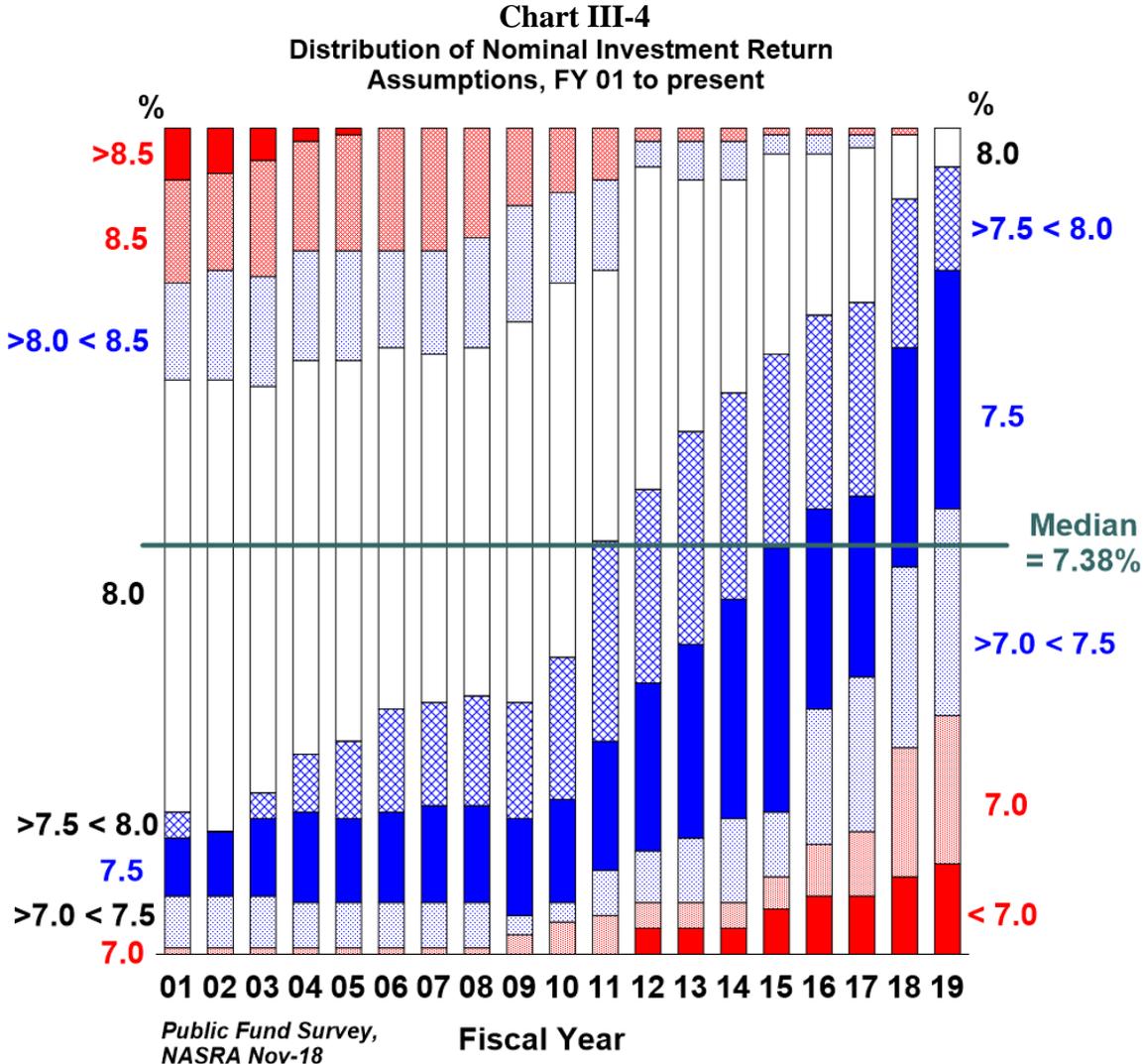
The discount rate assumption is generally the most significant of all the assumptions employed in actuarial valuations. The discount rate is based on the long-term expected return on plan investments. In the short-term, a higher discount rate results in lower expected contributions.

**SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE**

However, over the long term, actual contributions will depend on actual investment returns and not the discount rate (or expected investment returns). If actual investment returns are lower than expected, contribution rates will increase in the future. It is important to set a realistic discount rate so that projections of future contributions for budgeting purposes will not be biased, particularly to be too low.

Other Large Public Retirement Plans

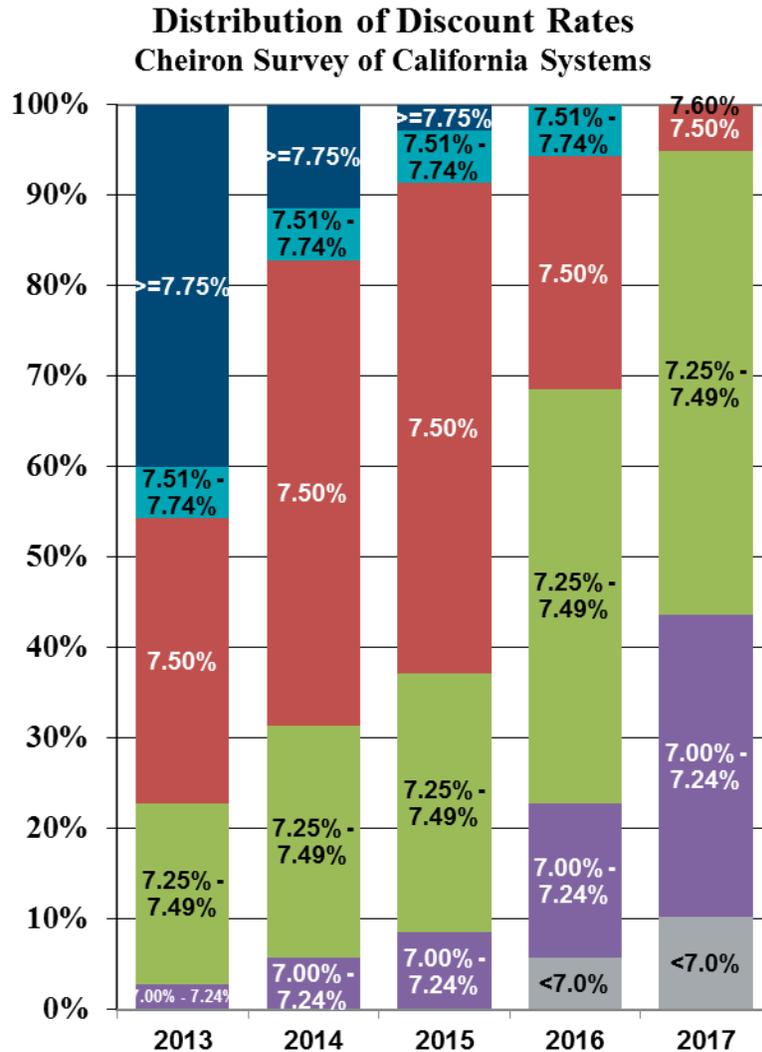
Based on the Public Fund Survey, developed by the National Association of State Retirement Administrators (NASRA) covering most of the largest public retirement systems in the country, there has been a general movement over at least the last decade to reduce the discount rate used in actuarial valuations. Chart III-4 below shows the change in the distribution of assumptions since 2001. The median assumption is now 7.38% and the number of plans using a discount rate 7.0% or lower has increased significantly.



SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE

In our survey of California retirement systems, the median assumption is even lower at 7.25% with over half of the 39 systems using the median rate. Only two systems were using a rate of 7.50% or higher in 2013, and both have since reduced their discount rates. Chart III-5 below shows the change in discount rate assumptions for California systems from 2013 to 2017.

Chart III-5



Target Asset Allocation and Future Expectations

The discount rate assumption depends on the anticipated average level of inflation and the anticipated average *real rate of return*. The real rate of return is the investment return in excess of underlying inflation. The expected average real rate of return is heavily dependent on asset mix: The portion of assets in stocks, bonds, and other asset classes.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE**

Table III-2 below shows the expected nominal geometric return based on the Board’s current target asset allocation and the capital market assumptions provided by the Plan’s investment consultant (Verus), as well as a survey of multiple investment consultants published by Horizon Actuarial Services over both a 10 and 20-year time horizon. The table also shows the underlying inflation assumption used in the development of these capital market assumptions and computes the expected real rate of return (investment return in excess of inflation).

For some classes in the StanCERA portfolio – in particular international small cap, cash, short-term government credit, emerging markets debt, private credit, value-add real estate and risk parity – the Horizon survey did not include specific assumptions, therefore the Verus assumptions were used for these classes (adjusted for differences in inflation).

Based on these assumptions, we calculated an expected geometric return of 7.47% under the Horizon 20-year survey assumptions, but only a 6.84% and 6.71% return under the Verus and Horizon 10-year assumptions, respectively.

Table III-2

StanCERA Target Portfolio Return Expectations			
Source	Nominal	Inflation	Real
Verus	6.84%	2.00%	4.84%
Horizon (Survey, 10-year)	6.71%	2.24%	4.47%
Horizon (Survey, 20-year)	7.47%	2.47%	5.00%

Based on these capital market assumptions, we also calculated the potential distribution of returns over 10 and 20-year periods as shown in Table III-3. The 50th percentile nominal return under the Horizon 20-year survey assumptions was 7.47%, which is higher than the 7.00% nominal return recently adopted by the Board.

SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE

Table III-3

Expected Distribution of Average Annual Passive Investment Returns						
Percentile	Verus (10 years)		Horizon Survey (10 years)		Horizon Survey (20 years)	
	Nominal	Real	Nominal	Real	Nominal	Real
95th	12.24%	10.24%	12.13%	9.89%	11.27%	8.80%
75th	9.02%	7.02%	8.90%	6.66%	9.01%	6.54%
50th	6.84%	4.84%	6.71%	4.47%	7.47%	5.00%
25th	4.70%	2.70%	4.56%	2.32%	5.95%	3.48%
5th	1.69%	-0.31%	1.55%	-0.69%	3.80%	1.33%

As stated earlier in this report, the Verus geometric assumption for the current target portfolio is slightly lower over the next 10 years (6.84%), and similar to the Horizon 10-year expectation. However, the Board's recently adopted real return assumption (4.25%, based on a 7.00% nominal return and 2.75% price inflation) is more conservative than the median real return under the Verus assumptions (4.84%).

As of the 2013 valuation, the expected rate of return is expressed net of investment, but not administrative, expenses. The returns above were modeled based on the expected returns of the portfolio benchmark indices, which are expected to have minimal expenses. The actuarial standards on selecting a return assumption (ASOP 27) state that in general superior or inferior returns (net of fees) should not be assumed for active versus passive management, therefore we do not recommend a significant adjustment to the modeled returns for the fees of the asset managers. However, a slight margin is appropriate to reflect the investment-related expenses other than those of the investment managers, which would include the investment advisor and custodian.

The recently adopted discount rate of 7.00% is consistent with the capital market assumptions discussed above, including an adjustment for differences in inflation and a small adjustment for investment-related expenses as described above. We therefore find the current discount rate to be a reasonable assumption.

While short-term considerations should not be unduly weighted when setting the discount rate, stakeholders should be aware of the following factors regarding short-term expectations:

- Many investment consultants expect poor rates of return in the immediate and near-term future. They reason that there is little in the way of yields on fixed income, and that the equity markets are fully valued.
- We believe that near- and mid-term return projections should be considered along with long-term projections. Fund performance is usually measured over five to 10 years; longer measurement periods are often considered less relevant because of the potential for changes in the economy and in the investment markets.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION III – ECONOMIC ASSUMPTIONS
DISCOUNT RATE**

- If Verus and much of the investment community are correct in their projections, we can expect returns below the 7.00% assumed rate for a number of years. This will result in actuarial losses and increases in employer contribution rates. However, these losses may be partially offset by gains on the liabilities from price and wage inflation below the assumed level (2.75% and 3.00%, respectively)

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MERIT SALARY INCREASES**

Demographic assumptions are used to predict membership behavior, including rates of retirement, termination, disability, and mortality. These assumptions are based primarily on the historical experience of StanCERA, with some adjustments where future experience is expected to differ from historical experience and with deference to standard tables where StanCERA experience is not fully credible and a standard table is available. For purposes of this study, merit salary increases are also considered a demographic assumption because the assumption is based primarily on StanCERA's historical experience.

MERIT SALARY INCREASES

Salary increases consist of three components: Increases due to cost of living maintenance (inflation), increases related to non-inflationary pressures on base pay (such as productivity increases), and increases in individual pay due to merit, promotion, and longevity. Increases due to cost of living and non-inflationary base pay factors were addressed in an earlier section of this report. To analyze the merit component, we subtracted the Plan's base wage growth as measured by the increase in the Plan's aggregate average wages for General members with 20 or more years of service during the experience study period, and Safety members with 10 or more years of service.

The merit salary increase assumption is analyzed by employee group and by service. Generally, newer employees are more likely to earn a longevity increase or receive a promotion, so their salary increases tend to be greater than those for longer service employees.

Charts IV-1 and IV-2 on the next page analyze the pay patterns for Safety and General members, respectively. The charts show the current assumption (red line) compared to the actual experience (blue line) and the proposed assumption (green line).

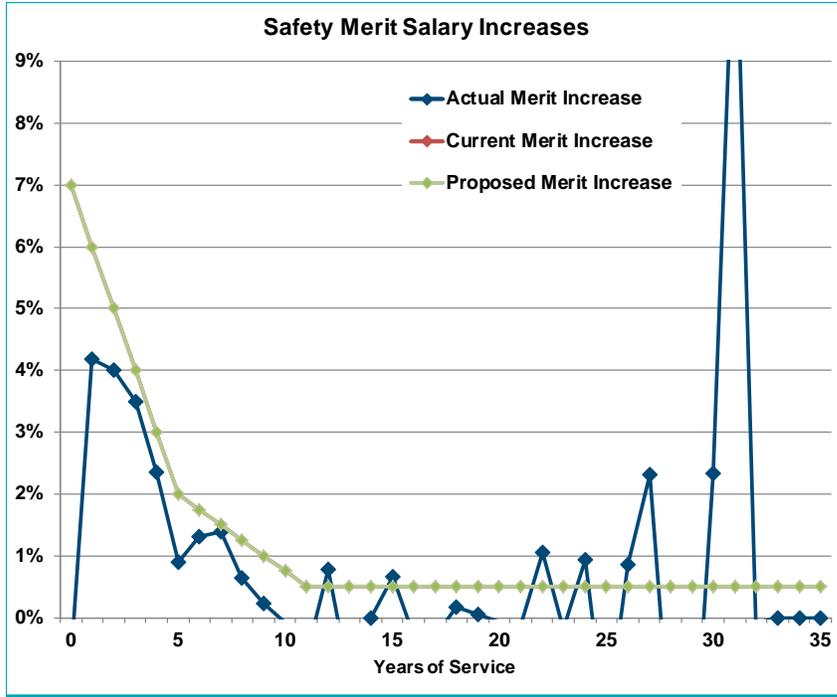
For Safety members, we have not recommended any changes.

For General members, we have proposed new assumptions with rates of 5% per year in the first five years of service and slightly higher increases thereafter, when compared to the previous assumption. The 5% pattern of increases in the first five years fits well with our general understanding of how the step increases work in the members' pay schedules. The proposal maintains an ultimate rate of 0.50% but at a later stage of a member's career than previously assumed, in this case, at 11 years of service instead of at eight years of service.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

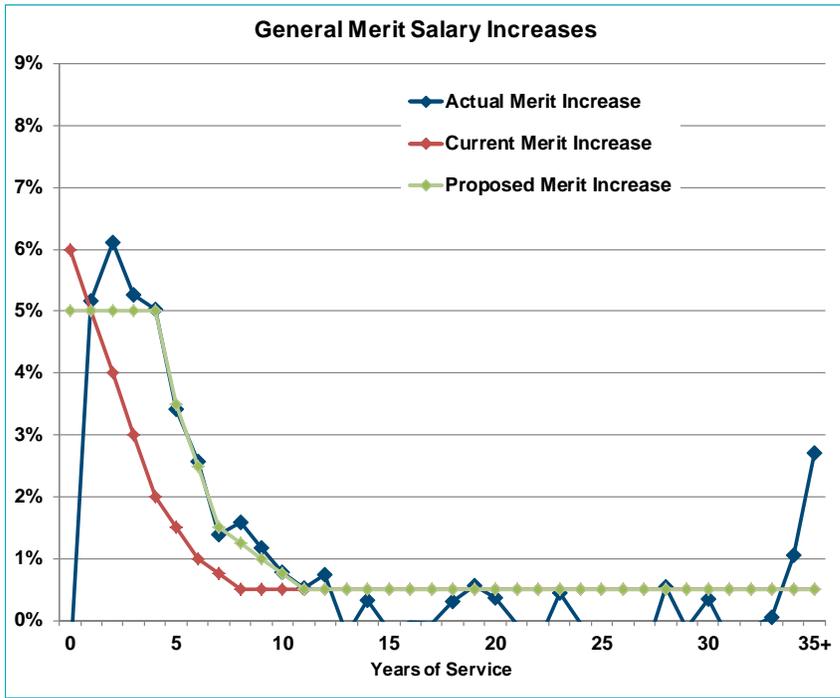
**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MERIT SALARY INCREASES**

Chart IV-1



Merit Salary Increases Safety		
Service	Current	Recommended
0	7.00%	7.00%
1	6.00%	6.00%
2	5.00%	5.00%
3	4.00%	4.00%
4	3.00%	3.00%
5	2.00%	2.00%
6	1.75%	1.75%
7	1.50%	1.50%
8	1.25%	1.25%
9	1.00%	1.00%
10	0.75%	0.75%
11	0.50%	0.50%
12	0.50%	0.50%
13	0.50%	0.50%
14	0.50%	0.50%
15	0.50%	0.50%
16	0.50%	0.50%
17	0.50%	0.50%
18	0.50%	0.50%
19	0.50%	0.50%
20	0.50%	0.50%
21	0.50%	0.50%
22	0.50%	0.50%
23	0.50%	0.50%
24	0.50%	0.50%
25	0.50%	0.50%
26	0.50%	0.50%
27	0.50%	0.50%
28	0.50%	0.50%
29	0.50%	0.50%
30+	0.50%	0.50%

Chart IV-2



Merit Salary Increases General		
Service	Current	Recommended
0	6.00%	5.00%
1	5.00%	5.00%
2	4.00%	5.00%
3	3.00%	5.00%
4	2.00%	5.00%
5	1.50%	3.50%
6	1.00%	2.50%
7	0.75%	1.50%
8	0.50%	1.25%
9	0.50%	1.00%
10	0.50%	0.75%
11	0.50%	0.50%
12	0.50%	0.50%
13	0.50%	0.50%
14	0.50%	0.50%
15	0.50%	0.50%
16	0.50%	0.50%
17	0.50%	0.50%
18	0.50%	0.50%
19	0.50%	0.50%
20	0.50%	0.50%
21	0.50%	0.50%
22	0.50%	0.50%
23	0.50%	0.50%
24	0.50%	0.50%
25+	0.50%	0.50%

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

ANALYSIS OF OTHER DEMOGRAPHIC ASSUMPTIONS

For all of the remaining demographic assumptions, we determined the ratio of the actual number of decrements for each membership group compared to the expected number of decrements (A/E ratio or actual-to-expected ratio). If the assumption is perfect, this ratio will be 100%. Otherwise, any recommended assumption change should move from the current A/E ratio towards 100% unless future experience is expected to be different than the experience during the period of study.

We also calculate an r-squared statistic for each assumption. R-squared measures how well the assumption fits the actual data and can be thought of as the percentage of the variation in actual data explained by the assumption. Ideally, r-squared would equal 100% although this is never the case. Any recommended assumption change should increase the r-squared compared to the current assumption making it closer to 100% unless the pattern of future decrements is expected to be different from the pattern experienced during the period of study.

In addition, we calculated the 90% confidence interval, which represents the range within which the true decrement rate during the experience study period fell with 90% confidence. (If there is insufficient data to calculate a confidence interval, the confidence interval is shown as the entire range of the graph.) We generally propose assumption changes when the current assumption is outside the 90% confidence interval of the observed experience. However, adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption. For disability and mortality rates, we compare StanCERA's experience to that of a standard table, and only adjust the standard table to the extent StanCERA's experience is large enough to be credible in the case of disabilities. For mortality, we adjust the standard table to bring the proposed assumption closer to an A/E ratio of 100%.

RETIREMENT RATES

The current retirement rates vary by age and service and are applied to all members who are eligible to retire. As a result, a General member who is age 60 with 10 years of service, for example, is assumed to be less likely to retire than a member who is age 60 with 30 years of service. In reviewing the data for StanCERA, we find that at many ages, members with more service are generally more likely to retire than members with fewer years of service. StanCERA is not large enough to justify assumptions for each age and service combination, so we continue to recommend separate assumptions by age for each of the following two service groups for Safety members:

- Members with less than 20 years of service,
- Members with 20 or more years of service.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

We continue to recommend separate assumptions by age for each of the following two service groups for General members:

- Members with less than 30 years of service,
- Members with 30 or more years of service.

As part of their findings in the actuarial audit performed on the 2015 Experience Study, Bartel Associates recommended considering whether it would be appropriate to use different retirement assumptions for the different Tiers, including the PEPRA members. For the pre-PEPRA membership, over 90% of the active members are in Tier V, so we do not believe there is credible information to make different assumptions, nor would different assumptions have a significant impact on Plan cost.

For the PEPRA membership, there is no data yet on retirement rates that would enable us to generate a distinct set of credible assumptions. However, based on the lower benefits at earlier ages and higher ages at which the maximum benefit multipliers are reached under the PEPRA formulas, it is reasonable to expect that some members will retire at later ages than they would under the pre-PEPRA formulas.

CalPERS has developed age and service based retirement rates reflecting these expectations. For the PEPRA members, we recommend adopting the CalPERS 2% at Age 62 Public Agency Miscellaneous rates and the 2.7% at Age 57 Public Agency Police rates (since the StanCERA Safety workforce has considerably more Police than Fire members). See Appendix A for a listing of the proposed rates.

For the pre-PEPRA membership, Table IV-R1 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with less than 20 years of service. Chart IV-R1 shows the information graphically along with the 90% confidence interval.

The data shows slightly lower actual retirement rates than expected under the current assumption, with an A/E ratio of 77% (83% for those under age 65). The actual rate was lower than the expected rate for those aged 61-64, but there were relatively few individuals still working at these ages. We do not propose any changes to these assumptions.

See Appendices A and B for a full listing of the rates. The ultimate retirement age remains at 65.

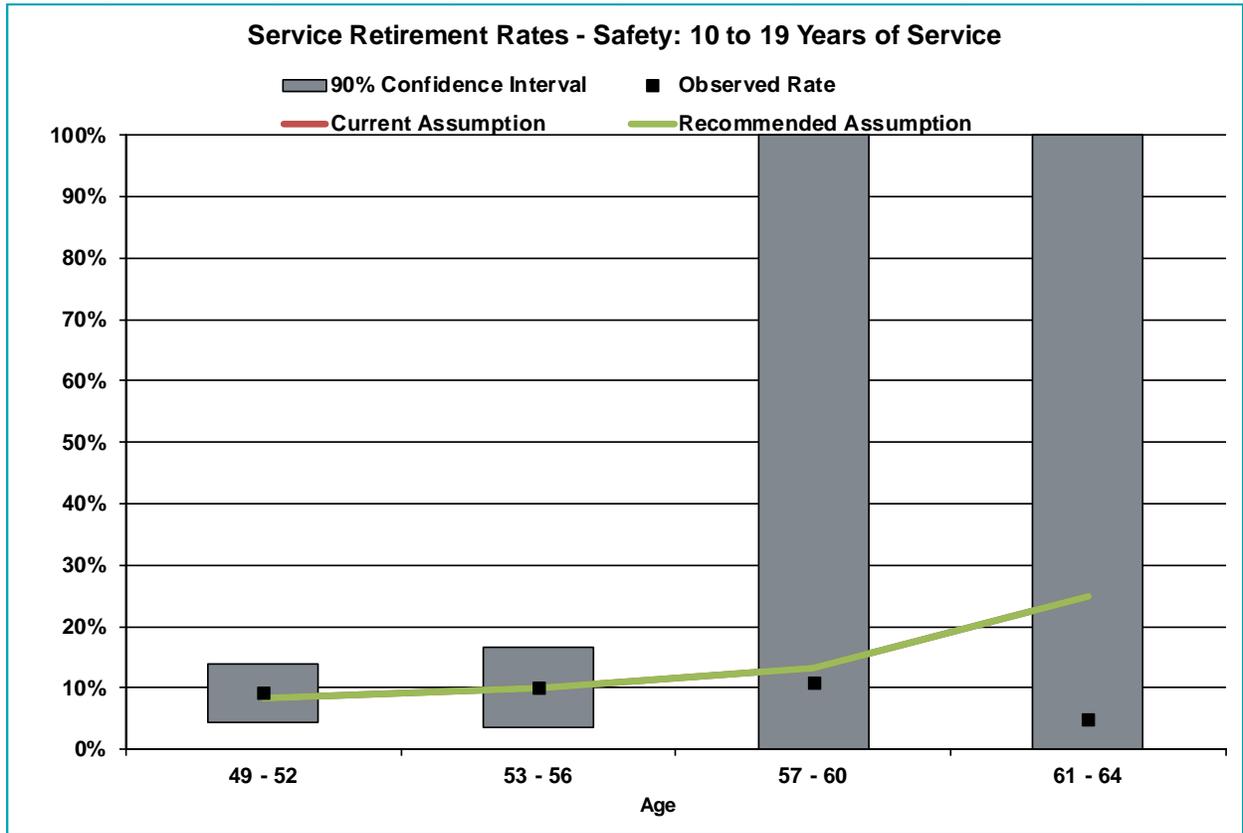
**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table IV-R1

Service Retirement Rates - Safety: 10 to 19 Years of Service							
Age	Exposures	Retirements			Actual to Expected Ratios		
		Actual	Current	Recommended	Current	Recommended	
49 - 52	98	9	8.1	8.1	111%	111%	
53 - 56	59	6	5.9	5.9	103%	103%	
57 - 60	46	5	6.1	6.1	82%	82%	
61 - 64	21	1	5.1	5.1	20%	20%	
Subtotal	223	21	25.2	25.2	83%	83%	
65+	8	4	7.5	7.5	53%	53%	
Total	231	25	32.7	32.7	77%	77%	
R-squared			0.5842	0.5842			

Chart IV-R1



Average Retirement Age			
Actual:	55.6	Current Expected:	58.1
		Recommended Expected:	58.1

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table IV-R2 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with 20 or more years of service, and Chart IV-R2 shows the information graphically along with the 90% confidence interval.

The data shows similar retirement rates to those expected under the current assumptions. We do not propose any changes to these assumptions.

See Appendices A and B for a full listing of the proposed and prior rates. The ultimate retirement age remains at 60.

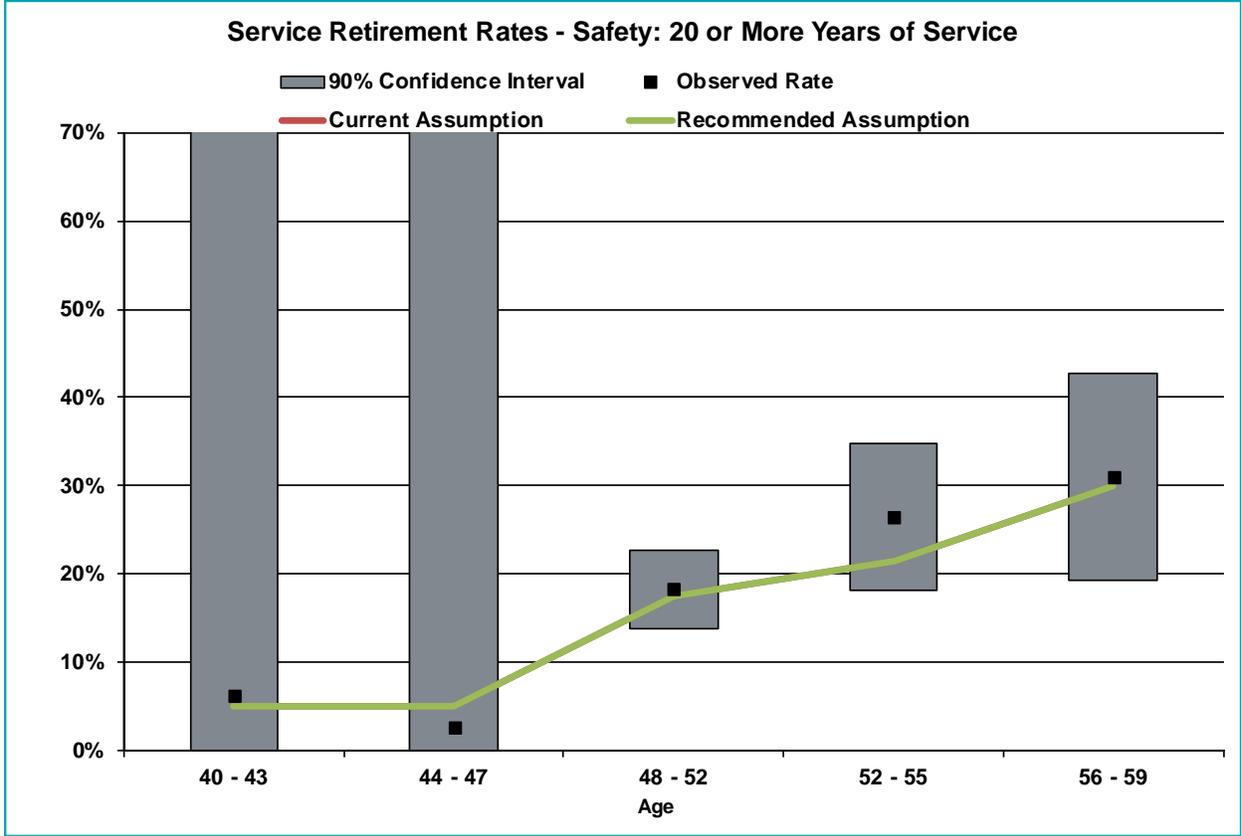
Table IV-R2

Service Retirement Rates - Safety: 20 or More Years of Service						
Age	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
40 - 43	48	3	2.4	2.4	124%	124%
44 - 47	186	5	9.3	9.3	54%	54%
48 - 52	203	37	35.4	35.4	104%	104%
52 - 55	76	20	16.3	16.3	123%	123%
56 - 59	42	13	12.6	12.6	103%	103%
Subtotal	554	78	76.0	76.0	103%	103%
60+	20	8	20.0	20.0	40%	40%
Total	574	86	96.0	96.0	90%	90%
R-squared			0.9496	0.9496		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Chart IV-R2



Average Retirement Age			
Actual:	52.5	Current Expected:	53.6
		Recommended Expected:	53.6

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table IV-R3 shows the calculation of actual-to-expected ratios and the r-squared statistic for General members with less than 30 years of service. Chart IV-R3 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the assumed retirement rates between the ages of 55 and 60 and increases the aggregate A/E ratio from 83% to 90%. The r-squared also increases from 0.94 to 0.96.

See Appendices A and B for a full listing of the proposed and prior rates. The ultimate retirement age remains at 75.

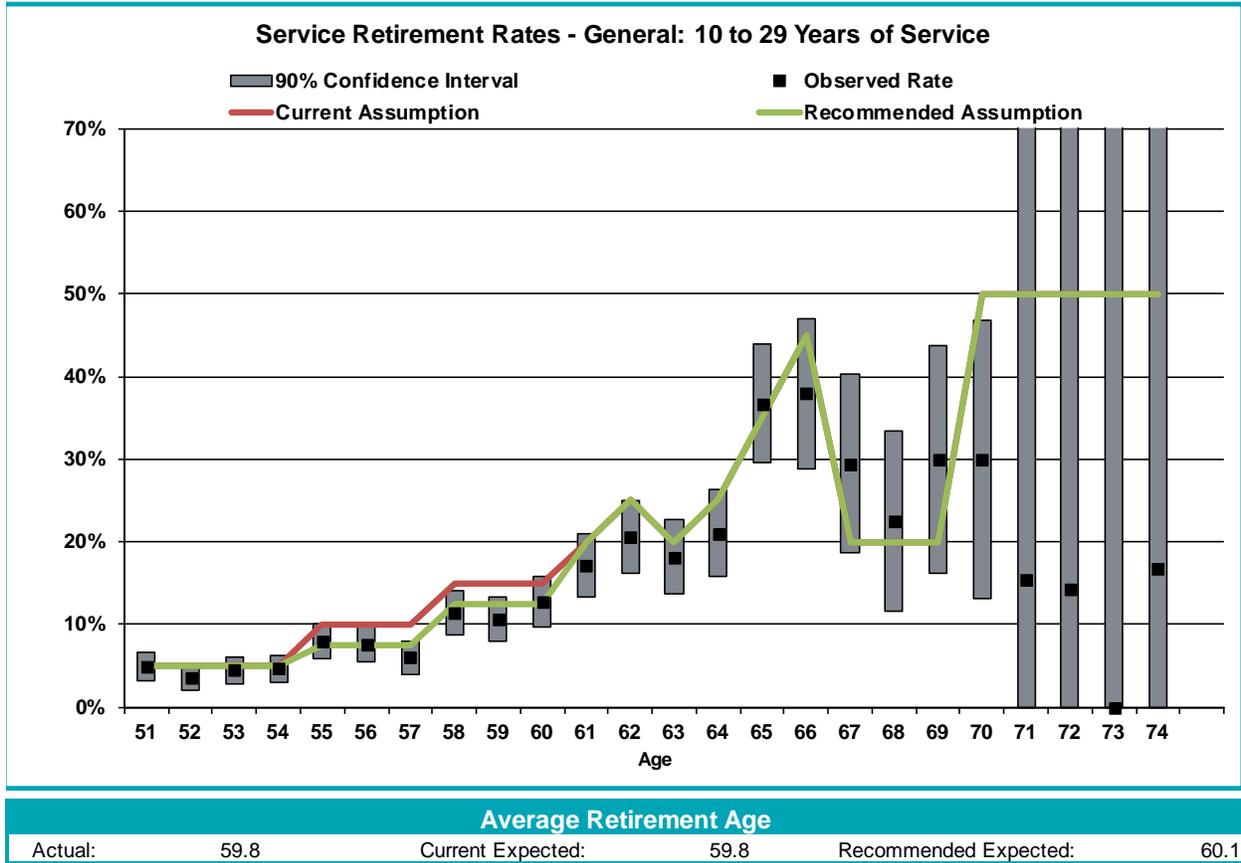
Table IV-R3

Service Retirement Rates - General: 10 to 29 Years of Service						
Age	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
50	439	20	21.9	21.9	91%	91%
51	451	22	22.5	22.5	98%	98%
52	429	15	21.5	21.5	70%	70%
53	445	20	22.2	22.2	90%	90%
54	430	20	21.5	21.5	93%	93%
55	431	34	43.1	32.3	79%	105%
56	407	31	40.7	30.5	76%	102%
57	382	23	38.2	28.6	60%	80%
58	369	42	55.3	46.1	76%	91%
59	339	36	50.8	42.3	71%	85%
60	314	40	47.1	39.3	85%	102%
61	268	46	53.6	53.6	86%	86%
62	233	48	58.3	58.3	82%	82%
63	193	35	38.5	38.5	91%	91%
64	162	34	40.4	40.4	84%	84%
65	123	45	42.9	42.9	105%	105%
66	77	29	34.4	34.4	84%	84%
67	48	14	9.5	9.5	147%	147%
68	40	9	8.0	8.0	113%	113%
69	30	9	6.0	6.0	150%	150%
70	20	6	10.0	10.0	60%	60%
71	13	2	6.5	6.5	31%	31%
72	7	1	3.5	3.5	29%	29%
73	5	0	2.5	2.5	0%	0%
74	6	1	3.0	3.0	33%	33%
Subtotal	5,655	582	701.7	645.7	83%	90%
75+	1	0	1.0	1.0	0%	0%
Total	5,656	582	702.7	646.7	83%	90%
R-squared			0.9423	0.9587		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Chart IV-R3



**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table IV-R4 shows the calculation of actual-to-expected ratios and the r-squared statistic for General members with 30 or more years of service, and Chart IV-R4 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption. The proposed assumption decreases the assumed rate of retirement from ages 55 to 59 and increases the aggregate A/E ratio from 85% to 93%. The r-squared also increases from 0.80 to 0.88.

See Appendices A and B for a full listing of the proposed and prior rates. The ultimate retirement age remains at 70.

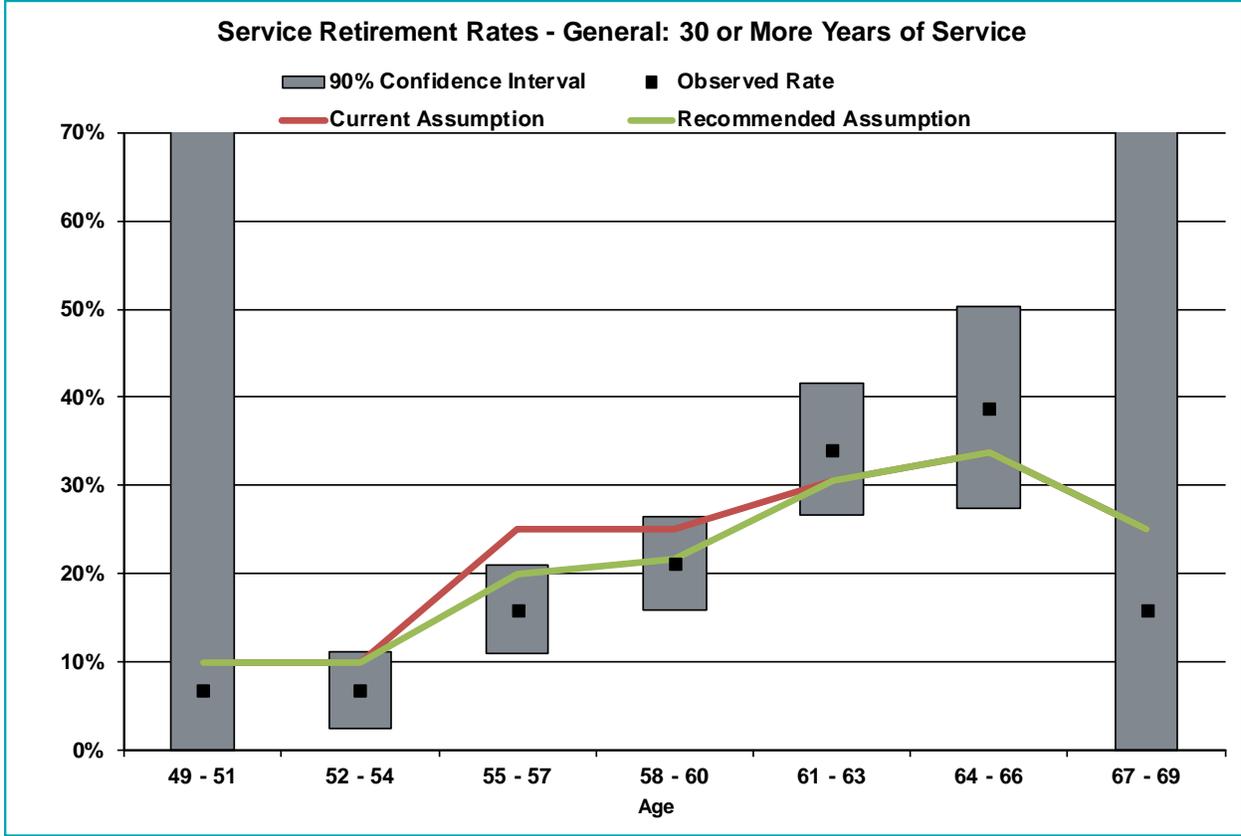
Table IV-R4

Service Retirement Rates - General: 30 or More Years of Service						
Age Band	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
49 - 51	15	1	1.5	1.5	69%	69%
52 - 54	89	6	8.9	8.9	68%	68%
55 - 57	145	23	36.1	28.9	64%	80%
58 - 60	161	34	40.3	35.0	84%	97%
61 - 63	109	37	33.2	33.2	111%	111%
64 - 66	49	19	16.6	16.6	115%	115%
67 - 69	19	3	4.8	4.8	63%	63%
Subtotal	585	123	141.2	128.7	87%	96%
70+	10	5	9.5	9.5	53%	53%
Total	595	128	150.7	138.2	85%	93%
R-squared			0.7993	0.8799		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Chart IV-R4



Average Retirement Band			
Actual:	60.5	Current Expected:	60.2
		Recommended Expected:	60.5

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Termination rates reflect the frequency at which active members leave employment for reasons other than retirement, death, or disability. Currently, there is one set of service-based termination rates for Safety members, and one set for General members. The General experience was analyzed separately for males and females, but previously a single set of termination rates was used for both groups, and based on the recent data we recommend continuing this approach.

Table IV-T1 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members, and Chart IV-T1 shows the information graphically along with the 90% confidence interval.

The data shows actual termination rates are similar to those expected under the current assumptions, therefore no changes are proposed.

See Appendices A and B for a full listing of the rates.

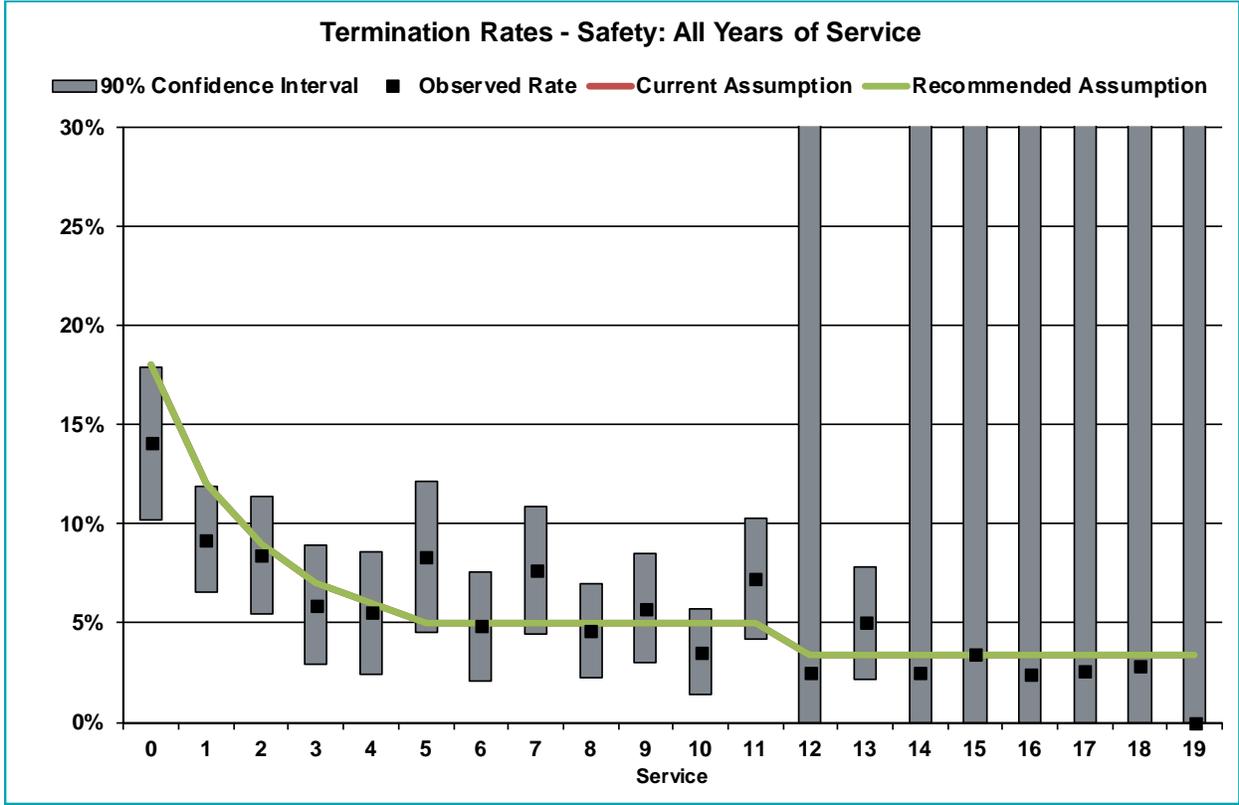
Table IV-T1

Termination Rates - Safety: All Years of Service						
Service	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
0	220	31	39.6	39.6	78%	78%
1	315	29	37.8	37.8	77%	77%
2	238	20	21.4	21.4	93%	93%
3	169	10	11.8	11.8	85%	85%
4	145	8	8.7	8.7	92%	92%
5	144	12	7.2	7.2	167%	167%
6	165	8	8.3	8.3	97%	97%
7	183	14	9.2	9.2	153%	153%
8	217	10	10.9	10.9	92%	92%
9	192	11	9.6	9.6	115%	115%
10	197	7	9.9	9.9	71%	71%
11	193	14	9.7	9.7	145%	145%
12	162	4	5.5	5.5	73%	73%
13	160	8	5.4	5.4	147%	147%
14	158	4	5.4	5.4	74%	74%
15	145	5	4.9	4.9	101%	101%
16	125	3	4.3	4.3	71%	71%
17	116	3	3.9	3.9	76%	76%
18	105	3	3.6	3.6	84%	84%
19	43	0	1.5	1.5	0%	0%
Total	3,392	204	218.4	218.4	93%	93%
R-squared			0.9079	0.9079		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Chart IV-T1



Average Termination Service			
Actual:	5.8	Current Expected:	5.5
		Recommended Expected:	5.5

Table IV-T2 shows the calculation of actual-to-expected ratios and the r-squared statistic for male General members, and Chart IV-T2 shows the information graphically along with the 90% confidence interval.

The data shows similar termination rates to those expected under the current assumptions, therefore no changes are proposed.

See Appendices A and B for a full listing of the rates.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

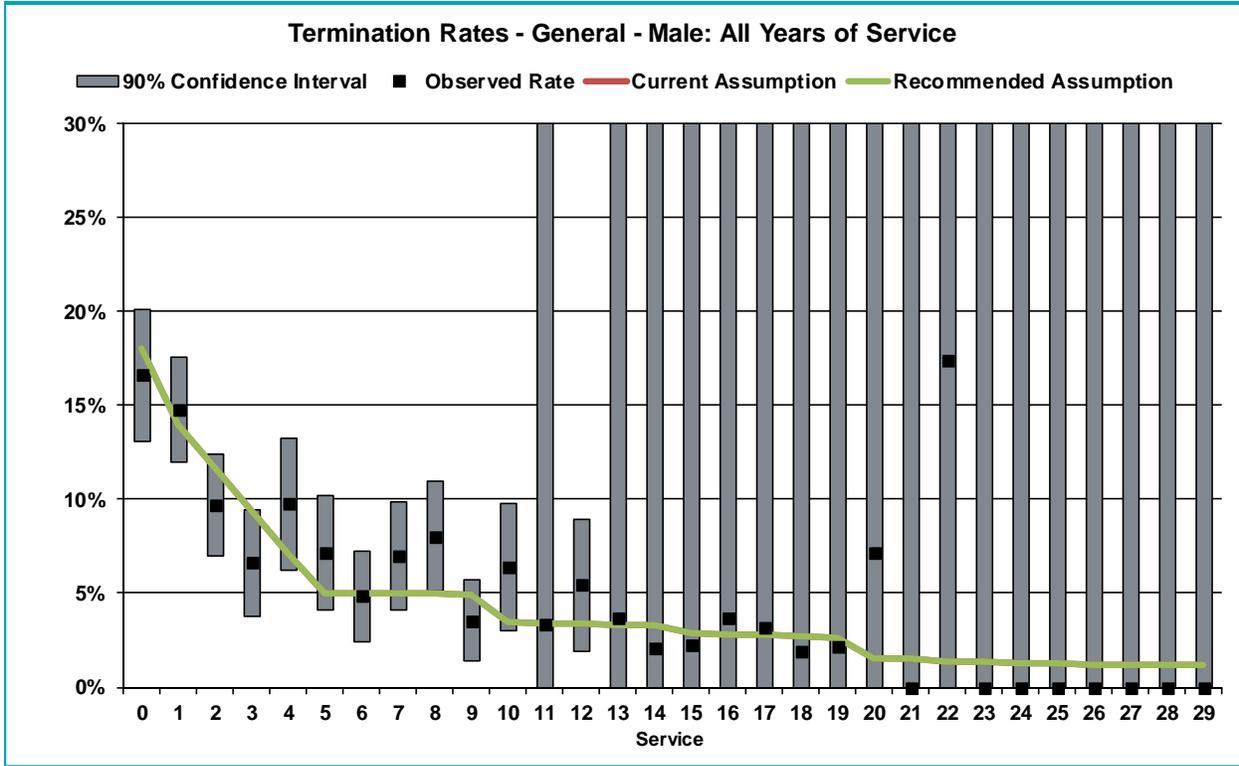
Table IV-T2

Termination Rates - General - Male: All Years of Service						
Service	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
0	301	50	54.2	54.2	92%	92%
1	439	65	61.5	61.5	106%	106%
2	320	31	37.4	37.4	83%	83%
3	212	14	19.9	19.9	70%	70%
4	195	19	13.8	13.8	137%	137%
5	196	14	9.8	9.8	143%	143%
6	207	10	10.4	10.4	97%	97%
7	215	15	10.8	10.8	140%	140%
8	237	19	11.8	11.8	161%	161%
9	198	7	9.7	9.7	72%	72%
10	141	9	4.9	4.9	182%	182%
11	119	4	4.0	4.0	99%	99%
12	111	6	3.8	3.8	160%	160%
13	108	4	3.6	3.6	112%	112%
14	96	2	3.2	3.2	63%	63%
15	88	2	2.5	2.5	79%	79%
16	81	3	2.3	2.3	133%	133%
17	64	2	1.8	1.8	112%	112%
18	53	1	1.4	1.4	71%	71%
19	46	1	1.2	1.2	85%	85%
20	28	2	0.4	0.4	476%	476%
21	23	0	0.3	0.3	0%	0%
22	12	2	0.2	0.2	1242%	1242%
23	8	0	0.1	0.1	0%	0%
24	6	0	0.1	0.1	0%	0%
25	5	0	0.1	0.1	0%	0%
26	6	0	0.1	0.1	0%	0%
27	4	0	0.0	0.0	0%	0%
28	3	0	0.0	0.0	0%	0%
29	1	0	0.0	0.0	0%	0%
Total	3,515	282	269.1	269.1	105%	105%
R-squared			0.9637	0.9637		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Chart IV-T2



Average Termination Service			
Actual:	4.3	Current Expected:	3.8
		Recommended Expected:	3.8

Table IV-T3 shows the calculation of actual-to-expected ratios and the r-squared statistic for female General members, and Chart IV-T3 shows the information graphically along with the 90% confidence interval.

The data shows that actual termination rates are similar to the current assumptions, therefore no changes are proposed.

See Appendices A and B for a full listing of the rates.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

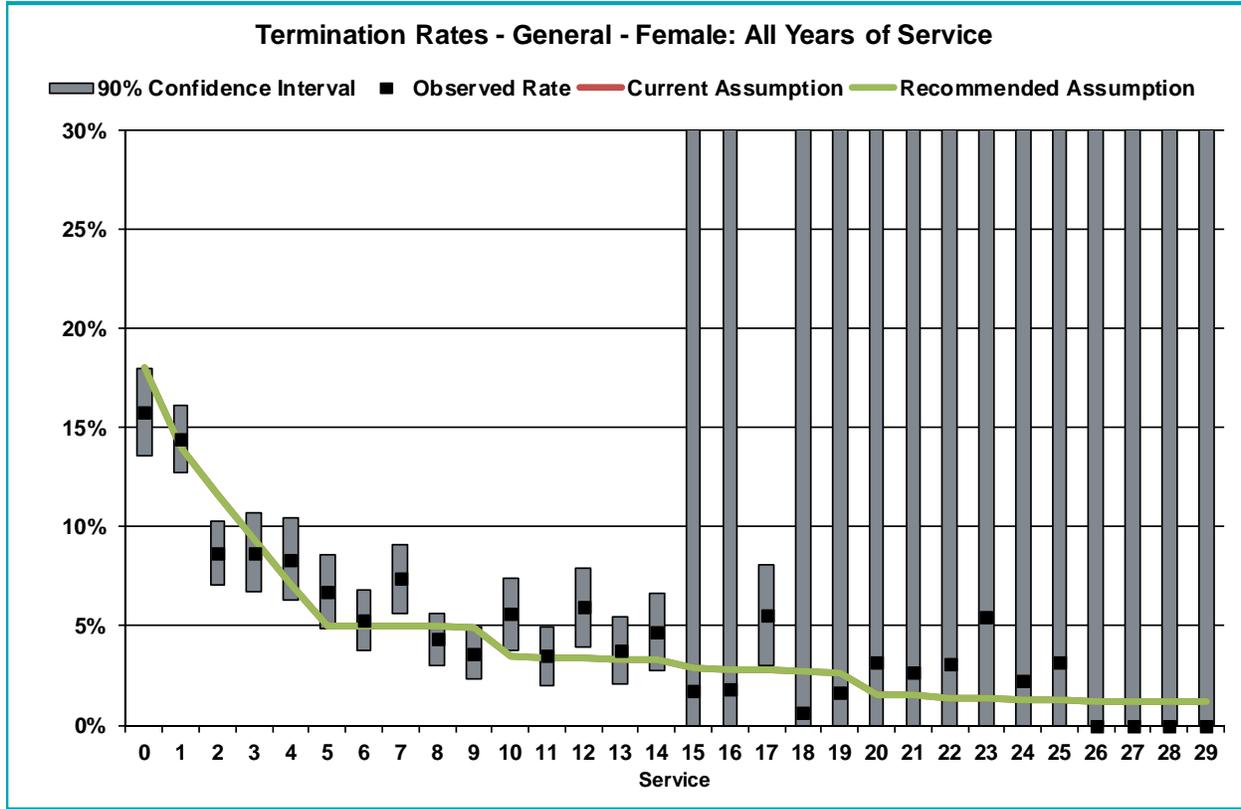
Table IV-T3

Termination Rates - General - Female: All Years of Service						
Service	Exposures	Retirements			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
0	748	118	134.6	134.6	88%	88%
1	1,152	166	161.3	161.3	103%	103%
2	843	73	98.6	98.6	74%	74%
3	539	47	50.7	50.7	93%	93%
4	477	40	33.9	33.9	118%	118%
5	491	33	24.6	24.6	134%	134%
6	567	30	28.3	28.3	106%	106%
7	608	45	30.4	30.4	148%	148%
8	667	29	33.4	33.4	87%	87%
9	577	21	28.3	28.3	74%	74%
10	447	25	15.6	15.6	160%	160%
11	402	14	13.7	13.7	102%	102%
12	386	23	13.1	13.1	175%	175%
13	347	13	11.5	11.5	114%	114%
14	319	15	10.5	10.5	143%	143%
15	294	5	8.5	8.5	59%	59%
16	278	5	7.8	7.8	64%	64%
17	218	12	6.1	6.1	197%	197%
18	161	1	4.3	4.3	23%	23%
19	123	2	3.2	3.2	63%	63%
20	94	3	1.4	1.4	213%	213%
21	75	2	1.1	1.1	179%	179%
22	65	2	0.9	0.9	220%	220%
23	55	3	0.8	0.8	390%	390%
24	45	1	0.6	0.6	171%	171%
25	32	1	0.4	0.4	244%	244%
26	19	0	0.2	0.2	0%	0%
27	8	0	0.1	0.1	0%	0%
28	4	0	0.0	0.0	0%	0%
29	3	0	0.0	0.0	0%	0%
Total	10,040	729	723.9	723.9	101%	101%
R-squared			0.9654	0.9654		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Chart IV-T3



Average Termination Service			
Actual:	4.7	Current Expected:	4.2
		Recommended Expected:	4.2

Refund rates and Reciprocity

When a vested member terminates employment, they have the option of receiving a refund of contributions with interest or a deferred annuity. If an employee terminates employment and works for a reciprocal employer, the employee’s retirement benefit is ultimately based on the employee’s service with StanCERA and Final Compensation based on employment with any reciprocal employer.

Previously, we reviewed the number of terminating members who reported establishing reciprocity during the assumption study period, and compared it to the number of total terminations to set the assumptions. However, members who terminate and establish reciprocity with another system are not required to report this fact to StanCERA until they actually submit their retirement application.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Therefore, for this study we modified our approach to analyze the percentage of those retiring from a deferred vested status during the study period who appeared to have established reciprocity after leaving StanCERA. To do this, we included both those who previously reported reciprocity to StanCERA, as well as those who had a final average pay in the retirement data that exceeded the final average pay most recently reported in the member's active data file from StanCERA by 20% or more.

Table IV-T4 shows the results of our analysis of transfers for General and Safety, for the period from July 1, 2015 through June 30, 2018. We are proposing an increase in the percentage of members assumed to establish reciprocity among those who terminate and do not withdraw their contributions: 50% of General members and 65% of Safety members are assumed to establish reciprocity, up from 25% and 50%, respectively.

Table IV-T4

	Transfers as a % of Non-Withdrawals		
	< 10 Years of Service	10+ Years of Service	All Service
Observed			
General	61%	40%	52%
Safety	62%	73%	67%
Current Assumption			
General	25%	25%	25%
Safety	50%	50%	50%
Proposed Assumption			
General	50%	50%	50%
Safety	65%	65%	65%

Table IV-T5 shows the results of our analysis of rates of withdrawal for those who terminated service. We have not changed our approach for this analysis – continuing to compare the number of those who terminated and withdraw their contributions, and analyzing the data separately for those with greater or less than 10 years of service - nor are we recommending any changes to these assumptions at this time.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Table IV-T5

	Withdrawals as % of Terminations	
	< 10 Years of Service	10+ Years of Service
Observed		
General	43.98%	15.15%
Safety	37.91%	7.84%
Current/Proposed Assumption		
General	50.00%	20.00%
Safety	35.00%	10.00%

Table IV-T6 shows the results of our analysis of the age at which vested terminated and transferred members decide to retire. We are recommending an increase in the expected commencement age for General members with reciprocity from age 58 to age 61.

Table IV-T6

	Age at Retirement		
	From Vested Status	From Transferred Status	All
Observed			
General	58.64	61.27	60.02
Safety	53.28	51.57	52.14
Current Assumption			
General	58.00	58.00	
Safety	53.00	53.00	
Proposed Assumption			
General	58.00	61.00	
Safety	53.00	53.00	

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

This section analyzes the incidence of disability by the age of the employee. There are separate sets of assumptions for nonservice-connected disabilities and service-connected disabilities. Both sets of assumptions for Safety members are unisex, while General rates vary by gender. The disability decrement is only applied after members are eligible for disability benefits.

The amount of disability experience is fairly limited; only 20 duty-related and 16 non duty-related disabilities have occurred during the last six years for Safety and General members combined. To improve the credibility of the data, we have aggregated the experience of the past three years with that of the prior two experience studies (2009-2018).

Table IV-D1 shows the calculation of actual-to-expected ratios and the r-squared statistic for service-connected disabilities for Safety members, and Chart IV-D1 shows the information graphically. The 90% confidence interval is not shown because of a lack of credible data.

We are recommending a change to the CalPERS State Safety duty disability rates. Based on our discussions with Staff, we anticipate that the procedures StanCERA uses to evaluate duty-related disability applications are more similar to those used for the State Safety workforce than those of the CalPERS Public Agencies. The data shows the disability rates of StanCERA are much closer, both in aggregate and at various age levels, to the State Safety rates used by CalPERS. The proposed assumptions reflect an improvement in the A/E ratio from 47% to 110%, and an increase in the r-squared from 0.17 to 0.28.

See Appendix A or B for a full listing of the current and proposed rates.

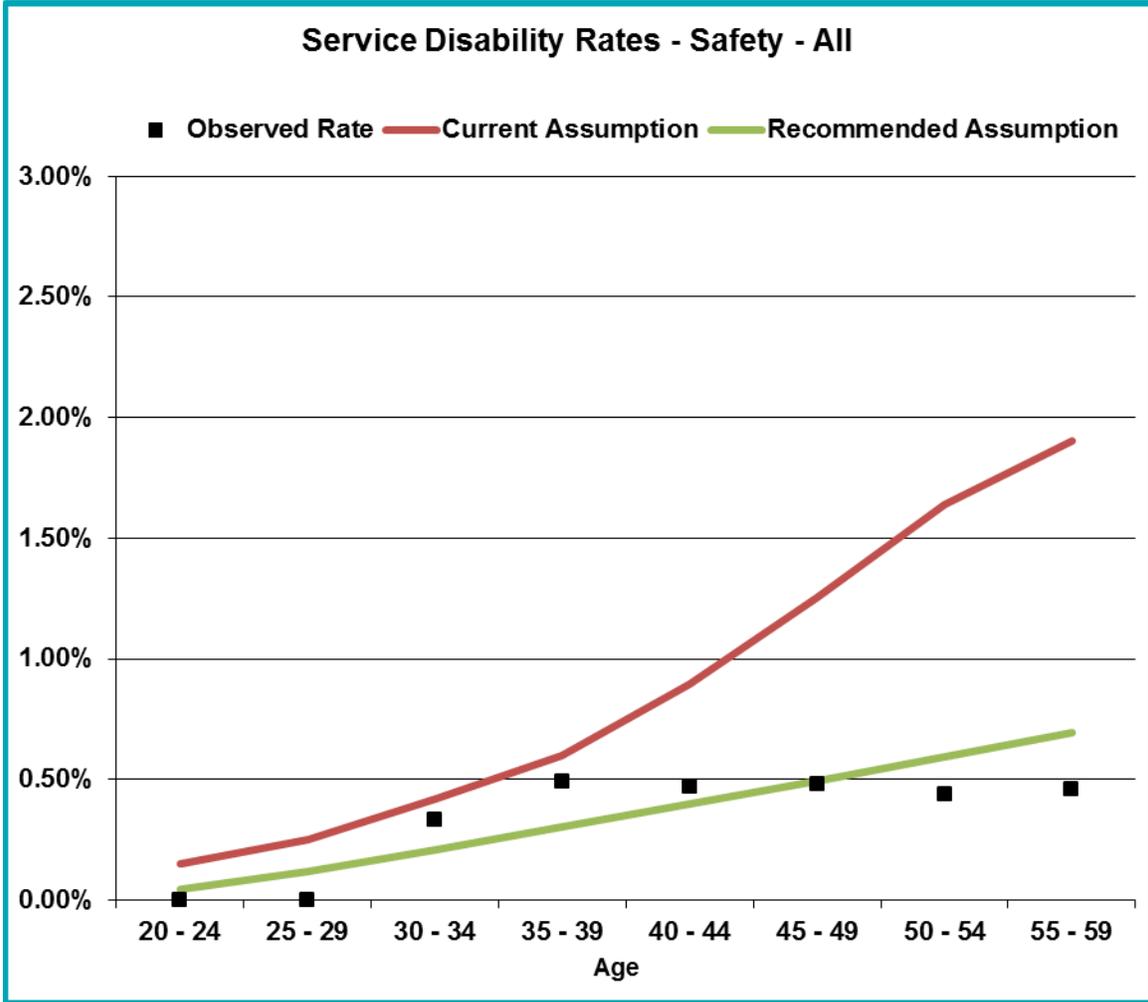
Table IV-D1

Service Disability Rates - Safety - All						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
20 - 24	206	0	0.3	0.1	0%	0%
25 - 29	968	0	2.4	1.1	0%	0%
30 - 34	1,200	4	5.0	2.5	80%	161%
35 - 39	1,219	6	7.3	3.7	82%	163%
40 - 44	1,068	5	9.6	4.2	52%	118%
45 - 49	836	4	10.5	4.1	38%	97%
50 - 54	455	2	7.5	2.7	27%	74%
55 - 59	218	1	4.2	1.5	24%	66%
Total	6,170	22	46.7	20.0	47%	110%
R-squared			0.1685	0.2764		

STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018

SECTION IV – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES

Chart IV-D1



Tables IV-D2 and IV-D3 on the next page shows the calculation of actual-to-expected ratios and the r-squared statistic for male and female General members. Charts are not shown, since the lack of credible data does not produce meaningful information.

The data shows that the aggregate number of disabilities has been reasonably close to the number expected under the current assumptions. We are not proposing any change to the service-connected disability assumption for General members.

See Appendix A or B for a full listing of the rates.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

Table IV-D2

Service Disability Rates - General - Male						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
20 - 24	70	0	0.0	0.0	0%	0%
25 - 29	492	0	0.1	0.1	0%	0%
30 - 34	920	0	0.2	0.2	0%	0%
35 - 39	982	0	0.3	0.3	0%	0%
40 - 44	1,009	0	0.5	0.5	0%	0%
45 - 49	1,135	0	0.8	0.8	0%	0%
50 - 54	1,274	0	1.3	1.3	0%	0%
55 - 59	1,108	0	1.5	1.5	0%	0%
60 - 69	913	5	1.2	1.2	406%	406%
Total	7,903	5	6.0	6.0	83%	83%
R-squared			0.1321	0.1321		

Table IV-D3

Service Disability Rates - General - Female						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
20 - 25	188	0	0.0	0.0	0%	0%
25 - 29	1,474	0	0.0	0.0	0%	0%
30 - 34	2,420	0	0.0	0.0	0%	0%
35 - 39	2,966	0	0.1	0.1	0%	0%
40 - 44	3,162	0	0.2	0.2	0%	0%
45 - 49	3,266	0	0.4	0.4	0%	0%
50 - 54	3,490	1	0.7	0.7	148%	148%
55 - 59	3,220	0	0.9	0.9	0%	0%
60 - 69	2,174	2	0.7	0.7	290%	290%
Total	22,360	3	3.1	3.1	98%	98%
R-squared			0.1216	0.1216		

Table IV-D4 on the next page shows the calculation of actual-to-expected ratios and the r-squared statistic for nonservice-connected disabilities for Safety members. A chart is not shown, since the lack of credible data does not produce meaningful information.

The data shows that the number of disabilities has been lower than expected under the current assumption. In this context, however, the 38% A/E ratio does not mean much; there was only one nonservice-connected disability among all safety members in the last nine years, while we predicted less than three disabilities. We are not proposing any changes to this assumption, continuing to use the CalPERS Public Agency Police Non-Industrial Disability table.

See Appendices A and B for a full listing of the rates.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

Table IV-D4

Ordinary Disability Rates - Safety - All						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
25 - 29	783	0	0.1	0.1	0%	0%
30 - 34	1,125	0	0.2	0.2	0%	0%
35 - 39	1,168	0	0.4	0.4	0%	0%
40 - 44	1,049	1	0.5	0.5	219%	219%
45 - 49	831	0	0.5	0.5	0%	0%
50 - 54	443	0	0.4	0.4	0%	0%
55 - 59	214	0	0.3	0.3	0%	0%
60 - 64	86	0	0.2	0.2	0%	0%
Total	5,697	1	2.6	2.6	38%	38%
R-squared			0.0323	0.0323		

The Table IV-D5 shows the calculation of actual-to-expected ratios and the r-squared statistic for nonservice-connected disabilities for male General members. A chart is not shown, since the lack of credible data does not produce meaningful information.

The data shows that the number of disabilities has been lower than expected under the current assumption. In this context, however, the 18% A/E ratio does not mean much; there were only two nonservice-connected disabilities. We are proposing modifying the assumptions to the latest CalPERS Public Agency Miscellaneous Non-Industrial Disability table for Males, which were updated as part of the last CalPERS experience study. Updating this table increases the A/E ratio from 18% to 24%, and increases the r-squared statistic slightly.

See Appendices A and B for a full listing of the proposed and prior rates.

Table IV-D5

Ordinary Disability Rates - General - Male						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
25 - 29	389	0	0.1	0.1	0%	0%
30 - 34	795	0	0.2	0.2	0%	0%
35 - 39	896	0	0.7	0.5	0%	0%
40 - 44	920	0	1.4	1.2	0%	0%
45 - 49	1,079	2	2.2	1.7	92%	118%
50 - 54	1,225	0	2.7	1.9	0%	0%
55 - 59	1,071	0	2.4	1.7	0%	0%
60 - 64	678	0	1.5	1.0	0%	0%
Total	7,051	2	11.1	8.3	18%	24%
R-squared			0.0469	0.0568		

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

Table IV-D6 shows the calculation of actual-to-expected ratios and the r-squared statistic for nonservice-connected disabilities for female General members. A chart is not shown, since the lack of credible data does not produce meaningful information.

The data shows that the number of disabilities has been lower than expected under the current assumption. We are proposing modifying the assumptions to the latest CalPERS Public Agency Miscellaneous Non-Industrial Disability table for Females, which were updated as part of the last CalPERS experience study. Updating this table increases the A/E ratio from 64% to 75%.

See Appendices A and B for a full listing of the proposed and prior rates.

Table IV-D6

Ordinary Disability Rates - General - Female						
Age Band	Exposures	Disabilities			Actual to Expected Ratios	
		Actual	Current	Recommended	Current	Recommended
25 - 29	1,184	0	0.1	0.1	0%	0%
30 - 34	2,126	0	1.0	1.0	0%	0%
35 - 39	2,757	1	3.1	2.6	33%	38%
40 - 44	2,970	6	5.4	4.6	110%	130%
45 - 49	3,127	5	7.1	6.2	70%	80%
50 - 54	3,361	4	7.1	6.1	56%	65%
55 - 59	3,129	4	5.0	4.1	80%	98%
60 - 64	1,794	0	2.3	1.8	0%	0%
Total	20,445	20	31.2	26.5	64%	75%
R-squared			0.3367	0.3377		

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Post-retirement mortality assumptions are typically developed separately by gender for both healthy annuitants and disabled annuitants. Pre-retirement mortality assumptions are developed separately for males and females. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables and projection scales serve as the primary basis for the assumption.

In the prior study, StanCERA adopted the following assumptions:

Active members

- CalPERS Preretirement Non-Industrial Mortality, adjusted by 100.3% for males and 98.8% for females.
- CalPERS Preretirement Industrial Mortality (Line-of-Duty Mortality for Safety only).

Healthy retirees and beneficiaries

- CalPERS Healthy Annuitant Mortality, adjusted by 93.4% for males and 107.9% for females.

Service-Connected Disabled members

- CalPERS Industrially Disabled Annuitant Mortality, adjusted by 100.2% for males and 100.1% for females.

Nonservice-Connected Disabled members

- CalPERS Non-Industrially Disabled Annuitant Mortality, adjusted by 96.4% for males and 110.4% for females.

StanCERA also adopted the approach of projecting these base tables generationally using the MP-2015 mortality improvement scale described above for all types of mortality except Line-of-Duty Mortality for Safety members. No mortality projection was used for Line-of-Duty Mortality for Safety members.

The Society of Actuaries recently released a comprehensive study of U.S. public sector mortality experience, which included the publication of new mortality tables, with separate tables for teachers, safety members, and other public employees. However, when we compared these tables to StanCERA's recent experience, we did not find them to be a better fit (or predictor of StanCERA mortality) than the most recent CalPERS tables, therefore we have continued to use the CalPERS tables as the basis for our analysis.

The Society of Actuaries has also continued to update their mortality improvement projection scale, the most recent of which is named the MP-2018 scale. We used this table as the basis for our analysis.

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

The steps in our analysis are as follows:

1. Select a standard mortality table that is, based on experience, most closely matching the anticipated experience of StanCERA.
2. Compare actual StanCERA experience to what would have been predicted by the selected standard table for the period of the experience study.
3. Adjust the standard table either fully or partially depending on the level of credibility for StanCERA experience. This adjusted table is called the base table.
4. Select an appropriate standard mortality improvement projection scale and apply it to the base table.

As we have done in prior experience studies, we have combined the experience of the past three years with that of the prior three-year period in order to have a more robust dataset to review.

Even with the use of six years of data, the StanCERA is only partially credible, based on standard statistical theory. We therefore recommend partially adjusting the CalPERS base tables to fit StanCERA's experience to develop a new base table. The rates for each age in the standard table are adjusted by a factor, where the factor is determined by multiplying the actual-to-expected ratio for the group (such as male retirees) by a credibility factor for the group. The credibility factor is equal to the square root of the number of deaths divided by 1,082, which is the number of deaths needed for full credibility (defined by a 90% probability that the observed rate is within 5% of the true rate). Where the adjustment is very close to 100%, we have elected not to recommend any adjustment to the base table.

Based on these adjustments, we are recommending the following base mortality table assumptions:

Active members

- CalPERS Preretirement Non-Industrial Mortality, adjusted by 97.2% for males and 101.6% for females.
- CalPERS Preretirement Industrial Mortality (Line-of-Duty Mortality for Safety only).

Healthy retirees and beneficiaries

- CalPERS Healthy Annuitant Mortality, adjusted by 97.2% for males and 104.1% for females.

Service-Connected Disabled members

- CalPERS Industrially Disabled Annuitant Mortality, adjusted by 101.9% for males and no adjustment for females.

Nonservice-Connected Disabled members

- CalPERS Non-Industrially Disabled Annuitant Mortality, no adjustment for males and adjusted by 104.5% for females.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

We also recommend projecting these base tables generationally using the MP-2018 mortality improvement scale described above for all types of mortality except Line-of-Duty Mortality for Safety members. We recommend no mortality projection for Line-of-Duty Mortality for Safety members.

As shown in Table IV-M1 below, our proposed mortality rates for healthy annuitants are close to recent experience. To perform our comparisons, the CalPERS base rates (without projection) were projected from their base year (2009) to the midpoint of the combined six-year study period (2015).

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table IV-M1

Mortality Experience (2012-2018)									
	Exposures	Actual Deaths	Weighted Exposures	Actual Weighted Deaths	Actual Weighted Rates	Current Expected Weighted Deaths	Proposed Expected Weighted Deaths	Current Weighted A/E Ratio	Recommended Weighted A/E Ratio
<u>Active Members</u>									
Male	8,641	11	572,176,604	660,456	0.12%	835,652	885,121	79%	75%
Female	15,691	20	827,520,407	1,007,962	0.12%	836,069	916,729	121%	110%
Total Actives	24,332	31	1,399,697,011	1,668,418	0.12%	1,671,721	1,801,849	100%	93%
<u>Retired and Surviving Spouse</u>									
Male	6,839	194	211,475,039	3,863,662	1.83%	4,618,185	4,366,032	84%	88%
Female	11,306	303	226,864,246	4,768,367	2.10%	4,463,674	4,445,606	107%	107%
Total Ret/Surv	18,145	497	438,339,285	8,632,029	1.97%	9,081,859	8,811,638	95%	98%
<u>Disabled</u>									
Nonservice-Connected Male	145	7	2,358,806	88,604	3.76%	76,595	83,630	116%	106%
Nonservice-Connected Female	349	15	5,599,255	171,124	3.06%	129,905	129,117	132%	133%
Service-Connected Male	881	20	29,295,298	558,936	1.91%	466,216	498,295	120%	112%
Service-Connected Female	471	7	12,036,068	149,159	1.24%	145,742	152,614	102%	98%
Total Disabled	1,846	49	49,289,427	967,823	1.96%	818,458	863,656	118%	112%
TOTAL (Excluding Actives)	19,991	546	487,628,712	9,599,852	1.97%	9,900,317	9,675,294	97%	99%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Rather than weighting the experience based on the number of members living and dying, we have weighted the experience based on benefit size (salary for current active members). This approach has been recommended by the Society of Actuaries' Retirement Plans Experience Committee (RPEC), since members with larger benefits are expected to live longer, and a benefit-weighted approach helps avoid underestimating the liabilities. The match between the actual and expected experience across all statuses (active, retired, and disabled) is close under the proposed assumptions: 99%.

Mortality Assumptions for Employee Contribution Rates

For purposes of determining employee contribution rates, the use of generational mortality improvements is impractical from an administrative perspective. Therefore, we recommend using the base mortality tables described above (various CalPERS tables with StanCERA-specific adjustments) projected using Scale MP-2018 from 2009 to 2040 for General Members and to 2040 for Safety Members. These static projections are intended to approximate generational mortality improvements.

The projection periods are based upon the duration of active liabilities for the respective impacted groups (General Tiers 1, 2, 4, 5, and Safety Tiers 2, 4, and 5) as of June 30, 2018 and the period during which the associated employee contribution rates will be in use. The rates also are blended using a male/female weighting of 25% male/75% female for General Members and 80% male/20% female for Safety members.

We anticipate that these mortality assumptions will be used to determine the employee contribution rates in effect for the period of July 1, 2019 through June 30, 2022. We also anticipate that the mortality assumptions for this purpose will be updated again after the next experience study covering the period from July 1, 2018 through June 30, 2021.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
OTHER DEMOGRAPHIC ASSUMPTIONS**

TERMINAL PAY

The current assumptions increase the liability for retirement benefits for Safety active participants by 3.0% and for General active participants by 3.5% to account for the impact of unused vacation time.

The data provided by StanCERA includes the vacation pay cashed out at retirement for each member who retired from active status after July 1, 2015. We compared the total vacation pay for retirees to their final average pay. For the 301 General retirees with a 12-month final average service period, the vacation pay represented 3.9%; for Safety, the average was 3.7% for 58 retirees.

StanCERA also provided the amount of vacation pay cashed out each year by all active members. This averaged 2.9% for General members and 1.9% for all Safety members who were under age 47 (and therefore would not be expected to retire in the next three years).

After backing out these average non- retiree cash outs, we recommend a load of 1.0% on final average compensation for General members (3.9% - 2.9%) and 1.75% for Safety (close to 3.7% - 1.9%), to reflect the fact that the load should only capture the additional cash outs that are expected to occur during the final average pay period.

There were only 11 retirees with a 36-month final average service period, so we excluded them from the analysis. For future retirees with a 36-month final average service period, we recommend loading the final average compensation by 1/3 of the load for those with 12-month final average pay periods. No load will be applied to the benefits of PEPRA members, as vacation cash outs are not included in their pensionable compensation.

FAMILY COMPOSITION

The current assumption is that 80% of active male and 50% of active female StanCERA participants who retire, become disabled, or die during active service have beneficiaries and that male members are three years older than their spouses, and female members are two years younger than their spouses. Based on the experience of the last three years, we recommend maintaining these assumptions.

	Number Retirees	Number Married	Percent Married	Member Age	Spouse Age	Difference
Male	198	159	80%	59.66	56.51	3.15
Female	311	164	53%	59.53	61.54	-2.01

Average ages shown are for married retirees.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

**SECTION IV – DEMOGRAPHIC ASSUMPTIONS
OTHER DEMOGRAPHIC ASSUMPTIONS**

PLAN EXPENSES

An allowance of \$2,546,160 for Plan administrative expenses was included in the annual cost calculation in the prior valuation. The inflation adjusted average of the Plan's administrative expenses in during the last two years have averaged approximately \$2,750,000. We recommend changing the Plan's assumed administrative expenses for 2019 to \$2,825,625 (the inflation-adjusted average for 2019), increasing each year at the assumed rate of inflation.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

The demographic assumptions are based on an experience study covering the period from July 1, 2015 through June 30, 2018.

1. Rate of Return

The annual rate of return on all Plan assets is assumed to be 7.00%, net of investment expenses.

2. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.75% per year.

3. Administrative Expenses

An allowance of \$2,825,625 for Plan administrative expenses for the current year has been included in the annual cost calculated. The administrative expense amount has been assumed to increase in future years at the rate of the Cost of Living assumption (2.75%).

4. Interest Credited to Employee Accounts

The employee accounts are credited with 0.25% interest annually.

5. Increases in Pay

Base salary increase: 3.00%

Assumed pay increases for active Members consist of increases due to base salary adjustments (as noted above), plus service-based increases due to longevity and promotion, as shown below.

Longevity & Promotion Increases		
Service	General	Safety
0	5.00%	7.00%
1	5.00%	6.00%
2	5.00%	5.00%
3	5.00%	4.00%
4	5.00%	3.00%
5	3.50%	2.00%
6	2.50%	1.75%
7	1.50%	1.50%
8	1.25%	1.25%
9	1.00%	1.00%
10	0.75%	0.75%
11+	0.50%	0.50%

STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

6. PEPRA Compensation Limit

The assumption used for increasing the compensation limit that applies to PEPRA members is 2.75%

7. Post Retirement COLA

For those with the 3% COLA benefit (i.e. 100% of CPI up to 3% annually with banking), 2.60% annual increases are assumed. Increases are assumed to occur on April 1.

8. Social Security Wage Base

General Plan 3 members have their benefits offset by an assumed Social Security Benefit. For projecting the Social Security Benefit, the annual Social Security Wage Base increase is assumed to be 3.00% per year.

9. Internal Revenue Code Section 415 Limit

The Internal Revenue Code Section 415 maximum benefit limitations are not reflected in the valuation for funding purposes. Any limitation is reflected in a member's benefit after retirement.

10. Internal Revenue Code Section 401(a)(17)

The Internal Revenue Code Section 401(a)(17) maximum compensation limitation is not reflected in the valuation for funding purposes. Any limitation is reflected in a member's benefit after retirement.

11. Family Composition

Percentage married for all active members who retire, become disabled, or die during active service is shown in the following table. Male retirees are assumed to be three years older than their spouses, while female retirees are assumed to be two years younger than their spouses.

Percentage Married	
Gender	Percentage
Males	80%
Females	50%

12. Accumulated Vacation Time Load

Active members' service retirement and related benefits are loaded by 1.75% for Safety Members and 1.00% for General Members for conversion of vacation time. 1/3 of this load applies for members with a 36-month final average service period. No other adjustment is made to the liabilities for anticipated future service purchases.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

13. Rates of Separation

Rates of termination apply to all active Members who terminate their employment.

Separate rates of termination are assumed among Safety and General Members.

Termination Rates		
Years of Service	General All	Safety All
0	18.0%	18.0%
1	14.0%	12.0%
2	11.7%	9.0%
3	9.4%	7.0%
4	7.1%	6.0%
5	5.0%	5.0%
10	3.5%	5.0%
15	2.9%	3.4%
20	1.5%	0.0%
25	1.3%	0.0%
30+	0.0%	0.0%

Termination rates do not apply once a member is eligible for retirement.

14. Withdrawal

Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Separate rates of withdrawal are assumed among Safety and General Members, and are based on service. The rates do not overlap with the service retirement rates.

50% of all General Member terminations with less than 10 years of service are assumed to take a refund of contributions, as well as 20% of those with 10 or more years of service.

35% of all Safety Member terminations with less than 10 years of service are assumed to take a refund of contributions, and 10% of those with 10 or more years are assumed to take a refund.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

15. Vested Termination and Reciprocal Transfers

Rates of vested termination apply to active Members who terminate their employment after five years of service and leave their member contributions on deposit with the Plan. Alternatively, those who terminate their employment with less than five years of service can leave their member contributions with the Plan and transfer to a reciprocal employer, therefore retaining entitlement to future Plan benefits.

Vested terminated Tier 3 General Members are assumed to begin receiving benefits at age 65 while all other General Members are assumed to begin at age 58, unless they have reciprocity, in which case they are assumed to begin at age 61; terminated Safety Members are assumed to begin receiving benefits at age 53. 50% of vested terminated General Members are assumed to be reciprocal; 65% of vested terminated Safety Members are assumed to be reciprocal.

Reciprocal members are assumed to receive 3.75% annual pay increases from the date of transfer to the assumed retirement date.

16. Form of Benefit

Upon retirement, all married members are assumed to elect the normal payment form (joint & 50% survivor annuity for Tier 3 and joint & 60% survivor annuity for all other tiers). Non-married members are assumed to elect a single life annuity. Actual form elections are not anticipated to materially affect results due to the actuarially equivalent optional form factors.

17. Rates of Service-Connected Disability

Separate rates of duty disability are assumed among Safety and General Members; rates for both sexes for Safety Members are combined. Safety members are assumed to follow the CALPERS State Safety rates. Sample rates are shown below:

Rates of Service-Connected Disability			
	General		Safety
Age	Male	Female	All
20	0.0043%	0.0002%	0.0020%
25	0.0102%	0.0004%	0.0760%
30	0.0211%	0.0008%	0.1700%
35	0.0284%	0.0024%	0.2640%
40	0.0401%	0.0056%	0.3600%
45	0.0613%	0.0101%	0.4570%
50	0.0897%	0.0162%	0.5570%
55	0.1227%	0.0249%	0.6580%
60	0.1637%	0.0349%	0.7620%
65	0.0000%	0.0000%	0.8690%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

18. Rates of Nonservice-Connected Disability

Separate rates of ordinary disability are assumed among Safety and General Members. Rates of ordinary disability for Safety Members are assumed to follow the CalPERS Public Agency Police Non-Industrial Disability table; rates of ordinary disability for General Members are assumed to follow the 2018 CalPERS Public Agency Miscellaneous Non-Industrial Disability table. The rates shown are applied after five Years of Service. Below are sample rates:

Rates of Non Service-Connected Disability General			Rates of Non Service-Connected Disability Safety	
Age	Male	Female	Age	All
20	0.0170%	0.0100%	20	0.0100%
25	0.0170%	0.0100%	25	0.0100%
30	0.0190%	0.0240%	30	0.0200%
35	0.0390%	0.0710%	35	0.0300%
40	0.1020%	0.1350%	40	0.0400%
45	0.1510%	0.1880%	45	0.0500%
50	0.1580%	0.1990%	50	0.0800%
55	0.1580%	0.1490%	55	0.1300%
60	0.1530%	0.1050%	60	0.2000%
65	0.1280%	0.0880%	65+	0.2000%
70+	0.1020%	0.0840%		

19. Rates of Mortality for Non-annuitants

Rates of ordinary death for active Members are specified by the CalPERS Pre-Retirement Non-Industrial Mortality table, adjusted by 97.2% for males and 101.6% for females, with generational mortality improvements projected from 2009 using Scale MP-2018. Duty related mortality rates are only applicable for Safety Active Members, and are based on the CalPERS Pre-Retirement Individual Death table without adjustment or projection.

The following table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

Non-Annuitant Mortality Rates			
Age	Ordinary Death - General and Safety		Duty Death Safety All
	Male	Female	
20	0.0320%	0.0215%	0.0030%
25	0.0413%	0.0248%	0.0070%
30	0.0505%	0.0269%	0.0100%
35	0.0588%	0.0378%	0.0120%
40	0.0774%	0.0539%	0.0130%
45	0.1094%	0.0766%	0.0140%
50	0.1600%	0.1079%	0.0150%
55	0.2353%	0.1550%	0.0160%
60	0.3446%	0.2261%	0.0170%
65	0.4949%	0.3324%	0.0180%
70	0.6891%	0.4747%	0.0190%

20. Rates of Mortality for Nonservice-Connected Disabled Retirees

Rates of mortality for nonservice-connected disabled Members are specified by the CalPERS Non-Industrially Disabled Annuitant Mortality table, adjusted by 104.5% for females, (no adjustment for males), with generational mortality improvements projected from 2009 using Scale MP-2018.

The following table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Nonservice-Connected Disabled Mortality Rates		
Age	Male	Female
45	1.297%	0.892%
50	1.784%	1.285%
55	2.095%	1.327%
60	2.634%	1.578%
65	3.120%	2.138%
70	3.890%	2.941%
75	5.398%	4.041%
80	8.230%	6.287%
85	13.166%	10.327%
90	18.469%	16.806%

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

21. Rates of Mortality for Service-Connected Disabled Retirees

Rates of mortality for service-connected disabled Members are specified by the CalPERS Industrially Disabled Annuitant Mortality table, adjusted by 101.9% for males (no adjustment for females), with generational mortality improvements projected from 2009 using Scale MP-2018.

The following table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Service-Connected Disabled Mortality Rates		
Age	Male	Female
45	0.344%	0.298%
50	0.542%	0.495%
55	0.648%	0.460%
60	0.884%	0.633%
65	1.455%	1.066%
70	2.254%	1.775%
75	3.908%	2.952%
80	6.754%	4.978%
85	10.587%	7.959%
90	16.493%	12.335%

22. Rates of Mortality for Emerging Disabled Retirees

Rates of mortality for future General disabled retirees, both nonservice- and service-connected, are specified by mortality tables consisting of blends of the mortality assumptions for current nonservice- and service-connected disabled retirees. The blend for future disabled General retirees is 75% and 25%, respectively. The proportions reflect the expected splits in future disabled retirees between nonservice- and service-connected disablements.

Future disabled Safety retirees are assumed to follow the same rates of mortality as the service-connected disabled retirees indicated in the prior bullet.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

23. Rates of Mortality for Healthy Annuitants

Rates of mortality for retired Members and their beneficiaries are specified by the CalPERS Healthy Annuitant Mortality table, adjusted by 97.2% for males and 104.1% for females, with generational mortality improvements projected from 2009 using Scale MP-2018.

The following table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Healthy Annuitant Mortality Rates		
Age	Male	Female
45	0.234%	0.221%
50	0.517%	0.515%
55	0.618%	0.479%
60	0.794%	0.556%
65	1.026%	0.779%
70	1.717%	1.317%
75	2.900%	2.283%
80	5.128%	3.847%
85	9.165%	6.949%
90	15.733%	12.841%

24. Mortality Improvement

As mentioned above, the mortality assumptions employ fully generational mortality improvement projection from a base year of 2009 using Scale MP-2018.

25. Rates of Mortality for Purposes of Determining Employee Contribution Rates

The rates are based on the same base tables described above (CalPERS mortality tables with StanCERA-specific adjustments) and are projected using Scale MP-2018 from 2009 to 2040 for General members and to 2040 for Safety members. The rates are blended using a male/female weighting of 25% male/75% female for General members and 80% male/20% female for Safety members. These assumptions are used only for determining the employee contribution rates for General members in Tiers 1, 2, 4 and 5 and Safety members in Tiers 2, 4 and 5.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

26. Rates of Retirement

Retirement for members in non-PEPRA Tiers (Tier 6) are assumed to occur among eligible members in accordance with the tables below:

Rates of Retirement General (Non-PEPRA)				Rates of Retirement Safety (Non-PEPRA)			
	Years of Service				Years of Service		
Age	0-9	10-29	30+	Age	0-9	10-19	20+
40-44	0.00%	0.00%	0.00%	40-48	0.00%	0.00%	5.00%
45-49	0.00%	0.00%	10.00%	49	0.00%	0.00%	20.00%
50-54	0.00%	5.00%	10.00%	50	0.00%	10.00%	30.00%
55	0.00%	7.50%	20.00%	51	0.00%	10.00%	20.00%
56	0.00%	7.50%	20.00%	52	0.00%	10.00%	20.00%
57	0.00%	7.50%	20.00%	53	0.00%	10.00%	20.00%
58	0.00%	12.50%	20.00%	54	0.00%	10.00%	20.00%
59	0.00%	12.50%	20.00%	55	0.00%	10.00%	30.00%
60	0.00%	12.50%	25.00%	56	0.00%	10.00%	30.00%
61	0.00%	20.00%	25.00%	57	0.00%	10.00%	30.00%
62	0.00%	25.00%	40.00%	58	0.00%	10.00%	30.00%
63	0.00%	20.00%	25.00%	59	0.00%	10.00%	30.00%
64	0.00%	25.00%	25.00%	60	0.00%	25.00%	100.00%
65	0.00%	35.00%	35.00%	61	0.00%	25.00%	100.00%
66	0.00%	45.00%	45.00%	62	0.00%	25.00%	100.00%
67	0.00%	20.00%	25.00%	63	0.00%	25.00%	100.00%
68	0.00%	20.00%	25.00%	64	0.00%	25.00%	100.00%
69	0.00%	20.00%	25.00%	65	0.00%	100.00%	100.00%
70	50.00%	50.00%	100.00%	66	0.00%	100.00%	100.00%
71	50.00%	50.00%	100.00%	67	0.00%	100.00%	100.00%
72	50.00%	50.00%	100.00%	68	0.00%	100.00%	100.00%
73	50.00%	50.00%	100.00%	69	0.00%	100.00%	100.00%
74	50.00%	50.00%	100.00%	70+	100.00%	100.00%	100.00%
75+	100.00%	100.00%	100.00%				

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

Retirement for members in PEPRA, Tier 6, are assumed to occur among eligible members in accordance with the sample rates below, from the full tables CALPERS Public Agency Miscellaneous 2% @ 62 table for General and the CALPERS Public Agency Safety Police 2.7% @ 57 table for Safety:

Rates of Retirement General (PEPRA) Years of Service				
Age	5	10	25	35
50-51	0.00%	0.00%	0.00%	0.00%
52	0.50%	0.80%	1.90%	3.80%
53	0.70%	1.10%	2.10%	4.80%
54	0.70%	1.10%	2.30%	5.40%
55	1.00%	1.90%	6.10%	15.20%
56	1.40%	2.60%	7.50%	16.70%
57	1.80%	2.90%	7.40%	14.30%
58	2.30%	3.50%	7.30%	13.50%
59	2.50%	3.80%	9.20%	17.50%
60	3.10%	5.10%	11.10%	18.30%
61	3.80%	5.80%	12.10%	23.20%
62	4.40%	7.40%	16.40%	27.10%
63	7.70%	10.50%	19.20%	26.60%
64	7.20%	10.10%	18.70%	27.60%
65	10.80%	14.10%	23.90%	34.80%
66	13.20%	17.20%	29.20%	42.60%
67	13.20%	17.20%	29.20%	40.50%
68	12.00%	15.60%	26.50%	38.70%
69	12.00%	15.60%	26.50%	36.80%
70	12.00%	15.60%	26.50%	38.70%
71	12.00%	15.60%	26.50%	38.70%
72	12.00%	15.60%	26.50%	38.70%
73	12.00%	15.60%	26.50%	38.70%
74	12.00%	15.60%	26.50%	38.70%
75+	100.00%	100.00%	100.00%	100.00%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS

Rates of Retirement Safety (PEPRA) Years of Service				
Age	5	10	25	35
50	5.00%	5.00%	5.00%	11.00%
51	4.00%	4.00%	5.75%	13.92%
52	3.80%	3.80%	5.80%	13.21%
53	3.80%	3.80%	7.74%	28.98%
54	3.80%	3.80%	9.31%	33.25%
55	6.84%	6.84%	13.40%	38.76%
56	6.27%	6.27%	12.28%	34.49%
57	6.00%	6.00%	11.75%	32.00%
58	8.00%	8.00%	13.75%	35.00%
59	8.00%	8.00%	14.00%	40.00%
60	15.00%	15.00%	15.00%	35.00%
61	14.40%	14.40%	14.40%	26.40%
62	15.00%	15.00%	15.00%	33.00%
63	15.00%	15.00%	15.00%	40.00%
64	15.00%	15.00%	15.00%	52.50%
65+	100.00%	100.00%	100.00%	100.00%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

The following are the assumptions used in the actuarial valuation as of June 30, 2017. The economic and demographic assumptions and methods for that valuation were determined in the Actuarial Experience Study performed by Cheiron as of June 30, 2015 and adopted by the Board on March 16, 2016.

1. Rate of Return

The annual rate of return on all Plan assets is assumed to be 7.25%, net of investment expenses.

2. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 3.00% per year.

3. Administrative Expenses

An allowance of \$2,546,160 for Plan administrative expenses has been included in the annual cost calculated.

4. Interest Credited to Employee Accounts

The employee accounts are credited with 0.25% interest annually.

5. Increases in Pay

Base salary increase: 3.25%

Assumed pay increases for active Members consist of increases due to base salary adjustments (as noted above), plus service-based increases due to longevity and promotion, as shown below.

Longevity & Promotion Increases		
Service	General	Safety
0	6.00%	7.00%
1	5.00%	6.00%
2	4.00%	5.00%
3	3.00%	4.00%
4	2.00%	3.00%
5	1.50%	2.00%
6	1.00%	1.75%
7	0.75%	1.50%
8	0.50%	1.25%
9	0.50%	1.00%
10	0.50%	0.75%
11+	0.50%	0.50%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

6. PEPRA Compensation Limit

The assumption used for increasing the compensation limit that applies to PEPRA members is 3.00%.

7. Post Retirement COLA

100% of CPI up to 3.00% annually with banking, 2.70% annual increases assumed. Increases are assumed to occur on April 1.

8. Social Security Wage Base

General Plan 3 members have their benefits offset by an assumed Social Security Benefit. For projecting the Social Security Benefit, the annual Social Security Wage Base increase is assumed to be 3.25% per year.

9. Internal Revenue Code Section 415 Limit

The Internal Revenue Code Section 415 maximum benefit limitations are not reflected in the valuation for funding purposes. Any limitation is reflected in a member's benefit after retirement.

10. Internal Revenue Code Section 401(a)(17)

The Internal Revenue Code Section 401(a)(17) maximum compensation limitation is not reflected in the valuation for funding purposes. Any limitation is reflected in a member's benefit after retirement.

11. Family Composition

Percentage married for all active members who retire, become disabled, or die during active service is shown in the following table. Male retirees are assumed to be three years older than their spouses, while female retirees are assumed to be two years younger than their spouses.

Percentage Married	
Gender	Percentage
Males	80%
Females	50%

12. Accumulated Vacation Time Load

Active members' service retirement and related benefits are loaded by 3.0% for Safety Members and 3.5% for General Members for conversion of vacation time. 1/3 of this load applies for members with a 36-month final average service period. No other adjustment is made to the liabilities for anticipated future service purchases.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

13. Rates of Separation

Rates of termination apply to all active Members who terminate their employment.

Separate rates of termination are assumed among Safety and General Members.

Termination Rates		
Years of Service	General All	Safety All
0	18.0%	18.0%
1	14.0%	12.0%
2	11.7%	9.0%
3	9.4%	7.0%
4	7.1%	6.0%
5	5.0%	5.0%
10	3.5%	5.0%
15	2.9%	3.4%
20	1.5%	0.0%
25	1.3%	0.0%
30+	0.0%	0.0%

Termination rates do not apply once a member is eligible for retirement.

14. Withdrawal

Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Separate rates of withdrawal are assumed among Safety and General Members, and are based on service. The rates do not overlap with the service retirement rates.

50% of all General Member terminations with less than 10 years of service are assumed to take a refund of contributions, as well as 20% of those with 10 or more years of service.

35% of all Safety Member terminations with less than 10 years of service are assumed to take a refund of contributions, and 10% of those with 10 or more years are assumed to take a refund.

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

15. Vested Termination and Reciprocal Transfers

Rates of vested termination apply to active Members who terminate their employment after five years of service and leave their member contributions on deposit with the Plan. Alternatively, those who terminate their employment with less than five years of service can leave their member contributions with the Plan and transfer to a reciprocal employer, therefore retaining entitlement to future Plan benefits.

Vested terminated Tier 3 General Members are assumed to begin receiving benefits at age 65 while all other General Members are assumed to begin at age 58; terminated Safety Members are assumed to begin receiving benefits at age 53. 25% of vested terminated General Members are assumed to be reciprocal; 50% of vested terminated Safety Members are assumed to be reciprocal.

Reciprocal members are assumed to receive 4% annual pay increases from the date of transfer to the assumed retirement date.

16. Form of Benefit

Upon retirement, all married members are assumed to elect the normal payment form (joint & 50% survivor annuity for Tier 3 and joint & 60% survivor annuity for all other tiers). Non-married members are assumed to elect a single life annuity. Actual form elections are not anticipated to materially affect results due to the actuarially equivalent optional form factors.

17. Rates of Service-Connected Disability

Separate rates of duty disability are assumed among Safety and General Members; rates for both sexes for Safety Members are combined. Below are sample rates:

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

Rates of Service-Connected Disability			
Age	General		Safety
	Male	Female	All
20	0.0043%	0.0002%	0.0759%
25	0.0102%	0.0004%	0.1932%
30	0.0211%	0.0008%	0.3457%
35	0.0284%	0.0024%	0.5309%
40	0.0401%	0.0056%	0.7426%
45	0.0613%	0.0101%	1.1297%
50	0.0897%	0.0162%	1.5092%
55	0.1227%	0.0249%	1.7230%
60	0.1637%	0.0349%	0.0000%
65	0.0000%	0.0000%	0.0000%

18. Rates of Nonservice-Connected Disability

Separate rates of ordinary disability are assumed among Safety and General Members. Rates of ordinary disability for Safety Members are assumed to follow the CalPERS Public Agency Police Non-Industrial Disability table; rates of ordinary disability for General Members are assumed to follow the CalPERS Public Agency Miscellaneous Non-Industrial Disability table. The rates shown are applied after five Years of Service. Below are sample rates:

Rates of Non Service-Connected Disability			
Age	General		Safety
	Male	Female	All
20	0.0170%	0.0100%	0.0100%
25	0.0170%	0.0100%	0.0100%
30	0.0190%	0.0240%	0.0200%
35	0.0490%	0.0810%	0.0300%
40	0.1220%	0.1550%	0.0400%
45	0.1910%	0.2180%	0.0500%
50	0.2130%	0.2290%	0.0800%
55	0.2210%	0.1790%	0.1300%
60	0.2220%	0.1350%	0.2000%
65	0.2100%	0.1180%	0.2000%
70	0.1800%	0.1140%	0.2000%
75	0.1420%	0.1180%	0.2000%
80	0.1420%	0.1180%	0.2000%
81+	0.0000%	0.0000%	0.0000%

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

19. Rates of Mortality for Non-Annuitants

Rates of ordinary death for active Members are specified by the CalPERS Pre-Retirement Non-Industrial Mortality table, adjusted by 100.3% for males and 98.8% for females, with generational mortality improvements projected from 2009 using Scale MP-2015. Duty related mortality rates are only applicable for Safety Active Members, and are based on the CalPERS Pre-Retirement Individual Death table without adjustment or projection.

The table on the following page provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Non-Annuitant Mortality Rates			
	Ordinary Death - General and Safety		Duty Death
Age	Male	Female	Safety All
20	0.0330%	0.0209%	0.0030%
25	0.0426%	0.0241%	0.0070%
30	0.0522%	0.0262%	0.0100%
35	0.0607%	0.0368%	0.0120%
40	0.0798%	0.0525%	0.0130%
45	0.1129%	0.0745%	0.0140%
50	0.1651%	0.1049%	0.0150%
55	0.2428%	0.1508%	0.0160%
60	0.3556%	0.2198%	0.0170%
65	0.5107%	0.3233%	0.0180%
70	0.7110%	0.4616%	0.0190%

20. Rates of Mortality for Nonservice-Connected Disabled Retirees

Rates of mortality for current nonservice-connected disabled Members are specified by the CalPERS Non-Industrially Disabled Annuitant Mortality table, adjusted by 96.4% for males and 110.4% for females, with generational mortality improvements projected from 2009 using Scale MP-2015.

The table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

Nonservice-Connected Disabled Mortality Rates		
Age	Male	Female
45	1.250%	0.943%
50	1.720%	1.358%
55	2.020%	1.402%
60	2.539%	1.667%
65	3.008%	2.259%
70	3.750%	3.107%
75	5.204%	4.269%
80	7.934%	6.642%
85	12.692%	10.910%
90	17.804%	17.755%

21. Rates of Mortality for Service-Connected Disabled Retirees

Rates of mortality for current service-connected disabled Members are specified by the CalPERS Industrially Disabled Annuitant Mortality table, adjusted by 100.2% for males and 100.1% for females, with generational mortality improvements projected from 2009 using Scale MP-2015.

The table provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Service-Connected Disabled Mortality Rates		
Age	Male	Female
45	0.339%	0.298%
50	0.533%	0.496%
55	0.637%	0.460%
60	0.869%	0.634%
65	1.431%	1.068%
70	2.216%	1.777%
75	3.842%	2.955%
80	6.642%	4.983%
85	10.410%	7.967%
90	16.218%	12.347%

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

22. Rates of Mortality for Emerging Disabled Retirees

Rates of mortality for future disabled retirees, both nonservice- and service-connected, are specified by mortality tables consisting of blends of the mortality assumptions for current nonservice- and service-connected disabled retirees. The blend for future disabled Safety retirees is 5% and 95%, respectively. The blend for future disabled General retirees is 75% and 25%, respectively. The proportions reflect the expected splits in future disabled retirees between nonservice- and service-connected disablements.

23. Rates of Mortality for Healthy Annuitants

Rates of mortality for retired Members and their beneficiaries are specified by the CalPERS Healthy Annuitant table, adjusted by 93.4% for males and 107.9% for females, with generational mortality improvements projected from 2009 using Scale MP-2015.

The table on the following page provides a sample of the base mortality rates including adjustments but prior to any projections for mortality improvements.

Healthy Annuitant Mortality Rates		
Age	Male	Female
45	0.225%	0.229%
50	0.497%	0.534%
55	0.594%	0.496%
60	0.763%	0.576%
65	0.986%	0.807%
70	1.649%	1.365%
75	2.786%	2.366%
80	4.928%	3.987%
85	8.807%	7.202%
90	15.118%	13.310%

24. Mortality Improvement

As mentioned above, the mortality assumptions employ a fully generational mortality improvement projection from base year 2009 using Scale MP-2015.

**STANISLAUS COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EXPERIENCE STUDY AS OF JUNE 30, 2018**

APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS

25. Rates of Retirement

Retirement is assumed to occur among eligible members in accordance with the tables below:

Rates of Retirement General				Rates of Retirement Safety			
Age	Years of Service			Age	Years of Service		
	0-9	10-29	30+		0-9	10-19	20+
40-44	0.00%	0.00%	0.00%	40-48	0.00%	0.00%	5.00%
45-49	0.00%	0.00%	10.00%	49	0.00%	0.00%	20.00%
50-54	0.00%	5.00%	10.00%	50	0.00%	10.00%	30.00%
55	0.00%	10.00%	25.00%	51	0.00%	10.00%	20.00%
56	0.00%	10.00%	25.00%	52	0.00%	10.00%	20.00%
57	0.00%	10.00%	25.00%	53	0.00%	10.00%	20.00%
58	0.00%	15.00%	25.00%	54	0.00%	10.00%	20.00%
59	0.00%	15.00%	25.00%	55	0.00%	10.00%	30.00%
60	0.00%	15.00%	25.00%	56	0.00%	10.00%	30.00%
61	0.00%	20.00%	25.00%	57	0.00%	10.00%	30.00%
62	0.00%	25.00%	40.00%	58	0.00%	10.00%	30.00%
63	0.00%	20.00%	25.00%	59	0.00%	10.00%	30.00%
64	0.00%	25.00%	25.00%	60	0.00%	25.00%	100.00%
65	0.00%	35.00%	35.00%	61	0.00%	25.00%	100.00%
66	0.00%	45.00%	45.00%	62	0.00%	25.00%	100.00%
67	0.00%	20.00%	25.00%	63	0.00%	25.00%	100.00%
68	0.00%	20.00%	25.00%	64	0.00%	25.00%	100.00%
69	0.00%	20.00%	25.00%	65	0.00%	100.00%	100.00%
70	50.00%	50.00%	100.00%	66	0.00%	100.00%	100.00%
71	50.00%	50.00%	100.00%	67	0.00%	100.00%	100.00%
72	50.00%	50.00%	100.00%	68	0.00%	100.00%	100.00%
73	50.00%	50.00%	100.00%	69	0.00%	100.00%	100.00%
74	50.00%	50.00%	100.00%	70+	100.00%	100.00%	100.00%
75+	100.00%	100.00%	100.00%				



Classic Values, Innovative Advice