



## **Marin County Employees' Retirement Association**

### **Actuarial Experience Study for July 1, 2017 through June 30, 2020**

**Produced by Cheiron**

**January 2021**

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January 7, 2021

Board of Retirement  
Marin County Employees' Retirement Association  
1 McInnis Parkway, Suite 100  
San Rafael, CA 94903-2764

Dear Members of the Board:

The purpose of this report is to provide the results of an Actuarial Experience Study of the Marin County Employees' Retirement Association (MCERA) covering actuarial experience from July 1, 2017 through June 30, 2020. This report is for the use of the MCERA Retirement Board in selecting assumptions to be used in actuarial valuations beginning June 30, 2020.

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate liabilities and projected benefit payments. We have reviewed the underlying workings of this model to the degree feasible and consistent with Actuarial Standard of Practice No. 56 and believe them to be appropriate for the purposes of this experience study report.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. 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 Retirement Board of MCERA for the purposes described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

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

Sincerely,  
Cheiron

A handwritten signature in blue ink, reading "Graham Schmidt", written in a cursive style.

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

A handwritten signature in blue ink, reading "William R. Hallmark", written in a cursive style.

William R. Hallmark, ASA, EA, FCA, MAAA  
Consulting Actuary

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**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 MCERA, 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 MCERA's membership or assets that would warrant such frequent or significant changes.

This report does not reflect any changes to long-term assumptions as a result of COVID-19, other than information that is already known as of the measurement date (June 30, 2020), such as current market conditions and actual changes in the covered population. Although COVID-19 is likely to have an impact on both economic and demographic experience, at least over the short term, the long-term effect of the pandemic is uncertain.

**SUMMARY OF ECONOMIC ASSUMPTION ANALYSIS**

The specific economic assumptions analyzed in this report are price inflation, wage and pensionable payroll 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 recommended in this report include a 6.75% long-term rate of return on Plan assets, an annual increase in prices measured by the Consumer Price Index (CPI) of 2.50%, annual wage increases of 3.00%, annual pensionable payroll growth of 2.75%, and a post-retirement COLA average growth rate of 1.9%, 2.4%, or 2.5%, for the 2.0%, 3.0% and 4.0% COLA caps, respectively. We note that other combinations of economic assumptions are also reasonable.

The real return expectation for this set of assumptions (4.25%) is consistent with the 10-year capital market expectations of Callan, the Plan's investment consultant, and more conservative than the long-term expectations (20 years or longer) of a survey of investment consultants published by Horizon Actuarial Services. Other data presented in this report indicate that the inflation and wage growth expectations recommended herein are reasonable.

The nominal return assumption is higher than the expectations provided by Callan, as well as the expectations from the Horizon survey over a 10-year time horizon. If the current asset target is maintained and these projections are realized, the Board can expect a pattern of small actuarial asset losses in the near term. However, these projections also assume lower inflation and if these projections are also realized, the asset losses may be at least partially offset by liability gains on COLAs and wages.

## SECTION I – EXECUTIVE SUMMARY

### SUMMARY OF DEMOGRAPHIC ASSUMPTION CHANGES

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

- **Retirement rates** – Increase rates for pre-PEPRA Miscellaneous members at ages 60 and older with less than 20 years of service; use CalPERS Public Safety Police rates for 3% at 55 Safety members; and replace rates for PEPRA members with CalPERS assumptions for their respective groups.
- **Termination rates** – Replace Miscellaneous member rates with unisex service-only table; slightly increase rates for Safety members with less than five years of service; reduce refund rates at low service levels; and increase rates of reciprocity.
- **Deferral age** – Increase Miscellaneous deferral age to 59 and Safety 3% at 50 deferral age to 53 for those with reciprocity.
- **Disability rates** – Increase percentage of disabilities assumed to be service-connected for Miscellaneous members from 50% to 75%, and change Safety rates to the CalPERS Peace Officers and Fire Fighter (POFF) rates multiplied by 120%.
- **Mortality rates** – Change mortality assumptions from CalPERS 2017 rates to Pub-2010 rates; update the mortality improvement scale to MP-2020.
- **Merit salary increases** – No changes.
- **Other assumptions** – Increase age difference for female retirees to 2 years younger than spouse; reduce current expected administrative expenses to \$5.0 million; decrease sick leave adjustment to 1.5% for Marin and San Rafael non-PEPRA members; increase sick leave adjustment from 3.0% to 4.0% for Novato non-PEPRA members; and apply a 1.5% sick leave adjustment for all PEPRA active members at retirement.

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

### COST OF ECONOMIC AND DEMOGRAPHIC ASSUMPTION CHANGES

The changes to the economic assumptions have the largest impact. Among the demographic assumptions, the recommended changes to mortality rates have the largest impact on contribution rates. Table I-1 summarizes the estimated cost impact of the recommended changes to economic and demographic assumptions contained in this report in the next year, while Table I-2 summarizes the estimated cost after the Unfunded Actuarial Liability (UAL) rate increases have been recognized over a three-year ramp up period. We have also included the estimated impact of two alternative economic assumption scenarios, as discussed at prior Board meetings.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION I – EXECUTIVE SUMMARY**

**Table I-1**

| Estimated Impact on Contribution Rates from Demographic Assumption Changes<br>(based on June 30, 2020 valuation results) |                        |              |               |               |              |               |                         |              |               |
|--------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------|---------------|--------------|---------------|-------------------------|--------------|---------------|
| Change in Contribution Rate (Employee and Employer)                                                                      |                        |              |               |               |              |               |                         |              |               |
| Description                                                                                                              | Total Normal Cost Rate |              |               | UAL Rate      |              |               | Total Contribution Rate |              |               |
|                                                                                                                          | County                 | Novato       | San Rafael    | County        | Novato       | San Rafael    | County                  | Novato       | San Rafael    |
| <u>Proposed Demographic Assumptions</u>                                                                                  |                        |              |               |               |              |               |                         |              |               |
| Mortality Rates                                                                                                          | -0.15%                 | -0.05%       | -0.17%        | -0.26%        | -0.38%       | -0.43%        | -0.41%                  | -0.43%       | -0.60%        |
| Retirement Rates                                                                                                         | 0.15%                  | -0.21%       | 0.03%         | 0.02%         | -0.04%       | -0.01%        | 0.17%                   | -0.25%       | 0.02%         |
| Disability Rates                                                                                                         | 0.11%                  | -0.15%       | 0.00%         | 0.01%         | 0.09%        | 0.04%         | 0.12%                   | -0.06%       | 0.04%         |
| Termination Rates                                                                                                        | -0.13%                 | 0.34%        | 0.13%         | 0.00%         | -0.03%       | -0.01%        | -0.13%                  | 0.31%        | 0.12%         |
| Vested Deferral Age                                                                                                      | -0.10%                 | -0.28%       | -0.07%        | -0.02%        | 0.04%        | 0.00%         | -0.12%                  | -0.24%       | -0.07%        |
| Spouse Age Difference                                                                                                    | -0.02%                 | -0.01%       | -0.02%        | -0.01%        | -0.01%       | -0.01%        | -0.03%                  | -0.02%       | -0.03%        |
| Administrative Expense                                                                                                   | -0.07%                 | -0.11%       | -0.10%        | -0.04%        | -0.09%       | -0.16%        | -0.11%                  | -0.20%       | -0.26%        |
| Load for Terminal Pay and Sick Leave                                                                                     | <u>0.05%</u>           | <u>0.38%</u> | <u>-0.04%</u> | <u>-0.02%</u> | <u>0.17%</u> | <u>-0.08%</u> | <u>0.03%</u>            | <u>0.55%</u> | <u>-0.12%</u> |
| Contribution Rate Increase After<br>Proposed Demographic Assumption Changes                                              | -0.16%                 | -0.09%       | -0.24%        | -0.32%        | -0.25%       | -0.66%        | -0.48%                  | -0.34%       | -0.90%        |

**Table I-2**

| Estimated Impact on Contribution Rates from All Assumption Changes<br>(based on June 30, 2020 valuation results) |                                               |               |               |                                               |               |               |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------|---------------|-----------------------------------------------|---------------|---------------|
| Change in Contribution Rate (Employee and Employer)                                                              |                                               |               |               |                                               |               |               |
| Description                                                                                                      | 1st Smoothing Year<br>Total Contribution Rate |               |               | 3rd Smoothing Year<br>Total Contribution Rate |               |               |
|                                                                                                                  | County                                        | Novato        | San Rafael    | County                                        | Novato        | San Rafael    |
| Total After Proposed Demographic Assumptions                                                                     | <b>-0.48%</b>                                 | <b>-0.34%</b> | <b>-0.90%</b> | <b>-1.12%</b>                                 | <b>-0.84%</b> | <b>-2.22%</b> |
| <u>Proposed Economic Assumptions</u>                                                                             |                                               |               |               |                                               |               |               |
| Recommended (6.75% Discount, 2.75% Payroll)                                                                      | <b>1.77%</b>                                  | <b>1.65%</b>  | <b>1.46%</b>  | <b>2.99%</b>                                  | <b>2.65%</b>  | <b>2.54%</b>  |
| Alternative 1 (6.75% Discount, 3.00% Payroll)                                                                    | 1.62%                                         | 1.32%         | 0.96%         | 2.84%                                         | 2.30%         | 2.04%         |
| Alternative 2 (6.50% Discount, 2.50% Payroll)                                                                    | 2.98%                                         | 1.71%         | 2.22%         | 5.16%                                         | 2.65%         | 3.82%         |
| Total (Recommended Economic + Proposed Demographic)                                                              | <b>1.29%</b>                                  | <b>1.31%</b>  | <b>0.56%</b>  | <b>1.87%</b>                                  | <b>1.81%</b>  | <b>0.32%</b>  |

## SECTION II – 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.
- **Payroll growth** – overall pensionable payroll growth used in the calculation of the unfunded liability amortization payment 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.

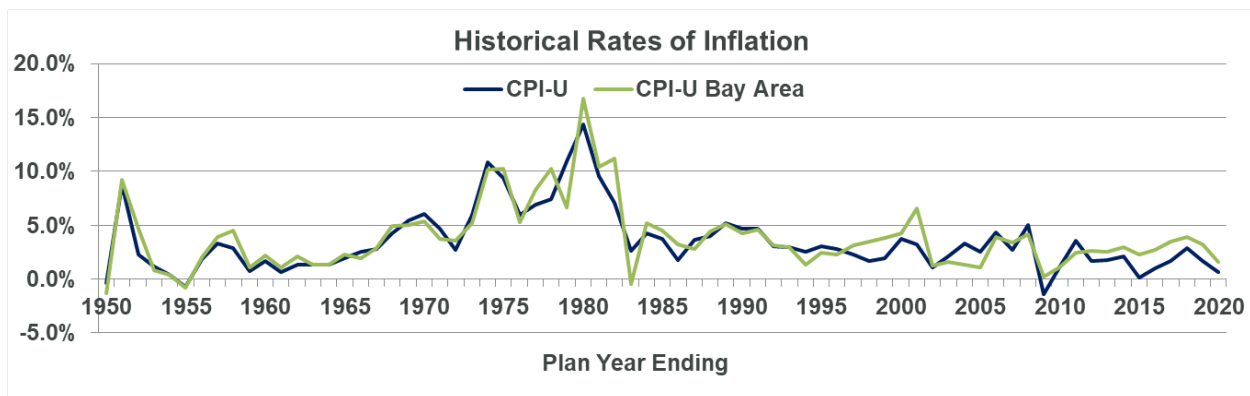
### PRICE INFLATION

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 II-1 below shows inflation (CPI-U) for the U.S. and for the Bay Area by Plan year (ending June 30) since 1950.

Chart II-1



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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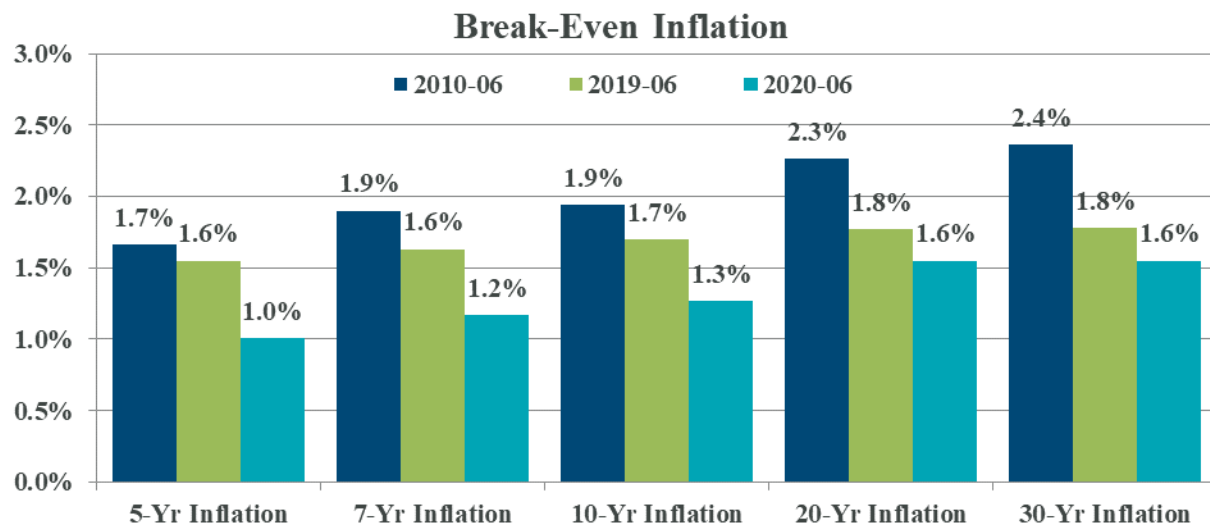
**SECTION II – ECONOMIC ASSUMPTIONS  
PRICE INFLATION**

Over the 70 years ending June 2020, the geometric average inflation rate for the U.S. has been about 3.5%, but this average is heavily influenced by the high inflation rates in the 1970s and early 1980s. Over the last 30 years, the geometric average inflation rate has been 2.3%, and it has only been 1.7% over the last 10 years. The inflation rate for the Bay Area – which affects post-retirement COLAs and active member wage increases, but not necessarily overall investment returns – has generally tracked U.S. inflation reasonably closely, but has been somewhat higher over the past decade.

**Future Expectations**

A measure of the market consensus of expected future inflation rates is the difference in yields between conventional treasury bonds/notes and Treasury Inflation-Protected Securities (TIPS) at the same maturity. Chart II-2 shows the break-even inflation rate as of June 2020, as well as the periods, one and 10 years earlier. Break-even inflation is the level of inflation needed for an investment in TIPS to “break even” with an investment in conventional treasury bonds/notes of the same maturity.

**Chart II-2**



Data Source Federal Reserve, Constant Maturity Yields, Monthly Series

The Federal Reserve Bank of Philadelphia publishes a quarterly survey of professional economic forecasters. Chart II-3 on the next page shows the distribution of the professionals' forecasts for average inflation over the next 10 years, compared to a survey of investment consultants performed by Horizon Actuarial Services, as well as a database of assumptions used by U.S. public pension plans and a Cheiron survey of assumptions used by California public pension plans.

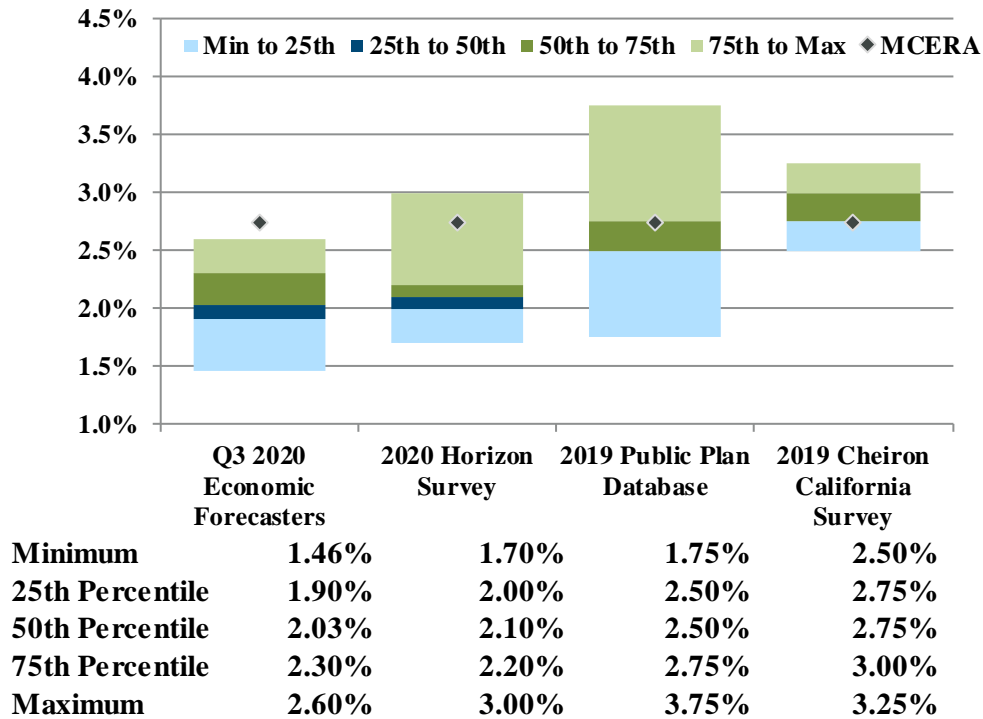


**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION II – ECONOMIC ASSUMPTIONS  
PRICE INFLATION**

**Chart II-3**

**Survey of CPI Assumptions**



Finally, Callan, the Board's investment consultant, uses a 10-year inflation assumption of 2.25%, similar to that of many other investment consultants.

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 2.25% and 2.75%, and we recommend that the Board reduce the inflation assumption from 2.75% to 2.50%. 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 would be considered.

**SECTION II – 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.

From 2009 through 2019, wage inflation for Marin local government workers averaged approximately 1.8% compared to annual US price inflation of 1.8% and Bay area inflation of 2.8%, making real wage growth negative compared to local inflation.

While governmental entities remain under financial stress (even more so now under the COVID-19 crisis) and other areas of employee compensation – most notably health care costs and pension contributions – have continued to increase faster than the CPI, it is common to assume some additional level of base payroll increase beyond general inflation, reflecting some level of real wage growth. Potential reasons contributing to the real wage 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 recently proven the case in the Bay Area. Also, while US local government workers did not experience any real wage growth from 2009 to 2019, over the last five years real wage growth has been approximately 1.3%. The Social Security Administration projects real wage growth of 0.6% – 1.8% going forward in their Social Security solvency projections.

If the Board adopts the recommended reduction in the price inflation assumption from 2.75% to 2.50%, we recommend that the Board increase the real wage growth assumption from 0.25% to 0.50%, retaining a 3.00% total wage growth assumption. This change brings the real wage growth assumption into closer alignment with the long-term assumption used by many other plans and the Social Security Administration in their projections, and also accounts for the fact that wages are generally related to local inflation, which recently in the Bay Area has been higher than the national average. However, retaining the current real wage growth assumption of 0.25% would also be reasonable.

**SECTION II – ECONOMIC ASSUMPTIONS  
PAYROLL GROWTH**

## **PAYROLL GROWTH**

The funding policy for MCERA is based on a “level percentage of payroll” methodology. This means that the amortization payments to fund the layers of the unfunded liability are designed to remain constant as a percentage of pensionable compensation (notwithstanding the phasing in and out of new layers).

In order to achieve this objective, an assumption regarding the rate of growth in overall pensionable compensation must be set. The dollar amount of the UAL payments will then be calculated to increase at this assumed rate of payroll growth. If actual payroll growth ends up being higher than the assumption, the UAL payments will decline as a percentage of pay, and if actual payroll growth is lower, the UAL rates will increase.

Traditionally for MCERA and most other public systems using level percentage of payroll methods, the assumed rate of payroll growth has been set equal to the wage growth assumption. This is consistent with an assumption that the pay for newly hired members will increase by the wage growth assumption each year, and that the Plan will have a stable active population – i.e., having a consistent number of active members and a stable distribution at various age and service levels – and that the increases in members’ pay will be pensionable.

However, there are several reasons why it may be reasonable to set a payroll/amortization growth rate lower than the wage growth assumption. As a result of the Public Employee Pension Reform Act (PEPRA), some pay amounts for new hires will not be pensionable, both because of the changes in the definition of pensionable compensation and the impact of the PEPRA wage cap. This means that even if overall wages grow by the full wage growth assumption, the amount of wages that are pensionable are likely to grow by a smaller rate. In addition, budgetary stresses – such as those that may result from events such as the current COVID crisis – could cause payroll to increase less than expected. Finally, setting the amortization growth rate below the wage growth assumption increases the likelihood that UAL payments will decline rather than grow as a percentage of pay.

For these reasons, we recommend setting the payroll/amortization growth assumption 0.25% less than the wage growth assumption. If the Board retains the 3.00% wage growth assumption as recommended, this would result in a payroll/amortization growth rate of 2.75%. However, retaining the current practice of setting the payroll/amortization growth rate equal to the wage growth assumption would also be reasonable, though slightly less conservative.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION II – ECONOMIC ASSUMPTIONS  
COLA GROWTH**

## **COLA GROWTH**

Most members of MCERA are eligible to receive automatic Cost-of-Living Adjustments (COLAs), based on the growth in the Bay Area Consumer Price Index (CPI-U) and reflecting various caps on the annual COLA increase. These caps depend on the Tier of the member, and can be 2%, 3% or 4% annually. 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.

Using an internally developed model, 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 1.6% was used in the simulations, to reflect the most recent level of Bay Area inflation (based on the increase in the CPI-U for the Bay Area from August 2019 through August 2020).

Based on the results of these simulations, Table II-1 shows our recommended COLA growth assumptions for the various COLA cap groups, based on three different price inflation assumptions.

**Table II-1**

| <b>Recommended COLA Assumptions Based on Inflation Assumption Adopted</b> |                  |                      |                      |
|---------------------------------------------------------------------------|------------------|----------------------|----------------------|
|                                                                           | <b>2.75%</b>     | <b>2.50%</b>         | <b>2.25%</b>         |
| <b>Inflation</b>                                                          | <b>(Current)</b> | <b>(Recommended)</b> | <b>(Alternative)</b> |
| 2% Cap                                                                    | 1.90%            | 1.90%                | 1.90%                |
| 3% Cap                                                                    | 2.60%            | 2.40%                | 2.20%                |
| 4% Cap                                                                    | 2.70%            | 2.50%                | 2.25%                |

We recommend the Board adopt the COLA growth assumptions consistent with the price inflation assumption adopted by the Board.

SECTION II – ECONOMIC ASSUMPTIONS  
DISCOUNT RATE

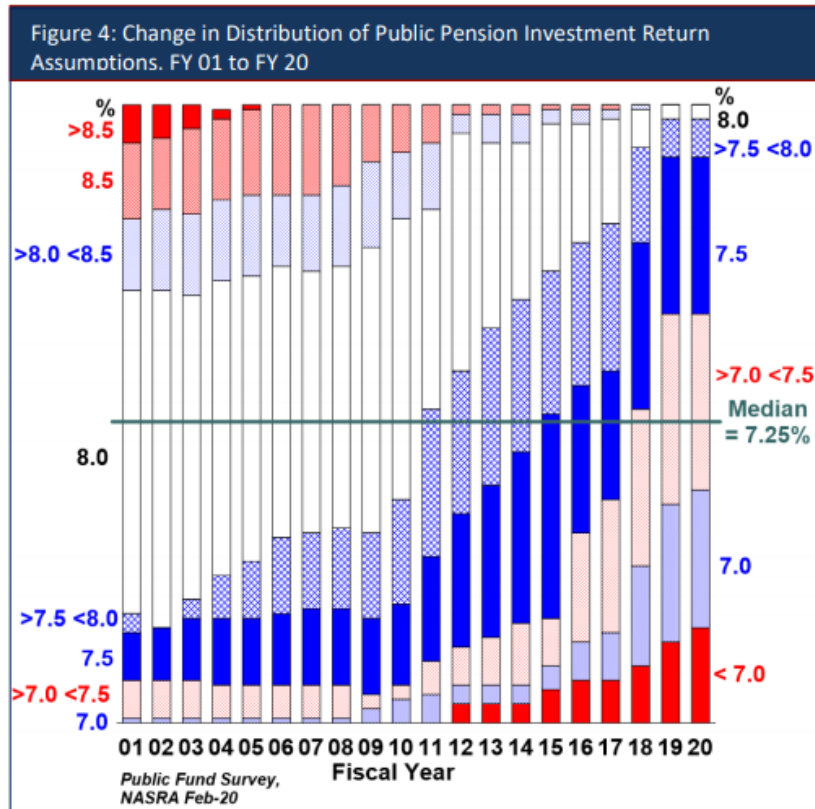
DISCOUNT RATE

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. 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 significantly 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 II-4 below shows the change in the distribution of assumptions since 2001. The median assumption is now 7.25% and the number of plans using a discount rate of 7.0% or lower has increased significantly.

Chart II-4

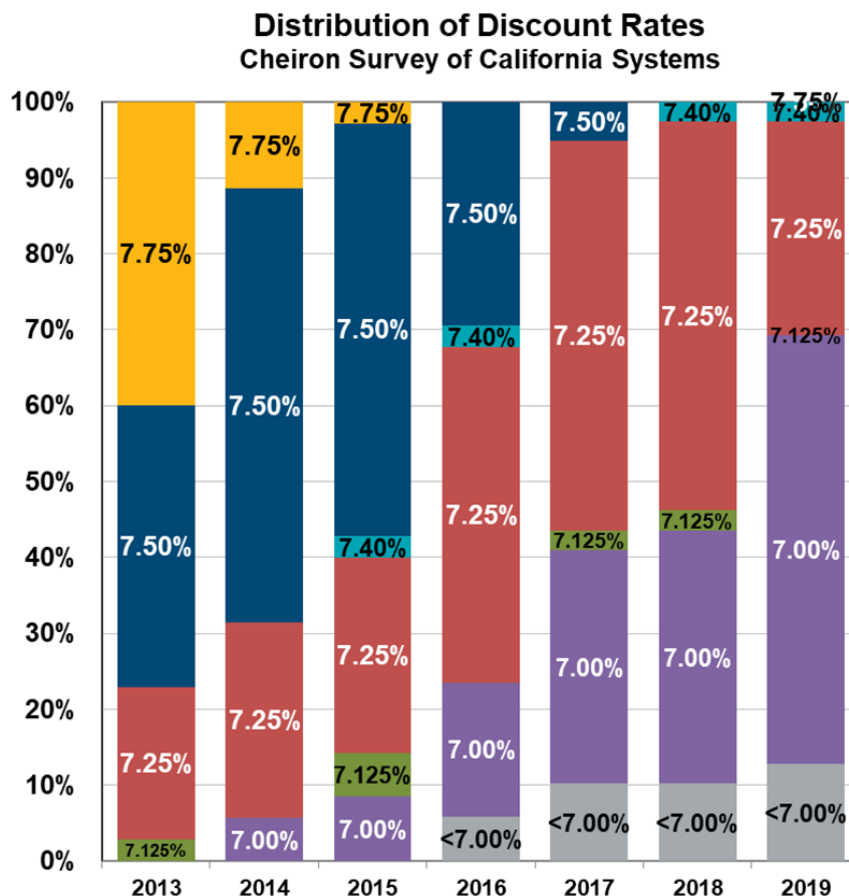


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EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION II – ECONOMIC ASSUMPTIONS  
DISCOUNT RATE**

In our survey of California retirement systems, only 30% were still using a discount rate of 7.25% or greater as of 2019. Chart II-5 below shows the change in discount rate assumptions for California systems from 2013 to 2019.

**Chart II-5**



**Target Asset Allocation and Future Expectations**

The nominal expected return on assets depends on the allocation of assets to different asset classes (e.g., stocks, bonds, etc.) and the capital market assumptions for each of the asset classes.

Table II-2 on the next page 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 (Callan), as well as an average set of capital market assumptions based on a survey of multiple investment consultants published by Horizon Actuarial Services. The table also shows the underlying inflation assumption used by each investment consultant in the development of their capital market assumptions and computes the expected real rate of return

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EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION II – ECONOMIC ASSUMPTIONS  
DISCOUNT RATE**

(investment return in excess of inflation). These results were produced using an internally developed model, which relies on asset class returns, standard deviations, and correlations provided by Callan and Horizon Actuarial Services, and which reflects an assumption that asset class returns are lognormally distributed.

**Table II-2**

| <b>MCERA Portfolio Return Expectations</b><br>(reflects 5bp adjustment for investment expenses) |                |                  |              |                               |
|-------------------------------------------------------------------------------------------------|----------------|------------------|--------------|-------------------------------|
| <b>Consultant</b>                                                                               | <b>Nominal</b> | <b>Inflation</b> | <b>Real</b>  | <b>Standard<br/>Deviation</b> |
| <b>Callan (10-year)</b>                                                                         | 6.48%          | 2.25%            | 4.23%        | 13.22%                        |
| <b>Horizon (Survey, 10-year)</b>                                                                | 6.18%          | 1.98%            | 4.20%        | 12.25%                        |
| <b>Horizon (Survey, 20-year)</b>                                                                | <u>7.06%</u>   | <u>2.17%</u>     | <u>4.89%</u> | <u>12.25%</u>                 |
| <b>Average</b>                                                                                  | 6.57%          | 2.13%            | 4.44%        | 12.57%                        |
| <b>Current Assumption</b>                                                                       | 7.00%          | 2.75%            | 4.25%        |                               |

We note that the returns in Table II-2 above were reduced by 0.05% to reflect investment fees on the MCERA portfolio. The public asset class returns provided by the investment consultants are based on the expected returns of the portfolio benchmark indices, whereas the private asset class expected returns provided are net of fees. 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 active asset managers. However, a slight margin is appropriate to reflect the cost of investing in passively-managed public classes, as well as investment-related expenses other than those of the investment managers, which would include the investment advisor and custodian.

Based on these capital market assumptions, as adjusted for investment expenses as discussed above, we also calculated the potential distribution of nominal returns over 10-year and 20-year periods (as applicable), as shown in Table II-3 on the next page. These results were determined based on the same internally developed model.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION II – ECONOMIC ASSUMPTIONS  
DISCOUNT RATE**

**Table II-3**

| Expected Distribution of Average Nominal Annual Investment Returns<br>(reflects 5bp adjustment for investment expenses) |                  |                   |                   |
|-------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|-------------------|
| Percentile                                                                                                              | Callan (10-Year) | Horizon (10-Year) | Horizon (20-Year) |
| <b>95th</b>                                                                                                             | 13.5%            | 12.7%             | 11.6%             |
| <b>75th</b>                                                                                                             | 9.3%             | 8.8%              | 8.9%              |
| <b>60th</b>                                                                                                             | 7.5%             | 7.2%              | 7.8%              |
| <b>50th</b>                                                                                                             | 6.5%             | 6.2%              | 7.1%              |
| <b>40th</b>                                                                                                             | 5.4%             | 5.2%              | 6.4%              |
| <b>25th</b>                                                                                                             | 3.7%             | 3.6%              | 5.2%              |
| <b>5th</b>                                                                                                              | -0.1%            | 0.1%              | 2.7%              |

Finally, we calculated the likelihood of achieving various nominal and real return thresholds, using the same model as described above, with the results shown in Table II-4 below. We note that for the purposes of this analysis, we used the applicable constant inflation assumption from the assumption set to estimate the real return from the simulated nominal returns. This practice may result in inaccurate estimates to the extent that the real returns by asset class are not independent of inflation.

**Table II-4**

| Likelihood of Achieving Average Returns<br>(reflects 5bp adjustment for investment expenses) |         |       |       |       |       |       |
|----------------------------------------------------------------------------------------------|---------|-------|-------|-------|-------|-------|
|                                                                                              | Nominal |       |       |       | Real  |       |
|                                                                                              | 6.50%   | 6.75% | 7.00% | 3.75% | 4.00% | 4.25% |
| <b>Callan (10-yr)</b>                                                                        | 50%     | 47%   | 45%   | 55%   | 52%   | 50%   |
| <b>Horizon (10-yr)</b>                                                                       | 47%     | 44%   | 42%   | 55%   | 52%   | 50%   |
| <b>Horizon (20-yr)</b>                                                                       | 58%     | 55%   | 51%   | 66%   | 63%   | 59%   |
| <b>Average</b>                                                                               | 52%     | 49%   | 46%   | 59%   | 56%   | 53%   |

As shown in Table II-2, we calculated an average expected geometric real return of 4.44%, which is slightly above the Board's current real return assumption of 4.25%. The average nominal return of 6.57% is lower than the current nominal return assumption of 7.00%, as a result of the lower average inflation assumption (2.13%) underlying the consultant expectations.

We recommend that the Board retain the current real return assumption of 4.25%, and reduce the nominal return assumption from 7.00% to 6.75%, consistent with the recommended reduction in the inflation assumption from 2.75% to 2.50%. We note that other combinations of real returns and inflation assumptions are also reasonable.



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – 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 MCERA, with some adjustments where future experience is expected to differ from historical experience and with deference to standard tables where MCERA experience is not fully credible and a standard table is available. For purposes of this study, merit salary increases and administrative expenses are also considered demographic assumptions because the assumptions are based primarily on MCERA'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.

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. A *longitudinal* approach was used to analyze the merit increases for this study.

A longitudinal study reviews the average increase in pay for each level of service. To analyze the merit component, we subtracted the Plan's real wage growth – as measured by the annual increase in average valuation salary during the experience study period – from the total pay increases experienced by each member during the experience study period.

Charts III-1 and III-2 on the following pages illustrate the results of the longitudinal study. It analyzes the pay patterns for Miscellaneous and Safety members, respectively. Our charts will generally show the current assumption (red line) compared to the actual experience (blue line) and the proposed assumption (green line). When no change in assumption is proposed, the current assumption will not appear on the chart. We backed out the wage growth in order to isolate the merit, promotion, and longevity component. 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.

We recommend no changes to the merit assumption for Miscellaneous or Safety.

MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020

SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MERIT SALARY INCREASES

Chart III-1: Miscellaneous

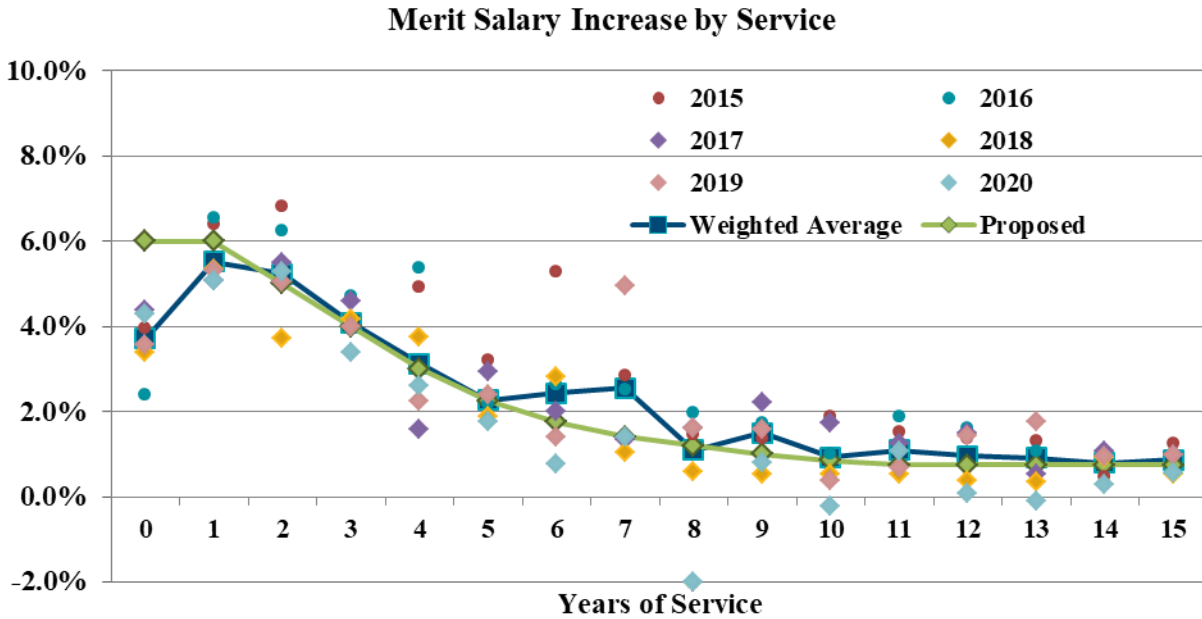
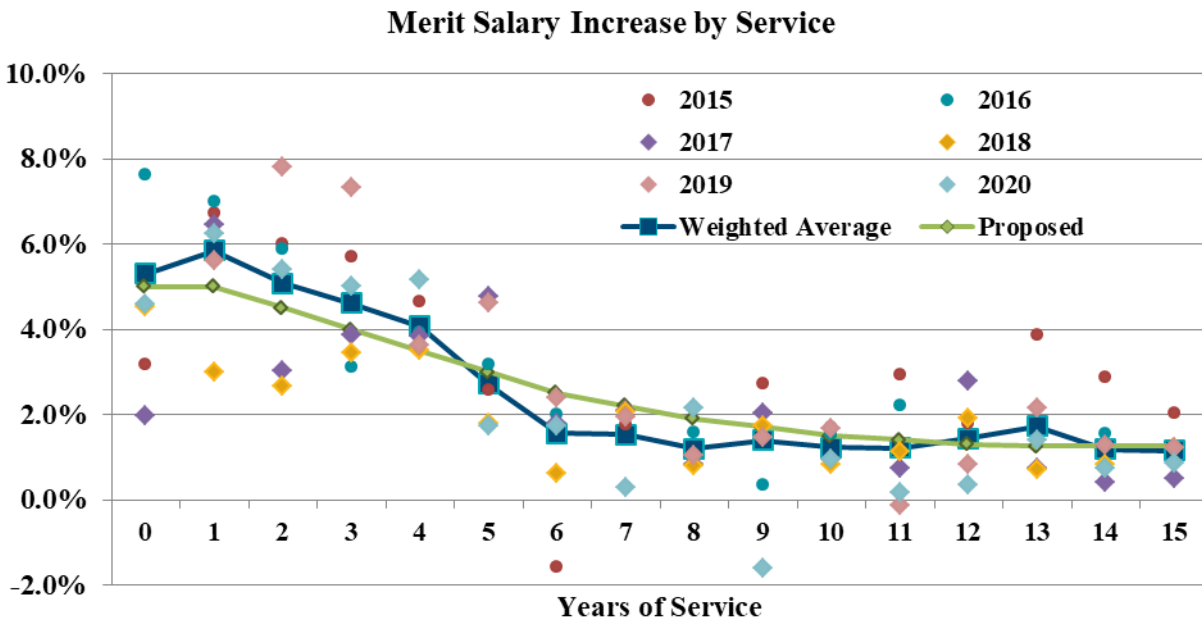


Chart III-2: Safety



### SECTION III – DEMOGRAPHIC ASSUMPTIONS

#### ANALYSIS OF OTHER DEMOGRAPHIC ASSUMPTIONS

For most 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.

In addition, we calculated the 90% confidence interval using a binomial distribution, which represents the range within which the true decrement rate during the experience study period fell with 90% confidence. 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, mortality, and some retirement rates, we compare MCERA's experience to that of a published table and adjust the tables to bring the proposed assumption closer to an A/E ratio of 100% taking into account the level and credibility of MCERA's experience.

Our internal model uses the limited fluctuation approach to credibility assigning full credibility when there is a 90% probability that MCERA's sample experience rate will be within 5% of the true expected rate. For assumptions where the expected rate is near zero, this approach requires 1082 actual decrements for full credibility. When there is insufficient experience for full credibility, partial credibility is assigned, weighting MCERA's experience by the square root of the ratio of actual decrements in the sample to the number of decrements required for full credibility. The remaining weight is given to the published table. Other methods of determining credibility may produce a different result.

To track how well the assumption fits the pattern of the data, we calculate the percentage of the assumptions that fall within the 90% confidence interval, and we calculate an r-squared statistic for each assumption. R-squared can be thought of as the percentage of the variation in actual data explained by the assumption. Ideally, all of the assumptions would fall within the 90% confidence interval and r-squared would equal 100% although this is never the case. Any proposed assumption change should increase the percentage of assumptions within the confidence interval and 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.

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

**RETIREMENT RATES**

The current retirement rates vary by group, age, and service and are applied to all members who are eligible to retire. 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.

Generally, at any given age, members with more service are more likely to retire than members with fewer years of service. We reviewed the MCERA actual retirement rates based on service groupings since MCERA is not large enough to justify assumptions for each age and service combination.

We recommend maintaining the current assumptions for pre-PEPRA Miscellaneous members, except increasing rates at ages 60 and above and with less than 20 years of service. We also recommend maintaining the current assumptions for those Safety members with the 3% at age 50 benefit formula. We suggest replacing the current assumptions for Safety members with the 3% at age 55 benefit formulas with age and service-based CalPERS rates for Public Safety Police members with the same formula.

We recommend replacing the assumptions for all Miscellaneous PEPRA members and Safety PEPRA members with those of their CalPERS counterparts. MCERA Miscellaneous PEPRA members would be assumed to retire using the CalPERS 2.0% at age 62 Public Agency Miscellaneous rates, while MCERA Safety PEPRA members would be assumed to retire using the CalPERS 2.7% at age 57 Public Agency Safety Police rates. These PEPRA assumptions reflect the expectation that PEPRA members may retire later than those in other tiers due to their lower benefit levels.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

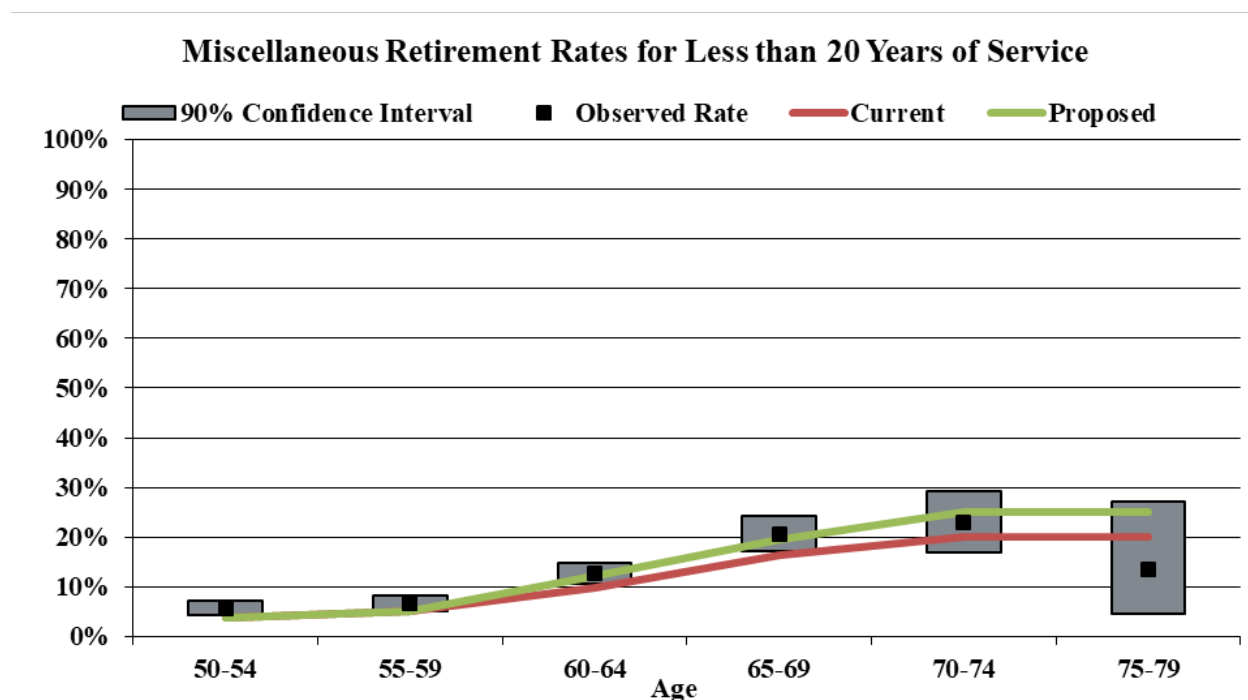
Table III-R1 shows the calculation of actual-to-expected ratios and the r-squared statistic for Miscellaneous members with less than 20 years of service. Chart III-R1 shows the information graphically along with the 90% confidence interval.

The data shows higher actual retirement rates than expected under the current assumption. The proposed assumption increases the aggregate assumed rate of retirement and decreases the aggregate A/E ratio from 129% to 111%. The r-squared statistic increases from 80.9% to 84.3%.

**Table III-R1 – Miscellaneous**

| Miscellaneous Retirement Rates for Less Than 20 Years of Service |              |             |              |              |                  |             |             |             |             |
|------------------------------------------------------------------|--------------|-------------|--------------|--------------|------------------|-------------|-------------|-------------|-------------|
| Age                                                              | Exposures    | Retirements |              |              | Retirement Rates |             |             | A/E Ratios  |             |
|                                                                  |              | Actual      | Current      | Proposed     | Actual           | Current     | Proposed    | Current     | Proposed    |
| 50-54                                                            | 740          | 42          | 28           | 28           | 5.7%             | 3.8%        | 3.8%        | 150%        | 150%        |
| 55-59                                                            | 730          | 49          | 37           | 37           | 6.7%             | 5.0%        | 5.0%        | 134%        | 134%        |
| 60-64                                                            | 673          | 85          | 67           | 83           | 12.6%            | 9.9%        | 12.3%       | 128%        | 103%        |
| 65-69                                                            | 372          | 77          | 61           | 72           | 20.7%            | 16.4%       | 19.5%       | 126%        | 106%        |
| 70-74                                                            | 113          | 26          | 23           | 28           | 23.0%            | 20.0%       | 25.0%       | 115%        | 92%         |
| 75-79                                                            | 22           | 3           | 4            | 6            | 13.6%            | 20.0%       | 25.0%       | 68%         | 55%         |
| <b>Total</b>                                                     | <b>2,650</b> | <b>282</b>  | <b>219</b>   | <b>253</b>   | <b>10.6%</b>     | <b>8.3%</b> | <b>9.6%</b> | <b>129%</b> | <b>111%</b> |
| <b>R-squared</b>                                                 |              |             | <b>80.9%</b> | <b>84.3%</b> |                  |             |             |             |             |

**Chart III-R1 – Miscellaneous**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

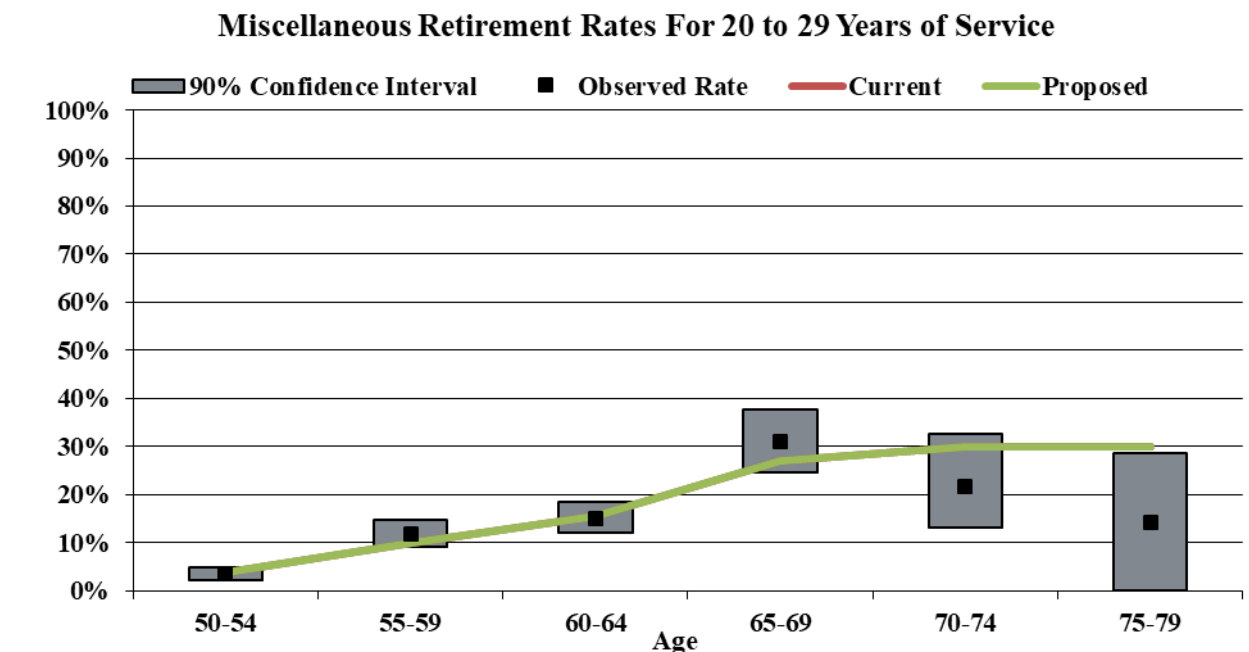
Table III-R2 shows the calculation of actual-to-expected ratios and the r-squared statistic for Miscellaneous members with 20 to 29 years of service. Chart III-R2 shows the information graphically along with the 90% confidence interval.

The data shows actual retirement rates close to those expected under the current assumption. No assumption changes are recommended for these members.

**Table III-R2 – Miscellaneous**

| Miscellaneous Retirement Rates for 20 to 29 Years of Service |              |             |              |              |                  |             |             |             |             |
|--------------------------------------------------------------|--------------|-------------|--------------|--------------|------------------|-------------|-------------|-------------|-------------|
| Age                                                          | Exposures    | Retirements |              |              | Retirement Rates |             |             | A/E Ratios  |             |
|                                                              |              | Actual      | Current      | Proposed     | Actual           | Current     | Proposed    | Current     | Proposed    |
| 50-54                                                        | 428          | 15          | 17           | 17           | 3.5%             | 3.9%        | 3.9%        | 90%         | 90%         |
| 55-59                                                        | 378          | 45          | 38           | 38           | 11.9%            | 10.0%       | 10.0%       | 119%        | 119%        |
| 60-64                                                        | 324          | 49          | 51           | 51           | 15.1%            | 15.7%       | 15.7%       | 96%         | 96%         |
| 65-69                                                        | 138          | 43          | 37           | 37           | 31.2%            | 27.1%       | 27.1%       | 115%        | 115%        |
| 70-74                                                        | 46           | 10          | 14           | 14           | 21.7%            | 30.0%       | 30.0%       | 72%         | 72%         |
| 75-79                                                        | 14           | 2           | 4            | 4            | 14.3%            | 30.0%       | 30.0%       | 48%         | 48%         |
| <b>Total</b>                                                 | <b>1,328</b> | <b>164</b>  | <b>161</b>   | <b>161</b>   | <b>5.9%</b>      | <b>5.7%</b> | <b>5.7%</b> | <b>102%</b> | <b>102%</b> |
| <b>R-squared</b>                                             |              |             | <b>82.7%</b> | <b>82.7%</b> |                  |             |             |             |             |

**Chart III-R2 – Miscellaneous**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

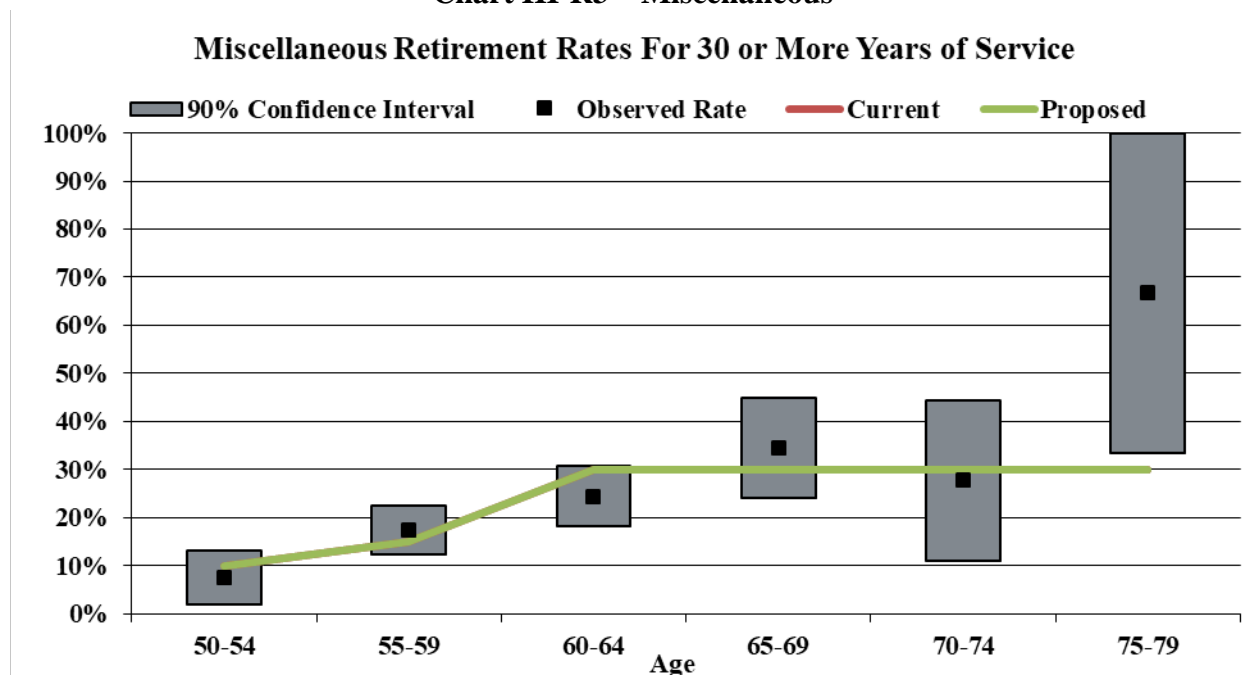
Table III-R3 shows the calculation of actual-to-expected ratios and the r-squared statistic for Miscellaneous members with 30 or more years of service. Chart III-R3 shows the information graphically along with the 90% confidence interval.

The data shows actual retirement rates close to those expected under the current assumption. No assumption changes are recommended for these members.

**Table III-R3 – Miscellaneous**

| <b>Miscellaneous Retirement Rates For 30 or More Years of Service</b> |                  |                    |                |                 |                         |                |                 |                   |                 |
|-----------------------------------------------------------------------|------------------|--------------------|----------------|-----------------|-------------------------|----------------|-----------------|-------------------|-----------------|
| <b>Age</b>                                                            | <b>Exposures</b> | <b>Retirements</b> |                |                 | <b>Retirement Rates</b> |                |                 | <b>A/E Ratios</b> |                 |
|                                                                       |                  | <b>Actual</b>      | <b>Current</b> | <b>Proposed</b> | <b>Actual</b>           | <b>Current</b> | <b>Proposed</b> | <b>Current</b>    | <b>Proposed</b> |
| 50-54                                                                 | 53               | 4                  | 5              | 5               | 7.5%                    | 10.0%          | 10.0%           | 75%               | 75%             |
| 55-59                                                                 | 138              | 24                 | 21             | 21              | 17.4%                   | 15.0%          | 15.0%           | 116%              | 116%            |
| 60-64                                                                 | 127              | 31                 | 38             | 38              | 24.4%                   | 30.0%          | 30.0%           | 81%               | 81%             |
| 65-69                                                                 | 58               | 20                 | 17             | 17              | 34.5%                   | 30.0%          | 30.0%           | 115%              | 115%            |
| 70-74                                                                 | 18               | 5                  | 5              | 5               | 27.8%                   | 30.0%          | 30.0%           | 93%               | 93%             |
| 75-79                                                                 | 3                | 2                  | 1              | 1               | 66.7%                   | 30.0%          | 30.0%           | 222%              | 222%            |
| <b>Total</b>                                                          | <b>397</b>       | <b>86</b>          | <b>88</b>      | <b>88</b>       | <b>3.1%</b>             | <b>3.1%</b>    | <b>3.1%</b>     | <b>98%</b>        | <b>98%</b>      |
| <b>R-squared</b>                                                      |                  |                    | <b>79.0%</b>   | <b>79.0%</b>    |                         |                |                 |                   |                 |

**Chart III-R3 – Miscellaneous**



See Appendices A and B for a full listing of the proposed and prior retirement rates for Miscellaneous members. The ultimate retirement age remains at 80.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

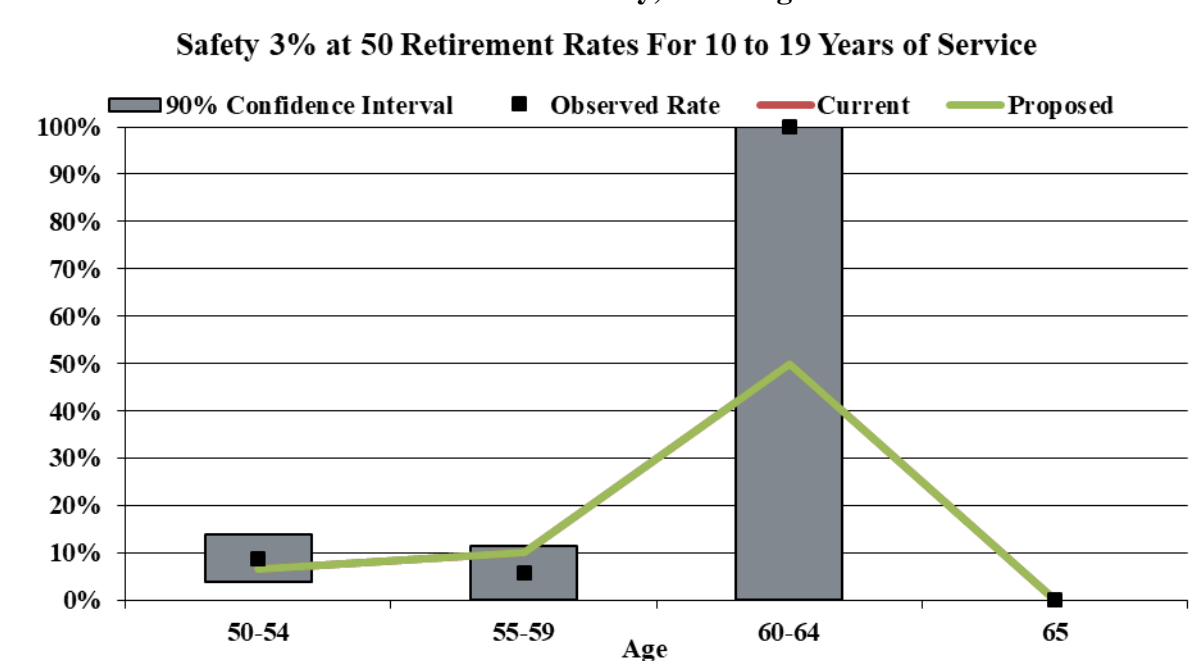
Table III-R4 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with the 3% at age 50 benefit formula and 10 to 19 years of service. Chart III-R4 shows the information graphically along with the 90% confidence interval.

The limited data shows actual retirement rates higher than those expected under the current assumption, but the current assumptions remain within the confidence intervals. No assumption changes are recommended for these members.

**Table III-R4 – Safety, 3% at age 50**

| Safety 3% at 50 Retirement Rates For 10 to 19 Years of Service |            |             |              |              |                  |             |             |             |             |
|----------------------------------------------------------------|------------|-------------|--------------|--------------|------------------|-------------|-------------|-------------|-------------|
| Age                                                            | Exposures  | Retirements |              |              | Retirement Rates |             |             | A/E Ratios  |             |
|                                                                |            | Actual      | Current      | Proposed     | Actual           | Current     | Proposed    | Current     | Proposed    |
| 50-54                                                          | 80         | 7           | 5            | 5            | 8.8%             | 6.6%        | 6.6%        | 133%        | 133%        |
| 55-59                                                          | 35         | 2           | 4            | 4            | 5.7%             | 10.0%       | 10.0%       | 57%         | 57%         |
| 60-64                                                          | 3          | 3           | 2            | 2            | 100.0%           | 50.0%       | 50.0%       | 200%        | 200%        |
| 65                                                             | 0          | 0           | 0            | 0            | 0.0%             | 0.0%        | 0.0%        | 0%          | 0%          |
| <b>Total</b>                                                   | <b>118</b> | <b>12</b>   | <b>10</b>    | <b>10</b>    | <b>10.2%</b>     | <b>8.7%</b> | <b>8.7%</b> | <b>117%</b> | <b>117%</b> |
| <b>R-squared</b>                                               |            |             | <b>80.6%</b> | <b>80.6%</b> |                  |             |             |             |             |

**Chart III-R4 – Safety, 3% at age 50**





**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

Table III-R5 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with the 3% at age 50 benefit formula and 20 to 29 years of service. Chart III-R5 shows the information graphically along with the 90% confidence interval.

The data shows lower actual retirement rates than expected under the current assumption, but the current assumptions remain within the confidence intervals. No assumption changes are recommended for these members.

**Table III-R5 – Safety, 3% at age 50**

| Safety 3% at 50 Retirement Rates For 20 to 29 Years of Service |            |             |              |              |                  |              |              |            |            |
|----------------------------------------------------------------|------------|-------------|--------------|--------------|------------------|--------------|--------------|------------|------------|
| Age                                                            | Exposures  | Retirements |              |              | Retirement Rates |              |              | A/E Ratios |            |
|                                                                |            | Actual      | Current      | Proposed     | Actual           | Current      | Proposed     | Current    | Proposed   |
| 40-44                                                          | 35         | 1           | 1            | 1            | 2.9%             | 3.0%         | 3.0%         | 95%        | 95%        |
| 45-49                                                          | 197        | 7           | 11           | 11           | 3.6%             | 5.8%         | 5.8%         | 61%        | 61%        |
| 50-54                                                          | 134        | 11          | 15           | 15           | 8.2%             | 11.3%        | 11.3%        | 72%        | 72%        |
| 55-59                                                          | 46         | 14          | 14           | 14           | 30.4%            | 31.0%        | 31.0%        | 98%        | 98%        |
| 60-64                                                          | 8          | 3           | 4            | 4            | 37.5%            | 50.0%        | 50.0%        | 75%        | 75%        |
| 65                                                             | 0          | 0           | 0            | 0            | 0.0%             | 0.0%         | 0.0%         | 0%         | 0%         |
| <b>Total</b>                                                   | <b>420</b> | <b>36</b>   | <b>46</b>    | <b>46</b>    | <b>8.6%</b>      | <b>10.9%</b> | <b>10.9%</b> | <b>78%</b> | <b>78%</b> |
| <b>R-squared</b>                                               |            |             | <b>85.6%</b> | <b>85.6%</b> |                  |              |              |            |            |

**Chart III-R5 – Safety, 3% at age 50**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

Table III-R6 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with the 3% at age 50 benefit formula and 30 or more years of service. Chart III-R6 shows the information graphically along with the 90% confidence interval.

The data shows actual retirement rates that are higher than expected in aggregate under the current assumption, but the current assumptions remain within the confidence intervals. Given the limited experience, we propose no change in assumptions.

**Table III-R6 – Safety, 3% at age 50**

| Safety 3% at 50 Retirement Rates For 30 or More Years of Service |           |             |              |              |                  |              |              |             |             |
|------------------------------------------------------------------|-----------|-------------|--------------|--------------|------------------|--------------|--------------|-------------|-------------|
| Age                                                              | Exposures | Retirements |              |              | Retirement Rates |              |              | A/E Ratios  |             |
|                                                                  |           | Actual      | Current      | Proposed     | Actual           | Current      | Proposed     | Current     | Proposed    |
| 40-44                                                            | 0         | 0           | 0            | 0            | 0.0%             | 0.0%         | 0.0%         | 0%          | 0%          |
| 45-49                                                            | 0         | 0           | 0            | 0            | 0.0%             | 0.0%         | 0.0%         | 0%          | 0%          |
| 50-54                                                            | 13        | 5           | 3            | 3            | 38.5%            | 20.0%        | 20.0%        | 192%        | 192%        |
| 55-59                                                            | 13        | 8           | 7            | 7            | 61.5%            | 50.0%        | 50.0%        | 123%        | 123%        |
| 60-64                                                            | 1         | 1           | 1            | 1            | 100.0%           | 50.0%        | 50.0%        | 200%        | 200%        |
| 65                                                               | 0         | 0           | 0            | 0            | 0.0%             | 0.0%         | 0.0%         | 0%          | 0%          |
| <b>Total</b>                                                     | <b>27</b> | <b>14</b>   | <b>10</b>    | <b>10</b>    | <b>51.9%</b>     | <b>35.6%</b> | <b>35.6%</b> | <b>146%</b> | <b>146%</b> |
| <b>R-squared</b>                                                 |           |             | <b>67.1%</b> | <b>67.1%</b> |                  |              |              |             |             |

**Chart III-R6 – Safety, 3% at age 50**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

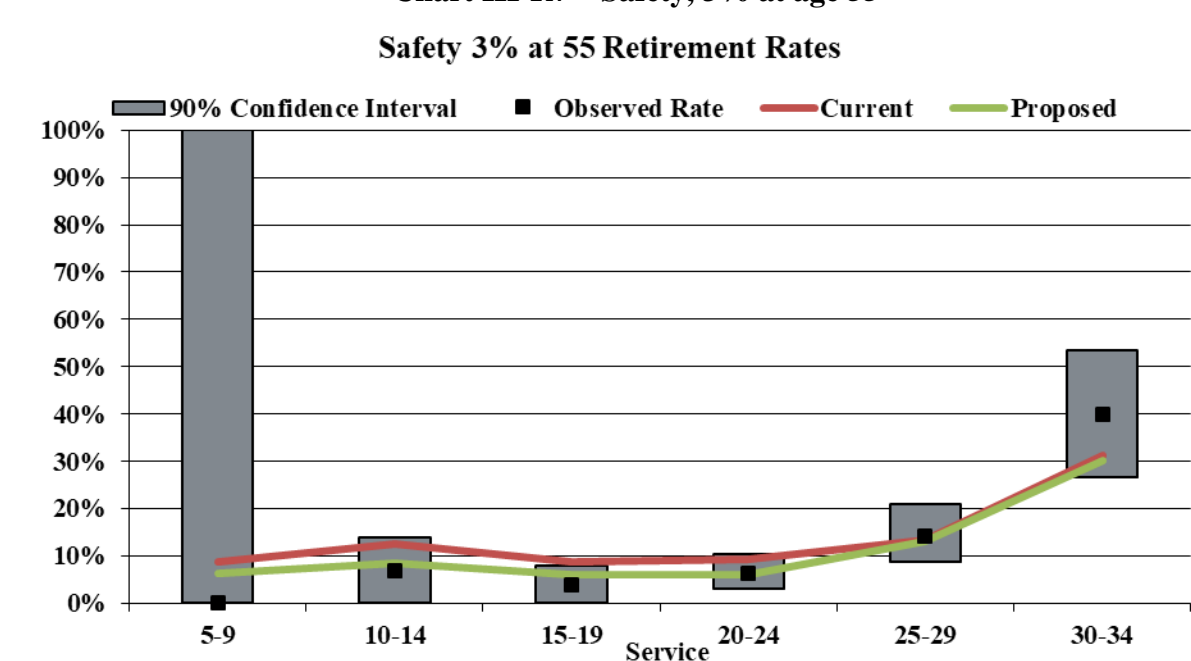
Table III-R7 shows the calculation of actual-to-expected ratios and the r-squared statistic for Safety members with the 3% at age 55 benefit formula and 5 to 34 years of service. Chart III-R7 shows the information graphically along with the 90% confidence interval. We note that in this case we have shown the comparison based on service rather than age, as the comparison based on age shows less distinguishable results between the current and proposed assumptions.

The data shows lower actual retirement rates than expected under the current assumption. We are proposing a change to base the rates on the 3% at 55 age and service-based CalPERS rates for Public Safety Police members. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 89% to 107%. The r-squared statistic increases from 79.3% to 85.1%.

**Table III-R7 – Safety, 3% at age 55**

| <b>Safety 3% at 55 Retirement Rates</b> |                  |                    |                |                 |                         |                |                 |                   |                 |
|-----------------------------------------|------------------|--------------------|----------------|-----------------|-------------------------|----------------|-----------------|-------------------|-----------------|
| <b>Service</b>                          | <b>Exposures</b> | <b>Retirements</b> |                |                 | <b>Retirement Rates</b> |                |                 | <b>A/E Ratios</b> |                 |
|                                         |                  | <b>Actual</b>      | <b>Current</b> | <b>Proposed</b> | <b>Actual</b>           | <b>Current</b> | <b>Proposed</b> | <b>Current</b>    | <b>Proposed</b> |
| 5-9                                     | 4                | 0                  | 0              | 0               | 0.0%                    | 8.8%           | 6.2%            | 0%                | 0%              |
| 10-14                                   | 29               | 2                  | 4              | 2               | 6.9%                    | 12.6%          | 8.6%            | 55%               | 81%             |
| 15-19                                   | 51               | 2                  | 5              | 3               | 3.9%                    | 8.8%           | 6.1%            | 44%               | 64%             |
| 20-24                                   | 126              | 8                  | 12             | 8               | 6.3%                    | 9.2%           | 6.1%            | 69%               | 104%            |
| 25-29                                   | 91               | 13                 | 12             | 12              | 14.3%                   | 13.5%          | 13.0%           | 106%              | 110%            |
| 30-34                                   | 30               | 12                 | 9              | 9               | 40.0%                   | 31.3%          | 30.2%           | 128%              | 132%            |
| <b>Total</b>                            | <b>331</b>       | <b>37</b>          | <b>42</b>      | <b>34</b>       | <b>11.2%</b>            | <b>12.6%</b>   | <b>10.4%</b>    | <b>89%</b>        | <b>107%</b>     |
| <b>R-squared</b>                        |                  |                    | <b>79.3%</b>   | <b>85.1%</b>    |                         |                |                 |                   |                 |

**Chart III-R7 – Safety, 3% at age 55**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
TERMINATION RATES**

**TERMINATION RATES**

Termination rates reflect the frequency at which active members leave employment for reasons other than retirement, death, or disability. Currently, the termination rates are based on age and service for both Safety and Miscellaneous members. Termination rates for Miscellaneous members also vary by sex. The termination rates do not apply once members are eligible for a service retirement benefit.

To make the best use of the available member data, we study all terminations together – vested terminations, terminating members who withdraw their contributions, and members who transfer to a reciprocal pension plan – to determine an overall termination rate. We then analyze the percentages of terminating members who withdraw their contributions, transfer, or are eligible for a vested benefit. Additionally, 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.

Based on this data, we recommend replacing the current age, service and sex-based termination rates for Miscellaneous members with service-only rates. We also recommend a small increase to Safety termination rates for members with less than five years of service.

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TERMINATION RATES**

Table III-T1 shows the calculation of actual-to-expected ratios and the r-squared statistic for Miscellaneous members and Table III-T2 shows the same for Safety members. Charts III-T1 and III-T2 show the information graphically along with the 90% confidence intervals.

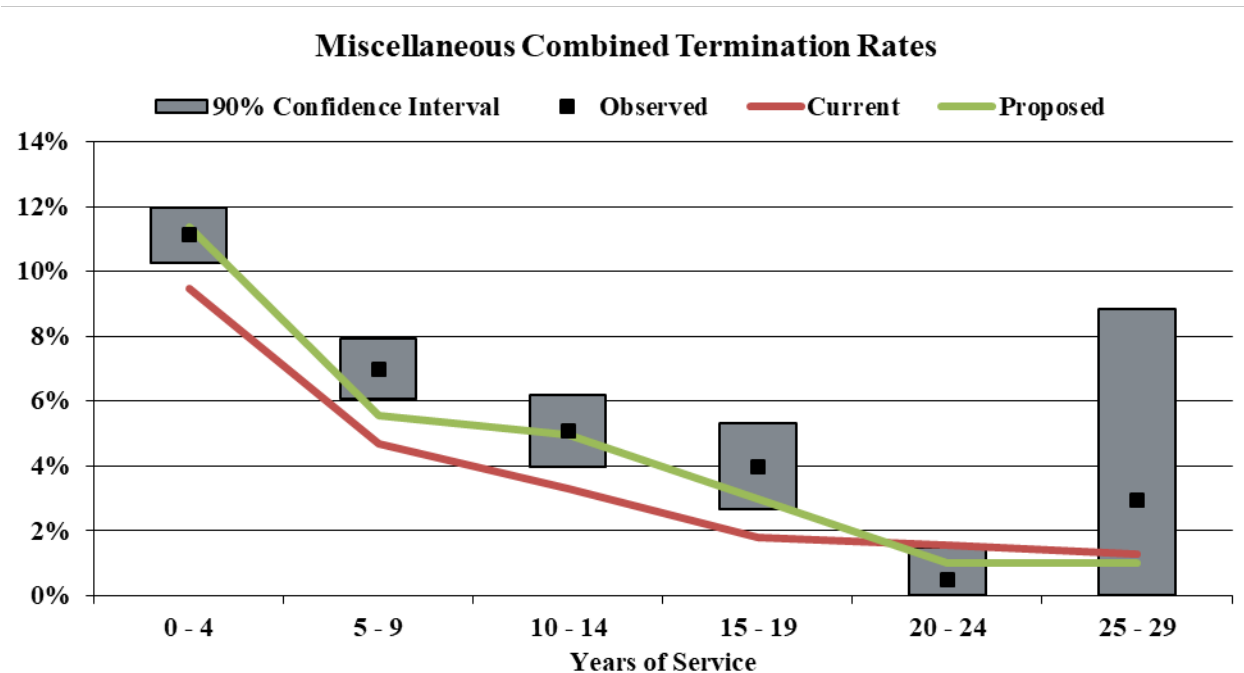
The data shows that in most cases the actual termination rates are slightly higher in aggregate, similar to results in the last study. We also reviewed the Miscellaneous experience by age and sex, but found that the differences in behavior associated with these factors were not as important as service, as evidenced by the fact that our proposed service-only tables provided a better match on all measures (A/E, confidence interval, r-squared statistic).

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

**Table III-T1 – Miscellaneous**

| <b>Miscellaneous Combined Termination Rates</b> |                  |                     |                |                 |                          |                |                 |                   |                 |
|-------------------------------------------------|------------------|---------------------|----------------|-----------------|--------------------------|----------------|-----------------|-------------------|-----------------|
| <b>Service</b>                                  | <b>Exposures</b> | <b>Terminations</b> |                |                 | <b>Termination Rates</b> |                |                 | <b>A/E Ratios</b> |                 |
|                                                 |                  | <b>Actual</b>       | <b>Current</b> | <b>Proposed</b> | <b>Actual</b>            | <b>Current</b> | <b>Proposed</b> | <b>Current</b>    | <b>Proposed</b> |
| 0 - 4                                           | 3,813            | 424                 | 362            | 433             | 11.12%                   | 9.49%          | 11.36%          | 117%              | 98%             |
| 5 - 9                                           | 1,980            | 138                 | 93             | 110             | 6.97%                    | 4.69%          | 5.56%           | 149%              | 125%            |
| 10 - 14                                         | 1,102            | 56                  | 36             | 55              | 5.08%                    | 3.30%          | 4.97%           | 154%              | 102%            |
| 15 - 19                                         | 602              | 24                  | 11             | 18              | 3.99%                    | 1.81%          | 3.00%           | 221%              | 133%            |
| 20 - 24                                         | 202              | 1                   | 3              | 2               | 0.50%                    | 1.54%          | 1.00%           | 32%               | 50%             |
| 25 - 29                                         | 34               | 1                   | 0              | 0               | 2.94%                    | 1.29%          | 1.00%           | 228%              | 294%            |
| <b>Total</b>                                    | <b>7,733</b>     | <b>644</b>          | <b>506</b>     | <b>618</b>      | <b>8.33%</b>             | <b>6.54%</b>   | <b>8.00%</b>    | <b>127%</b>       | <b>104%</b>     |
| <b>R-squared</b>                                |                  |                     | <b>94.2%</b>   | <b>98.2%</b>    |                          |                |                 |                   |                 |

**Chart III-T1 – Miscellaneous Combined**



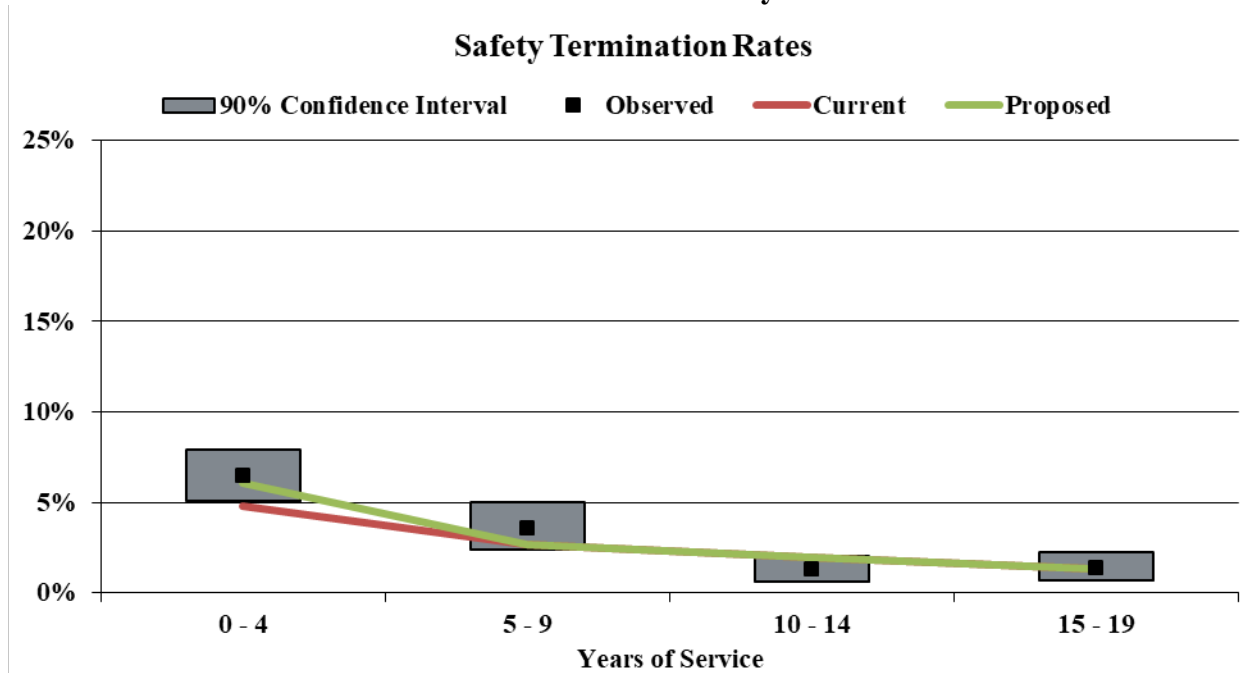
**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
TERMINATION RATES**

**Table III-T2 – Safety**

| Safety Termination Rates |              |              |              |              |                   |              |              |             |             |
|--------------------------|--------------|--------------|--------------|--------------|-------------------|--------------|--------------|-------------|-------------|
| Service                  | Exposures    | Terminations |              |              | Termination Rates |              |              | A/E Ratios  |             |
|                          |              | Actual       | Current      | Proposed     | Actual            | Current      | Proposed     | Current     | Proposed    |
| 0 - 4                    | 863          | 56           | 42           | 52           | 6.49%             | 4.83%        | 6.07%        | 134%        | 107%        |
| 5 - 9                    | 582          | 21           | 15           | 15           | 3.61%             | 2.66%        | 2.66%        | 136%        | 136%        |
| 10 - 14                  | 678          | 9            | 13           | 13           | 1.33%             | 1.94%        | 1.94%        | 68%         | 68%         |
| 15 - 19                  | 572          | 8            | 7            | 7            | 1.40%             | 1.30%        | 1.30%        | 108%        | 108%        |
| <b>Total</b>             | <b>2,695</b> | <b>94</b>    | <b>78</b>    | <b>88</b>    | <b>3.49%</b>      | <b>2.88%</b> | <b>3.28%</b> | <b>121%</b> | <b>106%</b> |
| <b>R-squared</b>         |              |              | <b>90.3%</b> | <b>89.8%</b> |                   |              |              |             |             |

**Chart III-T2 – Safety**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
TERMINATION RATES**

**TYPES OF TERMINATION**

When a vested member terminates employment, the member has 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 (also referred to as a transfer), the employee's retirement benefit is based on the employee's service with MCERA and Final Compensation based on employment with the reciprocal employer.

Tables III-T3 and III-T4 show the results of our analysis of terminations for Safety and Miscellaneous members, as well as our recommendations regarding rates of withdrawal, vested termination, and transfer.

We note that the actual rates of vested terminations and transfers are based on the information reported to Cheiron as part of the actuarial valuation data in the year after the member has terminated. However, many members do not report that they have established reciprocity with another system until they actually submit a retirement application. Therefore, if we relied only on the rates shown below to develop a reciprocity assumption, we would likely underestimate the ultimate number of transfers.

Accordingly, we also reviewed the number of members who went from a deferred status to service retirement during the study period, and determined which of those members had established reciprocity with another system prior to retirement. We found that over 40% of the Miscellaneous members had worked for a reciprocal employer, and over 80% of Safety members had done so. Therefore, our recommended rates of transfer shown in Tables III-T3 and III-T4 are higher than would have been indicated just by the actual rates reported at the time of termination.

**Table III-T3 – Safety**

| Types of Termination for Safety Members |        |          |             |
|-----------------------------------------|--------|----------|-------------|
| Service and Type                        | Actual | Expected | Recommended |
| 0-9 Years of Service                    |        |          |             |
| Withdrawal                              | 13.70% | 25.00%   | 20.00%      |
| Transfer                                | 17.26% | 45.00%   | 68.00%      |
| Vested Termination                      | 69.04% | 30.00%   | 12.00%      |
| 10+ Years of Service                    |        |          |             |
| Withdrawal                              | 15.00% | 15.00%   | 15.00%      |
| Transfer                                | 0.00%  | 51.00%   | 72.25%      |
| Vested Termination                      | 85.00% | 34.00%   | 12.75%      |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
TERMINATION RATES**

**Table III-T4 – Miscellaneous**

| Types of Termination for Miscellaneous Members |        |          |             |
|------------------------------------------------|--------|----------|-------------|
| Service and Type                               | Actual | Expected | Recommended |
| 0 Years of Service                             |        |          |             |
| Withdrawal                                     | 32.22% | 50.00%   | 40.00%      |
| Transfer                                       | 2.05%  | 15.00%   | 24.00%      |
| Vested Termination                             | 65.72% | 35.00%   | 36.00%      |
| 1 Year of Service                              |        |          |             |
| Withdrawal                                     | 32.61% | 40.00%   | 35.00%      |
| Transfer                                       | 3.74%  | 18.00%   | 26.00%      |
| Vested Termination                             | 63.65% | 42.00%   | 39.00%      |
| 2 Years of Service                             |        |          |             |
| Withdrawal                                     | 22.55% | 20.00%   | 20.00%      |
| Transfer                                       | 5.00%  | 24.00%   | 32.00%      |
| Vested Termination                             | 72.45% | 56.00%   | 48.00%      |
| 3 Years of Service                             |        |          |             |
| Withdrawal                                     | 13.73% | 20.00%   | 20.00%      |
| Transfer                                       | 10.78% | 24.00%   | 32.00%      |
| Vested Termination                             | 75.49% | 56.00%   | 48.00%      |
| 4 Years of Service                             |        |          |             |
| Withdrawal                                     | 19.05% | 20.00%   | 20.00%      |
| Transfer                                       | 5.06%  | 24.00%   | 32.00%      |
| Vested Termination                             | 75.89% | 56.00%   | 48.00%      |
| 5+ Years of Service                            |        |          |             |
| Withdrawal                                     | 9.09%  | 10.00%   | 10.00%      |
| Transfer                                       | 6.49%  | 27.00%   | 36.00%      |
| Vested Termination                             | 84.42% | 63.00%   | 54.00%      |

**RECIPROCAL PAY INCREASE**

If a member terminates employment and works for a reciprocal employer, the member's retirement benefit is ultimately computed using the highest Final Compensation based on employment with the reciprocal employer. We recommend that the assumption used to project pay during employment with the reciprocal employer be based on the wage growth assumption, increased by the ultimate merit pay increase assumption described earlier in this report. Therefore, the recommended total pay growth assumption for members in reciprocal status is 3.75% (3.00% + 0.75%) for Miscellaneous members and 4.25% (3.00% + 1.25%) for Safety members.



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
DISABILITY RATES**

**DISABILITY RATES**

This section analyzes the incidence of disability by the age of the employee. 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. The amount of disability experience is still fairly limited; only 46 disabilities have occurred during the last six years for Safety and Miscellaneous members combined.

Table III-D1 shows the calculation of actual-to-expected ratios and the r-squared statistic for all disabilities for Miscellaneous members, and Chart III-D1 shows the information graphically.

The data shows that actual disability rates are lower than expected for Miscellaneous members in aggregate. However, due to the limited amount of experience we recommend retaining the current rates, which are based on the 2017 CalPERS Public Agency Miscellaneous Ordinary Disability rates.

In the last six years, 73% of disabilities were service-related for Miscellaneous members. We recommend assuming that 75% of future disabilities are service-related for Miscellaneous members.

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

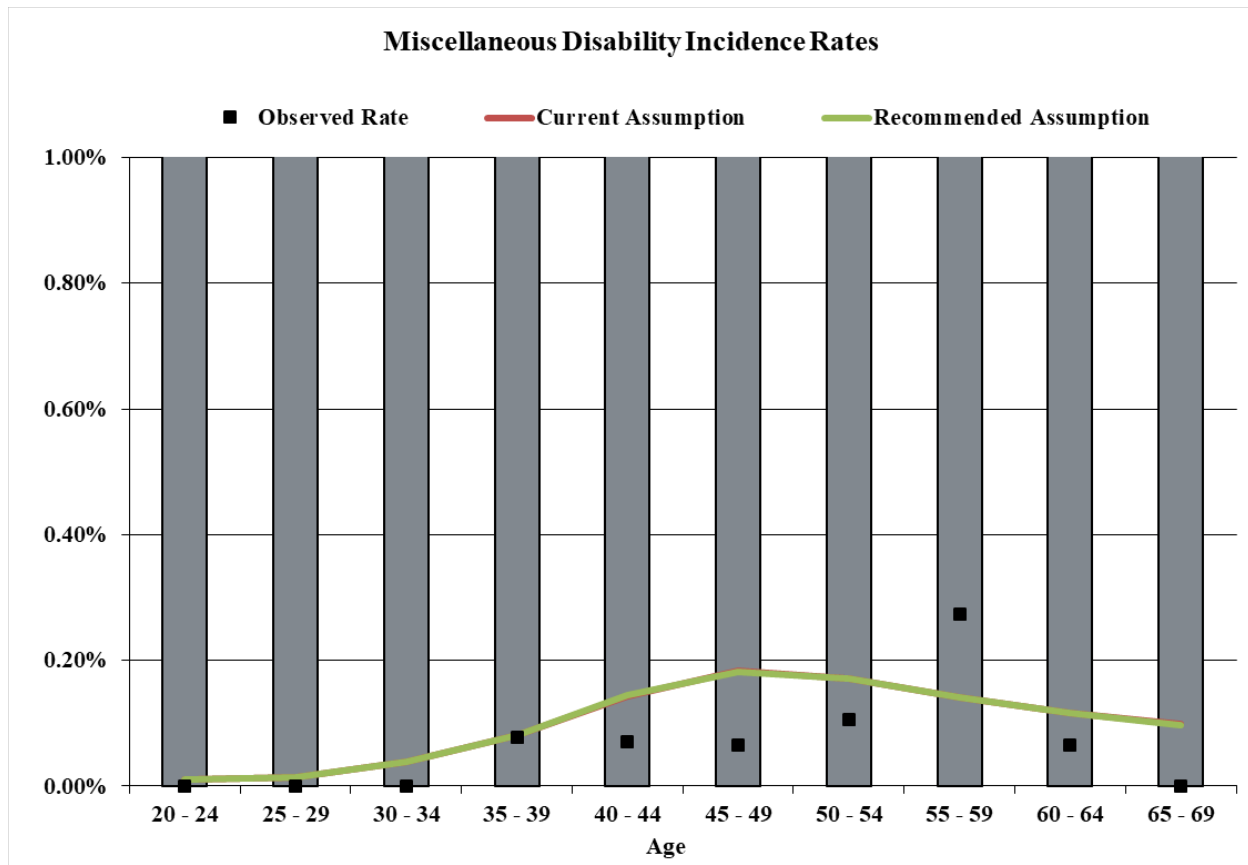
**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
DISABILITY RATES**

**Table III-D1 – Miscellaneous**

| Miscellaneous Disability Incidence Rates |               |              |               |               |                           |             |
|------------------------------------------|---------------|--------------|---------------|---------------|---------------------------|-------------|
| Age Band                                 | Exposures     | Disabilities |               |               | Actual to Expected Ratios |             |
|                                          |               | Actual       | Current       | Recommended   | Current                   | Recommended |
| 20 - 24                                  | 92            | 0            | 0.0           | 0.0           | 0%                        | 0%          |
| 25 - 29                                  | 636           | 0            | 0.1           | 0.1           | 0%                        | 0%          |
| 30 - 34                                  | 1,090         | 0            | 0.4           | 0.4           | 0%                        | 0%          |
| 35 - 39                                  | 1,290         | 1            | 1.0           | 1.0           | 96%                       | 96%         |
| 40 - 44                                  | 1,431         | 1            | 2.1           | 2.1           | 49%                       | 49%         |
| 45 - 49                                  | 1,531         | 1            | 2.8           | 2.8           | 36%                       | 36%         |
| 50 - 54                                  | 1,890         | 2            | 3.3           | 3.3           | 62%                       | 62%         |
| 55 - 59                                  | 1,829         | 5            | 2.6           | 2.6           | 194%                      | 193%        |
| 60 - 64                                  | 1,514         | 1            | 1.8           | 1.8           | 56%                       | 57%         |
| 65 - 69                                  | 729           | 0            | 0.7           | 0.7           | 0%                        | 0%          |
| 70 +                                     | 60            | 0            | 0.1           | 0.1           | 0%                        | 0%          |
| <b>Total</b>                             | <b>12,092</b> | <b>11.0</b>  | <b>14.8</b>   | <b>14.8</b>   | <b>74%</b>                | <b>74%</b>  |
| <b>R-squared</b>                         |               | <b>0</b>     | <b>0.1911</b> | <b>0.1911</b> |                           |             |

**Chart III-D1 – Miscellaneous**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
DISABILITY RATES**

Table III-D2 below shows the calculation of actual-to-expected ratios and the r-squared statistic for all disabilities for Safety members, and Chart III-D2 shows the information graphically.

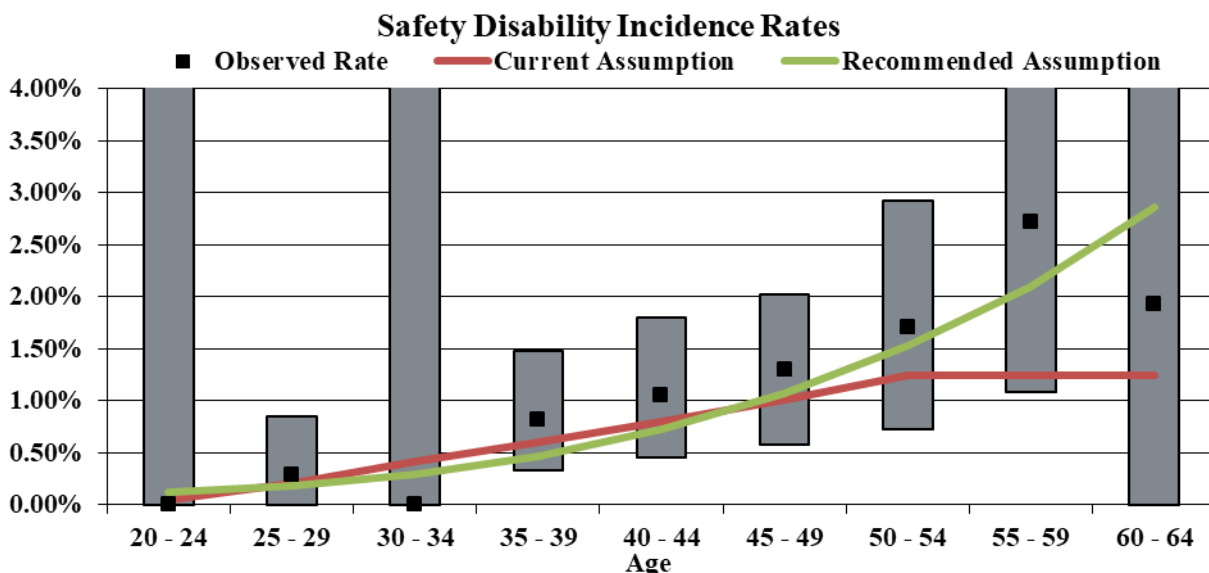
The data shows that actual disability rates are higher than the expected disability rates in aggregate. We recommend changing assumptions from the 2017 CalPERS Public Agency Police Unisex Industrial and Ordinary Disability rates to the CalPERS Peace Officers and Fire Fighter (POFF) rates, multiplied by 120%. We also recommend assuming all Safety disabilities are service-connected, as there has been only one non-service Safety disability in the last six years.

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

**Table III-D2 – Safety**

| Safety Disability Incidence Rates |              |              |              |              |                           |             |
|-----------------------------------|--------------|--------------|--------------|--------------|---------------------------|-------------|
| Age Band                          | Exposures    | Disabilities |              |              | Actual to Expected Ratios |             |
|                                   |              | Actual       | Current      | Recommended  | Current                   | Recommended |
| 20 - 34                           | 994          | 1            | 3.10         | 2.40         | 32%                       | 42%         |
| 35 - 39                           | 610          | 5            | 3.70         | 2.80         | 135%                      | 179%        |
| 40 - 44                           | 667          | 7            | 5.40         | 4.90         | 130%                      | 143%        |
| 45 - 49                           | 693          | 9            | 7.00         | 7.60         | 129%                      | 118%        |
| 50 - 54                           | 410          | 7            | 5.10         | 6.30         | 137%                      | 111%        |
| 55 - 59                           | 184          | 5            | 2.30         | 3.80         | 217%                      | 132%        |
| 60 +                              | 52           | 1            | 0.70         | 1.50         | 143%                      | 67%         |
| <b>Total</b>                      | <b>3,610</b> | <b>35</b>    | <b>27.30</b> | <b>29.30</b> | <b>128%</b>               | <b>119%</b> |
| <b>R-squared</b>                  |              |              | <b>44.8%</b> | <b>49.0%</b> |                           |             |

**Chart III-D2 – Safety**



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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

Post-retirement mortality assumptions are typically developed separately by sex 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.

The steps in our analysis are as follows:

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

In general we propose assumption changes when the actual-to-expected (A/E) ratio for the current assumption is significantly different than 100%. However, for those groups that do not have sufficient experience, we may recommend replacement tables based on the experience of the groups that have more credible data. For example, there is very little mortality experience among active members, so we have recommended that MCERA use standard tables for those members, without adjustment to reflect MCERA's experience. We note that the pre-retirement mortality assumptions have very little impact on the liability estimates, because of the very low rates of decrement.

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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

In the prior study MCERA elected to use the following mortality tables.

**Active members**

- CalPERS 2017 Pre-Retirement Non-Industrial Death rates (plus Duty-Related Death rates for Safety members), with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017. 0% of all Miscellaneous and 95% of all Safety pre-retirement deaths are assumed to be service-connected.

**Healthy retirees and beneficiaries**

- CalPERS 2017 Post-Retirement Healthy Mortality rates, adjusted by 90% for Males (Miscellaneous and Safety), with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017.

**Disabled members**

- CalPERS 2017 Disability Mortality rates (Non-Industrial rates for Miscellaneous members and Industrial Disability rates for Safety members), adjusted by 90% for Males (Miscellaneous and Safety) and 90% for Miscellaneous Females, with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017.

Since the prior study, the Society of Actuaries' Retirement Plans Experience Committee (RPEC) has continued to release annual updates of the mortality improvement scales, with the newest version – Scale MP-2020 - reflecting three additional years of data (2016-2018) than was used in the development of Scale MP-2017. As a result, it reflects lower expected improvement rates in the near term than Scale MP-2017, based on the lower levels of mortality improvement observed during the three most recent years in the data. It also reflects modifications to the long term (or ultimate) levels of expected improvement at various ages.

MP-2020, similar to MP-2017, represents the Society of Actuaries' most advanced actuarial methodology in incorporating mortality improvement trends with actual recent mortality rates, by using rates that vary not only by age but also by calendar year – known as a two-dimensional approach to projecting mortality improvements. Scale MP-2020 was designed with the intent of being applied to mortality on a generational basis. The effect of this is to build in an automatic expectation of future improvements in mortality. RPEC suggests that using generational mortality is a preferable approach, as it allows for an explicit declaration of the amount of future mortality improvement included in the assumptions.

RPEC has also recently released a new set of base mortality rate tables – the Pub-2010 Mortality Tables, which are based on a recent study of US defined benefit public plan mortality experience. The experience covered 35 public systems with 78 plans from calendar years 2008-2013, including approximately 46 million exposures and 580 thousand deaths.

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**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

MCERA's experience over the past six years matches fairly well with the new Pub-2010 rates, after applying the improvement projections from the base year of the tables (2010) using the new MP-2020 mortality improvement projections through the mid-point of the six-year period (2016).

Even with the use of six years of data, the MCERA experience is only partially credible, based on standard statistical theory. We therefore recommend partially adjusting the Pub-2010 base tables to fit MCERA's experience to develop a new base table. If appropriate, the rates for each age in the standard table have been adjusted by a factor, where the factor is determined by multiplying the actual-to-expected ratio for the group (such as for the Safety male disabled retirees) by a credibility factor which will bring the A/E results closer – but not all the way – to 100%.

Rather than weighting the experience based on the number of members living and dying, we have weighted the experience based on benefit size (and by compensation for active members). This approach has been recommended by RPEC, since members with larger benefits are expected to live longer, and a benefit-weighted approach helps avoid underestimating the liabilities.

Based on this information, we are recommending the following base mortality table assumptions:

**Active members**

- Public General Employee Mortality Table (PubG-2010 Employee), with no adjustments.
- Public Safety Above Median Income Employee Mortality Table (PubS-2010(A)), with no adjustments.

**Healthy retirees**

- Public General Retiree Mortality Table (PubG-2010), with no adjustments.
- Public Safety Above Median Income Retiree Mortality Table (PubS-2010(A)), with no adjustments.

**Disabled members**

- Public General Disabled Annuitant Mortality Table (PubG-2010), with no adjustments.
- Public Safety Above Median Disabled Annuitant Mortality Table (PubS-2010(A)), adjusted by 95% for Safety male members and no adjustment for Safety female members.

**Beneficiaries**

- Public Contingent Survivor Mortality Table (PubG-2010), with no adjustment for male beneficiaries and adjusted by 105% for female beneficiaries.

Tables III-M1 through III-M4 on the following pages show the calculation of actual-to-expected death ratios for Healthy Annuitant Miscellaneous male, Healthy Annuitant Miscellaneous female, Healthy Annuitant Safety male, and Healthy Annuitant Safety female members,

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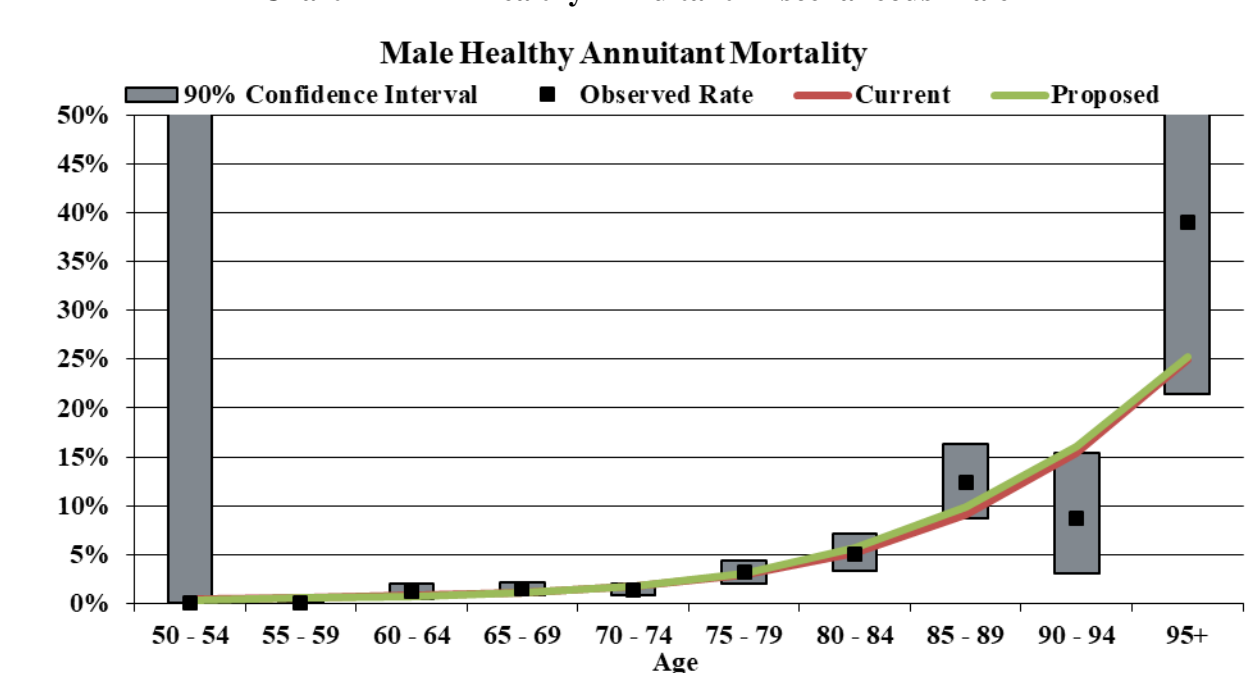
**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

respectively. Charts III-M1 through III-M4 show the information graphically along with the 90% confidence intervals.

**Table III-M1 – Healthy Annuitant Miscellaneous Male**

| Healthy Annuitant Mortality - Base Table for Miscellaneous Males |              |               |                    |                 |                |                |             |             |
|------------------------------------------------------------------|--------------|---------------|--------------------|-----------------|----------------|----------------|-------------|-------------|
| Age Band                                                         | Exposures    | Actual Deaths | Weighted Exposures | Weighted Deaths |                |                | A/E Ratios  |             |
|                                                                  |              |               |                    | Actual          | Current        | Proposed       | Current     | Proposed    |
| 50 - 54                                                          | 39           | 0             | 67,586             | 0               | 293            | 244            | 0%          | 0%          |
| 55 - 59                                                          | 250          | 1             | 582,595            | 399             | 3,226          | 3,094          | 12%         | 13%         |
| 60 - 64                                                          | 615          | 8             | 2,392,043          | 27,695          | 19,216         | 17,880         | 144%        | 155%        |
| 65 - 69                                                          | 882          | 11            | 3,696,863          | 53,609          | 38,744         | 39,779         | 138%        | 135%        |
| 70 - 74                                                          | 901          | 16            | 3,579,204          | 49,520          | 60,345         | 63,758         | 82%         | 78%         |
| 75 - 79                                                          | 586          | 18            | 2,648,012          | 84,516          | 76,389         | 81,113         | 111%        | 104%        |
| 80 - 84                                                          | 367          | 24            | 1,254,815          | 63,396          | 64,603         | 71,031         | 98%         | 89%         |
| 85 - 89                                                          | 208          | 24            | 764,637            | 95,010          | 69,298         | 75,581         | 137%        | 126%        |
| 90 - 94                                                          | 65           | 7             | 161,795            | 14,029          | 24,890         | 25,922         | 56%         | 54%         |
| 95 +                                                             | 14           | 6             | 32,952             | 12,877          | 8,231          | 8,303          | 156%        | 155%        |
| <b>Total</b>                                                     | <b>3,927</b> | <b>115</b>    | <b>15,180,504</b>  | <b>401,052</b>  | <b>365,235</b> | <b>386,705</b> | <b>110%</b> | <b>104%</b> |

**Chart III-M1 – Healthy Annuitant Miscellaneous Male**



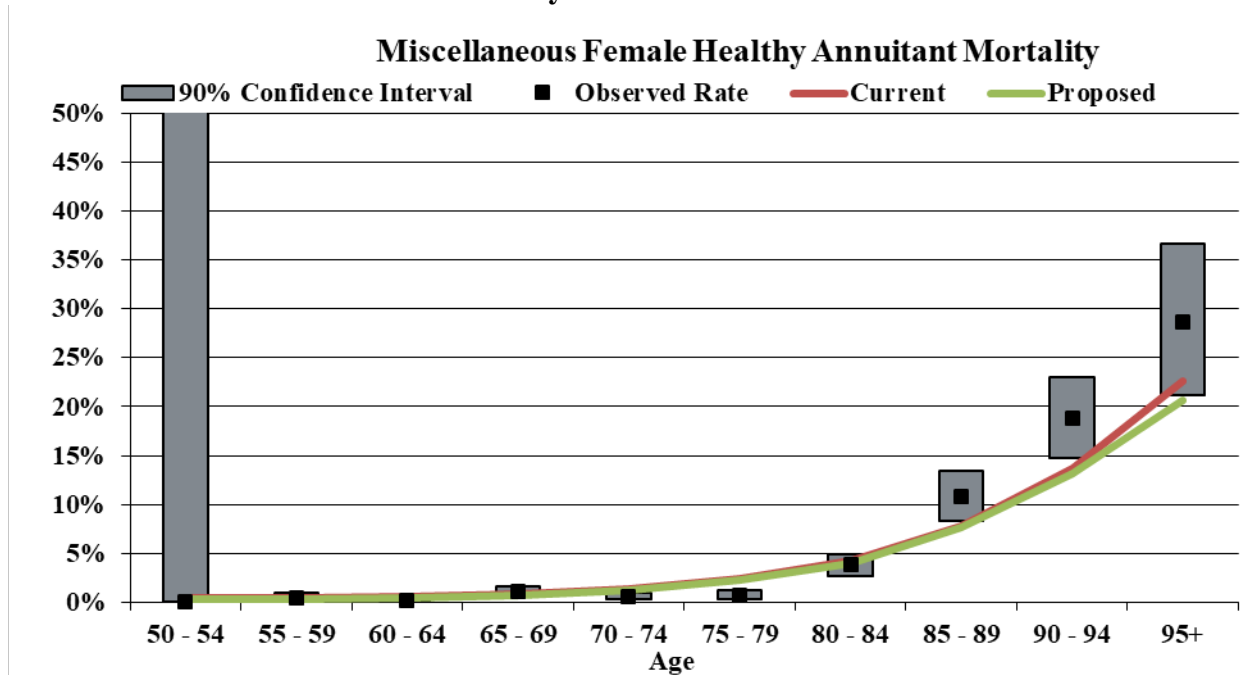
**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

**Table III-M2 – Healthy Annuitant Miscellaneous Female**

| Healthy Annuitant Mortality - Base Table for Miscellaneous Females |              |               |                    |                 |                |                |            |             |
|--------------------------------------------------------------------|--------------|---------------|--------------------|-----------------|----------------|----------------|------------|-------------|
| Age Band                                                           | Exposures    | Actual Deaths | Weighted Exposures | Weighted Deaths |                |                | A/E Ratios |             |
|                                                                    |              |               |                    | Actual          | Current        | Proposed       | Current    | Proposed    |
| 50 - 54                                                            | 99           | 0             | 182,104            | 0               | 795            | 479            | 0%         | 0%          |
| 55 - 59                                                            | 428          | 2             | 1,053,855          | 4,652           | 5,094          | 3,595          | 91%        | 129%        |
| 60 - 64                                                            | 810          | 3             | 2,263,803          | 4,579           | 13,464         | 10,399         | 34%        | 44%         |
| 65 - 69                                                            | 1,473        | 12            | 4,214,894          | 46,711          | 34,753         | 30,835         | 134%       | 151%        |
| 70 - 74                                                            | 1,457        | 10            | 4,317,038          | 25,787          | 55,649         | 53,333         | 46%        | 48%         |
| 75 - 79                                                            | 1,023        | 11            | 2,768,397          | 19,594          | 66,144         | 61,420         | 30%        | 32%         |
| 80 - 84                                                            | 706          | 23            | 1,704,701          | 64,923          | 72,336         | 68,583         | 90%        | 95%         |
| 85 - 89                                                            | 408          | 42            | 816,988            | 88,104          | 63,343         | 62,070         | 139%       | 142%        |
| 90 - 94                                                            | 252          | 45            | 441,446            | 83,047          | 60,349         | 58,286         | 138%       | 142%        |
| 95 +                                                               | 90           | 27            | 157,571            | 45,202          | 35,535         | 32,623         | 127%       | 139%        |
| <b>Total</b>                                                       | <b>6,746</b> | <b>175</b>    | <b>17,920,799</b>  | <b>382,598</b>  | <b>407,462</b> | <b>381,624</b> | <b>94%</b> | <b>100%</b> |

**Chart III-M2 – Healthy Annuitant Miscellaneous Female**





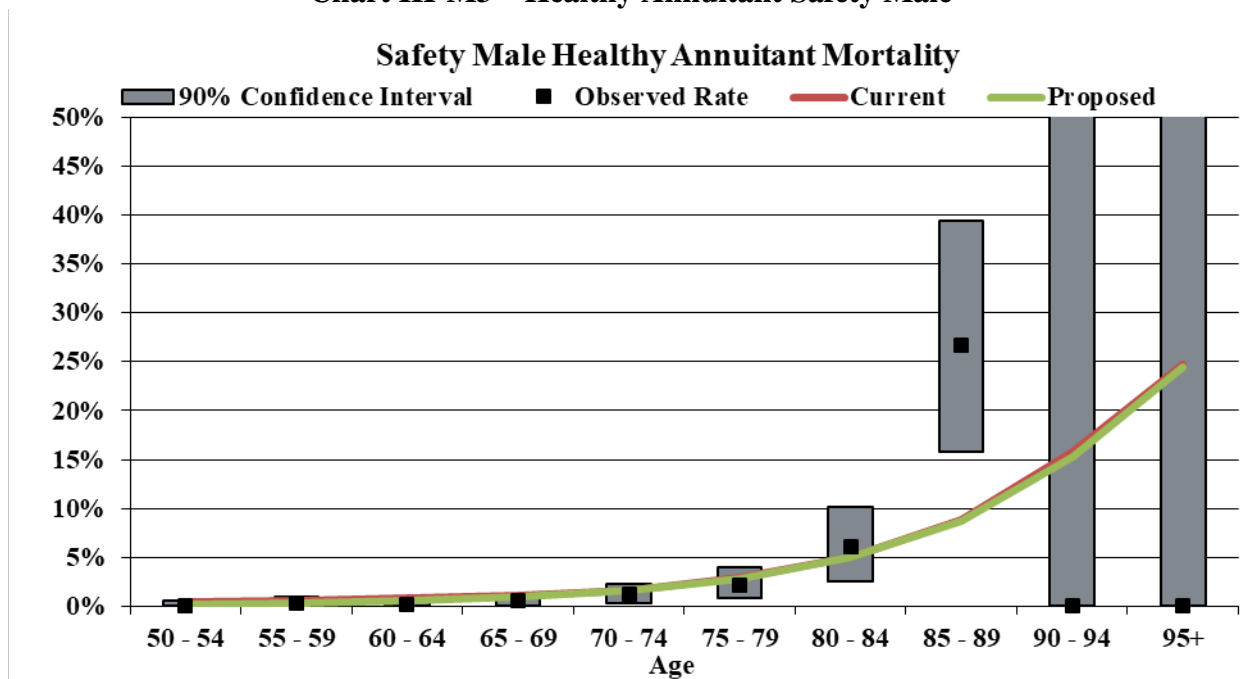
**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

**Table III-M3 – Healthy Annuitant Safety Male**

| Healthy Annuitant Mortality - Base Table for Safety Males |              |               |                    |                 |                |                |            |            |
|-----------------------------------------------------------|--------------|---------------|--------------------|-----------------|----------------|----------------|------------|------------|
| Age Band                                                  | Exposures    | Actual Deaths | Weighted Exposures | Weighted Deaths |                |                | A/E Ratios |            |
|                                                           |              |               |                    | Actual          | Current        | Proposed       | Current    | Proposed   |
| 50 - 54                                                   | 172          | 1             | 817,294            | 307             | 3,499          | 1,663          | 9%         | 18%        |
| 55 - 59                                                   | 420          | 1             | 2,814,033          | 10,363          | 15,102         | 9,511          | 69%        | 109%       |
| 60 - 64                                                   | 518          | 1             | 4,029,070          | 8,479           | 31,518         | 22,472         | 27%        | 38%        |
| 65 - 69                                                   | 442          | 3             | 3,504,678          | 19,322          | 36,450         | 32,120         | 53%        | 60%        |
| 70 - 74                                                   | 354          | 9             | 2,539,029          | 30,801          | 42,178         | 39,897         | 73%        | 77%        |
| 75 - 79                                                   | 224          | 6             | 1,569,470          | 33,629          | 45,776         | 44,205         | 73%        | 76%        |
| 80 - 84                                                   | 119          | 7             | 596,536            | 36,088          | 30,163         | 30,030         | 120%       | 120%       |
| 85 - 89                                                   | 38           | 9             | 177,634            | 47,306          | 15,792         | 15,529         | 300%       | 305%       |
| 90 - 94                                                   | 4            | 0             | 19,748             | 0               | 3,117          | 3,011          | 0%         | 0%         |
| 95 +                                                      | 4            | 0             | 18,881             | 0               | 4,657          | 4,624          | 0%         | 0%         |
| <b>Total</b>                                              | <b>2,295</b> | <b>37</b>     | <b>16,086,373</b>  | <b>186,295</b>  | <b>228,253</b> | <b>203,062</b> | <b>82%</b> | <b>92%</b> |

**Chart III-M3 – Healthy Annuitant Safety Male**



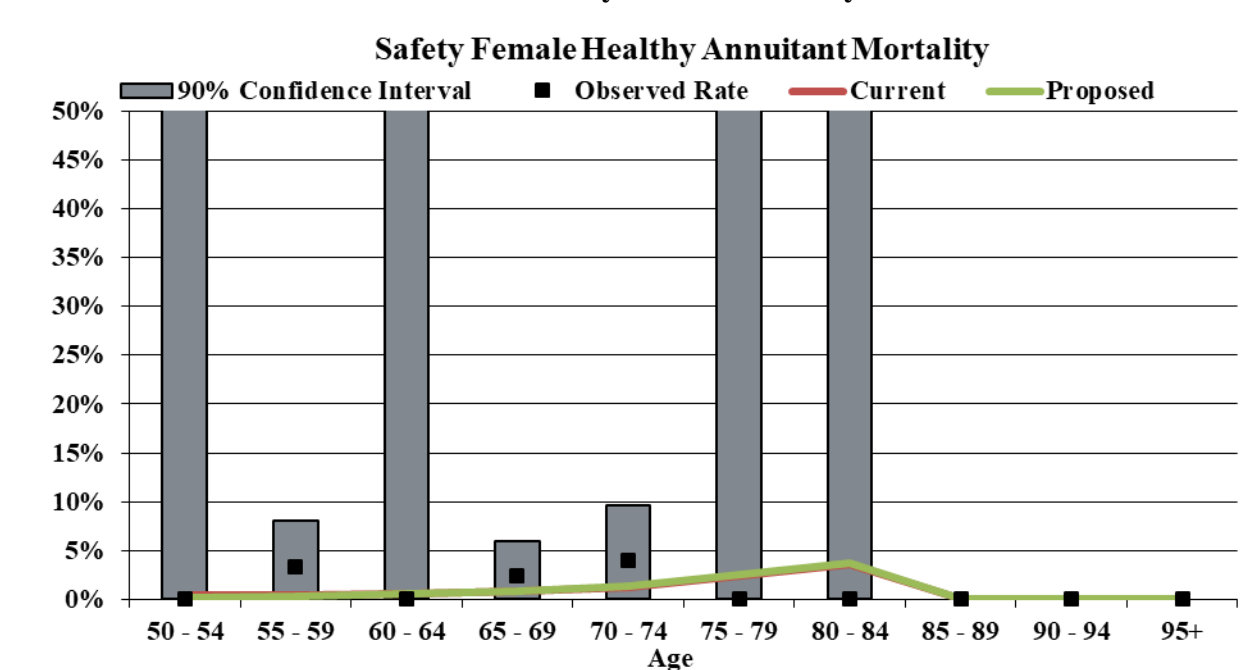
**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

**Table III-M4 – Healthy Annuitant Safety Female**

| Healthy Annuitant Mortality - Base Table for Safety Females |            |               |                    |                 |              |              |             |             |
|-------------------------------------------------------------|------------|---------------|--------------------|-----------------|--------------|--------------|-------------|-------------|
| Age Band                                                    | Exposures  | Actual Deaths | Weighted Exposures | Weighted Deaths |              |              | A/E Ratios  |             |
|                                                             |            |               |                    | Actual          | Current      | Proposed     | Current     | Proposed    |
| 50 - 54                                                     | 22         | 0             | 99,905             | 0               | 426          | 185          | 0%          | 0%          |
| 55 - 59                                                     | 50         | 1             | 141,937            | 4,742           | 684          | 470          | 693%        | 1009%       |
| 60 - 64                                                     | 69         | 0             | 203,578            | 0               | 1,191        | 1,045        | 0%          | 0%          |
| 65 - 69                                                     | 68         | 3             | 294,493            | 7,130           | 2,352        | 2,440        | 303%        | 292%        |
| 70 - 74                                                     | 31         | 2             | 124,054            | 4,964           | 1,564        | 1,742        | 317%        | 285%        |
| 75 - 79                                                     | 18         | 0             | 85,411             | 0               | 2,017        | 2,124        | 0%          | 0%          |
| 80 - 84                                                     | 3          | 0             | 11,123             | 0               | 402          | 415          | 0%          | 0%          |
| 85 - 89                                                     | 0          | 0             | 0                  | 0               | 0            | 0            | 0%          | 0%          |
| 90 - 94                                                     | 0          | 0             | 0                  | 0               | 0            | 0            | 0%          | 0%          |
| 95 +                                                        | 0          | 0             | 0                  | 0               | 0            | 0            | 0%          | 0%          |
| <b>Total</b>                                                | <b>261</b> | <b>6</b>      | <b>960,501</b>     | <b>16,836</b>   | <b>8,636</b> | <b>8,421</b> | <b>195%</b> | <b>200%</b> |

**Chart III-M4 – Healthy Annuitant Safety Female**



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

Table III-M5 shows a summary of the weighted and unweighted exposures, deaths, and the calculation of actual-to-expected death ratios for all groups.

**Table III-M5 – Mortality Summary**

| MCERA Mortality Analysis by Group |           |               |                    |                 |            |            |            |          |
|-----------------------------------|-----------|---------------|--------------------|-----------------|------------|------------|------------|----------|
| Group                             | Exposures | Actual Deaths | Weighted Exposures | Weighted Deaths |            |            | A/E Ratios |          |
|                                   |           |               |                    | Actual          | Current    | Proposed   | Current    | Proposed |
| Active Members                    |           |               |                    |                 |            |            |            |          |
| Miscellaneous Male                | 4,831     | 9             | 4,948,488,322      | 8,517,392       | 10,953,608 | 12,137,114 | 78%        | 70%      |
| Miscellaneous Female              | 7,442     | 8             | 6,312,454,403      | 12,316,449      | 9,483,118  | 9,769,075  | 130%       | 126%     |
| Safety Male                       | 3,047     | 2             | 4,438,313,928      | 4,495,615       | 5,820,991  | 4,066,892  | 77%        | 111%     |
| Safety Female                     | 585       | 0             | 589,489,184        | 0               | 547,911    | 428,106    | 0%         | 0%       |
| Healthy Annuitant                 |           |               |                    |                 |            |            |            |          |
| Miscellaneous Male                | 3,927     | 115           | 15,180,504         | 401,052         | 365,235    | 386,705    | 110%       | 104%     |
| Miscellaneous Female              | 6,746     | 175           | 17,920,799         | 382,598         | 407,462    | 381,624    | 94%        | 100%     |
| Safety Male                       | 2,295     | 37            | 16,086,373         | 186,295         | 228,253    | 203,062    | 82%        | 92%      |
| Safety Female                     | 261       | 6             | 960,501            | 16,836          | 8,636      | 8,421      | 195%       | 200%     |
| Disabled Annuitant                |           |               |                    |                 |            |            |            |          |
| Miscellaneous Male                | 324       | 8             | 1,029,757          | 32,540          | 36,942     | 40,733     | 88%        | 80%      |
| Miscellaneous Female              | 481       | 15            | 1,191,397          | 27,988          | 31,765     | 37,992     | 88%        | 74%      |
| Safety Male                       | 1,103     | 17            | 6,082,869          | 63,820          | 97,042     | 97,470     | 66%        | 65%      |
| Safety Female                     | 169       | 2             | 650,088            | 5,405           | 4,670      | 4,927      | 116%       | 110%     |
| Beneficiaries                     |           |               |                    |                 |            |            |            |          |
| Male                              | 377       | 28            | 648,344            | 26,545          | 21,625     | 25,517     | 123%       | 104%     |
| Female                            | 2,204     | 119           | 5,375,408          | 259,942         | 181,514    | 189,151    | 143%       | 137%     |
|                                   |           |               |                    |                 |            |            |            |          |

**TULARE COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

**Mortality Assumptions for Employee Contribution Rates**

For purposes of determining employee contribution rates for non-PEPRA members, the use of generational mortality improvements is impractical from an administrative perspective, because of the entry-age based structure of these rates. Therefore, we recommend using the base mortality tables described above (various Pub-2010 tables with adjustments), projected using Scale MP-2020 from 2010 to 2044 for Miscellaneous members and to 2047 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, and the period during which the associated employee contribution rates will be in use. The employee contribution rates are also blended using a male/female weighting of 40%/60% for Miscellaneous members and 85%/15% 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, 2021 through June 30, 2024. 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, 2020 through June 30, 2023.

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
OTHER DEMOGRAPHIC ASSUMPTIONS**

**FAMILY COMPOSITION**

Members who are married at the time of retirement are entitled to an unreduced 60% joint and survivor annuity.

An analysis of all members who retired within the last six years showed that 79% of males are married and 52% of females are married. However, among male members the rates of marriage were higher for the Safety members (86%) than the Miscellaneous members (75%), which is consistent with the current marriage assumptions (85% for Safety males, 75% for Miscellaneous males). The rates of marriage for the Miscellaneous and Safety females were both close to the current assumption (55%), though there was very little Safety female experience. We recommend keeping the current marital assumptions for future retirees.

An analysis of all retired Miscellaneous members showed that on average male members are 2.5 years older than their spouses and female members are 2.2 years younger than their spouses. Similarly, an analysis of all retired Safety members showed that on average male members are 2.5 years older than their spouses and female members are 2.8 years younger than their spouses. We recommend maintaining the current assumption that male members are three years older than their spouses and increasing the assumption for female members from one year younger to two years younger than their spouses.

**TERMINAL SERVICE AND COMPENSATION LOADS**

A load is currently applied to the projected benefits for (non-PEPRA) active members, to account for anticipated conversions of sick leave, end-of-career service purchases, or other terminal earnings to retirement service credit or final compensation.

An analysis of unexpected additional service and earnings for all members with a vested right to a benefit who retired in the last three years without reciprocity is shown in Table III-O1 on the next page.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
OTHER DEMOGRAPHIC ASSUMPTIONS**

**Table III-O1 – Terminal Service and Compensation Loads**

| Pay and Service Increases at Retirement<br>2018-2020 Retirements |       |                                              |                                            |                      |                       |                        |
|------------------------------------------------------------------|-------|----------------------------------------------|--------------------------------------------|----------------------|-----------------------|------------------------|
|                                                                  | Count | Expected Monthly<br>Benefit at<br>Retirement | Actual Monthly<br>Benefit at<br>Retirement | Observed<br>Increase | Current<br>Assumption | Proposed<br>Assumption |
| Non-PEPRA                                                        |       |                                              |                                            |                      |                       |                        |
| Marin                                                            |       |                                              |                                            |                      |                       |                        |
| County                                                           | 282   | \$ 1,178,593                                 | \$ 1,196,440                               | 1.51%                | 2.00%                 | 1.50%                  |
| Courts                                                           | 11    | 33,549                                       | 33,934                                     | 1.15%                | 2.00%                 | 1.50%                  |
| Special Districts                                                | 13    | 58,974                                       | 59,013                                     | 0.07%                | 2.00%                 | 1.50%                  |
| Total                                                            | 306   | 1,271,116                                    | 1,289,387                                  | 1.44%                |                       |                        |
| Novato                                                           | 12    | 108,638                                      | 112,922                                    | 3.94%                | 3.00%                 | 4.00%                  |
| San Rafael                                                       | 56    | 266,600                                      | 271,458                                    | 1.82%                | 2.50%                 | 1.50%                  |
| PEPRA                                                            |       |                                              |                                            |                      | 0.00%                 | 1.50%                  |

The increases for Marin (including the County, Courts and Special Districts) and San Rafael members are due primarily to additional service granted at retirement as a result of unused sick leave. We propose a reduction in the terminal service load from 2.00% for the County and 2.50% for San Rafael to 1.50% for both groups.

For Novato Fire, members are also eligible to cash out vacation pay earned and payable in their final service period, and may therefore have an additional increase in pensionable compensation not necessarily reflected in their most recent valuation data. Based on a review of their retirement calculations, we propose a combined 4.00% load for terminal service and compensation increases for their non-PEPRA members.

As part of the most recent actuarial audit, it was noted that PEPRA members may also be eligible for terminal service credits due to sick leave, though not compensation increases such as those applicable to non-PEPRA Novato members. We confirmed this with MCERA Staff, and therefore propose to apply a 1.50% increase to service amounts for PEPRA members at retirement. While data regarding PEPRA retirements is currently limited, we believe it is reasonable to use the same assumption regarding sick leave accruals and usage as the other groups, until and unless emerging experience indicates otherwise.

## DEFERRED RETIREMENT AGE

An analysis of all terminated members with a vested right to a benefit who retired in the last six years is shown in Table III-O2 on the following page. We reviewed the information separately for those members who retired with reciprocity, since they will generally have a greater incentive

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
OTHER DEMOGRAPHIC ASSUMPTIONS**

to defer their retirement. This is especially true for members considering whether to retire once they have reached their maximum retirement benefit age. For example, a 3% at 50 Safety member without reciprocity should have no incentive to defer commencement past age 50 (since their benefit will not increase by doing so), whereas a member with reciprocity may continue to receive pay increases.

The analysis shows that on average Miscellaneous members retire at age 60.2, which is higher than the current assumption of age 58. Safety 3% at age 50 members retire at age 54.0, and Safety 3% at age 55 members retire at age 54.3.

We recommend changing the assumption for Miscellaneous members from 58 to 59, for both those with and without reciprocity. We recommend increasing the assumption for the Safety 3% at 50 members with reciprocity from 50 to 53, and leaving the assumption for members without reciprocity at age 50. We recommend no change for Safety 3% at 55 or Safety PEPPRA members, leaving the assumed commencement age at 55 for those with and without reciprocity.

**Table III-02 – Deferred Retirement Age**

| Deferred Retirement Age<br>2014-2020 Retirements |       |                              |                       |                        |
|--------------------------------------------------|-------|------------------------------|-----------------------|------------------------|
|                                                  | Count | Average<br>Retirement<br>Age | Current<br>Assumption | Proposed<br>Assumption |
| Miscellaneous                                    |       |                              |                       |                        |
| No Reciprocity                                   | 72    | 61.0                         | 58                    | 59                     |
| With Reciprocity                                 | 61    | 59.2                         | 58                    | 59                     |
| Safety                                           |       |                              |                       |                        |
| 3% at Age 50                                     |       |                              |                       |                        |
| No Reciprocity                                   | 3     | 54.4                         | 50                    | 50                     |
| With Reciprocity                                 | 25    | 53.9                         | 50                    | 53                     |
| 3% at Age 55                                     |       |                              |                       |                        |
| No Reciprocity                                   | 2     | 56.2                         | 55                    | 55                     |
| With Reciprocity                                 | 14    | 54.0                         | 55                    | 55                     |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS  
OTHER DEMOGRAPHIC ASSUMPTIONS**

**ADMINISTRATIVE EXPENSES**

The returns discussed in the economic assumption section are expected to be net of investment expenses; administrative expenses are not addressed. Effective with the June 30, 2013 actuarial valuation, MCERA began to include an additional cost item for expected annual administrative expenses in the actuarial cost calculation. For the valuation as of June 30, 2020, we recommend lowering the current administrative expense assumption from \$5.373 million to \$5.0 million for the Plan year 2020-2021, with future expenses expected to increase at the wage growth assumption.

**Table III-O3 – Analysis of Administrative Expenses**

| FYE  | Pension                          |                         |                   |
|------|----------------------------------|-------------------------|-------------------|
|      | Administrative Expenses          | Adjustment to FYE 2021* | Adjusted Expenses |
| 2020 | 4,607,760                        | 1.0300                  | 4,745,993         |
| 2019 | 5,056,350                        | 1.0467                  | 5,292,231         |
| 2018 | 4,203,705                        | 1.0803                  | 4,541,265         |
| 2017 | 4,404,191                        | 1.1225                  | 4,943,772         |
| 2016 | 4,379,760                        | 1.1616                  | 5,087,525         |
| 2015 | 4,654,623                        | 1.1926                  | 5,551,283         |
|      | Adjusted Average (FYE 2018-2020) |                         | 4,859,830         |
|      | Adjusted Average (FYE 2015-2017) |                         | 5,194,193         |
|      | Adjusted Average (FYE 2015-2020) |                         | 5,027,012         |
|      | Current Assumption               |                         | 5,373,235         |
|      | Proposed Assumption (FYE 2021)   |                         | 5,000,000         |

\* Adjusted to FYE 2020 using increase in Bay Area CPI, plus wage growth at 3% for FYE 2021



**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

The recommended assumptions will be presented to the Board at their January 13, 2021 meeting. The assumptions are based on an experience study covering the period from July 1, 2017 through June 30, 2020.

**1. Rate of Return**

Assets are assumed to earn 6.75% net of investment and administrative expenses.

**2. Administrative Expenses**

Administrative expenses are assumed to be \$5.000 million for the next year, to be split between employees and employers based on their share of the overall contributions. Administrative expenses are assumed to increase by 3.0% per year.

**3. Cost of Living**

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.50% per year.

**4. Post Retirement COLA**

Post retirement COLAs are assumed at the rate of 2.5% for members with a 4% COLA cap, 2.4% for members with a 3% COLA cap, and 1.9% for members with a 2% COLA cap.

**5. 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 at the time of retirement.

**6. Internal Revenue Code Section 401(a)(17)**

The Internal Revenue Code Section 401(a)(17) maximum compensation limitation is reflected in the valuation to project compensation and benefits. The limit is expected to increase by 2.50% in future years.

**7. PEPRAs Compensation Limit**

The PEPRAs Pensionable Compensation Limit (GC 7522.10) is reflected in the valuation to project compensation and benefits for PEPRAs members. The limit is expected to increase by 2.50% in future years.

**8. Interest on Member Contributions**

The annual credited interest rate on member contributions is assumed to be 6.75%.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

**9. Sick Leave Service Credit Upon Retirement**

Active members' benefits are adjusted by a percentage, in accordance with the table below, for anticipated conversions of sick leave or other terminal earnings to retirement service credit or final compensation.

|                                 | Rate  |
|---------------------------------|-------|
| Non-PEPRA                       |       |
| Marin County                    | 1.50% |
| Marin Courts                    | 1.50% |
| Marin Special Districts         | 1.50% |
| Novato Fire Protection District | 4.00% |
| City of San Rafael              | 1.50% |
| PEPRA                           | 1.50% |

**10. Family Composition**

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

| Percentage Married    |            |
|-----------------------|------------|
| Class and Gender      | Percentage |
| Miscellaneous Males   | 75%        |
| Miscellaneous Females | 55%        |
| Safety Males          | 85%        |
| Safety Females        | 55%        |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

**11. Increases in Pay**

Wage inflation component: 3.00%

Additional longevity and promotion component:

| Service | Miscellaneous | Safety |
|---------|---------------|--------|
| 0       | 6.00%         | 5.00%  |
| 1       | 6.00%         | 5.00%  |
| 2       | 5.00%         | 4.50%  |
| 3       | 4.00%         | 4.00%  |
| 4       | 3.00%         | 3.50%  |
| 5       | 2.25%         | 3.00%  |
| 6       | 1.75%         | 2.50%  |
| 7       | 1.40%         | 2.20%  |
| 8       | 1.20%         | 1.90%  |
| 9       | 1.00%         | 1.70%  |
| 10      | 0.85%         | 1.50%  |
| 11      | 0.75%         | 1.40%  |
| 12      | 0.75%         | 1.30%  |
| 13+     | 0.75%         | 1.25%  |

**12. Rates of Termination (All Types)**

Sample rates of termination are shown in the following tables. Note that termination rates do not apply once a member is eligible for retirement.

| Service | Miscellaneous | Service | Miscellaneous |
|---------|---------------|---------|---------------|
| 0       | 14.00%        | 11      | 4.75%         |
| 1       | 13.00%        | 12      | 4.50%         |
| 2       | 12.00%        | 13      | 4.25%         |
| 3       | 9.50%         | 14      | 4.00%         |
| 4       | 8.25%         | 15      | 3.50%         |
| 5       | 7.50%         | 16      | 3.25%         |
| 6       | 6.75%         | 17      | 3.00%         |
| 7       | 6.25%         | 18      | 2.75%         |
| 8       | 5.75%         | 19      | 2.50%         |
| 9       | 5.25%         | 20+     | 0.00%         |
| 10      | 5.00%         |         |               |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

| Service | Safety |
|---------|--------|
| 0       | 9.00%  |
| 1       | 7.00%  |
| 2       | 5.00%  |
| 3       | 5.00%  |
| 4       | 5.00%  |

| Age | Safety                |
|-----|-----------------------|
|     | 5-19 Years of Service |
| 20  | 2.06%                 |
| 25  | 2.24%                 |
| 30  | 3.53%                 |
| 35  | 3.41%                 |
| 40  | 1.14%                 |
| 45  | 1.70%                 |
| 50  | 0.27%                 |
| 55  | 0.09%                 |
| 60  | 0.00%                 |

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**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

**13. Withdrawal, Reciprocal Transfers, and Vested Termination**

The following rates apply to active members who terminate their employment. Members who withdraw their member contributions forfeit entitlement to future Plan benefits.

| Service | Miscellaneous |            |             | Safety     |            |             |
|---------|---------------|------------|-------------|------------|------------|-------------|
|         | Withdrawal    | Reciprocal | Vested Term | Withdrawal | Reciprocal | Vested Term |
| 0       | 40.00%        | 24.00%     | 36.00%      | 20.00%     | 68.00%     | 12.00%      |
| 1       | 35.00%        | 26.00%     | 39.00%      | 20.00%     | 68.00%     | 12.00%      |
| 2       | 20.00%        | 32.00%     | 48.00%      | 20.00%     | 68.00%     | 12.00%      |
| 3       | 20.00%        | 32.00%     | 48.00%      | 20.00%     | 68.00%     | 12.00%      |
| 4       | 20.00%        | 32.00%     | 48.00%      | 20.00%     | 68.00%     | 12.00%      |
| 5       | 10.00%        | 36.00%     | 54.00%      | 20.00%     | 68.00%     | 12.00%      |
| 6       | 10.00%        | 36.00%     | 54.00%      | 20.00%     | 68.00%     | 12.00%      |
| 7       | 10.00%        | 36.00%     | 54.00%      | 20.00%     | 68.00%     | 12.00%      |
| 8       | 10.00%        | 36.00%     | 54.00%      | 20.00%     | 68.00%     | 12.00%      |
| 9       | 10.00%        | 36.00%     | 54.00%      | 20.00%     | 68.00%     | 12.00%      |
| 10+     | 10.00%        | 36.00%     | 54.00%      | 15.00%     | 72.25%     | 12.75%      |

**14. Rates of Disability**

The rates of disability for Miscellaneous members are based on the 2017 CalPERS Public Agency Miscellaneous Ordinary Disability rates for males and females without adjustment.

The rates of disability for Safety members are based on adjusted 2020 CalPERS Peace Officers and Fire Fighter (POFF) Industrial and Ordinary Disability rates (multiplied by 120%).

75% of all Miscellaneous and 100% of all Safety disabilities are assumed to be service-connected. Sample *service-connected* disability rates of active participants are shown below.

| Age | Miscellaneous |         | Safety  |
|-----|---------------|---------|---------|
|     | Male          | Female  |         |
| 20  | 0.0128%       | 0.0075% | 0.0828% |
| 25  | 0.0128%       | 0.0075% | 0.1404% |
| 30  | 0.0143%       | 0.0180% | 0.2364% |
| 35  | 0.0293%       | 0.0533% | 0.3828% |
| 40  | 0.0765%       | 0.1013% | 0.6048% |
| 45  | 0.1133%       | 0.1410% | 0.9192% |
| 50  | 0.1185%       | 0.1493% | 1.3500% |
| 55  | 0.1185%       | 0.1119% | 1.9020% |
| 60  | 0.1148%       | 0.0788% | 2.5848% |
| 65  | 0.0960%       | 0.0660% | 3.4164% |

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Sample *non service-connected* disability rates of active participants are shown below.

| Age | Miscellaneous |         | Safety  |
|-----|---------------|---------|---------|
|     | Male          | Female  |         |
| 20  | 0.0042%       | 0.0025% | 0.0000% |
| 25  | 0.0042%       | 0.0025% | 0.0000% |
| 30  | 0.0047%       | 0.0060% | 0.0000% |
| 35  | 0.0097%       | 0.0178% | 0.0000% |
| 40  | 0.0255%       | 0.0338% | 0.0000% |
| 45  | 0.0377%       | 0.0470% | 0.0000% |
| 50  | 0.0395%       | 0.0498% | 0.0000% |
| 55  | 0.0395%       | 0.0373% | 0.0000% |
| 60  | 0.0382%       | 0.0263% | 0.0000% |
| 65  | 0.0320%       | 0.0220% | 0.0000% |

**15. Rates of Mortality for Active Lives**

Mortality rates for Miscellaneous active members are based on the sex distinct Public General 2010 Employee Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, with no adjustments.

Mortality rates for Safety active members are based on the sex distinct Public Safety 2010 Above-Median Income Employee Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, with no adjustments. 10% of Safety member active deaths are assumed to occur in the line of duty.

**16. Rates of Mortality for Retired Healthy Lives**

Mortality rates for Miscellaneous retired members are based on the sex distinct Public General 2010 Healthy Retiree Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, with no adjustments.

Mortality rates for Safety retired members are based on the sex distinct Public Safety 2010 Above-Median Income Healthy Retiree Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, with no adjustments.

**17. Rates of Mortality for Retired Disabled Lives**

Rates of mortality among Miscellaneous disabled members are based on the sex distinct Public General 2010 Disabled Retiree Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, with no adjustments.

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Rates of mortality among Safety disabled members are based on the sex distinct Public Safety 2010 Disabled Retiree Mortality Table, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, adjusted by 95% for males with no adjustment for females.

**18. Rates of Mortality for Beneficiaries**

Rates of mortality among members' beneficiaries once their benefits commence are given by sex distinct Public 2010 Contingent Survivor Mortality Table, using General 2010 Healthy Retiree Mortality Table before age 45, with generational mortality improvements projected from 2010 using Projection Scale MP-2020, adjusted by 105% for females and no adjustments to males. Prior to the death of the member, the mortality of the beneficiaries is assumed to use the same sex distinct assumptions as the retired healthy members.

**19. Mortality Improvement**

Mortality is assumed to improve in future years in accordance with the MP-2020 generational improvement tables.

**20. Rates of Retirement**

Rates of retirement are based on age according to the following tables below.

**Non-PEPRA Miscellaneous Rates**

| Age   | <20 Years of Service | 20-29 Years of Service | 30+ Years of Service |
|-------|----------------------|------------------------|----------------------|
| 50-52 | 3.00%                | 3.00%                  | 3.00%                |
| 53    | 5.00%                | 5.00%                  | 10.00%               |
| 54    | 5.00%                | 5.00%                  | 15.00%               |
| 55-59 | 5.00%                | 10.00%                 | 15.00%               |
| 60    | 10.00%               | 10.00%                 | 30.00%               |
| 61    | 10.00%               | 10.00%                 | 30.00%               |
| 62    | 12.00%               | 20.00%                 | 30.00%               |
| 63    | 14.00%               | 20.00%                 | 30.00%               |
| 64    | 16.00%               | 20.00%                 | 30.00%               |
| 65    | 18.00%               | 20.00%                 | 30.00%               |
| 66-69 | 20.00%               | 30.00%                 | 30.00%               |
| 70-79 | 25.00%               | 30.00%                 | 30.00%               |
| 80    | 100.00%              | 100.00%                | 100.00%              |

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**PEPRA Miscellaneous Rates**

| <b>2017 CalPERS 2.0% @ 62 Public Agency<br/>Miscellaneous Sample Rates</b> |                                |                                |                                |
|----------------------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <b>Age</b>                                                                 | <b>15 Years of<br/>Service</b> | <b>20 Years of<br/>Service</b> | <b>25 Years of<br/>Service</b> |
| 52                                                                         | 1.20%                          | 1.50%                          | 1.90%                          |
| 55                                                                         | 2.80%                          | 3.60%                          | 6.10%                          |
| 60                                                                         | 7.10%                          | 9.10%                          | 11.10%                         |
| 61                                                                         | 7.90%                          | 10.00%                         | 12.10%                         |
| 62                                                                         | 10.40%                         | 13.40%                         | 16.40%                         |
| 63                                                                         | 13.40%                         | 16.30%                         | 19.20%                         |
| 64                                                                         | 12.90%                         | 15.80%                         | 18.70%                         |
| 65                                                                         | 17.30%                         | 20.60%                         | 23.90%                         |
| 66                                                                         | 21.20%                         | 25.20%                         | 29.20%                         |
| 67                                                                         | 21.20%                         | 25.20%                         | 29.20%                         |
| 68-74                                                                      | 19.30%                         | 22.90%                         | 26.50%                         |
| 75+                                                                        | 100.00%                        | 100.00%                        | 100.00%                        |

**Non-PEPRA Safety Rates**

| <b>Age</b> | <b>3% @ 50<br/>&lt;20 Years of<br/>Service</b> | <b>3% @ 50<br/>20-29 Years of<br/>Service</b> | <b>3% @ 50<br/>30+ Years of<br/>Service</b> |
|------------|------------------------------------------------|-----------------------------------------------|---------------------------------------------|
| 40-44      | 0.00%                                          | 3.00%                                         | 3.00%                                       |
| 45-48      | 0.00%                                          | 3.00%                                         | 3.00%                                       |
| 49         | 0.00%                                          | 15.00%                                        | 15.00%                                      |
| 50         | 5.00%                                          | 15.00%                                        | 50.00%                                      |
| 51-52      | 5.00%                                          | 10.00%                                        | 20.00%                                      |
| 53-54      | 10.00%                                         | 10.00%                                        | 20.00%                                      |
| 55         | 10.00%                                         | 25.00%                                        | 50.00%                                      |
| 56         | 10.00%                                         | 30.00%                                        | 50.00%                                      |
| 57         | 10.00%                                         | 35.00%                                        | 50.00%                                      |
| 58         | 10.00%                                         | 40.00%                                        | 50.00%                                      |
| 59         | 10.00%                                         | 45.00%                                        | 50.00%                                      |
| 60-64      | 50.00%                                         | 50.00%                                        | 50.00%                                      |
| 65         | 100.00%                                        | 100.00%                                       | 100.00%                                     |



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**APPENDIX A – SUMMARY OF PROPOSED ASSUMPTIONS**

| <b>2017 CalPERS 3.0% @ 55 Public Agency</b> |                            |                            |                            |
|---------------------------------------------|----------------------------|----------------------------|----------------------------|
| <b>Safety Police Sample Rates</b>           |                            |                            |                            |
| <b>Age</b>                                  | <b>15 Years of Service</b> | <b>20 Years of Service</b> | <b>25 Years of Service</b> |
| 50                                          | 3.50%                      | 3.50%                      | 7.00%                      |
| 51                                          | 2.80%                      | 2.90%                      | 6.50%                      |
| 52                                          | 3.20%                      | 3.90%                      | 6.60%                      |
| 53                                          | 2.80%                      | 4.30%                      | 7.50%                      |
| 54                                          | 3.80%                      | 7.40%                      | 11.80%                     |
| 55                                          | 7.00%                      | 12.00%                     | 17.50%                     |
| 56                                          | 6.00%                      | 11.00%                     | 16.50%                     |
| 57                                          | 6.00%                      | 11.00%                     | 16.50%                     |
| 58                                          | 8.00%                      | 10.00%                     | 18.50%                     |
| 59                                          | 9.50%                      | 13.00%                     | 18.50%                     |
| 60                                          | 15.00%                     | 15.00%                     | 18.50%                     |
| 61                                          | 12.00%                     | 12.00%                     | 16.00%                     |
| 62                                          | 15.00%                     | 15.00%                     | 20.00%                     |
| 63                                          | 15.00%                     | 15.00%                     | 20.00%                     |
| 64                                          | 15.00%                     | 15.00%                     | 17.50%                     |
| 65                                          | 100.00%                    | 100.00%                    | 100.00%                    |

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**PEPRA Safety Rates**

| <b>2017 CalPERS 2.7% @ 57 Public Agency</b> |                            |                            |                            |
|---------------------------------------------|----------------------------|----------------------------|----------------------------|
| <b>Safety Police Sample Rates</b>           |                            |                            |                            |
| <b>Age</b>                                  | <b>15 Years of Service</b> | <b>20 Years of Service</b> | <b>25 Years of Service</b> |
| 50                                          | 5.00%                      | 5.00%                      | 5.00%                      |
| 51                                          | 4.00%                      | 4.00%                      | 5.75%                      |
| 52                                          | 3.80%                      | 3.80%                      | 5.80%                      |
| 53                                          | 3.80%                      | 3.80%                      | 7.74%                      |
| 54                                          | 3.80%                      | 4.37%                      | 9.31%                      |
| 55                                          | 6.84%                      | 9.12%                      | 13.40%                     |
| 56                                          | 6.27%                      | 8.36%                      | 12.28%                     |
| 57                                          | 6.00%                      | 8.00%                      | 11.75%                     |
| 58                                          | 8.00%                      | 8.80%                      | 13.75%                     |
| 59                                          | 8.00%                      | 9.20%                      | 14.00%                     |
| 60                                          | 15.00%                     | 15.00%                     | 15.00%                     |
| 61                                          | 14.40%                     | 14.40%                     | 14.40%                     |
| 62                                          | 15.00%                     | 15.00%                     | 15.00%                     |
| 63                                          | 15.00%                     | 15.00%                     | 15.00%                     |
| 64                                          | 15.00%                     | 15.00%                     | 15.00%                     |
| 65                                          | 100.00%                    | 100.00%                    | 100.00%                    |

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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

The assumptions and methods used in the June 30, 2019 actuarial valuation reflect the results of an Experience Study performed by Cheiron covering the period from July 1, 2014 through June 30, 2017 and adopted by the Board.

**1. Rate of Return**

Assets are assumed to earn 7.00% net of investment, but not administrative expenses.

**2. Administrative Expenses**

Administrative expenses are assumed to be \$5.217 million for the next year, to be split between employees and employers based on their share of the overall contributions. Administrative expenses are assumed to increase by 3.0% per year.

**3. 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.

**4. Post Retirement COLA**

Post retirement COLAs are assumed at the rate of 2.7% for members with a 4% COLA cap, 2.6% for members with a 3% COLA cap, and 1.9% for members with a 2% COLA cap.

**5. 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 at the time of retirement.

**6. Internal Revenue Code Section 401(a)(17)**

The Internal Revenue Code Section 401(a)(17) maximum compensation limitation is reflected in the valuation to project compensation and benefits. The limit is expected to increase by 2.75% in future years.

**7. PEPPRA Compensation Limit**

The PEPPRA Pensionable Compensation Limit (GC 7522.10) is reflected in the valuation to project compensation and benefits for PEPPRA members. The limit is expected to increase by 2.75% in future years.

**8. Interest on Member Contributions**

The annual credited interest rate on member contributions is assumed to be 7.00%.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**9. Sick Leave Service Credit Upon Retirement**

Active members' benefits are adjusted by a percentage, in accordance with the table below, for anticipated conversions of sick leave or other terminal earnings to retirement service credit or final compensation.

|                                 | Rate  |
|---------------------------------|-------|
| Marin County                    | 2.00% |
| Marin Courts                    | 2.00% |
| Marin Special Districts         | 2.00% |
| Novato Fire Protection District | 3.00% |
| City of San Rafael              | 2.50% |

**10. Family Composition**

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

| Percentage Married    |            |
|-----------------------|------------|
| Class and Gender      | Percentage |
| Miscellaneous Males   | 75%        |
| Miscellaneous Females | 55%        |
| Safety Males          | 85%        |
| Safety Females        | 55%        |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**11. Increases in Pay**

Wage inflation component: 3.00%

Additional longevity and promotion component:

| Service | Miscellaneous | Safety |
|---------|---------------|--------|
| 0       | 6.00%         | 5.00%  |
| 1       | 6.00%         | 5.00%  |
| 2       | 5.00%         | 4.50%  |
| 3       | 4.00%         | 4.00%  |
| 4       | 3.00%         | 3.50%  |
| 5       | 2.25%         | 3.00%  |
| 6       | 1.75%         | 2.50%  |
| 7       | 1.40%         | 2.20%  |
| 8       | 1.20%         | 1.90%  |
| 9       | 1.00%         | 1.70%  |
| 10      | 0.85%         | 1.50%  |
| 11      | 0.75%         | 1.40%  |
| 12      | 0.75%         | 1.30%  |
| 13+     | 0.75%         | 1.25%  |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**12. Rates of Termination (All Types)**

Sample rates of termination are shown in the following tables below. Note that termination rates do not apply once a member is eligible for retirement.

| Service | Miscellaneous |        |        |
|---------|---------------|--------|--------|
|         | Male          | Female | Safety |
| 0       | 15.00%        | 15.00% | 8.00%  |
| 1       | 9.00%         | 10.00% | 5.00%  |
| 2       | 7.00%         | 8.00%  | 4.00%  |
| 3       | 7.00%         | 8.00%  | 4.00%  |
| 4       | 7.00%         | 8.00%  | 4.00%  |

| Age | 5-9 Years<br>of Service | Miscellaneous                     |                           |                                    | Safety                    |                           |                          |
|-----|-------------------------|-----------------------------------|---------------------------|------------------------------------|---------------------------|---------------------------|--------------------------|
|     |                         | Male<br>10-14 Years<br>of Service | 15-29 Years<br>of Service | Females<br>5-9 Years<br>of Service | 10-14 Years<br>of Service | 15-29 Years<br>of Service | 5-19 Years<br>of Service |
| 20  | 7.00%                   | 5.30%                             | 3.00%                     | 7.80%                              | 5.30%                     | 3.00%                     | 2.06%                    |
| 25  | 7.00%                   | 5.30%                             | 3.00%                     | 7.80%                              | 5.30%                     | 3.00%                     | 2.24%                    |
| 30  | 7.00%                   | 5.30%                             | 3.00%                     | 7.80%                              | 5.30%                     | 3.00%                     | 3.53%                    |
| 35  | 6.80%                   | 4.50%                             | 2.50%                     | 7.80%                              | 4.50%                     | 2.50%                     | 3.41%                    |
| 40  | 4.80%                   | 3.20%                             | 2.00%                     | 5.80%                              | 3.20%                     | 2.00%                     | 1.14%                    |
| 45  | 3.80%                   | 2.50%                             | 1.70%                     | 4.80%                              | 2.50%                     | 1.70%                     | 1.70%                    |
| 50  | 2.10%                   | 0.00%                             | 0.00%                     | 3.10%                              | 0.00%                     | 0.00%                     | 0.27%                    |
| 55  | 1.20%                   | 0.00%                             | 0.00%                     | 2.20%                              | 0.00%                     | 0.00%                     | 0.09%                    |
| 60  | 1.20%                   | 0.00%                             | 0.00%                     | 2.20%                              | 0.00%                     | 0.00%                     | 0.00%                    |

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**13. Withdrawal, Reciprocal Transfers and Vested Termination**

Rates of withdrawal apply to active Members who terminate their employment. Members who withdraw their member contributions forfeit entitlement to future Plan benefits.

| Service | Withdrawal | Miscellaneous |             |            | Safety     |             |
|---------|------------|---------------|-------------|------------|------------|-------------|
|         |            | Reciprocal    | Vested Term | Withdrawal | Reciprocal | Vested Term |
| 0       | 50.00%     | 15.00%        | 35.00%      | 25.00%     | 45.00%     | 30.00%      |
| 1       | 40.00%     | 18.00%        | 42.00%      | 25.00%     | 45.00%     | 30.00%      |
| 2       | 20.00%     | 24.00%        | 56.00%      | 25.00%     | 45.00%     | 30.00%      |
| 3       | 20.00%     | 24.00%        | 56.00%      | 25.00%     | 45.00%     | 30.00%      |
| 4       | 20.00%     | 24.00%        | 56.00%      | 25.00%     | 45.00%     | 30.00%      |
| 5       | 10.00%     | 27.00%        | 63.00%      | 25.00%     | 45.00%     | 30.00%      |
| 6       | 10.00%     | 27.00%        | 63.00%      | 25.00%     | 45.00%     | 30.00%      |
| 7       | 10.00%     | 27.00%        | 63.00%      | 25.00%     | 45.00%     | 30.00%      |
| 8       | 10.00%     | 27.00%        | 63.00%      | 25.00%     | 45.00%     | 30.00%      |
| 9       | 10.00%     | 27.00%        | 63.00%      | 25.00%     | 45.00%     | 30.00%      |
| 10+     | 10.00%     | 27.00%        | 63.00%      | 15.00%     | 51.00%     | 34.00%      |

**14. Reciprocal Transfers and Vested Termination Deferral Age**

Miscellaneous members who terminate employment and do not withdraw their member contributions are assumed to retire at age 58. Safety members who terminate employment and do not withdraw their member contributions are assumed to retire at age 50 if their benefits are calculated under CERL section 31664.1 and age 55 otherwise.

**15. Projected Pay for Reciprocal Transfers**

Members who terminate and transfer to a reciprocal employer are expected to have their wages increase from their date of termination to their assumed retirement age by 3.00% wage inflation and either 0.75% for Miscellaneous members or 1.25% for Safety members.

Members who have terminated and transferred to a reciprocal employer or have transferred within MCERA are assumed to have the same salary increases, and are exposed to the same rates of mortality and retirement as if they were active. No other decrements are assumed.

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
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**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**16. Rates of Disability**

The rates of disability for Miscellaneous members are based on the 2017 CalPERS Public Agency Miscellaneous Ordinary Disability rates for males and females without adjustment.

The rates of disability for Safety members are based on adjusted 2017 CalPERS Public Agency Police Unisex Industrial and Ordinary Disability rates (multiplied by 0.6, and with a maximum rate of 1.25%).

50% of all Miscellaneous and 95% of all Safety disabilities are assumed to be service-connected. Sample *service-connected* disability rates of active participants are shown below.

| Miscellaneous |         |         |         |
|---------------|---------|---------|---------|
| Age           | Male    | Female  | Safety  |
| 20            | 0.0085% | 0.0050% | 0.0057% |
| 25            | 0.0085% | 0.0050% | 0.0998% |
| 30            | 0.0095% | 0.0120% | 0.3186% |
| 35            | 0.0195% | 0.0355% | 0.5022% |
| 40            | 0.0510% | 0.0675% | 0.6857% |
| 45            | 0.0755% | 0.0940% | 0.8750% |
| 50            | 0.0790% | 0.0995% | 1.1875% |
| 55            | 0.0790% | 0.0745% | 1.1875% |
| 60            | 0.0765% | 0.0525% | 1.1875% |
| 65            | 0.0640% | 0.0440% | 1.1875% |

Sample *non service-connected* disability rates of active participants are shown below.

| Miscellaneous |         |         |         |
|---------------|---------|---------|---------|
| Age           | Male    | Female  | Safety  |
| 20            | 0.0085% | 0.0050% | 0.0003% |
| 25            | 0.0085% | 0.0050% | 0.0053% |
| 30            | 0.0095% | 0.0120% | 0.0168% |
| 35            | 0.0195% | 0.0355% | 0.0264% |
| 40            | 0.0510% | 0.0675% | 0.0361% |
| 45            | 0.0755% | 0.0940% | 0.0461% |
| 50            | 0.0790% | 0.0995% | 0.0625% |
| 55            | 0.0790% | 0.0745% | 0.0625% |
| 60            | 0.0765% | 0.0525% | 0.0625% |
| 65            | 0.0640% | 0.0440% | 0.0625% |



**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**17. Rates of Mortality for Active Lives**

Rates of mortality for active members are specified by CalPERS 2017 Pre-Retirement Non-Industrial Death rates (plus Duty-Related Death rates for Safety members), with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017. 0% of all Miscellaneous and 95% of all Safety pre-retirement deaths are assumed to be service-connected.

**18. Rates of Mortality for Retired Healthy Lives**

Rates of mortality for retired members and their beneficiaries are given by CalPERS 2017 Post-Retirement Healthy Mortality rates, adjusted by 90% for Males (Miscellaneous and Safety), with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017.\*<sup>1</sup>

**19. Rates of Mortality for Retired Disabled Lives**

Rates of mortality among disabled members are given by CalPERS 2017 Disability Mortality rates (Non-Industrial rates for Miscellaneous members and Industrial Disability rates for Safety members), adjusted by 90% for Males (Miscellaneous and Safety) and 90% for Miscellaneous Females, with the 15-year static projection used by CalPERS replaced by generational improvements from a base year of 2014 using Scale MP-2017.\*

**20. Mortality Improvement**

Mortality is assumed to improve in future years in accordance with the MP-2017 generational improvement tables.

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\* Rates of mortality for annuitants younger than age 50 are from the CalPERS 2014 Experience Study

**MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION  
EXPERIENCE STUDY AS OF JUNE 30, 2020**

**APPENDIX B – SUMMARY OF PRIOR ASSUMPTIONS**

**21. Rates of Retirement**

Rates of retirement are based on age according to the following tables below.

PEPRA: For New Members we assume that the current retirement rates will apply, but that no Non-Safety members will retire before age 52.

**Miscellaneous Rates**

| Age   | <20 Years of Service | 20-29 Years of Service | 30+ Years of Service |
|-------|----------------------|------------------------|----------------------|
| 50-52 | 3.00%                | 3.00%                  | 3.00%                |
| 53    | 5.00%                | 5.00%                  | 10.00%               |
| 54    | 5.00%                | 5.00%                  | 15.00%               |
| 55-59 | 5.00%                | 10.00%                 | 15.00%               |
| 60    | 5.00%                | 10.00%                 | 30.00%               |
| 61    | 10.00%               | 10.00%                 | 30.00%               |
| 62-63 | 10.00%               | 20.00%                 | 30.00%               |
| 64-65 | 15.00%               | 20.00%                 | 30.00%               |
| 66-67 | 15.00%               | 30.00%                 | 30.00%               |
| 68-79 | 20.00%               | 30.00%                 | 30.00%               |
| 80    | 100.00%              | 100.00%                | 100.00%              |

**Safety Rates**

| Age   | 3% @ 50<br><20 Years of Service | 3% @ 50<br>20-29 Years of Service | 3% @ 50<br>30+ Years of Service | 3% @ 55<br><20 Years of Service | 3% @ 55<br>20-29 Years of Service | 3% @ 55<br>30+ Years of Service |
|-------|---------------------------------|-----------------------------------|---------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| 40-44 | 0.00%                           | 3.00%                             | 3.00%                           | 0.00%                           | 1.00%                             | 1.00%                           |
| 45-48 | 0.00%                           | 3.00%                             | 3.00%                           | 0.00%                           | 5.00%                             | 5.00%                           |
| 49    | 0.00%                           | 15.00%                            | 3.00%                           | 0.00%                           | 5.00%                             | 5.00%                           |
| 50    | 5.00%                           | 15.00%                            | 50.00%                          | 5.00%                           | 10.00%                            | 30.00%                          |
| 51-52 | 5.00%                           | 10.00%                            | 20.00%                          | 5.00%                           | 10.00%                            | 30.00%                          |
| 53-54 | 10.00%                          | 10.00%                            | 20.00%                          | 5.00%                           | 10.00%                            | 30.00%                          |
| 55    | 10.00%                          | 25.00%                            | 50.00%                          | 20.00%                          | 30.00%                            | 30.00%                          |
| 56    | 10.00%                          | 30.00%                            | 50.00%                          | 10.00%                          | 30.00%                            | 30.00%                          |
| 57    | 10.00%                          | 35.00%                            | 50.00%                          | 10.00%                          | 20.00%                            | 30.00%                          |
| 58    | 10.00%                          | 40.00%                            | 50.00%                          | 10.00%                          | 20.00%                            | 30.00%                          |
| 59    | 10.00%                          | 45.00%                            | 50.00%                          | 10.00%                          | 20.00%                            | 30.00%                          |
| 60-64 | 50.00%                          | 50.00%                            | 50.00%                          | 20.00%                          | 20.00%                            | 50.00%                          |
| 65    | 100.00%                         | 100.00%                           | 100.00%                         | 100.00%                         | 100.00%                           | 100.00%                         |



*Classic Values, Innovative Advice*