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Ohio Police and Fire Pension Fund

**Quinquennial Experience Review
2017-2021**

Filed with ORSC: November 1, 2022





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Cavanaugh Macdonald

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October 26, 2022

Board of Trustees
Ohio Police & Fire Pension Fund
140 East Town Street
Columbus, Ohio 43215

Dear Trustees:

It is a pleasure to submit this report of our investigation of the experience of the Ohio Police & Fire Pension Fund (OP&F) for the period of January 1, 2017 through December 31, 2021. The results of the quinquennial experience review are the basis for recommended changes to the actuarial assumptions. The set of assumptions proposed as a result of this review will be used in the January 1, 2022 actuarial valuation of OP&F to analyze the financial status of the fund and disclose employer liabilities for financial statements.

The purpose of this report is to communicate the results of our review of the actuarial methods and assumptions to be used in the completion of the upcoming valuation. Our recommendations represent changes from the prior methods or assumptions, which are intended to better anticipate the emerging experience of the Fund. Actual future experience, however, may still differ from these assumptions.

In preparing this report, we relied without audit on information supplied by OP&F staff. In our examination, we have found the data to be reasonably consistent and comparable with data used for other purposes. It should be noted that if any data or other information is inaccurate or incomplete, our calculations and recommendations might need to be revised. We would like to acknowledge the help given by OP&F staff in the preparation of this report.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* and No. 35, *Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations*.



Board of Trustees
October 26, 2022
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In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements and changes in plan provisions or applicable law.

We look forward to our discussions and the opportunity to respond to your questions and comments.

I, Larry Langer, am a member of the American Academy of Actuaries, an Enrolled Actuary and an Associate of the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Wendy T. Ludbrook, am a member of the American Academy of Actuaries, an Enrolled Actuary and a Fellow of the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'L Langer'.

Larry Langer, ASA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, appearing to read 'Wendy Ludbrook'.

Wendy T. Ludbrook, FSA, EA, FCA, MAAA
Consulting Actuary

A handwritten signature in blue ink, appearing to read 'Ryan Gundersen'.

Ryan Gundersen
Senior Consultant



SECTION 1 – EXECUTIVE SUMMARY

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement Fund. Actuarial valuations of the Ohio Police & Fire Pension Fund (OP&F or Fund) are prepared annually to determine the financial status of the Fund on an actuarial basis, i.e., the current assets plus future contributions along with investment earnings will be sufficient to provide the benefits promised by the Fund to current members. The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, termination of employment, retirement age and salary changes, to estimate the obligations of the Fund.

The basic purpose of an experience review is to determine whether the actuarial assumptions currently in use are accurately predicting actual emerging experience. This information, along with the professional judgment of fund personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to realize that actual experience is reported short term while assumptions are intended to be long term estimates of experience.

OP&F conducts an experience review every five years. This review covers the economic and demographic assumptions along with the actuarial methods used in the valuation process. The review period is January 1, 2017 through December 31, 2021.

There are two distinct membership groups in OP&F, with different contribution rates Police Officers and Firefighters. Where appropriate, different assumptions apply to the two different groups.



SECTION 1 – EXECUTIVE SUMMARY

ACTUARIAL METHODS

Actuarial valuations utilize methods to determine the liabilities, assets, the funding period of the plan. While these are not like actuarial assumptions that may change over time depending on experience, an experience review is still a good opportunity to review these methods to see if they are still appropriate for systematically funding the promised benefits.

There are three key actuarial methods that are required to complete the annual actuarial valuation. The current methods are shown below:

- Actuarial Cost Method: Entry Age Normal, **prescribed by the Ohio Revised Code (ORC).**
- Asset Valuation Method: Four-year moving market average value of assets that spreads the difference between the actual investment income and the expected income on the market value (based on the valuation interest rate) over a period of four years, with an 80% to 120% corridor around market value
- Funding Policy: The actuary determines how many years are required by OP&F to completely amortize the UAAL (funding period), using member and employer contributions reduced by the amount allocated to health care and the amount of normal cost for the year. If the funding period exceeds 30 years, a plan shall be developed and presented by the Board of Trustees to the Ohio Retirement Study Council to reduce the funding period to not more than 30 years. **This is prescribed by the ORC.**

We are not recommending any changes to these methods.

ACTUARIAL ASSUMPTIONS

The actuarial valuation process utilizes two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its impact on OP&F. Demographic assumptions are based on the emergence of the specific experience of OP&F members.

Economic Assumptions

The following table summarizes the current and proposed economic assumptions.

	Current Assumptions	Proposed Assumptions
Price Inflation	2.75%	2.75%
Investment Return	7.50%	7.00% - 7.50%
General Wage Growth	3.25%	3.25%
Merit Salary Increases	7.25% - 0.50%	7.25% - 0.50%
Payroll Growth	3.25%	3.25%
COLA (simple)	2.20%	2.20%
Member DROP Account Interest	4.00%	3.75%
Administrative Expenses	Actual Admin Expenses from previous year, increasing in the future with inflation	Actual Admin Expenses from previous, increasing in the future with inflation



Demographic Assumptions

We generally analyzed experience for each of the five years individually as well as in aggregate. If any of the experience in certain years seemed out of line, the credibility of that experience was reduced in evaluating the current assumptions and proposing changes. A portion of this review was during the Covid-19 pandemic, and so we are aware that the behavior and experiences of the members during this period could be affected. Based on our review of data on a year-by-year basis and our familiarity with other retirement Funds, especially in the Midwest, we do not believe that there was much impact on OP&F membership. However, our recommendations for changes were influenced by this awareness.

In the analysis of demographic experience, we use a methodology for analyzing the experience, called a “liability-weighted” approach (referred to in this report as “weighted”). A member’s “liability” in the Fund is generally determined by the benefit amount and age of the member. Many assumptions already reflect differences by age directly. The other factor, benefit amount, is impacted by salary and service. We use these two factors to estimate the member’s relative benefit level and then weight the experience (the exposure and actual occurrences are scaled by salary and service). This approach is particularly insightful when analyzing experience from a non-homogenous group. While we reviewed experience on both a count and liability-weighted basis for most decrements, we generally gave the liability-weighted experience more credibility in proposing changes. This is discussed in each section of the demographic assumptions in this report.

Our recommended changes to the demographic assumptions are intended to better reflect future experience and improve the calculation of future liabilities. The specific changes are discussed below:

Mortality: In general, mortality rates continue to improve, largely as expected. We are recommending moving to the family of Pub-2010 Mortality Tables, with adjustments as needed to ensure the fit is reasonable. The Pub-2010 Tables, including the mortality improvement scales, are the recently published first ever mortality tables for use in public pension valuations. The recommended changes impact the mortality assumption used for active members, disabled members and in-pay members.

Retirement: Based on trends observed in the experience review period, we are recommending adjustments to retirement rates for Police and Firefighter members including streamlining the rates from the current structure to now be based on service only.

DROP Participation: Based on trends observed in the experience review period, we are recommending lowering the DROP participation rate.

Disability: Based on the actual experience observed in the current review and as a continuation from the prior review, we are recommending the disability rates be lowered.

Termination of Employment: Based on the actual experience observed in the current review, we are recommending lowering this assumption and streamlining the rates from the current structure to now be based on service only.

Miscellaneous Demographic Assumptions: Overall, the current assumptions are reasonably anticipating the behavior of members in relation to marital status, spouse age difference and optional benefit form election. We recommend modest changes to these assumptions.



SECTION 1 – EXECUTIVE SUMMARY

Merit Salary Scale: This assumption is used, in conjunction with the general wage growth assumption (an economic assumption), to develop the individual salary increase assumption. The general shape of the merit scale is a good fit to the observed experience. We are not recommending any adjustments to the merit scale at this time.

Healthcare Stabilization Fund (HCSF) Participation: While the HCSF utilizes the pension assumptions, there are also participation assumptions unique to this plan. Based on trends observed in the experience review period, the levels of participation in the HCSF are lower and we are recommending lowering these assumptions.

OPTIONAL FORM FACTORS

A retiring member may elect the form of payment for his monthly benefit: e.g., single life annuity, joint and survivor annuity, life annuity certain and continuous, etc. These different types of forms of payments are called optional forms. Optional form factors are used to convert the benefit amount for one form of benefit payment to another on an actuarial equivalent basis (i.e., no gain or loss to the Fund). This actuarial equivalence is based on an interest rate and mortality assumption and should be reviewed considering the recommended changes in the mortality and interest rate assumptions.

COST IMPACT

The financial impact of the proposed changes are summarized in the following table. While the assumption changes impact the liabilities, normal cost rate and funding period, assets are unaffected. The results presented show the prior year's results, the January 1, 2022 results before any changes, the January 1, 2022 results with only the discount rate change to 7.50% that the Board approved in February 2022 and finally the January 1, 2022 changes with all recommended assumptions reflected. Note, that while we are recommending a range of return assumptions, we have only shown the 7.50% results here.

	January 1, 2021 Results	January 1, 2022 Results		
		Before Changes	Reflect 7.50% Return Assumption	Reflect All Assumptions
Return Assumption	8.00%	8.00%	7.50%	7.50%
Other Assumptions	Current	Current	Current	Proposed
Pension Normal Cost Rate	15.70%	14.93%	16.79%	16.35%
Actuarial Accrued Liability	\$ 22,628,591,064	\$ 23,441,337,687	\$ 24,686,364,204	\$ 24,517,577,785
Actuarial Value of Assets	16,112,136,611	17,095,829,803	17,095,829,803	17,095,829,803
UAAL	6,516,454,453	6,345,507,884	7,590,534,401	7,421,747,982
Funded Ratio	71.2%	72.9%	69.3%	69.7%
Funding Period in Years	24.54	20.00	30.29	28.07
HCSF Solvency Date	Dec-2037	Sep-2041	Feb-2041	Dec-2046



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SECTION 2 - INTRODUCTION

Funding and Valuation Principles

Just as certain investment choices have an associated “investment risk,” choices in actuarial assumptions have an associated “actuarial risk”. Our responsibility is to consider the impact our work will have on members, employers, and taxpayers, both current and future.

The determination of funding period is dependent on the assumptions used to project the future benefit payments and then discount them to obtain the present values. Thus, it is important that the Board understand the sensitivity of the actuarial calculations to the underlying assumptions.

- If actual experience shows that the assumptions overestimated the true cost of the plan, current taxpayers and public employees and employers may be required to bear a burden that rightfully belongs to future taxpayers.
- If actual experience shows that the assumptions underestimated the true costs, future taxpayers and future employees and employers may be required to bear a burden that rightfully belongs to the current taxpayers.

The actuarial assumptions do not impact the true cost of the plan benefits; however, they do impact how the financing and pre-funding of those retirement benefits takes place before the true costs can be determined. Therefore, a balanced approach that is neither overly conservative nor aggressive seems the most equitable to all impacted parties.

The actuarial assumptions are divided into two groups: economic and demographic. The economic assumptions must not only reflect OP&F’S experience but also give greater consideration to the long-term expectation of future economic growth for the nation, as well as the global economy.

The non-economic, or demographic assumptions, are based on OP&F’S actual experience, adjusted to reflect trends and historical experience. The demographic assumptions are much more dependent on the numerical results of the experience review, but there is still subjectivity involved in evaluating the experience and proposing any changes. There is no “right” answer because the future is unknown. Differences of opinion among actuaries will occur based on each person’s background, experience and outlook.

Overview

This report presents the results of an investigation of the recent actuarial demographic experience of OP&F. We will refer to this investigation as an experience review. Throughout this report, we refer to “current” and “proposed” actuarial assumptions. The current assumptions and methods are those used in the actuarial valuation of OP&F as of January 1, 2021. They were adopted by the Board based on OP&F’S 2012-2016 Quinquennial Experience Review. The proposed assumptions are those we recommend for use in the valuation prepared as of January 1, 2022 and for subsequent valuations until further changes are made.

Section 3 of this report discusses our recommended economic assumptions while Section 4 covers the actuarial methods. Sections 5 through 12 of this report will show the results of our review of demographic assumptions. The exhibits are detailed comparisons between actual and expected events (death, retirement,



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termination, etc.) on both the current and, if applicable, the proposed assumptions. More detail is included in the Appendices for your reference.

Our Philosophy

Similar to an actuarial valuation, the numerical calculation of actual and expected experience is a fairly mechanical process. From one actuary to another, you would expect to see very little difference. However, the setting of assumptions is a different story, as it is more art than science. In this report, we at times propose revisions to the current assumptions. To better understand our thought process, here is a brief summary of our philosophy:

- **Don't overreact:** When we see significant changes in experience, we generally do not adjust our rates to reflect the entire difference. We will generally propose rates somewhere between the old rates and the new experience depending on the level of credibility assigned to the more recent data. If the experience during the next review shows the same result, we will probably recognize this trend at that point. On the other hand, if the experience returns closer to its prior level, we will not have overreacted, minimizing volatility in the actuarial contribution rates.
- **Anticipate Trends:** If there is an identified trend that is expected to continue, we believe that this should be recognized. An example of this is the retiree mortality assumption. Mortality rates have generally declined over the past century with advances in public health and medical techniques, and most actuaries reflect the expectation of this trend continuing in their selection of a mortality assumption.
- **Simplify:** In this report we describe what factor affects each assumption. In general, we attempt to identify which factors are most important and eliminate the ones that add complexity to the valuation without significantly improving accuracy.

Actuarial Standard of Practice Number 27: Selection of Economic Assumptions for Measuring Pension Obligations

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standard of Practice (ASOP) No. 27. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment.

ASOP 27 requires the actuary to select a “reasonable” assumption. For this purpose, an assumption is reasonable if it has the following characteristics:

- a. it is appropriate for the purpose of the measurement;
- b. it reflects the actuary's professional judgement;
- c. it takes into account historical and current economic data that is relevant as of the measurement date;
- d. it reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and



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- e. it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic) except when provisions for adverse deviation or plan provisions that are difficult to measure are included.

With respect to relevant data, the standard recommends the actuary review appropriate recent and long-term historical economic data, but advises the actuary not to give undue weight to recent experience. Furthermore, it advises the actuary to consider that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment. In addition, with respect to any particular valuation, each economic assumption should be consistent with all other economic assumptions over the measurement period.

ASOP 27 recognizes that economic data and analyses are available from a variety of sources, including representatives of the plan sponsor, investment advisors, economists, and other professionals. The actuary is permitted to incorporate the views of experts, but the selection or advice must reflect the actuary's professional judgment.

The standard also discusses a “range of reasonable assumptions” which in part states “the actuary should also recognize that different actuaries will apply professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.”

Actuarial Standard of Practice No. 35: Selection of Demographic Assumptions

Actuarial Standard of Practice No. 35 (ASOP 35) governs the selection of demographic and other non-economic assumptions for measuring pension obligations. *ASOP 35* states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

ASOP No. 35 Steps

The actuary should follow the following steps in selecting the demographic assumptions:

- **Identify the Types of Assumptions.** Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.
- **Consider the Relevant Assumption Universe.** The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.
- **Consider the Assumption Format.** The assumption format includes whether assumptions are based on parameters such as gender, age, service or calendar year. The actuary should consider the impact the



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format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.

- Select the Specific Assumption. In selecting an assumption the actuary should consider the potential impact of future plan design changes as well as the factors listed above.
- Evaluate the Reasonableness of the Selected Assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant actuarial gains or losses.

ASOP No. 35 General Considerations and Application

Each individual demographic assumption should satisfy the criteria of *ASOP 35*. In selecting demographic assumptions the actuary should also consider the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption review at each measurement date. In our opinion, the demographic assumptions proposed in this report have been developed in accordance with *ASOP 35*.



SECTION 3 – ECONOMIC ASSUMPTIONS

The economic assumptions for OP&F include price inflation, long-term investment return, interest crediting rate for member accounts, wage growth (the across-the-board portion of salary increases) and the covered payroll increase assumption. Unlike demographic assumptions, economic assumptions do not lend themselves to analysis largely on the basis of internal historical patterns because economic assumptions are impacted by external forces in the economy. The investment return and general wage increase assumptions are selected on the basis of expectations in an inflation-free environment and then increased by the long-term expectation for inflation, called the “building block” approach.

Sources of data considered in the analysis and selection of the economic assumptions included:

- The 2022 Social Security Trustees Report (June 2022)
- Future expectations of OP&F investment consultant, Wilshire Consulting
- Future expectations of other investment consultants
- U.S. Department of the Treasury bond rates
- Assumptions used by other large public retirement Funds, based on the Public Fund Survey, published by the National Association of State Retirement Administrators (NASRA)
- Historical observations of price and wage growth statistics and investment returns

Price Inflation

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage growth (which then impacts individual salary increases), and payroll growth.

Inflation also has a direct impact on the valuation results. Ohio Law requires OP&F to pay annual cost-of-living allowances (COLAs) to eligible members. Members are eligible to for a COLA once they have received pension benefits for at least one year and have reached age 55. The maximum COLA payable to members with less than 15 years of service credit as of July 1, 2013 is the lesser of 3.0% or the increase in the CPI-U, subject to a floor of 0%. Therefore, the inflation assumption is used directly to develop the assumed increase in the annual pension payments for this group of retirees.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level “real return” – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates are expected to result in lower expected investment returns, at least in the long run.

The current assumption for price inflation is 2.75% per year which was recommended and adopted in the last experience review.

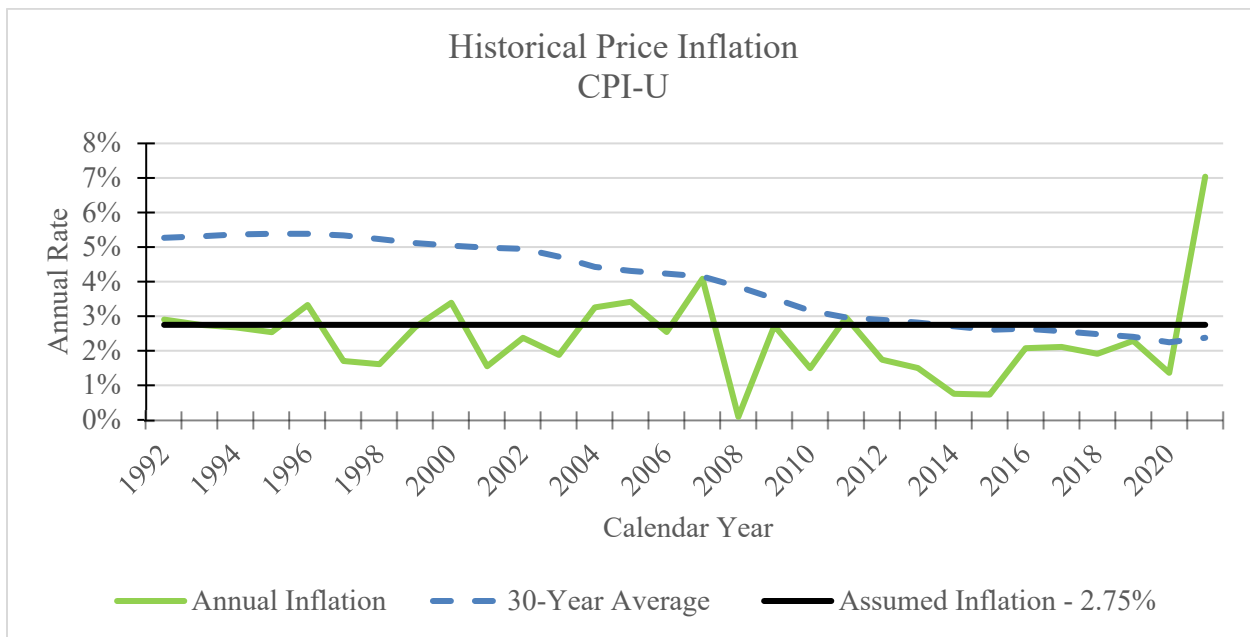
Past Experience: Although economic activities, in general, and inflation in particular, do not lend themselves to prediction solely on the basis of historical analysis, historical patterns and long-term trends are factors to be considered in developing the inflation assumption. The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The following table provides historical annualized rates of the CPI-U over periods ending December 31st.



SECTION 3 – ECONOMIC ASSUMPTIONS

Period	Number of Years	Annualized Rate of Inflation
1921 – 2021	100	2.82%
1961 – 2021	60	3.79
1971 – 2021	50	3.90
1981 – 2021	40	2.76
1991 – 2021	30	2.37
2001 – 2021	20	2.31
2011 - 2021	10	2.14

The following graph illustrates the historical annual change in price inflation, measured as of December 31 for each of the last 70 years, as well as the thirty-year rolling average.



Over more recent periods, measured from December 31, 2021, the average annual rate of increase in the CPI-U has been below the current assumption of 2.75%. The period of high inflation from 1973 to 1982 has a significant impact on the averages over periods which include these rates. While there has been a steady decline in inflation since that time, we note that 2021 is a clear exception. There are varying opinions as to the cause of the recent spike in inflation, but the current market pricing of Treasuries and TIPS suggests



SECTION 3 – ECONOMIC ASSUMPTIONS

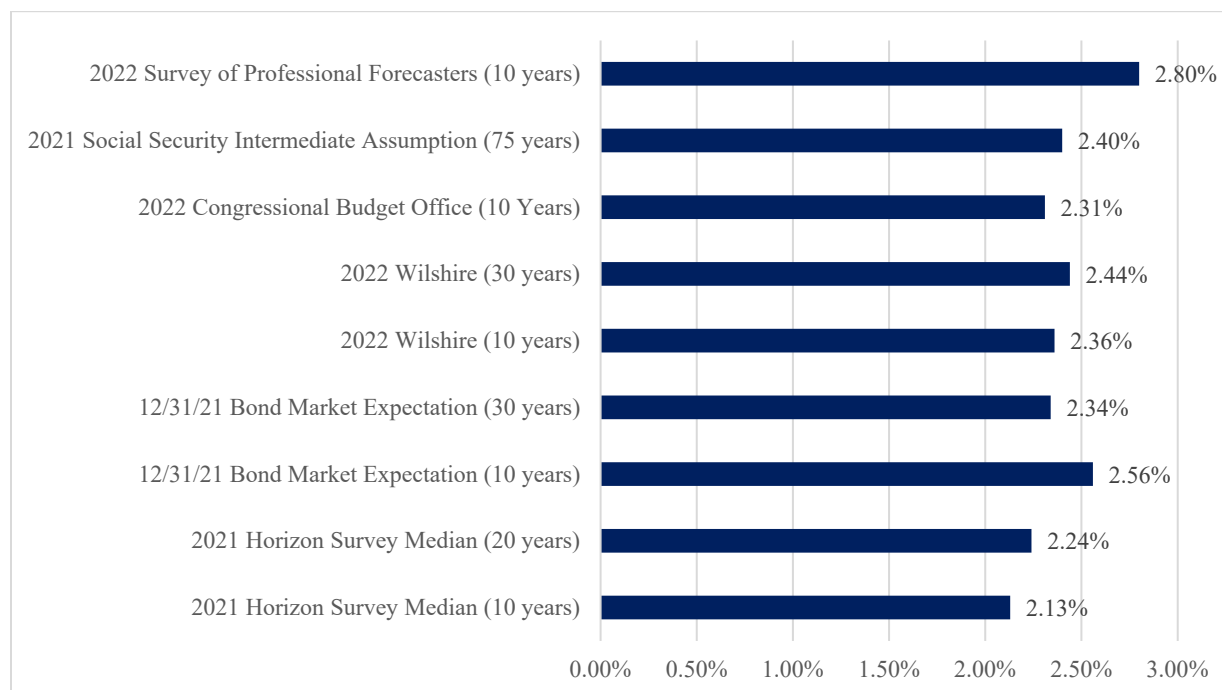
that the financial markets currently anticipate to this phenomenon to last a few years at the most. At this point, it is difficult to determine what the recent increase tells us regarding long-term inflation.

Forecasts of Inflation

Additional information to consider in formulating this assumption is obtained from measuring the spread on Treasury Inflation Protected Securities (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities (bonds) and the inflation indexed yield on TIPS of the same maturity is referred to as the “breakeven rate of inflation” and represents the bond market’s expectation of inflation over the period to maturity. As of December 31, 2021, the market rate of inflation over the next 30 years was 2.34%. Current market prices as of October 2022 suggest that investors expect inflation to be around 2.24% over the next ten years and 2.15% over the next 30 years. These rates have been volatile recently, making market pricing difficult to use for developing a long-term assumption.

OP&F’S investment consultant, Wilshire, also has an inflation forecast in their capital market assumptions. Their 2022 short-term assumption (10 years) is 2.36% and their long-term assumption (30 years) is 2.44%. The Philadelphia Federal Reserve Survey of Professional Forecasters in the third quarter of 2022 indicated that inflation over the next ten years is expected to be 2.80%.

Other sources of forecasting information we considered include that of Wilshire, the OP&F investment consultant, the Horizon Actuarial Services survey of investment advisors, and the Congressional Budget Office. The following chart summarizes all of these forward-looking estimates.





SECTION 3 – ECONOMIC ASSUMPTIONS

Social Security Projections

Although many economists forecast lower inflation than the assumptions used by retirement Funds, they are generally looking at a shorter time horizon (10 years) than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the most recent set of assumptions (June 2022), the projected average annual increase in the CPI over the next 75 years was estimated to be 2.4%, under the intermediate (best estimate) cost assumption. The range of price inflation used in the Social Security 75-year modeling, which includes a low- and high-cost scenario, in addition to the intermediate cost projection, was 1.8% to 3.0%.

Peer Fund Comparison

While we do not recommend the selection of any assumption based on what other Funds use, it does provide another set of relevant information to consider. According to the Public Plan Database (a survey of over 130 state and local retirement Funds maintained by a collaboration between the Center for Retirement Research at Boston College, the Center for State and Local Government Excellence, and the National Association of State Retirement Administrators) the average inflation assumption for statewide Funds has been steadily declining. As of 2020, the average assumption is 2.59%, which is slightly below OP&F'S current assumption.

Conclusion: The current inflation assumption is 2.75%, which was reduced by 0.50% in the last experience review. Actual inflation for the last 20-30 years has averaged less than 2.4% and rarely exceeded 3% in any year. However, since early 2021, inflation has increased sharply to levels not seen in decades. Actuarial standards caution against assigning too much weight to recent experience, and so we are hesitant to make any significant changes based on the high inflation in the last year. By the time the next experience review is performed, we should have a better sense of whether or not the recent high inflation is likely to be a long-term trend. Based on the information analyzed, **we recommend retaining the inflation assumption at 2.75%.**

Consumer Price Inflation	
Current Assumption	2.75%
Recommended Assumption	2.75%



SECTION 3 – ECONOMIC ASSUMPTIONS

CPI-Based COLA Assumption

Use in the Valuation: Based on the Ohio Revised Code OP&F pays annual cost-of-living allowances (COLAs) to eligible members. Members are eligible to for a COLA once they have received pension benefits for at least one year and have reached age 55. This benefit adjustment can maintain or stabilize the purchasing power of the member’s benefit by offsetting increasing costs due to general inflation over time.

Members who have 15 or more years of service credit as of July 1, 2013 and are not receiving a benefit from OP&F yet, and members who are receiving a pension that became effective before July 1, 2013 will receive a COLA equal to 3% of the member’s base pension benefit. Members who have less than 15 years of service credit as of July 1, 2013 will receive a COLA that is the minimum of 3% or the increase in Consumer Price Index (CPI) from the preceding year, subject to a floor of 0%. Because this COLA is CPI-based, an assumption on future inflation is needed to project this amount.

The current assumption for the CPI-based COLA is 2.20%. Recognizing that annual inflation has a random component, we simulated the expected effective COLA that would apply to members who have less than 15 years of service credit as of July 1, 2013 with a cap of 3% and floor of 0% reflected. Based on the recommended price inflation of 2.75% and the estimated standard deviation of 1.38%, we estimate a CPI-based COLA of 2.33% over the next 30 years. **We recommend maintaining the current CPI-based COLA assumption of 2.20%.**

RATE OF CREDITING INTEREST ON DROP ACCOUNT BALANCES

Use in the Valuation: OP&F will credit interest on DROP account balances each month at a rate equal to the 10-year U.S. Treasury Note Business Day Series, as published by the United State Federal Reserve, with 2.5% minimum and a cap of 5.0%. Because this rate impacts the dollar amount of future DROP balances available for withdrawal under the DROP program provisions, an assumption is needed to project this amount.

The current assumption is 4.00%. Using Wilshire’s Core & Long-Term Treasury assumptions that were weighted to match the duration of the 10-year Treasury, we simulated the expected crediting rate with a cap of 5.0% and a floor of 2.5% over the next 30 years, which produced a 30-year geometric mean of 3.68%. Based on this analysis, **we recommend lowering the current assumption for crediting interest on DROP account balances to 3.75%.**

Interest on DROP Account Balances	
Current Assumption	4.00%
Recommended Assumption	3.75%



SECTION 3 – ECONOMIC ASSUMPTIONS

INVESTMENT RETURN

Use in the Valuation: The investment return assumption reflects anticipated returns on the current and future assets. It is one of the primary determinants in the calculation of the expected cost of the Fund's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. This assumption has a direct impact on the calculation of liabilities, normal costs, and contribution rates. Generally, the investment return assumption should be set with consideration of the asset allocation policy, expected long term real rates of return on the specific asset classes, the underlying inflation rate, and any investment expenses, but is also impacted by the funding dynamics of the Fund along with the risk tolerance and preferences of the Board.

The current investment return assumption is 7.50%, net of all investment-related and administrative expenses, as approved by the Board in February 2022. The 7.50% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is price inflation (previously discussed). Any excess return over price inflation is referred to as the real rate of return. The real rate of return, based on the current set of assumptions, is 4.75% (7.50% nominal return less 2.75% inflation).

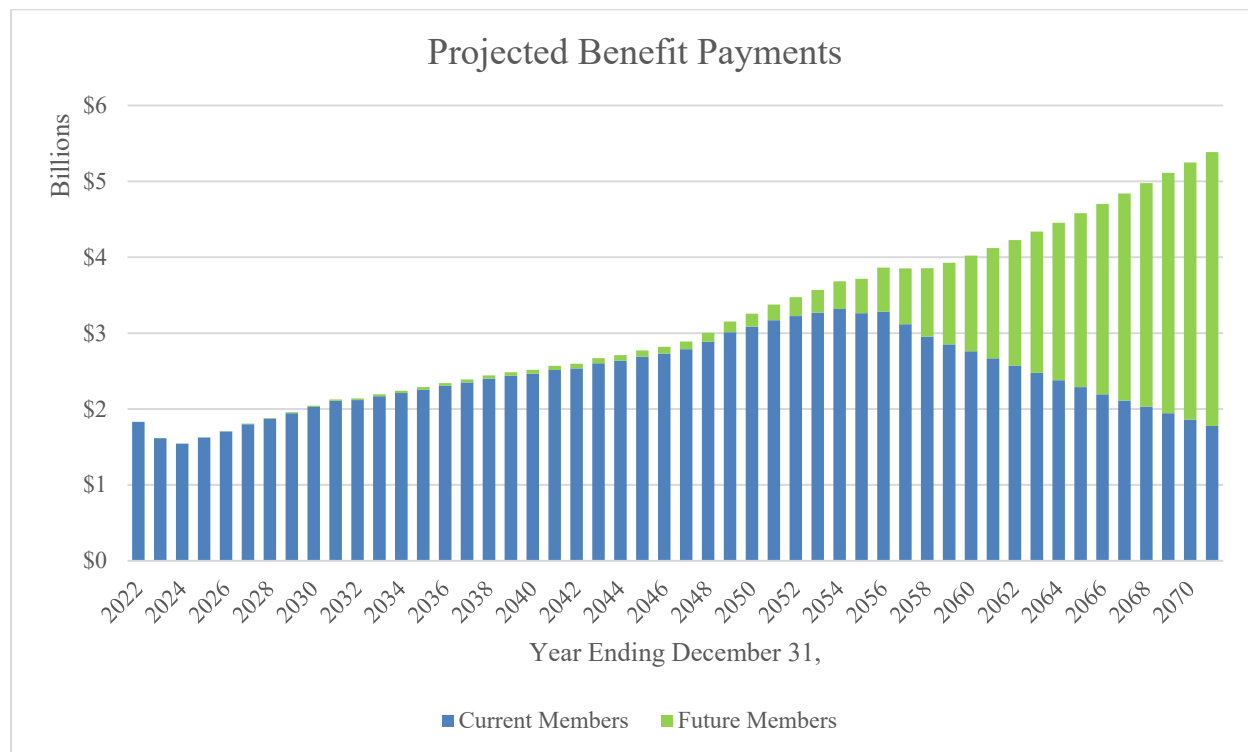
ASOP 27 provides guidance to actuaries on the selection of economic assumptions used for measuring pension obligations. Our findings and analysis, following that ASOP, are discussed below.

Long Term Perspective

Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon so as to make prudent choices regarding how to invest the trust funds, i.e., asset allocation. For actuarial calculations, we typically consider very long periods of time as some current employees will still be receiving benefit payments more than 80 years from now. For example, a newly hired firefighter who is 25 years old may work for 35 years, to age 60, and live another 30 years, to age 90. The retirement Fund would receive contributions for the first 35 years and then pay out benefits for the next 30 years. During the entire 65-year period, the Fund is investing assets related to that member. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open plan like OP&F, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in time horizon is frequently a source of debate and confusion when setting economic assumptions. The following graph illustrates the long duration of expected benefit payments for current members on January 1, 2022, (blue bars) as well as the expected benefit payments for future hires (green bars) based on the valuation model.



SECTION 3 – ECONOMIC ASSUMPTIONS



Forward Looking Analysis

We believe the most appropriate analysis to consider in setting the investment return assumption is to model the expected returns given the Fund’s target asset allocation and forward-looking capital market assumptions. Because we are trained as actuaries and not as investment professionals, we rely heavily on professional investment consultants, such as Wilshire, to provide investment expertise including capital market assumptions.

In performing our analysis, we use the building block approach so the real rate of return of the portfolio is modeled, based on the target asset allocation, and then the expected return is added to the price inflation assumption. Therefore, our analysis focuses on the real rate of return while the analysis of the investment consultants more typically focuses on the nominal return in their asset allocation consulting. OP&F’S current target asset allocation, along with their investment consultant’s (Wilshire Consulting) 10 and 30-year capital market assumptions, are shown in the following tables:



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OP&F Target Asset Allocation and Wilshire's 10-Year Assumptions

Asset Class	Target Allocation	Nominal Rate of Return	Standard Deviation
US Equity	21.0%	7.32%	17.00%
Non US Equity	14.0%	8.89%	19.10%
Private Equity	8.0%	13.36%	28.00%
High Yield	7.0%	6.72%	10.00%
Private Credit	5.0%	8.94%	12.08%
Core Fixed Income	23.0%	4.14%	4.25%
Cash	0.0%	3.15%	0.75%
US TIPS	17.0%	3.32%	6.00%
Real Estate	12.0%	8.32%	15.63%
Real Assets	8.0%	8.34%	16.97%
Midstream Energy	5.0%	9.41%	19.00%
Gold	5.0%	6.98%	18.00%
Inflation	0.0%	2.36%	1.75%
Leverage	-25.0%	3.40%	0.75%



SECTION 3 – ECONOMIC ASSUMPTIONS

OP&F Target Asset Allocation and Wilshire’s 30-Year Assumptions

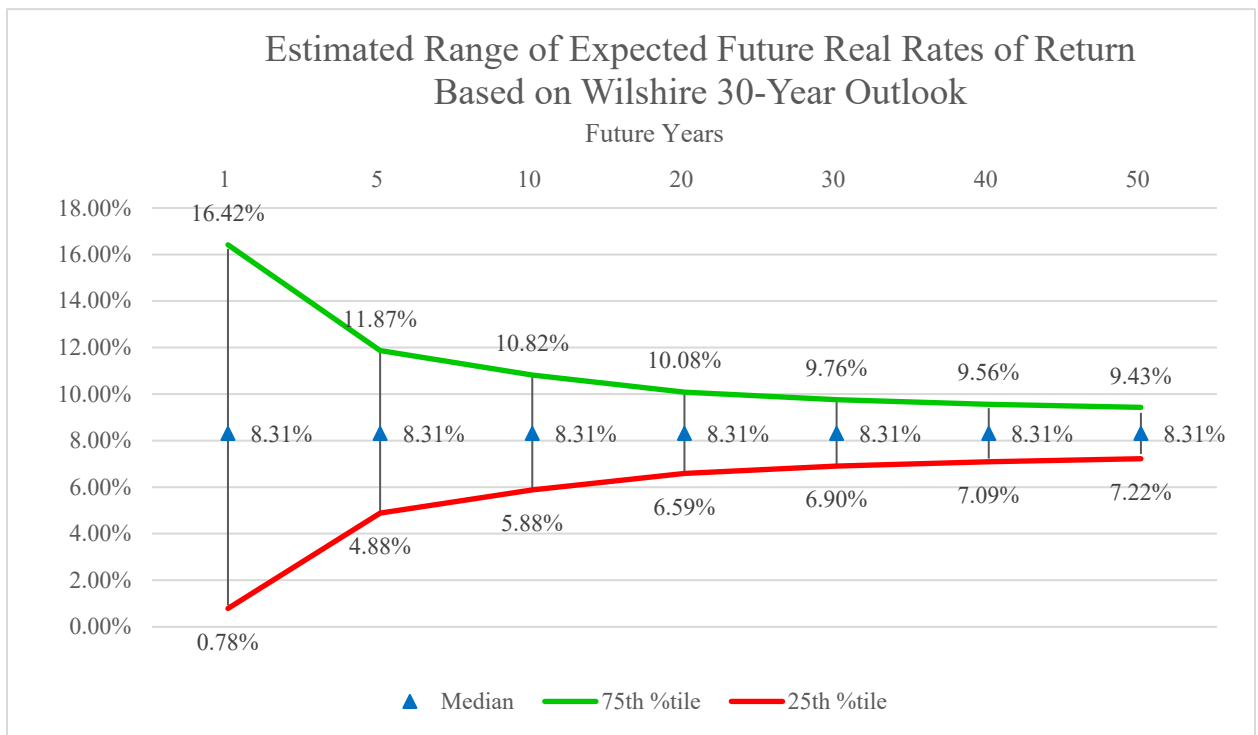
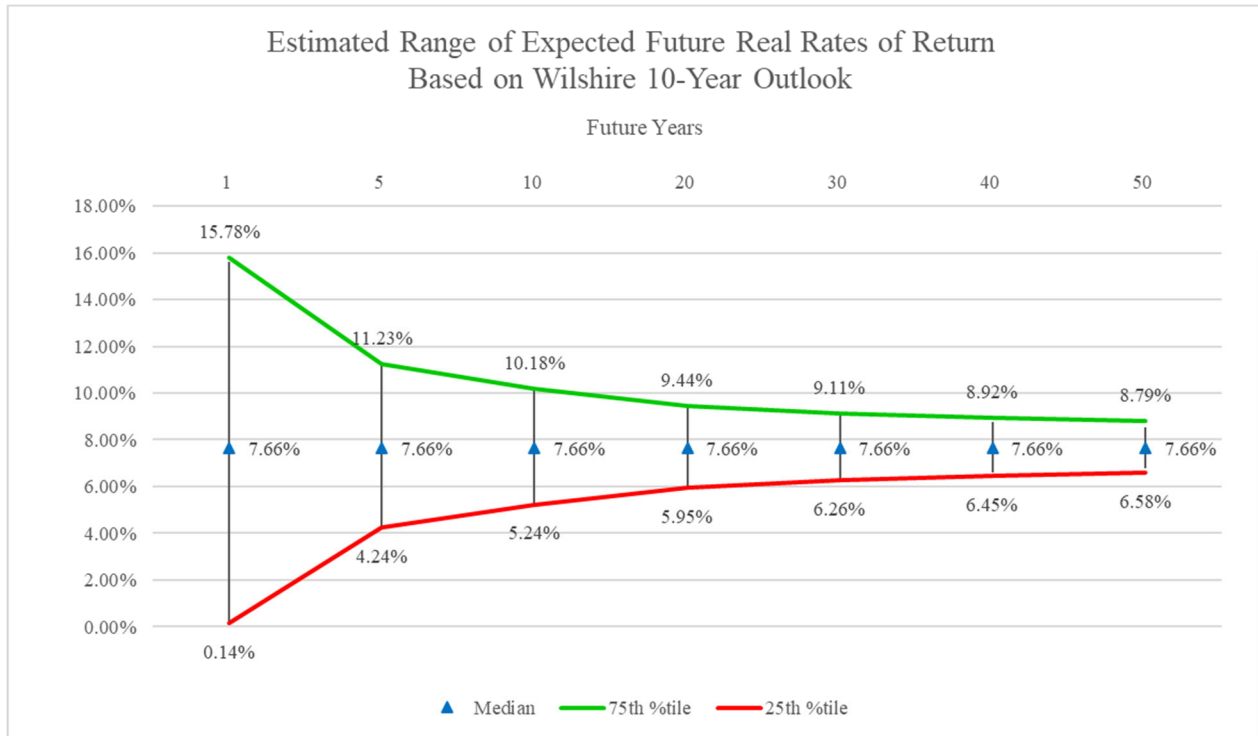
Asset Class	Target Allocation	Nominal Rate of Return	Standard Deviation
US Equity	21.0%	8.26%	17.00%
Non US Equity	14.0%	9.33%	19.10%
Private Equity	8.0%	13.65%	28.00%
High Yield	7.0%	7.09%	10.00%
Private Credit	5.0%	8.54%	12.08%
Core Fixed Income	23.0%	4.51%	4.25%
Cash	0.0%	3.20%	0.75%
US TIPS	17.0%	4.17%	6.00%
Real Estate	12.0%	8.95%	15.63%
Real Assets	8.0%	9.59%	16.97%
Midstream Energy	5.0%	9.91%	19.00%
Gold	5.0%	7.11%	18.00%
Inflation	0.0%	2.44%	1.75%
Leverage	-25.0%	3.45%	0.75%

Based on their 2022 capital market assumptions, Wilshire’s expected real compound expected return is 4.92% over the next 10 years. Combined with their short-term inflation assumption of 2.36%, the nominal return for the next 10 years is 7.28%. However, using Wilshire’s 30-year assumptions, the expected real compound return is 5.56%. Wilshire’s returns are based on their latest ALM study and does represent an increase from recent past studies. Our understanding is this is a result of higher projected interest rates and Wilshire has advised the Board that the sell-off of 2022 actually creates potential in later years. Combined with their inflation assumption of 2.44%, the nominal return over 30 years is 8.00%. These movements in expected return over time illustrate the variability of expected returns and the awareness that today’s markets are expected to improve over time.

It is also worth noting that the variability year-to-year is fairly significant, but that over time, the expected return is more stable. The following graphs illustrate this (using the current 2.75% inflation assumption):



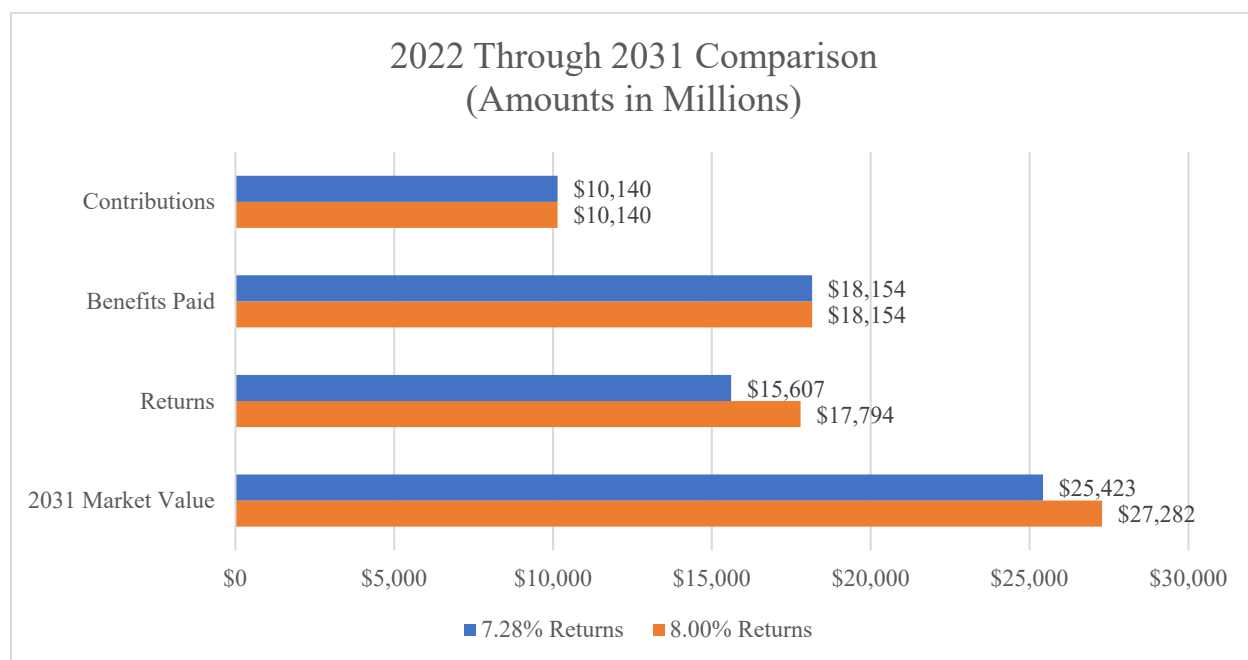
SECTION 3 – ECONOMIC ASSUMPTIONS





SECTION 3 – ECONOMIC ASSUMPTIONS

Another factor in using the information provided by Wilshire is reflecting both the short term and long term expectations. While actuaries typically consider a long-term perspective, they cannot ignore that the short-term must occur before the long term can occur. This is especially relevant in the present economic environment where bond yields are relatively low from a historical perspective and expected to increase. This movement is likely to dampen investment returns for the next few years, which is seen in Wilshire’s short term expectations being lower. To see the impact of this, we compared projected financial results in ten years under a 7.28% return vs. an 8.00% return. The following chart shows the results for OP&F membership.



It should be noted that there is currently a fair amount of variation in expectations among investment professionals. Therefore, it can be beneficial to consider other advisors’ expectations when setting the investment return assumption. Horizon Actuarial Services prepares an annual study in which they survey various investment advisors and provide ranges of results as well as averages. The 2021 Survey included a total of 39 investment advisors who provided their capital market assumptions as of early 2021. We have observed that with higher inflation emerging in 2021 and the strong market returns in 2021, many advisors have made significant changes in their long-term assumptions. Therefore, we are hesitant to utilize this study in the same way as we have in the past.

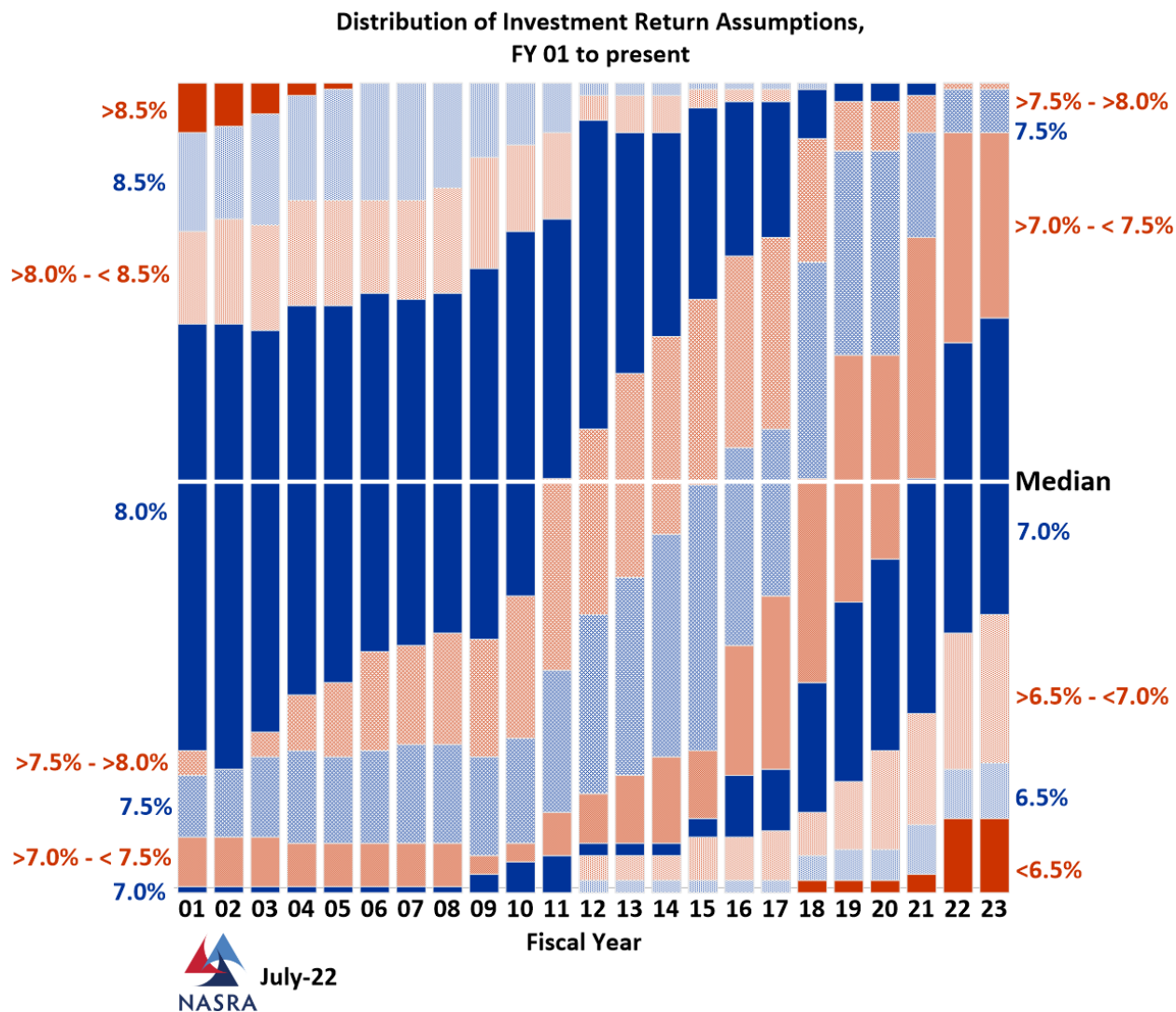
Peer Fund Comparison

Public retirement Funds have historically compared their investment performance to their peer group. While we believe there is some merit in assessing the movement in the assumed rate of return for other Funds, this is not an appropriate basis for setting this assumption in our opinion. For example, different plans have different plan dynamics which will impact their choice of the assumed investment return. This peer group information merely provides another set of relevant data to consider as long as we recognize that asset allocation varies from Fund to Fund.



SECTION 3 – ECONOMIC ASSUMPTIONS

The following graph shows the change in the distribution of the investment return assumption from fiscal year 2001 through July, 2022 for the 120+ large public retirement Funds included in the NASRA Public Fund Survey. As it indicates, the investment return assumptions used by public plans have decreased over the last twenty years. It is worth noting that the median investment return assumption dropped from 8.00% in 2011 to 7.00% in 2022. During this time, the median inflation assumption also declined over 1% as the typical assumed real return (nominal return net of inflation) actually increased slightly.





SECTION 3 – ECONOMIC ASSUMPTIONS

Recommendation:

Because investment earnings account for the majority of revenue for most public plans, the choice of an investment return assumption has a major impact on a Fund’s financing and actuarial funded status. An investment return assumption that is too low will overstate liabilities and costs, causing current members/taxpayers to be overcharged and future members/taxpayers to be undercharged. An investment return assumption that is too high will understate liabilities and undercharge current members/taxpayers at the expense of future members/taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and inequitable distribution of costs among generations of members/taxpayers. Because of this, setting the investment return assumption requires a balancing act with an attempt to not be overly conservative nor aggressive.

By actuarial standards, we are required to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe we must be careful not to let recent experience or short-term expectations impact our judgment regarding an appropriate investment return assumption over the long term. However, given the material difference in expectations in the short and long term have narrowed significantly over the past few months, which makes the impact of recent experience less of an issue.

Since experience studies are performed only every five years and investment consultants modify their capital market assumptions at least once a year, we do not believe basing the investment return assumption solely on the most recent estimate from one investment consultant or a survey of several investment consultants is reasonable. Such action could create significant and frequent fluctuations in the Fund’s funded ratio and the corresponding actuarial contribution rate, creating unnecessary challenges in funding the Fund. Our goal is to choose an assumption that will be reasonable over the long-term with infrequent adjustments. We expect to change this only when there are compelling changes to investment policy, changes in the underlying inflation assumption, or evidence of a change in the long-term trends in the capital markets. The current 7.50% investment return assumption when compared to the current projections from Wilshire provides for a reasonable amount of cushion, which makes it less likely that we will have to adjust the assumption before the next quinquennial review.

There is clearly no single investment return assumptions that would also be the only one considered reasonable under Actuarial Standards of Practice, and we are willing to engage in a discussion with the Board about this assumption, if desired. The Board’s expectations for future returns, the relative weighting to assign to the results of different analyses, and the Board’s risk perspective may also influence the Board’s selection of the investment return assumption. **Given the above analysis our recommendation is below:**

Investment Return	
Current Assumption	7.50%
Recommended Assumption	7.00% - 7.50%



SECTION 3 – ECONOMIC ASSUMPTIONS

ADMINISTRATIVE EXPENSES

Administrative expenses are explicitly used in the development of 30-year funding analysis. The fixed contribution rate also includes a component of the normal cost to cover the administrative expenses of OP&F. The actual expense amount for the year ending on the valuation date is projected to the appropriate fiscal year with inflation as an estimate of the administrative expense in that fiscal year. This is a commonly used approach, and **we recommend it be retained**. Consequently, no adjustment to the investment return assumption is needed to reflect payment of administrative expenses from the Fund’s investment return.

GENERAL WAGE GROWTH

Background: General wage growth, thought of as the “across the board” rate of salary increases, is composed of the price inflation assumption and an assumption for the real rate of wage increases/real wage growth. The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity growth.

In constructing the salary increase assumption used to project future salary increases for individual members, the wage growth assumption is combined with an assumption for service-based salary increases (called a merit scale). The service-based salary increase assumption will be addressed in section on the demographic assumptions. Given the current price inflation assumption of 2.75%, the current wage growth assumption of 3.25% implies an assumed real rate of wage increase or real wage growth assumption of 0.50%.

Historical Perspective: Wage statistics are found in the Social Security Fund database on the National Average Wage data. This information goes back to 1955 and is the most comprehensive database available. Because the National Average Wage is based on all wage earners in the country who are covered by Social Security, it can be influenced by the mix of jobs (full-time vs. part-time, manufacturing vs. service, etc.) as well as by changes in some segments of the workforce that are not seen in all segments (e.g., regional changes or growth in computer technology). Furthermore, if compensation is shifted between wages and benefits, the wage index would not accurately reflect increases in total compensation. OP&F membership is composed exclusively of Police and Firefighters in Ohio, whose wages and benefits are somewhat linked as a result of state and local tax revenues, funding allocations, and governing policies. Because the competition for workers can, in the long term, extend across industries and geography, the broad national earnings growth will have some impact on OP&F members. In the shorter term, however, the wage growth of OP&F and the nation may be less directly correlated.

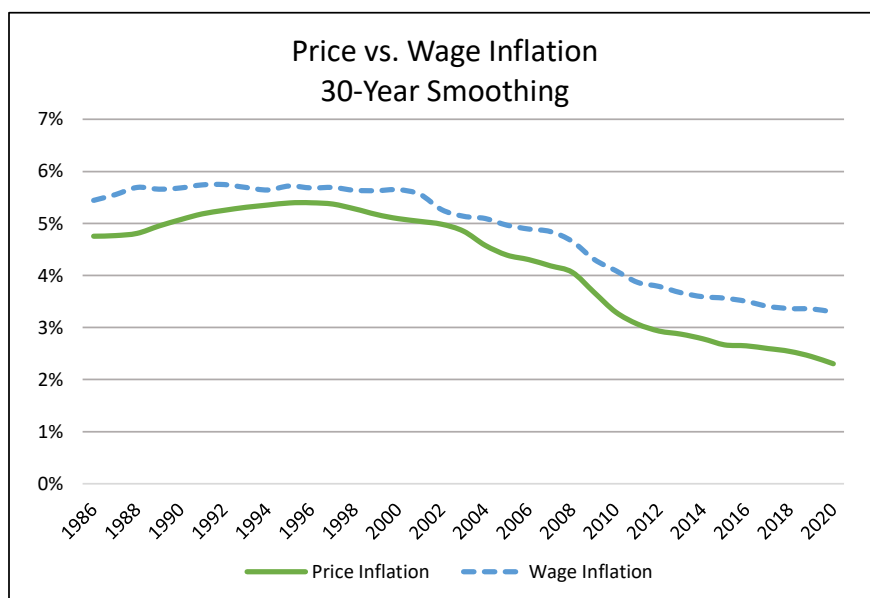
The following table shows the compounded wage growth over various periods, along with the comparable price inflation rate for the same period. The differences represent the real wage growth rate.



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Years	Period	General Wage Inflation	CPI Increase	Real Wage Inflation
2010 - 2020	10	2.9%	1.7%	1.2%
2000 - 2020	20	2.8%	2.0%	0.8%
1990 - 2020	30	3.3%	2.3%	1.0%
1980 - 2020	40	3.8%	2.8%	1.0%
1970 - 2020	50	4.5%	3.8%	0.7%
1960 - 2020	60	4.5%	3.7%	0.8%

Similar information over rolling thirty-year periods is shown in the following graph:



We note that the Social Security Administration data and assumptions are based on increases in the average or mean wage. Over the past 25 years, the wage index has grown almost 1.2% over inflation. Over the same time period the increase in the median real wage was 0.90% per year, indicating that the increase in wages occurred more at the top end of the wage scale.

Over the last 10 years, BLS data indicates that total compensation costs for state and local government workers increased at an average annual rate of 1.02% above inflation. Because this includes benefit costs, the growth in wages would be expected to be a bit lower. For OP&F membership over the same period, the average salary increased about 0.26% above inflation.

Forecasts of Future Wages: The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In the June, 2022 Trustees Report, the annual increase in the National Average Wage Index over inflation under the



SECTION 3 – ECONOMIC ASSUMPTIONS

intermediate cost assumption (best estimate) was 1.15%. The range of the assumed real wage growth in the 2022 Trustees report was 0.53% to 1.77% per year.

Analysis and Conclusion:

Historically, wages have grown at a rate that is greater than inflation, often between 0.7% and 1.0%. Because state and local governments provide a significant proportion of total compensation as benefits, we would expect the increase in wages to be below the national average for all employers. The current 0.50% increase per year reflects these two observations. Currently, the labor market is tight and there is some upward pressure on wages, although inflation is high as well. It is not clear how these two factors will unfold over time, and so we choose to focus on the historical information, but carefully monitoring the unfolding economic situation over the coming months.

Based on the available data and our professional judgment, **we recommend that the long-term assumed real wage growth be kept at 0.50% per year. When coupled with the price inflation assumption of 2.75%, the resulting general wage growth assumption will continue to be 3.25%.**

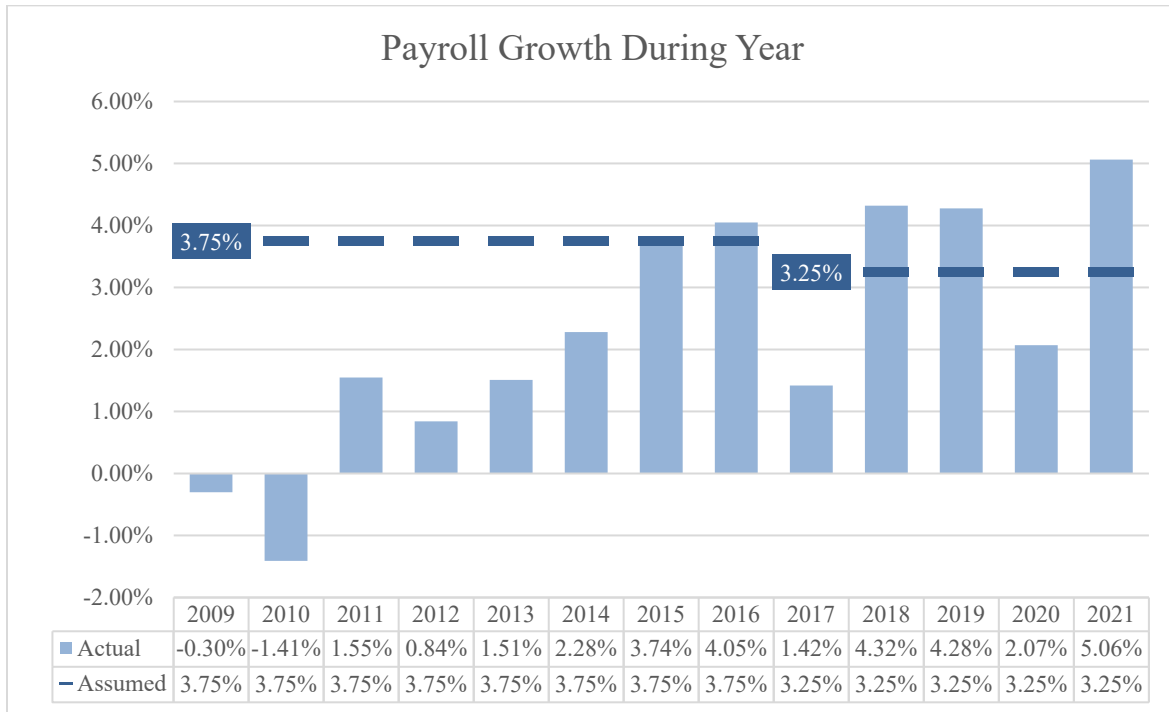
PAYROLL GROWTH ASSUMPTION

Employer and member contributions to the OP&F are based on fixed contribution rates that are applied to the membership's covered payroll. Therefore, the valuation requires an assumption regarding future annual increases in covered payroll to project future contributions into the Fund. The payroll growth assumption is typically used for this purpose. The current payroll growth assumption for OP&F is 3.25%.

We also analyzed the OP&F actual covered payroll growth over the past 10 years and note that it has averaged 2.95% while inflation averaged 2.14% for the same period. While this might support an assumption of payroll growth that is more than 0.50% in excess of inflation, we believe that this is an assumption in which conservatism is warranted to help assure the adequacy of contribution. The following graph compares actual payroll growth to the assumed rate of payroll growth since 2009.



SECTION 3 – ECONOMIC ASSUMPTIONS



We recommend the payroll growth assumption also be maintained at 3.25%.



SECTION 3 – ECONOMIC ASSUMPTIONS

SUMMARY

The following table summarizes the current set of economic assumptions along with the recommended set of economic assumptions:

	Current Assumptions	Recommended Assumptions
Price Inflation	2.75%	2.75%
Investment Return	7.50%	7.00% to 7.50%
Administrative Expenses	Actual administrative expenses from the previous year, increasing in the future with inflation	Actual administrative expenses from the previous year, increasing in the future with inflation
CPI-Based COLA Assumption (Simple)	2.20%	2.20%
Interest on DROP Accounts	4.00%	3.75%
General Wage Growth	3.25%	3.25%
Payroll Growth	3.25%	3.25%



SECTION 3 – ECONOMIC ASSUMPTIONS

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SECTION 4 – ACTUARIAL METHODS

Actuarial valuations utilize methods to determine the liabilities, assets, the funding period of the plan. While these are not like actuarial assumptions that may change over time depending on experience, an experience review is still a good opportunity to review these methods to see if they are still appropriate for systematically funding the promised benefits.

FUNDING POLICY

The actuary determines how many years are required by OP&F to completely amortize the UAAL (funding period), using member and employer contributions reduced by the amount allocated to health care and the amount of normal cost for the year. Section 742.16 of the Ohio Revised Code (ORC), as adopted by Senate Bill No. 82, sets forth an objective that the funding period is no more than 30 years. If the funding period exceeds 30 years, a plan shall be developed and presented by the Board of Trustees to the Ohio Retirement Study Council to reduce the funding period to not more than 30 years. **This is prescribed by the Ohio Revised Code.**

ACTUARIAL COST METHOD

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed, i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries **will** influence the timing of costs by their choice of methods and assumptions.

The actuarial cost method is used to allocate the present value of future benefits between past service (actuarial liability) and future service (normal costs). Currently the valuation uses the entry age normal cost method. This is the most widely used cost method of large public sector plans and has demonstrated the highest degree of stability as compared to alternative methods. It also is the required actuarial cost method under calculations required by the Governmental Accounting Standards Board Statements Number 67 and 68. **This method is also prescribed by the Ohio Revised Code.**

ACTUARIAL VALUE OF ASSETS

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. The purpose of an asset smoothing method is to dampen the impact that market volatility has on valuation results by spreading the expected market gains and losses over several years. The actuary does not have complete freedom in assigning this value. The Actuarial Standards Board has basic principles regarding the calculation of a smoothed asset value which are set out in *ASOP 44, Selection and Use of Asset Valuation Methods for Pension Valuations*.

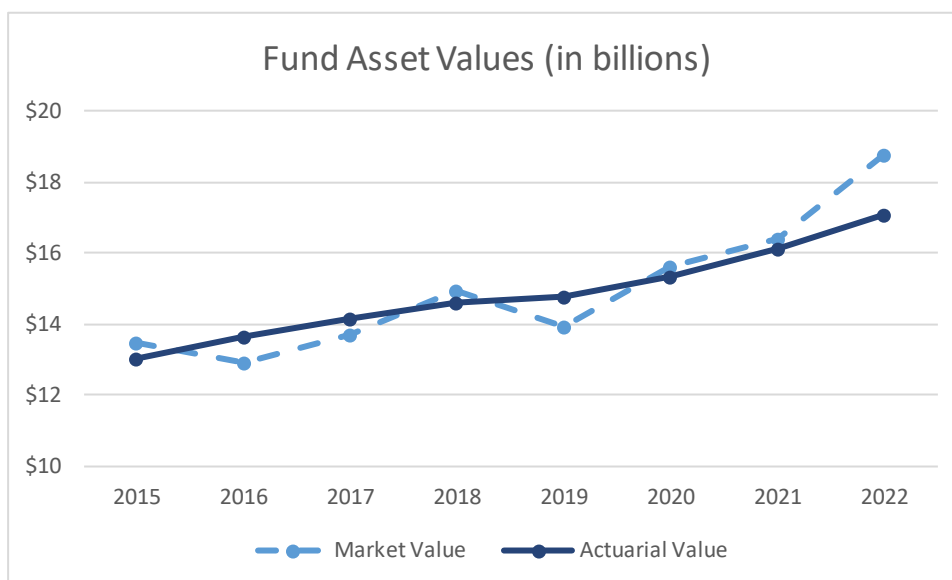
OP&F currently values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. The asset valuation method is a four-



SECTION 4 – ACTUARIAL METHODS

year moving market average value of assets that spreads the difference between the actual investment income and the expected income on the market value (based on the valuation interest rate) over a period of four years.

It should be noted that if the return on the market value of assets was exactly equal to the assumed rate of return in all future years, this smoothing method would converge to the market value in four years. However, it is very rare for the actual return to be within 0.25% of the assumed rate for even one year, let alone every year over a longer period. The following graph illustrates the asset volatility experienced by the Fund since 2015.



In the presence of volatility, this method does a good job of smoothing out the actual market volatility, while tracking well with the overall asset movement.

OP&F’S current asset valuation method also includes what is known as a “corridor”, which provides that once the initial determination of the actuarial value of assets is made it is compared to a corridor around market value (80% of market value to 120% of market value). If the initial actuarial value lies outside the corridor, the final actuarial value of assets is set equal to the corresponding corridor value. For example, if the initial actuarial value of assets is 132% of market value, the actuarial value is instead set equal to 120% of market value. We believe the corridor is necessary to ensure actuarial standards (*ASOP 44*) are met. We believe the current method, with the corridor, is reasonable and meets actuarial standards. **We recommend the current asset valuation method be retained.**



SECTION 4 – ACTUARIAL METHODS

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SECTION 5 – INTRODUCTION TO DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice No. 35 (ASOP 35), Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, provides guidance to actuaries giving advice on the selection of demographic assumptions for defined benefit plans, such as OP&F.

The purpose of a review of demographic experience is to compare what actually happened to the individual members of the Fund during the review period (January 1, 2017, through December 31, 2021 for pension; January 1, 2019 – December 31, 2021 for HCSF) with what was expected to happen based on the actuarial assumptions.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the review is tabulated by age, duration, sex, group, and membership class (active, retired, etc.).
- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.
- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual-to-expected ratio (A/E ratio) and is typically expressed as a percentage. A percentage in excess of 100% indicates that the actual experience was greater than the expected experience, whereas a percentage of less than 100% indicates that the actual experience was less than expected.

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Professional judgment is required to set assumptions for future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience. Determining the credibility of the recent experience is as much an art as a science, and Actuarial Standards recognize that the assignment of credibility will vary between actuaries. In particular, we frequently look to the prior review for confirmation of trends.

In addition to the traditional “headcount” or “count” basis, we also analyzed the experience using a “liability-weighted” approach. The member’s liability in the Fund is generally determined by the benefit amount and age of the member. Some assumptions already reflect differences by age directly. The other factor, benefit amount, is impacted by a member’s salary and service. These two factors are used to estimate the member’s relative benefit level and to weight experience (the exposure and actual occurrences are scaled by salary and service). This approach is particularly insightful when analyzing experience from a non-homogenous group such as Police and Firefighters. While we reviewed experience on both a count and liability basis for most assumptions, we generally assigned more credibility to the liability-weighted experience and made recommendations on that basis.

Prior experience reviews have included analysis of experience separated for Police and Firefighters. In general, that analysis has indicated differences in behavior. We believe the use of separate assumptions in some instances for each group provides a better estimate of the total Fund liability. We recommend this approach be retained.

When changes in assumptions are proposed, revised rates of decrement are tested by using them to recalculate the expected number of decrements during the review period, and the results are shown as an



SECTION 5 – INTRODUCTION TO DEMOGRAPHIC ASSUMPTIONS

actual-to-proposed ratio (A/P ratio) which can be compared to the A/E ratio to see the change in fit due to the new assumptions.

Salary adjustments, other than the economic assumption for general wage growth, are treated as a demographic assumption. However, the method of investigation needed for salaries is different from that used for the decrements. A description of the procedure followed is included in that section of this report.

The demographic assumptions studied include:

- Section 6 - Mortality
- Section 7 - Retirement, including DROP participation
- Section 8 - Disability
- Section 9 - Termination of Employment
- Section 10 - Miscellaneous
- Section 11 - Merit Salary Scale
- Section 12 - Healthcare Stabilization Fund Participation



SECTION 6 – MORTALITY

Background: One of the most important demographic assumptions is mortality because this assumption anticipates when retirement payments will stop (the duration of benefit payments). It also predicts when pre-retirement death benefits will be paid. The life expectancies of current and future retirees are predicated on the assumed rates of mortality at each age. Mortality rates have generally declined over the past century with advances in public health and medical techniques, and most actuaries reflect the expectation of this trend continuing in their selection of a mortality assumption. Furthermore, large, public retirement Funds typically exhibit better mortality than the general population as a whole.

Actuarial Standards of Practice call for the actuary to make an assumption regarding future mortality improvement. There are two basic ways this can be done. Historically, mortality rates were developed with a “margin” for future improvement, meaning that the probabilities of death were lower than what had been observed in recent data. With the increase of available computational power, a new method became increasingly popular. This method, called the “generational” mortality method, actually improves the mortality table (lowers the probability of death) by a small amount for each year in the future. This is a more direct method of reflecting mortality improvement and is the approach that OP&F has been using for many years.

In the 2012-2016 Experience Review, a new family of mortality tables, the RP-2014 tables that the Society of Actuaries developed, were first used. While public plan data was excluded from the development of the RP-2014 Tables (it was primarily developed for corporate retirement plans), it nonetheless was the most recent available mortality table and broadly-based study of retiree mortality. This family of tables was also published with a mortality improvement scale (MP-2014) to anticipate future improvements in mortality. Each year after 2014, the mortality improvement scale was updated to reflect the most recent observed experience. At the time of the last review the most recent scale available was the MP-2016 scale. That scale, with some adjustments, was recommended to be used until the next experience review was performed.

In 2019, the Society of Actuaries released a family of mortality tables based entirely on public retirement plan data. Different mortality tables have been developed for general government employees and retirees, public safety employees and retirees, and teacher employees and retirees. We typically find that these tables are a better fit for public plans, requiring less adjustment, particularly with the fit of retirees under 65. (In private plans, retirements before age 65 are less common and so the mortality patterns seem to differ.) We recommend moving to this family of mortality tables, with some adjustments to the table to better fit the observed data patterns. We also are recommending updating the projection scale used to anticipated future mortality improvement to the MP-2021 projection scale, since it is based on the most up-to-date information available.

We note that a portion of the data during this review period included observations from early 2020 through December 31, 2021 which covered the height of the Covid-19 pandemic. We analyzed the mortality data by year, but it did not show that the death rates were noticeably higher during the key time periods of the pandemic. This is consistent with our experience with other statewide retirement Funds, and likely reflects that public plan retirees tend to be in comparatively better socio-economic groups relative to the population as a whole. To the extent that there were additional deaths arising from the pandemic, the result would be to increase mortality rates slightly (at older ages) relative to what they would have been in the absence of Covid-19. At this time, it appears that Covid-19 will likely become endemic in the population at some level, which would mean that slightly higher mortality rates are indeed appropriate. Therefore, we believe that our recommendations are based on the best available information. Between now and the next review,



SECTION 6 – MORTALITY

we will continue to monitor the actual deaths versus the assumed deaths and will suggest changes to this assumption if we believe they are warranted.

Because of potential differences in mortality, we studied healthy retirees, disabled retirees, contingent annuitants and active members separately. And while we did look at Police and Fire mortality experience separately, because they both exhibited similar mortality patterns, we are recommending one set of tables for both Police and Fire members.

Healthy Retirees: The valuation currently uses separate mortality assumptions for Police and Firefighters. The current mortality assumptions for healthy retirees, vested former members and surviving beneficiaries are based on the RP-2014 Total Employee and Healthy Annuitant Table (RP-2014 Table) projected with the Buck Modified 2016 Improvement Scale, with the following adjustments:

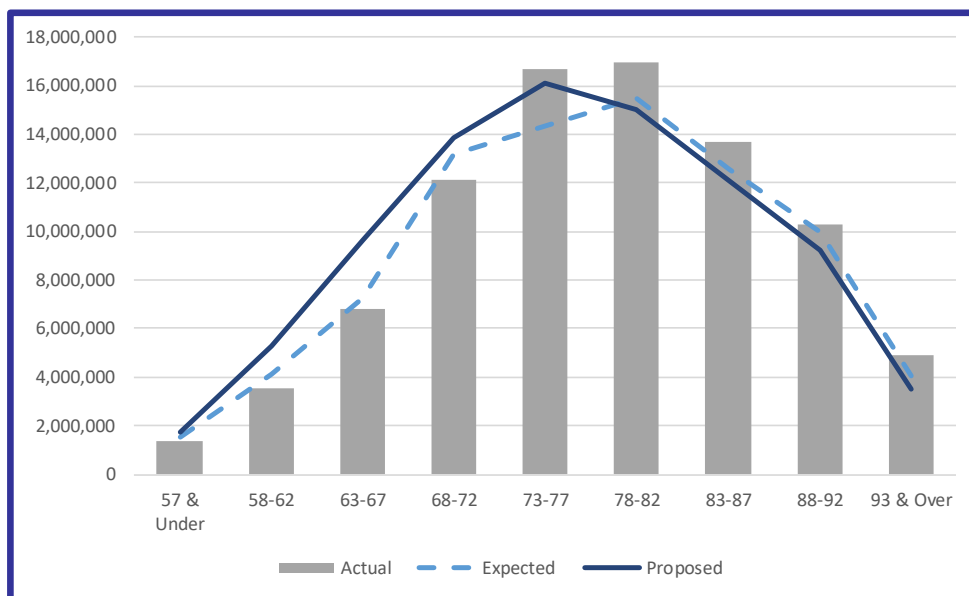
Age	Police	Fire
67 or less	77%	68%
68-77	105%	105%
78 and up	115%	115%

In the analysis that follows, if the A/E ratio is greater than 100% the assumptions have predicted fewer deaths than actually occurred, while an A/E ratio less than 100% indicates the assumptions have predicted more deaths than have occurred. Because future improvements in mortality are explicitly reflected in the mortality rates applied in future years, there is no need for a margin (setting the A/E ratio well above 100%). Instead, we are looking for an A/E ratio around 100%, which is appropriate since future mortality improvements are reflected with a generational mortality projection. The analysis of the retiree mortality data has been based on a liability-weighted approach by using the benefit amount in place of simply a count of the number of lives approach.

The mortality tables used by OP&F project anticipated future mortality improvements on a “generational” basis, i.e., mortality rates are set by the year in which a member reaches a particular age. Since the actual experience in our analysis included deaths in the period January 1, 2017 through December 31, 2021, we projected mortality rates to the midpoint of the experience review period for purposes of developing the expected number of deaths at each age. The results of the review are summarized in the following chart.



SECTION 6 – MORTALITY



Actual	Expected	Proposed
\$86.44M	\$82.42M	\$86.41M
Actual/Expected		Actual/Proposed
105%		100%

On a benefit-weighted basis, the observed mortality was higher than the expected rates for both males and females. The proposed rates reflect a movement toward 100%, in keeping with our general philosophy of moving toward the observed experience.

We recommend changing the mortality assumptions for Healthy Retiree and Vested Former Membership as follows:

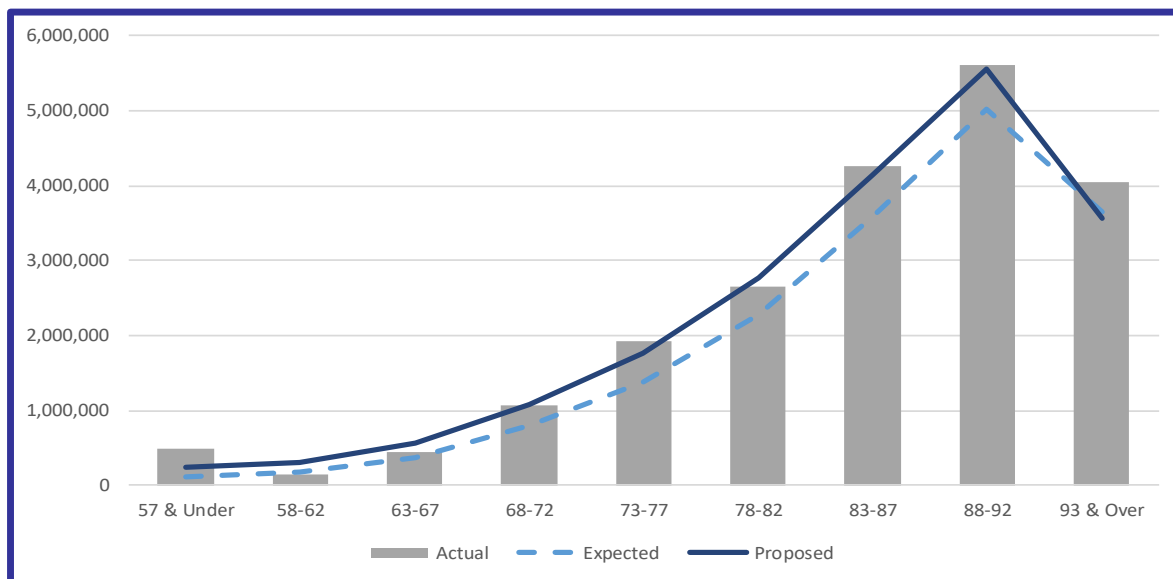
- Male** Pub-2010 Below-Median Safety Amount-Weighted Healthy Retiree mortality table with rates adjusted by 96.2%. All rates are adjusted generationally using the MP-2021 improvement scale.
- Female** Pub-2010 Below-Median Safety Amount-Weighted Healthy Retiree mortality table with rates adjusted by 98.7%. All rates are adjusted generationally using the MP-2021 improvement scale.



SECTION 6 – MORTALITY

Contingent Annuitants: The mortality of contingent annuitants applies to the survivors of members who have elected a joint and survivor option. There is never complete data on the mortality experience of contingent annuitants prior to the death of the member because there is no requirement that the death be reported to the Fund. There also tends to be more fluctuation in contingent annuitant mortality than healthy mortality because of the smaller number of contingent annuitants. The current assumption is the RP-2014 Total Employee and Healthy Annuitant Mortality Table with rates adjusted by 120% and projected with the Buck Modified MP-2016 Improvement Scale.

The results of the review are summarized in the following chart.



Actual	Expected	Proposed
\$20.64M	\$17.32M	\$19.99M
Actual/Expected		Actual/Proposed
119%		103%

On a benefit-weighted basis, the observed mortality was higher than the expected rates for both males and females. The proposed rates reflect a movement toward 100%, in keeping with our general philosophy of moving toward the observed experience.

We recommend changing the mortality assumptions for Contingent Annuitants as follows:

- Male** Pub-2010 Below-Median Safety Amount-Weighted Contingent Annuitant mortality table with rates adjusted by 108.9%. All rates are adjusted generationally using the MP-2021 improvement scale.
- Female** Pub-2010 Below-Median Safety Amount-Weighted Contingent Annuitant mortality table with rates adjusted by 131%. All rates are adjusted generationally using the MP-2021 improvement scale.

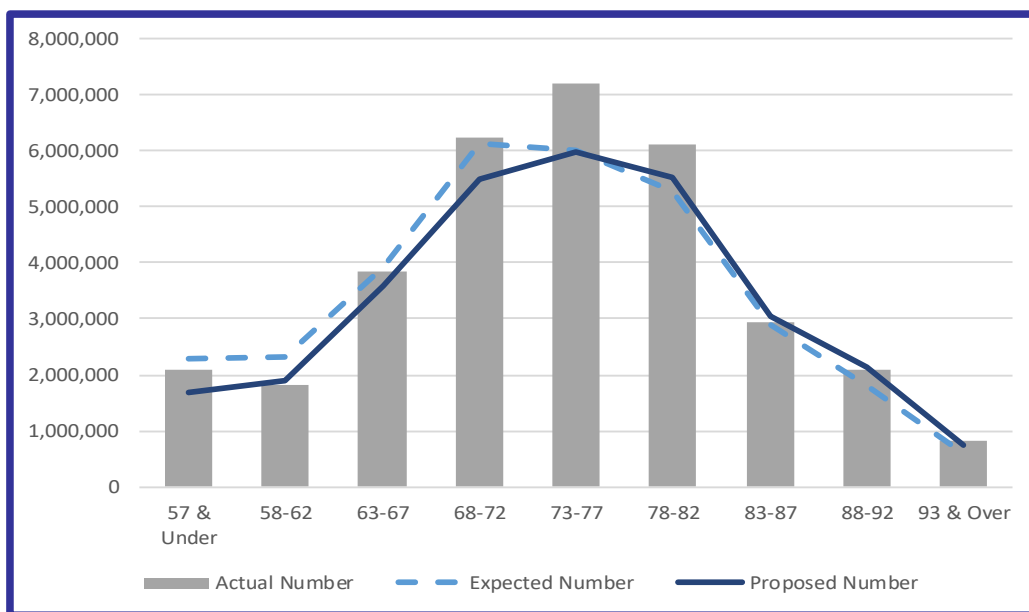


SECTION 6 – MORTALITY

Disabled Members: The valuation assumes that disabled members, in general, will not live as long as retired members who met the regular service retirement eligibility. There tends to be more fluctuation in disabled mortality than healthy mortality because of differences in the types of disabilities and the relatively small number of disabled members. In addition, the smaller number of exposures results in more volatility. The current assumption is the RP-2014 Disabled Annuitant Table (RP-2014 Table) projected with the Buck Modified 2016 Improvement Scale, with the following adjustments:

Age	Police	Fire
59 or less	35%	35%
60-69	60%	45%
70-79	75%	70%
80 and up	100%	90%

The results of the review are summarized in the following chart.



Actual	Expected	Proposed
\$33.14M	\$31.26M	\$30.1M
Actual/Expected		Actual/Proposed
106%		110%

On a benefit-weighted basis, the observed mortality was higher than the expected rates for males and lower for females. Our preference is to use the same family of mortality tables for all assumptions. As such, our recommended tables may not look to fit as well as the current tables. But, given the small level of exposures and the inherent volatility in these results, we are comfortable with our recommendation.



SECTION 6 – MORTALITY

We recommend changing the mortality assumptions for Disabled Retirees as follows:

- Male** Pub-2010 Safety Amount-Weighted Disabled Retiree mortality table with rates adjusted by 135%. All rates are adjusted generationally using the MP-2021 improvement scale.
- Female** Pub-2010 Safety Amount-Weighted Disabled Retiree mortality table with rates adjusted by 97.9%. All rates are adjusted generationally using the MP-2021 improvement scale.

Active Members: This assumption predicts eligibility for death benefits for active members prior to retirement, rather than the expected lifetime for pension payments. The observed rates of mortality among active members may be impacted by active members first terminating or moving to disabled status before death. For these reasons, it is likely active death rates are actually higher than the experience data might indicate. Because of these challenges and the very limited number of observed deaths, we frequently find it best to simply use the active member mortality table that corresponds with the retiree mortality table. The current assumption is the RP-2014 Total Employee Table (RP-2014 Table) projected with the Buck Modified 2016 Improvement Scale.

The observed A/E and A/P ratios, for both the current and proposed assumptions for active members are shown in the following chart.

Active Members	2017-2021 Observations			Current	Proposed
	Actual	Expected	Proposed	A/E Ratio	AP Ratio
Male	\$11.18M	\$10.52M	\$14.29M	106%	78%
Female	\$0.44M	\$0.43M	\$0.66M	102%	66%

Our preference is to use the same family of mortality tables for all assumptions. As such, our recommended tables may not look to fit as well as the current tables. But, given the small probability of death while members are active and the inherent volatility in these results, we are comfortable with our recommendation.

We recommend changing the mortality assumptions for Active Members as follows:

- Male** Pub-2010 Safety Amount-Weighted Employee mortality table. All rates are adjusted generationally using the MP-2021 improvement scale.
- Female** Pub-2010 Safety Amount-Weighted Employee mortality table. All rates are adjusted generationally using the MP-2021 improvement scale.

We recommend that the mortality assumptions described here and detailed in Appendix C be adopted.



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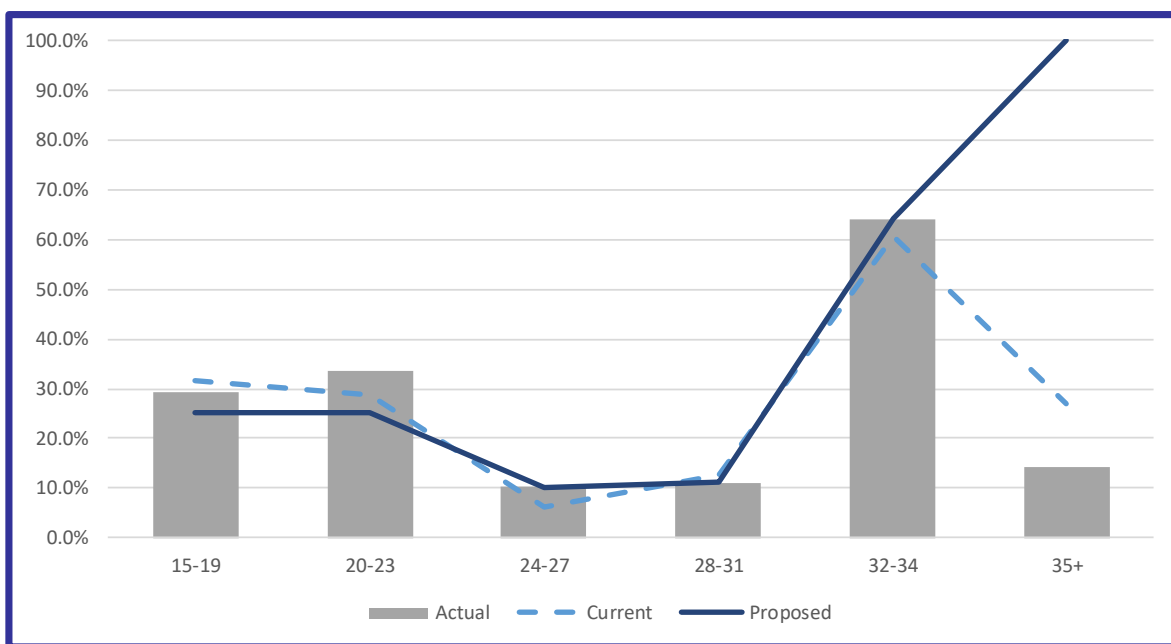
SECTION 7 – RETIREMENT

Service retirement typically measures the change in status from active membership directly to retirement. However, the OP&F Plan also offers a DROP benefit which also influences retirement timing. Because of potential differences in retirement patterns, we studied the retirement experience of members in three different categories described below. This assumption does not include the retirement patterns of the retirees who terminated from active membership and then commence benefits at a later date. That experience is studied separately later in this section.

Traditional actuarial analysis measures the number of actual retirements compared to the expected number of retirements (A/E ratio based on counts). However, as we have observed in the past, experience gains on retirements may not appear despite the fact that a smaller than expected number of members retired if the demographic composition of the group retiring was significantly different from that of the total eligible group. In general, if the average salary and service for those retiring was higher than the average salary and service for the total group eligible to retire the expected gains will not materialize. Similar to the mortality analysis, liability-weighted analysis captures these differences in the experience review results and enables us to develop assumptions that are based on the liability experience rather than experience using the counts.

The summary results of our experience review for *all* retirements during the review period are shown below:

Police



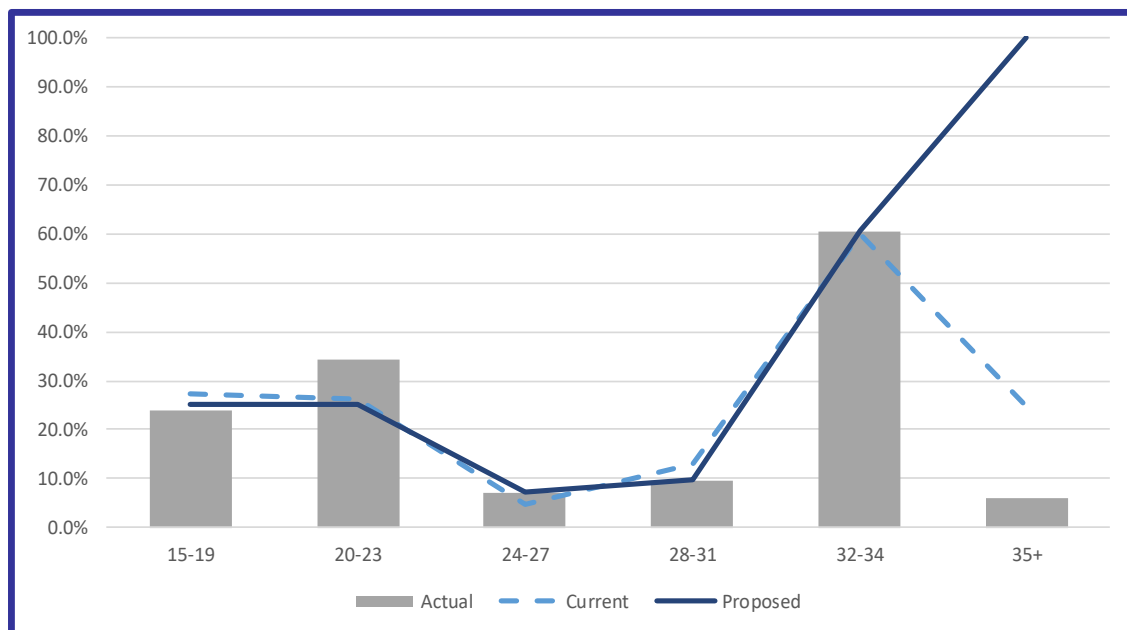
Actual	Expected	Proposed
\$210.65M	\$189.35M	\$212.22M
Actual/Expected		Actual/Proposed
111%		99%



SECTION 7 – RETIREMENT

More Police members retired than the current assumptions anticipated. We recommend adjusting the rates to get closer to the actual experience, simplifying the rates to be based on service only and have assumed there could be a few more retirement in the future than what was observed in the past few years. Also, because our valuation software requires us to have a point where all members are fully retired, we have assumed all members will be fully retired by 33 or 35 years of service depending on which set of retirement rates apply to them.

Firefighters



Actual	Expected	Proposed
\$172.17M	\$176.17M	\$176.19M
Actual/Expected		Actual/Proposed
98%		98%

While fewer Firefighter members retired than the current assumptions anticipated, the assumptions were relatively close to the actual experience. We recommend simplifying the rates to be solely based on service and have assumed there could be a few more retirements in the future than what was observed in the past few years. Also, because our valuation software requires us to have a point where all members are fully retired, we have assumed all members will be fully retired by 33 or 35 years of service depending on which set of retirement rates apply to them.



SECTION 7 – RETIREMENT

Our recommendations for the three retirement patterns we observed are as follows:

Members Currently in DROP

When a member is eligible for a normal service retirement, they can enter DROP by delaying retirement and continuing to work as a full-time police officer or firefighter. The requirement for normal service retirement eligibility for members hired into an OP&F-covered position after July 1, 2013 is age 52 with at least 25 years of service credit. The requirement for normal service retirement eligibility for members hired into an OP&F-covered position on or before July 1, 2013 is age 48 with at least 25 years of service credit.

The current rates are based on both age and the number of years since entering DROP, with separate tables for Police and Firefighters. Because most members enter DROP at the first eligibility, we are recommending a more simplified table that is based only on service.

Service	Police	Firefighters
25	7.25%	4.75%
26	6.00%	4.75%
27	6.25%	4.75%
28	6.00%	6.00%
29	8.50%	9.00%
30	16.75%	15.75%
31	16.25%	11.00%
32	50.00%	44.00%
33+	100%	100%

Members Not Currently in DROP

For members who are currently not in DROP but have either reached DROP eligibility (as described in the section above) or may become eligible for DROP in the future, the current rates are based on both age and the number of years eligible for DROP, with separate tables for Police and Firefighters. We are recommending a more simplified table that is based only on service.

Upon first eligibility for retirement, the rate is 20% for Police and 15% for Firefighters. After first eligibility the rates are as follow:



SECTION 7 – RETIREMENT

Service	Police	Fire fighters
25	20%	15%
26	8%	5%
27	8%	5%
28	8%	5%
29	8%	5%
30	8%	5%
31	15%	5%
32	15%	5%
33	15%	5%
34	15%	5%
35+	100%	100%

As an example, if a Police member first becomes eligible to retire at age 48 and 25 years of service, their rate at 25 years of service would be 20% and their rate at 26 years of service would be 8%. However, if a Police member first becomes eligible to retire at age 48 and 27 years of service their rate of retirement at 27 years of service would be 20% and their rate at 28 years of service would be 8%.

For members who are not expected to reach service retirement eligibility by age 62 (i.e., not expected to have 25 years of service by age 62), these members are assumed to not enter DROP and the recommended rates of retirement are as follows:

Police

Age	Years of Service	
	15-23	24
62	25%	20%
63	25%	20%
64	25%	20%
65	100%	100%

Fire fighters

Age	Years of Service	
	15-23	24
62	25%	15%
63	25%	15%
64	25%	15%
65	100%	100%

Inactive Vested Members

Currently, inactive vested members who leave their contributions with the Fund are assumed to retire at their first retirement eligibility. We reviewed the experience during the five years observation period and based on the small number of members in this group we recommend **no change in this assumption.**



SECTION 7 – RETIREMENT

DROP Experience

The DROP assumptions govern when members are expected to enter or leave the DROP program. The DROP program was initiated in 2003 and we have a full complement of history, from member entry to mandatory exit (five or eight years later), upon which to base our assumptions. The current assumptions anticipate that 90% of all members who do not retire at the earliest possible age after the valuation will enter the DROP program. The results of the review of DROP participation are summarized in the following chart.

Year	Total Retirements from Active Status	# Entering DROP	% Entering DROP
2017	804	610	76%
2018	756	628	83%
2019	875	695	79%
2020	840	683	81%
2021	918	676	74%
Total	4,193	3,292	79%

Based on experience data for 2017-2021, we recommend lowering the 90% assumption, to 80% to be more in line with actual experience.

DROP Account Distributions

The current assumption anticipates that the DROP account withdrawals are made as follows: For members who terminate DROP before the required three or five years, distribution of the account balance is assumed to be made in a lump sum payment at the end of the three- or five-year period. Distributions for other members are assumed to be made in a lump sum or installments at retirement in a pattern equivalent to 25 percent receiving lump sums, 30 percent receiving installments over two years, and 45 percent receiving installments over 10 years.

Review of the 2017-2021 experience review data shows similar patterns still exist. One change we are recommending is for current retirees who still have a DROP balance. These members are further deferring withdrawals and leaving their balances in the plan longer than currently anticipated. We are recommending that balances for these members are assumed to be drawn down over a ten-year period from the valuation date.

Based on the above experience data, we propose changing the DROP Account Distributions assumptions as follows:

- For currently retired members who have an outstanding DROP balance we assume they will take their balance in installments over 10 years.
- For members who terminate DROP before the required three or five years, distribution of the account balance is assumed to be made in a lump sum payment at the end of the three- or five-year period.



SECTION 7 – RETIREMENT

- Distributions for other members are assumed to be made in a lump sum or installments at retirements in a pattern equivalent to 25 percent receiving lump sums, 30 percent receiving installments over two years, and 45 percent receiving installments over 10 years.

We recommend that the retirement assumptions described here and detailed in Appendix D be adopted.



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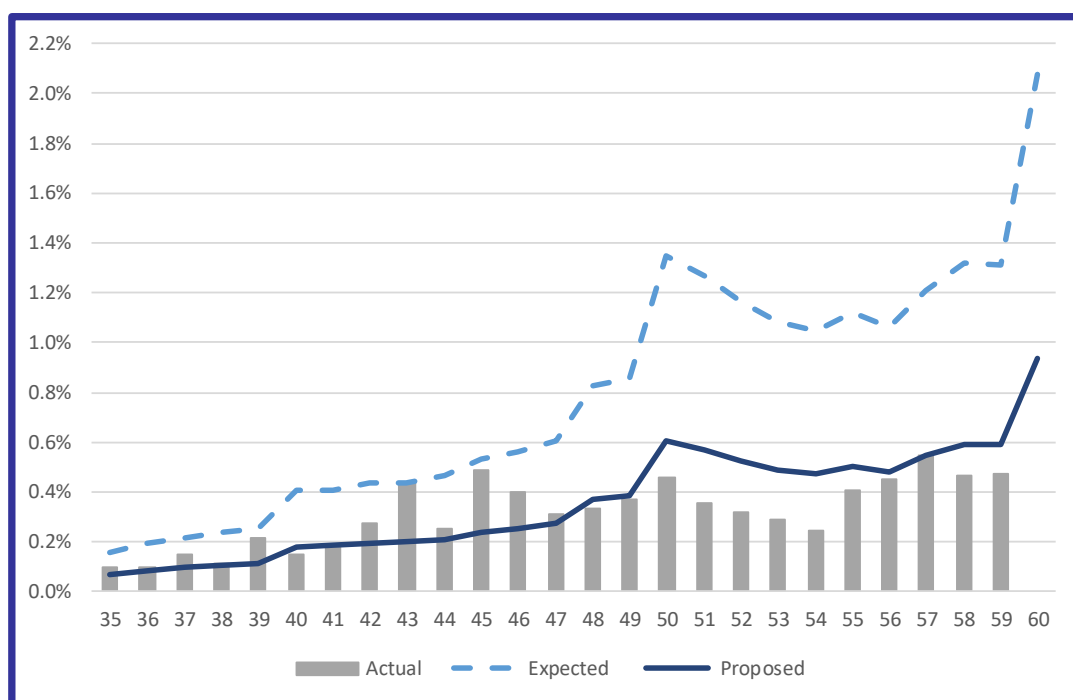
SECTION 8 – DISABILITY

The current disability assumption describes the expected rate of disability among active members and their eligibility to receive disability benefits from the Fund. The assumption has two parts: the likelihood of becoming disabled; and the type of disability benefit the member will receive. As members advance through their careers, it becomes more likely that they will become disabled.

The current assumption has different rates for Police and Firefighters based on age and date of hire (hired before July 2, 2013 and hired after July 1, 2013).

The summary results of our experience review for Police and Firefighter disability retirements during the review period are shown below:

Police



Actual	Expected	Proposed
\$14.44M	\$35.6M	\$16.02M
Actual/Expected		Actual/Proposed
41%		90%

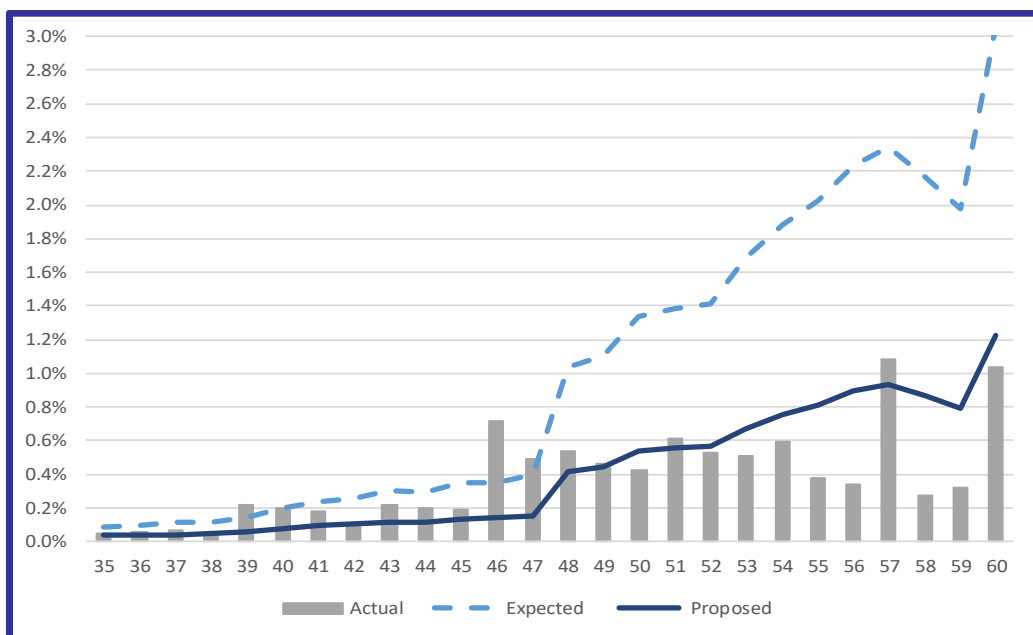
Overall, there were substantially fewer disabilities than expected as demonstrated by the A/E ratio being well below 100%. The results in this review are similar to those in prior review, so we believe it is reasonable to continue to reduce the probability of disability.

We recommend reducing rates by 45% for Police members.



SECTION 8 – DISABILITY

Firefighters



Actual	Expected	Proposed
\$16.19M	\$41.93M	\$16.77M
Actual/Expected		Actual/Proposed
39%		97%

Overall, there were substantially fewer disabilities than expected as demonstrated by the A/E ratio being well below 100%. The results in this review are similar to those in prior review, so we believe it is reasonable to continue to reduce the probability of disability.

We recommend reducing rates by 40% for Firefighter members.



SECTION 8 – DISABILITY

Type of Disability

The disability retirement benefit amount is dependent on whether the disability occurred on-duty or off-duty and, if on-duty, whether the disability is considered partial or permanent. Under the current assumption 25% of disabilities experienced by plan members are assumed to occur off-duty, 58% are assumed to occur on-duty and are considered partial disabilities and 17% are assumed to occur on-duty and are considered permanent disabilities.

The summary results of our experience review for type of disability retirements during the review period are shown below:

Type of Disability							
Year	Off Duty	On Duty Partial	On Duty Permanent	Total	% Off Duty	% Partial	% Permanent
2017	27	68	25	120	23%	57%	21%
2018	24	70	21	115	21%	61%	18%
2019	20	62	25	107	19%	58%	23%
2020	18	53	15	86	21%	62%	17%
2021	26	47	12	85	31%	55%	14%
Total	115	300	98	513	22%	59%	19%

The actual experience over the five-year period was very close to the current assumption and, as such, **we recommend no change in the assumption.**

We recommend that the disability assumptions described here and detailed in Appendix E be adopted.



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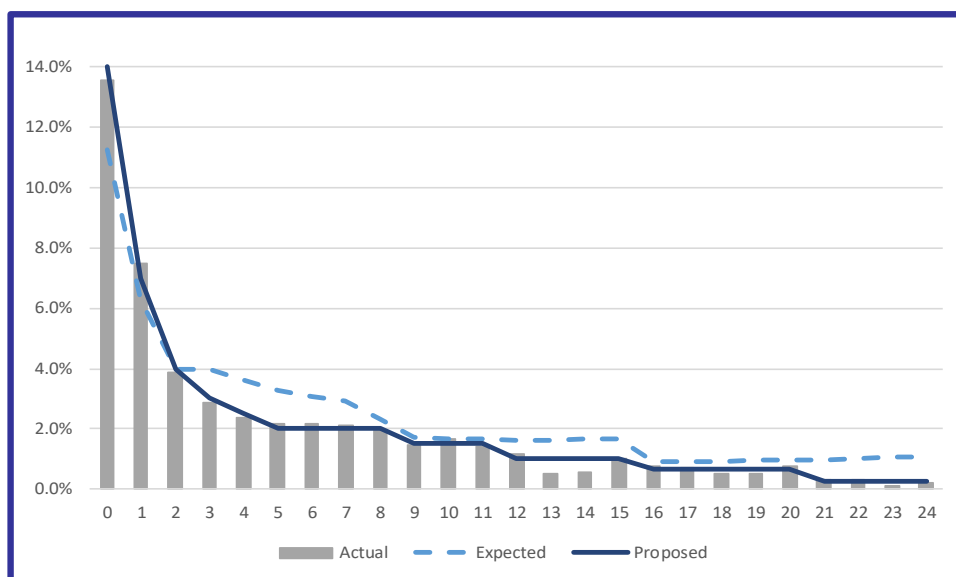


SECTION 9 – TERMINATION OF EMPLOYMENT

This section summarizes the results of our review of termination of employment for reasons other than death, retirement, or disability. The withdrawal assumption anticipates that some active members will stop working prior to retirement. Members who withdraw prior to 15 years of service receive a refund of their member contributions. Members who withdraw with 15 or more years of service receive a deferred annuity benefit. The current withdrawal rates vary based on age, years of service and type of member.

In general, rates of withdrawal tend to be highest at younger ages and in the early years of employment. Terminations lower than expected tend to increase the liabilities, but in terms of the impact on the valuation, which members terminate can be more important than the number of terminations so we focus on the liability weighted results.

Police



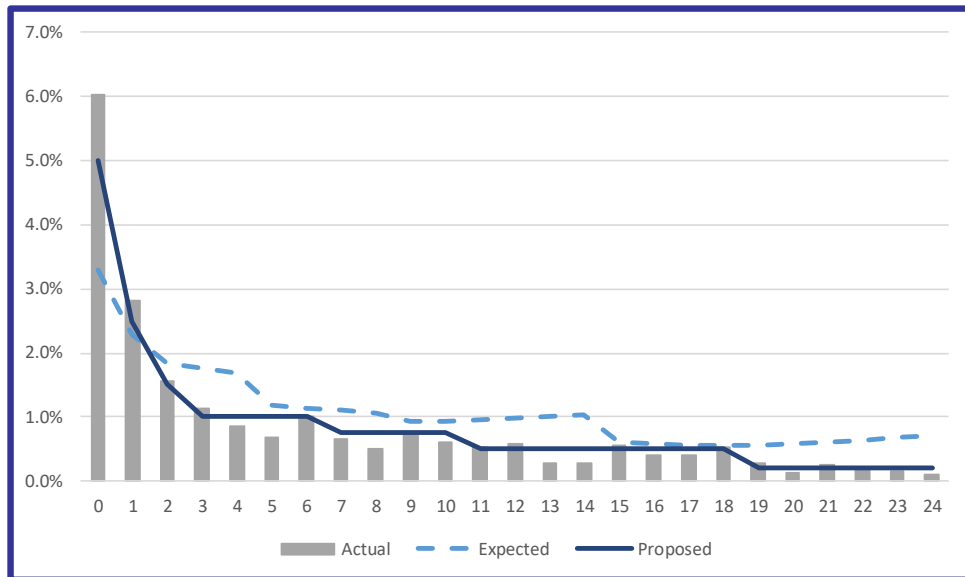
Actual	Expected	Proposed
\$90.34M	\$110.67M	\$90.8M
Actual/Expected		Actual/Proposed
82%		99%

The observed withdrawal rates were lower than expected at most ages. **We recommend lowering the rates to be more in line with actual experience and simplifying the table to be a purely service-based table (as opposed to age- and service-based) since withdrawal varies primarily by service.**



SECTION 9 – TERMINATION OF EMPLOYMENT

Firefighters



Actual	Expected	Proposed
\$30.1M	\$42.37M	\$30.56M
Actual/Expected		Actual/Proposed
71%		98%

The observed withdrawal rates were lower than expected at most ages. **We recommend lowering the rates to be more in line with actual experience and simplifying the table to be a purely service-based table (as opposed to age- and service-based) since withdrawal varies primarily by service.**

We recommend that the termination of employment assumptions described here and detailed in Appendix F be adopted.



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SECTION 10 – MISCELLANEOUS DEMOGRAPHIC ASSUMPTIONS

While not as impactful as the demographic assumption previously discussed, there are other assumptions needed for the valuation of plan liabilities related to marital status, spouse age differences and optional forms of benefit elected. Because these assumptions tend to be specific to the group or plan we are reviewing we generally recommend assumptions that tie closely to the actual experience observed during the review period.

Marital Status

The current assumptions anticipate that 75% of active members are married with a 3-year age difference between spouses. Data for new retirees during the review period suggests that 80% of retirees are married with a 3.3-year age difference between spouses.

We recommend changing the percent married assumption to 80% but retaining the 3-year age difference between spouses.

Optional Form Election

The current assumption for retirees electing an optional form of payment is that 33% of service retirees and 10% of disability retirees will elect a Joint & Survivor pension with 40% continued to a joint annuitant after the member's death. The rest are assumed to elect a life annuity.

Data for new retirees during the review period suggests that 41% of service retirees and 16% of disability retirees elect a Joint and Survivor pension, with an average of 45% continued to a joint annuitant upon the member's death.

We recommend changing these assumptions to 40% of service retirees and 15% of disability retirees electing a Joint & Survivor pension with 45% continued to a joint annuitant upon the member's death.

Optional Form Factors

At retirement members can elect the form of their retirement benefit, e.g., single life or joint and survivor. Optional form factors are used to convert the formula benefit to another form of payment and yet remain actuarially equivalent in the eyes of the plan.

This actuarial equivalence is based on an interest rate and mortality assumption and should be reviewed considering the recommended changes in the mortality and interest rate assumptions.



SECTION 10 – MISCELLANEOUS DEMOGRAPHIC ASSUMPTIONS

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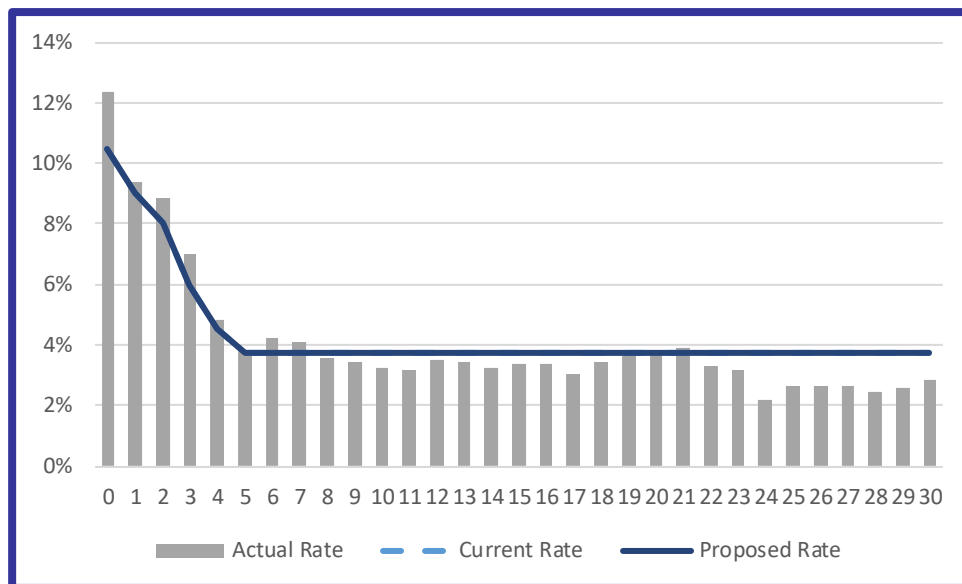


SECTION 11 – MERIT SALARY SCALE

The assumed rates of salary increase provide the expected growth in future salaries both for approximating the future benefits to be provided and the future amounts expected to be contributed to the Fund through contributions of members and employers. Therefore, this assumption is very material to the valuation results. The actuarial standards of practice recommend a “building block” approach to developing this assumption. Under this approach, the assumption is composed of an assumption for general wage growth (the “across the board” increases granted to active members) and a merit scale reflecting salary increases due to promotion or longevity, based on years of service.

General wage inflation reflects the overall return on labor in the economy and is normally above price inflation. The current assumption is 3.25% or 0.50% above the assumed price inflation of 2.75%. Merit Scale increases are generally age and/or service related and are typically based on the actual experience of the Fund participants. OP&F uses one set of rates for all employees that vary by service.

Although future salary increases are the result of these two components, it is difficult, if not impossible, to isolate the true salary adjustment due to inflation and productivity. Therefore, the experience review reviewed total salary increases for the period. We then compare the shape of the observed salary increases to the shape of the merit scale to assess the quality of fit. The following graphs demonstrate this analysis:



Based on the current assumptions, salaries were expected to increase approximately 4.62% per year on average over the five-year period. Actual Salaries increased 4.47% on average over the period.

The general wage increase being less than assumed is not unexpected given the low price and wage inflation during the review period. In examining the shape of expected merit increases compared with the observed increases, **we do not see any significant differences that would cause us to recommend a change at this time.**

We have come through a period where salary increases for most public employees have been quite low. This is unlikely to remain the long-term trend so we prefer to maintain the current assumption. **We recommend that the salary increase assumptions described here and detailed in Appendix G be adopted.**



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SECTION 12 – HEALTHCARE STABILIZATION FUND

The Healthcare Stabilization Fund (HCSF) provides eligible retirees and their spouses with a fixed monthly stipend earmarked to pay for health care. The HCSF shares most of its assumptions with the pension Fund, but there are a few participation assumptions that are unique to the HCSF and are key drivers of costs for the Fund. The HCSF stipend program became available January 1, 2019 ending the previous group-sponsored model. Because of this, we reviewed health care experience that occurred beginning with the inception of the stipend-based program, January 1, 2019, through December 31, 2022. The HCSF actuarial assumptions tend to be specific to the group or plan we are reviewing, and we generally recommend assumptions that tie closely to the actual experience observed during the study period.

Election Percentage, New Retirees

The current assumptions anticipate that 60% of eligible non-Medicare members and 90% of Medicare eligible members elect coverage at retirement. Data for new retirees during the review period suggests that 58% of eligible non-Medicare members and 76% of Medicare eligible members elect coverage.

We recommend keeping the eligible non-Medicare member assumption at 60% and lowering the Medicare eligible members assumption to 80%.

Spouse Coverage, New Retirees

The current assumptions anticipate that 50% of non-Medicare members and 70% of Medicare members who elect coverage at retirement also elect coverage for their spouse and/or children. Data for new retirees during the review period suggests that 51% of non-Medicare members and 48% of Medicare members who elect coverage at retirement also elect to cover their spouses and/or children.

We recommend keeping the non-Medicare member assumption at 50% and increasing the Medicare member assumption to 60%.

Election Percentage, Post Retirement

The current assumptions anticipate that 75% of non-Medicare members who waived coverage will elect plan coverage in a future year once they become Medicare eligible. Data during the review period suggests that only 4% of non-Medicare members who waived coverage elected coverage in a future year once they became Medicare eligible. To provide a level of conservatism we recommend setting an assumption that is slightly higher than what experience has shown but will continue to monitor and adjust as needed in the future.

We recommend lowering the assumption to 25%.

Electing Medicare Part B Coverage

The current assumptions anticipate that 88% of future Medicare eligible members will elect the Medicare Part B benefit. Data during the review period suggests that 60% of Medicare eligible members elected the Medicare Part B benefit.

We recommend lowering the assumption to 70%.



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APPENDICES



APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

The actuarial assumptions were adopted as of January 1, 2017, based on a five-year experience review covering the period 2012 through 2016.

Interest Rate

8.00 percent per annum, compounded annually.

Salary Increase Rates

Assumed annual salary increases are as follows:

Years of Service	Salary Increase Rate
Less than 1	10.50%
1	9.00%
2	8.00%
3	6.00%
4	4.50%
5 or more	3.75%

Payroll Growth

3.25 percent per annum, compounded annually, consisting of inflation rate of 2.75 percent plus productivity increase rate of 0.5 percent.

DROP Interest Crediting Rate

4.0 percent per annum, compounded annually.

CPI-Based COLA

2.2 percent simple for increases based on the lesser of the increase in CPI and three percent.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Withdrawal Rates

The following sample withdrawal rates are based on age and service (for causes other than death, disability, or retirement):

Police

Years of Service	Age							
	25	30	35	40	45	50	55	60
0	9.62%	9.94%	15.93%	17.85%	15.22%	22.00%	18.68%	19.23%
1	5.88%	5.54%	6.49%	7.65%	5.99%	10.15%	11.21%	11.54%
2	3.27%	4.21%	3.92%	5.87%	5.80%	9.90%	9.34%	9.62%
3	4.11%	3.35%	4.66%	5.74%	5.61%	9.17%	8.78%	9.04%
4	3.64%	3.06%	4.29%	5.23%	4.95%	7.95%	7.47%	7.69%
5	2.59%	2.65%	3.49%	4.22%	4.22%	7.57%	8.79%	6.50%
6	2.64%	2.56%	3.28%	3.57%	3.44%	5.86%	7.03%	5.20%
7	2.58%	2.21%	3.18%	3.46%	3.44%	5.71%	6.90%	5.10%
8	2.39%	1.95%	2.56%	1.95%	2.06%	5.57%	6.63%	4.90%
9	2.12%	1.59%	1.74%	1.62%	1.18%	4.43%	6.09%	4.50%
10	1.56%	1.56%	1.66%	1.59%	1.09%	4.31%	6.03%	4.46%
11	1.49%	1.49%	1.58%	1.56%	1.00%	4.20%	5.98%	4.42%
12	1.41%	1.41%	1.50%	1.52%	0.91%	4.09%	5.92%	4.38%
13	1.31%	1.31%	1.42%	1.49%	0.83%	3.97%	5.87%	4.34%
14	1.21%	1.21%	1.33%	1.46%	0.74%	3.86%	5.82%	4.30%
15+	1.17%	1.17%	1.17%	0.91%	0.79%	0.91%	1.10%	1.96%



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Firefighter

Years of Service	Age							
	25	30	35	40	45	50	55	60
0	2.69%	3.46%	3.66%	6.22%	8.48%	6.93%	8.73%	19.11%
1	2.11%	1.46%	2.96%	4.98%	7.01%	5.00%	7.16%	15.66%
2	1.53%	1.64%	1.83%	3.04%	4.98%	4.54%	7.16%	15.66%
3	1.44%	1.55%	1.74%	2.90%	4.80%	4.32%	7.16%	15.66%
4	1.15%	1.46%	1.66%	2.77%	4.61%	3.97%	5.73%	12.53%
5	0.83%	0.94%	1.33%	1.64%	2.05%	2.91%	5.33%	11.94%
6	0.78%	0.87%	1.24%	1.53%	1.72%	2.58%	3.66%	8.19%
7	0.78%	0.80%	1.19%	1.42%	1.51%	2.37%	3.35%	7.51%
8	0.72%	0.73%	1.05%	1.31%	1.40%	2.26%	3.05%	6.82%
9	0.73%	0.73%	0.86%	1.10%	1.18%	1.62%	2.29%	5.12%
10	0.73%	0.73%	0.84%	1.07%	1.16%	1.55%	2.21%	4.95%
11	0.71%	1.71%	0.82%	1.05%	1.14%	1.49%	2.13%	4.78%
12	0.68%	0.68%	0.80%	1.03%	1.12%	1.42%	2.06%	4.60%
13	0.65%	0.65%	0.78%	1.01%	1.10%	1.36%	1.98%	4.43%
14	0.61%	0.61%	0.76%	0.99%	1.07%	1.29%	1.91%	4.26%
15+	0.90%	0.90%	0.90%	0.47%	0.50%	0.59%	0.92%	1.21%



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Rates of Disability

The following are sample rates of disability and occurrence of disability by type:

Age	Police		Fire	
	Hired Before July 2, 2013	Hired After July 1, 2013	Hired Before July 2, 2013	Hired After July 1, 2013
20	0.001%	0.001%	0.001%	0.001%
25	0.007%	0.007%	0.005%	0.005%
30	0.089%	0.089%	0.002%	0.022%
35	0.154%	0.154%	0.091%	0.091%
40	0.403%	0.403%	0.204%	0.204%
45	0.533%	0.533%	0.347%	0.347%
50	1.351%	0.691%	1.337%	0.475%
55	1.119%	1.119%	2.025%	2.025%
60	2.078%	2.078%	3.060%	3.060%
64	3.099%	3.099%	7.190%	7.190%

Upon attainment of normal retirement eligibility, the rate is 0.300%.

Type of Disability	
On duty permanent and total	17%
On duty partial	58%
Off duty ordinary	25%



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Retirement Rates

The following rates of retirement apply to members who have not elected to be in DROP:

Age	Police	Firefighter
48	0%	0%
48-50	5%	4%
51	6%	4%
52	6%	6%
53	10%	6%
54	10%	7%
55-57	11%	11%
58	5%	16%
59	10%	16%
60	18%	20%
61	19%	20%
62	25%	50%
63	25%	20%
64	25%	25%
65-69	35%	25%
70	100%	100%

Deferred Retirement Option Plan Elections

90 percent of members who do not retire when first eligible are assumed to elect DROP.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

DROP Retirement Rates

The following rates of retirement apply to members in DROP on or before July 1, 2013:

Police

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	5%	5%							
49	4%	5%							
50	4%	5%	4%						
51	4%	5%	4%	10%					
52	3%	5%	4%	9%	9%				
53	3%	5%	4%	9%	8%	12%			
54	4%	5%	5%	10%	9%	13%	13%		
55	5%	5%	5%	16%	16%	14%	18%	44%	
56	5%	5%	5%	15%	15%	13%	17%	41%	100%
57	5%	5%	5%	16%	15%	14%	17%	43%	100%
58	5%	5%	5%	16%	15%	14%	17%	42%	100%
59	15%	5%	5%	15%	16%	16%	18%	44%	100%
60	17%	5%	5%	16%	17%	18%	19%	47%	100%
61	17%	5%	5%	17%	18%	18%	20%	48%	100%
62	16%	5%	5%	16%	17%	17%	19%	46%	100%
63	18%	6%	6%	18%	19%	19%	21%	50%	100%
64	19%	5%	5%	17%	17%	18%	19%	49%	100%
65	24%	6%	6%	23%	22%	22%	25%	59%	100%
66	24%	6%	6%	20%	19%	22%	22%	54%	100%
67	24%	5%	5%	20%	19%	22%	22%	53%	100%
68	24%	5%	5%	15%	19%	22%	22%	53%	100%
69	24%	5%	5%	20%	19%	22%	22%	47%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Firefighter

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	2%								
49	4%	3%							
50	5%	4%	4%						
51	3%	3%	3%	9%					
52	3%	3%	3%	8%	9%				
53	4%	3%	4%	10%	11%	13%			
54	4%	3%	3%	9%	11%	13%	13%		
55	6%	4%	4%	13%	13%	15%	17%	38%	
56	5%	3%	4%	13%	12%	14%	17%	37%	100%
57	5%	3%	4%	13%	12%	14%	17%	37%	100%
58	5%	3%	4%	17%	15%	15%	17%	46%	100%
59	6%	3%	4%	17%	15%	16%	18%	46%	100%
60	6%	3%	4%	18%	16%	16%	19%	48%	100%
61	6%	3%	4%	17%	15%	15%	19%	45%	100%
62	6%	3%	4%	17%	15%	16%	18%	46%	100%
63	29%	3%	4%	20%	18%	20%	18%	52%	100%
64	32%	3%	4%	21%	20%	22%	19%	55%	100%
65	33%	4%	4%	22%	21%	23%	20%	57%	100%
66	38%	4%	5%	26%	24%	23%	24%	64%	100%
67	38%	4%	5%	26%	24%	23%	24%	65%	100%
68	38%	4%	5%	26%	24%	23%	24%	65%	100%
69	38%	4%	5%	20%	25%	23%	24%	65%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%

The same rates apply for members entering DROP after July 1, 2013, except the rates for years three and four are replaced with the rates for year two.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

The following rates of retirement apply to members who are not yet in DROP but may become eligible in the future:

Police

Age	Years Eligible for DROP									
	0	1	2	3	4	5	6	7	8	9+
47	6%									
48	12%									
49	7%	5%								
50	6%	5%	5%							
51	6%	5%	5%	5%						
52	6%	5%	5%	5%	5%					
53	11%	5%	5%	5%	5%	12%				
54	10%	5%	5%	5%	5%	13%	13%			
55	12%	6%	6%	6%	6%	14%	18%	43%		
56	12%	6%	5%	5%	5%	13%	17%	41%	96%	
57	13%	6%	5%	5%	5%	14%	17%	43%	94%	100%
58	7%	5%	5%	5%	5%	13%	17%	43%	98%	100%
59	10%	5%	5%	5%	5%	17%	18%	45%	97%	100%
60	20%	8%	6%	6%	6%	18%	20%	48%	98%	100%
61	32%	6%	5%	5%	5%	18%	19%	46%	93%	100%
62	29%	9%	5%	5%	5%	16%	17%	42%	92%	100%
63	33%	5%	7%	7%	7%	18%	19%	46%	95%	100%
64	31%	11%	7%	7%	7%	18%	19%	49%	93%	100%
65	47%	13%	6%	6%	6%	20%	22%	54%	100%	100%
66	47%	13%	5%	5%	5%	20%	20%	50%	100%	100%
67	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%
68	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%
69	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Firefighter

Age	Years Eligible for DROP									
	0	1	2	3	4	5	6	7	8	9+
47	3%									
48	6%									
49	6%	4%								
50	6%	4%	4%							
51	5%	3%	4%	4%						
52	5%	3%	3%	3%	3%					
53	5%	4%	4%	4%	4%	13%				
54	5%	3%	4%	4%	4%	13%	13%			
55	8%	5%	5%	5%	5%	15%	18%	38%		
56	8%	5%	4%	4%	4%	14%	17%	38%	95%	
57	8%	4%	5%	5%	5%	15%	17%	38%	98%	100%
58	8%	5%	4%	4%	4%	16%	19%	46%	97%	100%
59	9%	5%	5%	5%	5%	16%	19%	46%	97%	100%
60	10%	5%	7%	7%	7%	17%	20%	49%	86%	100%
61	11%	5%	4%	4%	4%	16%	19%	45%	93%	100%
62	15%	7%	12%	12%	12%	16%	20%	49%	95%	100%
63	33%	7%	4%	4%	4%	19%	16%	48%	100%	100%
64	37%	7%	3%	3%	3%	20%	18%	49%	100%	100%
65	37%	7%	8%	8%	8%	20%	18%	51%	100%	100%
66	37%	7%	4%	4%	4%	23%	23%	61%	100%	100%
67	37%	7%	4%	4%	4%	23%	23%	53%	100%	100%
68	37%	7%	4%	4%	4%	23%	23%	53%	100%	100%
69	37%	7%	4%	4%	4%	23%	23%	47%	100%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Retirement Age for Inactive Vested Participants

Commencement at age 48 and 25 years of service from full-time hire date, whichever is later.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Healthy Mortality

Mortality for non-disabled participants is based on the RP-2014 Total Employee and Healthy Annuitant Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Buck Modified 2016 Improvement Scale. Rates for surviving beneficiaries are adjusted by 120%.

Age	Police	Fire
67 or less	77%	68%
68-77	105%	87%
78 and up	115%	120%

Disabled Mortality

Mortality for disabled participants is based on the RP-2014 Disabled Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Buck Modified 2016 Improvement Scale.

Age	Police	Fire
59 or less	35%	35%
60-69	60%	45%
70-79	75%	70%
80 and up	100%	90%

415 Limits

Benefits are limited by the IRC Section 415, assumed to increase 2.75 percent per annum.

Future Normal Cost

The normal cost is increased by all administrative expenses budgeted; net of the State Subsidy received from the State of Ohio.

Administrative Expenses

Administrative Expenses are the actual administrative expenses from the previous year, increasing in the future with inflation.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Percent Married

75 percent of active members are assumed to be married.

Age of Spouse

Wives are assumed to be three years younger than their husbands.

Optional Form Election

33 percent of service retirees and 10 percent of disability retirees are assumed to elect the 40 percent Joint and Survivor pension at retirement. If the joint annuitant predeceases the retiree, the increase, or pop-up, in the retiree's benefit associated with the 40 percent Joint and Survivor pension is assumed to be 14.36 percent for disability retirees and 10.50 percent for all other retirees.

DROP Account Distributions

For members who terminate DROP before the required three or five years, distribution of the account balance is assumed to be made in a lump sum payment at the end of the three or five year period. Distributions for other members are assumed to be made in a lump sum or installments at retirements in a pattern equivalent to 25 percent receiving lump sums, 30 percent receiving installments over two years, and 45 percent receiving installments over 10 years.

Medicare Part B Premium Reimbursement

For service and disability retirements, as well as survivors, Ohio Police & Fire reimburses the standard Medicare Part B premium provided the retiree is not eligible for reimbursement from any other sources.

88 percent of members are assumed to be eligible for reimbursement once they reach age 65.

The Medicare Part B Premium assumptions are only used to determine the cost if the Medicare Part B reimbursement payments were to be paid from the pension trust instead of the Health Care Stabilization Fund.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Methods

Actuarial Cost Method

Projected benefit method with individual level percentage entry age normal cost and actuarial accrued liability. Gains and losses are reflected in the actuarial accrued liability. Prior to January 1, 2015, to be consistent with the asset methodology employed by OP&F, DROP balances were netted out of the liabilities.

Asset Valuation Method

A four-year moving average market value of assets that spreads the difference between the actual investment income and the expected income on the market value (based on the valuation interest rate) over a period of four years. The actuarial value shall not be less than 80 percent or more than 120 percent of market value.

Data

Census and Assets

The valuation was based on members of OP&F as of the valuation date and does not take into account future members. All census and asset data was supplied by OP&F. Salaries and benefits tabulated in the tables in this report were summed to pennies, but displayed to whole dollars, thus, totals may not be consistent with amounts displayed due to rounding.



APPENDIX A – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

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APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

The actuarial assumptions were adopted as of January 1, 2022, based on a quinquennial experience review covering the period 2017 through 2021.

Interest Rate

7.50 percent per annum, compounded annually.

Salary Increase Rates

Assumed annual salary increases are as follows:

Years of Service	Salary Increase Rate
Less than 1	10.50%
1	9.00%
2	8.00%
3	6.00%
4	4.50%
5 or more	3.75%

Payroll Growth

3.25 percent per annum, compounded annually, consisting of inflation rate of 2.75 percent plus productivity increase rate of 0.5 percent.

DROP Interest Crediting Rate

3.75 percent per annum, compounded annually.

CPI-Based COLA

2.2 percent simple for increases based on the lesser of the increase in CPI and three percent.

Withdrawal Rates

The following sample withdrawal rates are based on age and service (for causes other than death, disability, or retirement):

Years of Service	Firefighters	Police
0	5.00%	14.00%
5	1.00%	2.00%
10	0.75%	1.50%
15	0.50%	1.00%



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

20	0.20%	0.65%
24	0.20%	0.25%

Rates of Disability

The following are sample rates of disability and occurrence of disability by type:

Age	Firefighters	Police
20	0.0004%	0.0005%
25	0.0020%	0.0032%
30	0.0088%	0.0401%
35	0.0364%	0.0693%
40	0.0816%	0.1814%
45	0.1388%	0.2399%
50	0.5348%	0.6080%
55	0.8100%	0.5036%
60	1.2240%	0.9351%
64	2.8760%	1.3946%

Type of Disability	
On duty permanent and total	17%
On duty partial	58%
Off duty ordinary	25%



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Retirement Rates

The following rates apply to members who are not currently in DROP, but either have reached DROP eligibility or may become eligible for DROP in the future. Upon first eligibility for retirement, the rate is 15 percent for Firefighters and 20 percent for Police. After first eligibility the rates are as follows:

Years of Service	Firefighters	Police
25	15%	20%
26	5%	8%
27	5%	8%
28	5%	8%
29	5%	8%
30	5%	8%
31	5%	15%
32	5%	15%
33	5%	15%
34	5%	15%
35+	100%	100%

The following rates apply to members who will not reach retirement eligibility prior to age 62:

Firefighters

Age	Years of Service	
	15-23	24
62	25%	15%
63	25%	15%
64	25%	15%
65	100%	100%

Police

Age	Years of Service	
	15-23	24
62	25%	20%
63	25%	20%
64	25%	20%
65	100%	100%



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Deferred Retirement Option Plan Elections

80 percent of members who do not retire when first eligible are assumed to elect DROP.

DROP Retirement Rates

The following rates of retirement apply to members in DROP as of the valuation date:

Years of Service	Firefighters	Police
25	4.75%	7.25%
26	4.75%	6.00%
27	4.75%	6.25%
28	6.00%	6.00%
29	9.00%	8.50%
30	15.75%	16.75%
31	11.00%	16.25%
32	44.00%	50.00%
33+	100.00%	100.00%

Retirement Age for Inactive Vested Participants

Commencement at age 48 and 25 years of service from full-time hire date, whichever is later.



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Service Retiree and Vested Former Member Mortality

Mortality for service retirees is based on the Pub-2010 Below-Median Safety Amount-Weighted Healthy Retiree mortality table with rates adjusted by 96.2% for males and 98.7% for females. All rates are projected using the MP-2021 Improvement Scale.

Disabled Mortality

Mortality for disabled retirees is based on the Pub-2010 Safety Amount-Weighted Disabled Retiree mortality table with rates adjusted by 135% for males and 97.9% for females. All rates are projected using the MP-2021 Improvement Scale.

Contingent Annuitant Mortality

Mortality for contingent annuitants is based on the Pub-2010 Below-Median Safety Amount-Weighted Contingent Annuitant Retiree mortality table with rates adjusted by 108.9% for males and 131% for females. All rates are projected using the MP-2021 Improvement Scale.

Pre-Retirement Mortality

Mortality for active members is based on the Pub-2010 Below-Median Safety Amount-Weighted Employee mortality table. All rates are projected using the MP-2021 Improvement Scale.

415 Limits

Benefits are limited by the IRC Section 415, assumed to increase 2.75 percent per annum.

Future Normal Cost

The normal cost is increased by all administrative expenses budgeted; net of the State Subsidy received from the State of Ohio.

Administrative Expenses

Administrative Expenses are the actual administrative expenses from the previous year, increasing in the future with inflation.



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

Percent Married

80 percent of active members are assumed to be married.

Age of Spouse

Wives are assumed to be three years younger than their husbands.

Optional Form Election

40 percent of service retirees and 15 percent of disability retirees are assumed to elect a 45 percent Joint and Survivor pension at retirement. If the joint annuitant predeceases the retiree, the increase, or pop-up, in the retiree's benefit associated with the 45 percent Joint and Survivor pension is assumed to be 14.36 percent for disability retirees and 10.50 percent for all other retirees.

DROP Account Distributions

For currently retired members who have an outstanding DROP balance we assume they will take their balance in installments over 10 years. For members who terminate DROP before the required three or five years, distribution of the account balance is assumed to be made in a lump sum payment at the end of the three- or five-year period. Distributions for active members are assumed to be made in a lump sum or installments at retirements in a pattern equivalent to 25 percent receiving lump sums, 30 percent receiving installments over two years, and 45 percent receiving installments over 10 years.

Medicare Part B Premium Reimbursement

For service and disability retirements, as well as survivors, Ohio Police & Fire reimburses the standard Medicare Part B premium provided the retiree is not eligible for reimbursement from any other sources.

70 percent of members are assumed to be eligible for reimbursement once they reach age 65.

The Medicare Part B Premium assumptions are only used to determine the cost if the Medicare Part B reimbursement payments were to be paid from the pension trust instead of the Health Care Stabilization Fund.



APPENDIX B – STATEMENT OF PROPOSED ACTUARIAL ASSUMPTIONS AND OTHER INPUTS

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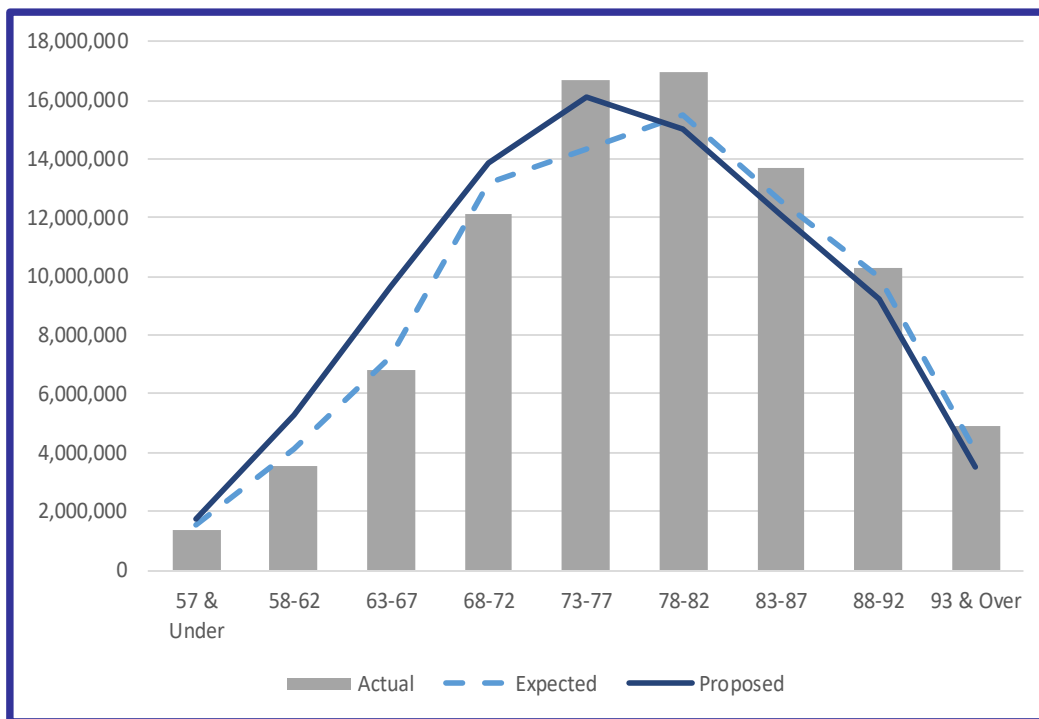


APPENDIX C

MORTALITY



Summary of Mortality Experience among Healthy Retirees Total



Actual	Expected	Proposed
\$86.44M	\$82.42M	\$86.41M
Actual/Expected		Actual/Proposed
105%		100%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
50 & Under	\$ 31,080,660	\$ 141,301	0.5%	\$ 63,532	0.2%	\$ 88,198	0.3%
51	22,584,022	68,146	0.3%	69,837	0.3%	72,290	0.3%
52	29,630,813	51,005	0.2%	98,752	0.3%	102,623	0.3%
53	36,022,384	77,727	0.2%	127,858	0.4%	135,370	0.4%
54	46,176,537	98,790	0.2%	175,504	0.4%	190,969	0.4%
55	55,716,622	121,015	0.2%	225,002	0.4%	251,445	0.5%
56	76,008,789	334,883	0.4%	327,116	0.4%	377,242	0.5%
57	98,895,777	501,849	0.5%	454,726	0.5%	542,077	0.5%
58	113,124,205	558,603	0.5%	556,810	0.5%	681,884	0.6%
59	128,687,288	503,085	0.4%	678,197	0.5%	851,417	0.7%
60	142,887,708	723,243	0.5%	809,479	0.6%	1,037,018	0.7%
61	154,262,584	798,622	0.5%	940,711	0.6%	1,224,149	0.8%
62	169,451,374	994,121	0.6%	1,112,945	0.7%	1,462,711	0.9%



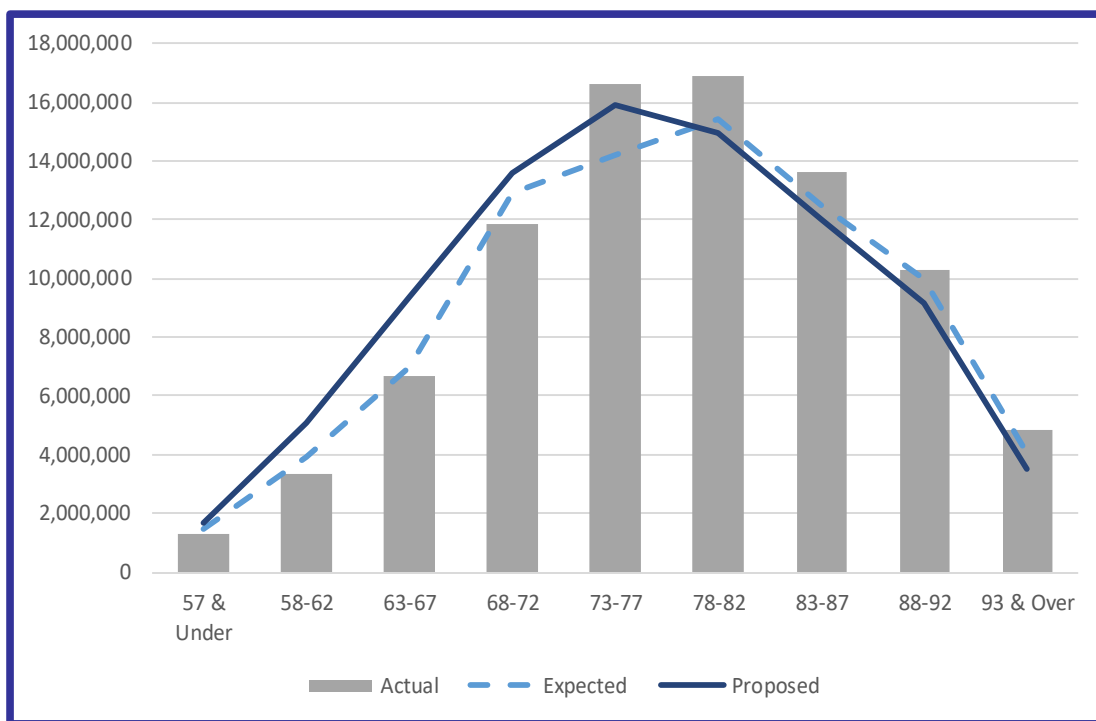
APPENDIX C - MORTALITY

**Summary of Mortality Experience among Healthy Retirees
Total (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
63	\$ 174,637,715	\$ 1,458,383	0.8%	\$ 1,236,314	0.7%	\$ 1,632,834	0.9%
64	177,954,553	733,998	0.4%	1,360,384	0.8%	1,799,163	1.0%
65	177,167,934	2,081,928	1.2%	1,461,079	0.8%	1,929,537	1.1%
66	175,379,144	1,094,742	0.6%	1,564,330	0.9%	2,091,384	1.2%
67	167,993,096	1,423,803	0.8%	1,620,686	1.0%	2,196,559	1.3%
68	164,761,407	2,024,085	1.2%	2,297,955	1.4%	2,366,551	1.4%
69	162,631,407	2,110,783	1.3%	2,471,721	1.5%	2,568,528	1.6%
70	165,711,156	2,392,691	1.4%	2,754,473	1.7%	2,887,938	1.7%
71	153,161,355	2,275,938	1.5%	2,782,983	1.8%	2,952,957	1.9%
72	144,042,592	3,336,264	2.3%	2,865,269	2.0%	3,076,931	2.1%
73	131,306,304	2,602,209	2.0%	2,860,975	2.2%	3,120,047	2.4%
74	122,513,626	3,531,214	2.9%	2,930,246	2.4%	3,243,491	2.6%
75	104,777,450	3,354,675	3.2%	2,765,346	2.6%	3,095,069	3.0%
76	98,783,473	3,163,331	3.2%	2,875,116	2.9%	3,261,755	3.3%
77	90,728,502	4,031,010	4.4%	2,912,750	3.2%	3,354,009	3.7%
78	81,682,412	3,867,898	4.7%	3,511,236	4.3%	3,379,850	4.1%
79	67,697,541	3,982,192	5.9%	3,240,346	4.8%	3,137,176	4.6%
80	57,199,044	3,061,501	5.4%	3,052,059	5.3%	2,968,937	5.2%
81	48,030,239	3,123,450	6.5%	2,862,966	6.0%	2,792,061	5.8%
82	41,973,870	2,934,411	7.0%	2,798,074	6.7%	2,731,903	6.5%
83	36,314,697	3,010,077	8.3%	2,711,104	7.5%	2,642,278	7.3%
84	31,155,904	2,463,370	7.9%	2,599,439	8.3%	2,528,934	8.1%
85	26,551,696	2,806,513	10.6%	2,485,092	9.4%	2,404,375	9.1%
86	22,888,684	2,166,905	9.5%	2,406,161	10.5%	2,309,224	10.1%
87	19,822,555	3,255,486	16.4%	2,338,865	11.8%	2,223,240	11.2%
88	16,320,662	2,093,118	12.8%	2,156,551	13.2%	2,031,019	12.4%
89	14,174,349	2,105,763	14.9%	2,100,020	14.8%	1,958,232	13.8%
90	12,899,575	2,488,241	19.3%	2,136,529	16.6%	1,971,037	15.3%
91	10,406,322	1,818,669	17.5%	1,911,793	18.4%	1,743,957	16.8%
92	8,241,174	1,788,646	21.7%	1,665,337	20.2%	1,498,611	18.2%
93	5,770,313	1,586,262	27.5%	1,269,037	22.0%	1,127,571	19.5%
94	3,947,520	1,076,104	27.3%	941,785	23.9%	822,706	20.8%
95	2,647,114	873,802	33.0%	676,567	25.6%	585,049	22.1%
96	1,586,845	454,212	28.6%	439,502	27.7%	372,638	23.5%
97	1,065,629	400,866	37.6%	317,624	29.8%	264,879	24.9%
98	608,197	220,984	36.3%	196,238	32.3%	161,427	26.5%
99	386,102	163,059	42.2%	132,767	34.4%	109,226	28.3%
100 & Over	198,406	111,340	56.1%	73,513	37.1%	47,038	23.7%
Total	\$ 3,827,647,327	\$ 86,440,316	2.3%	\$ 82,422,699	2.2%	\$ 86,405,518	2.3%



Summary of Mortality Experience among Healthy Retirees Male



Actual	Expected	Proposed
\$85.48M	\$81.34M	\$85.27M
Actual/Expected		Actual/Proposed
105%		100%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
50 & Under	\$ 28,086,528	\$ 141,301	0.5%	\$ 59,206	0.2%	\$ 84,042	0.3%
51	20,784,187	68,146	0.3%	65,986	0.3%	69,299	0.3%
52	27,186,391	51,005	0.2%	93,167	0.3%	98,008	0.4%
53	32,881,585	77,727	0.2%	120,284	0.4%	128,631	0.4%
54	42,890,526	98,790	0.2%	166,986	0.4%	182,945	0.4%
55	51,287,598	121,015	0.2%	212,562	0.4%	239,193	0.5%
56	70,448,239	334,883	0.5%	310,279	0.4%	359,822	0.5%
57	92,705,429	436,348	0.5%	434,387	0.5%	520,188	0.6%
58	106,300,829	499,726	0.5%	532,337	0.5%	654,885	0.6%
59	120,590,404	410,973	0.3%	646,792	0.5%	815,639	0.7%
60	134,592,372	678,948	0.5%	774,462	0.6%	996,435	0.7%
61	145,681,208	798,622	0.5%	901,172	0.6%	1,177,882	0.8%
62	160,248,278	948,446	0.6%	1,066,825	0.7%	1,408,307	0.9%

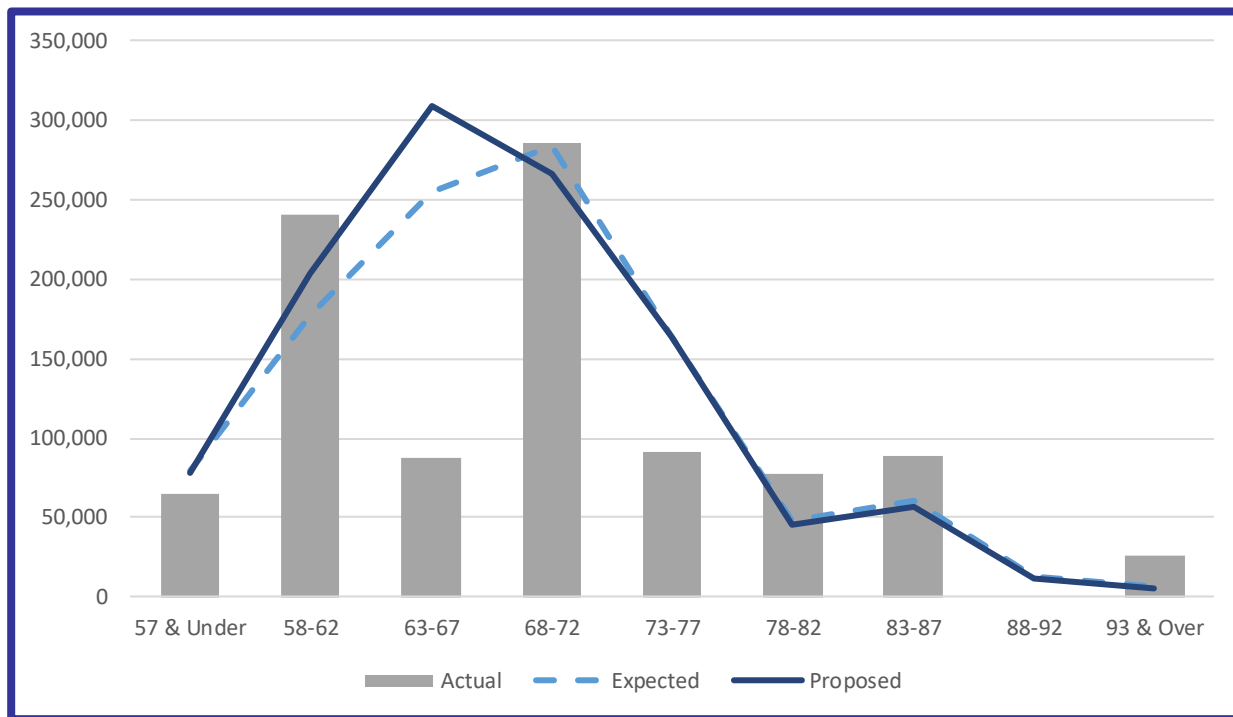


**Summary of Mortality Experience among Healthy Retirees
Male (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
63	\$ 165,247,437	\$ 1,458,383	0.9%	\$ 1,185,347	0.7%	\$ 1,572,048	1.0%
64	169,357,395	733,998	0.4%	1,309,748	0.8%	1,738,419	1.0%
65	168,975,692	2,044,715	1.2%	1,408,865	0.8%	1,866,225	1.1%
66	167,841,295	1,094,742	0.7%	1,512,186	0.9%	2,027,654	1.2%
67	161,515,689	1,373,763	0.9%	1,571,914	1.0%	2,136,453	1.3%
68	159,352,761	2,024,085	1.3%	2,237,427	1.4%	2,311,292	1.5%
69	157,618,494	2,110,783	1.3%	2,410,455	1.5%	2,511,897	1.6%
70	161,474,170	2,300,364	1.4%	2,697,564	1.7%	2,834,806	1.8%
71	149,645,751	2,222,983	1.5%	2,731,300	1.8%	2,903,872	1.9%
72	140,721,954	3,196,340	2.3%	2,811,404	2.0%	3,025,126	2.1%
73	128,878,071	2,557,077	2.0%	2,817,650	2.2%	3,077,665	2.4%
74	120,499,249	3,531,214	2.9%	2,890,532	2.4%	3,204,089	2.7%
75	103,257,967	3,354,675	3.2%	2,732,241	2.6%	3,061,724	3.0%
76	97,557,128	3,117,357	3.2%	2,845,509	2.9%	3,231,546	3.3%
77	90,080,649	4,031,010	4.5%	2,895,217	3.2%	3,336,096	3.7%
78	81,165,146	3,812,556	4.7%	3,494,269	4.3%	3,363,791	4.1%
79	67,408,661	3,982,192	5.9%	3,229,807	4.8%	3,127,114	4.6%
80	57,000,293	3,038,776	5.3%	3,043,847	5.3%	2,961,170	5.2%
81	47,889,389	3,123,450	6.5%	2,856,412	6.0%	2,785,890	5.8%
82	41,869,009	2,934,411	7.0%	2,792,608	6.7%	2,726,755	6.5%
83	36,208,149	3,010,077	8.3%	2,704,915	7.5%	2,636,421	7.3%
84	30,905,058	2,463,370	8.0%	2,582,908	8.4%	2,513,503	8.1%
85	26,344,017	2,738,589	10.4%	2,469,691	9.4%	2,390,086	9.1%
86	22,747,848	2,145,596	9.4%	2,394,445	10.5%	2,298,395	10.1%
87	19,701,949	3,255,486	16.5%	2,327,681	11.8%	2,212,879	11.2%
88	16,198,975	2,093,118	12.9%	2,143,973	13.2%	2,019,342	12.5%
89	14,174,349	2,105,763	14.9%	2,100,020	14.8%	1,958,232	13.8%
90	12,899,575	2,488,241	19.3%	2,136,529	16.6%	1,971,037	15.3%
91	10,406,322	1,818,669	17.5%	1,911,793	18.4%	1,743,957	16.8%
92	8,241,174	1,788,646	21.7%	1,665,337	20.2%	1,498,611	18.2%
93	5,770,313	1,586,262	27.5%	1,269,037	22.0%	1,127,571	19.5%
94	3,947,520	1,076,104	27.3%	941,785	23.9%	822,706	20.8%
95	2,647,114	873,802	33.0%	676,567	25.6%	585,049	22.1%
96	1,586,845	454,212	28.6%	439,502	27.7%	372,638	23.5%
97	1,039,011	374,248	36.0%	310,820	29.9%	259,211	24.9%
98	608,197	220,984	36.3%	196,238	32.3%	161,427	26.5%
99	386,102	163,059	42.2%	132,767	34.4%	109,226	28.3%
100 & Over	198,406	111,340	56.1%	73,513	37.1%	47,038	23.7%
Total	\$ 3,685,050,699	\$ 85,476,372	2.3%	\$ 81,336,267	2.2%	\$ 85,266,238	2.3%



Summary of Mortality Experience among Healthy Retirees Female



Actual	Expected	Proposed
\$0.96M	\$1.09M	\$1.14M
Actual/Expected		Actual/Proposed
89%		118%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed
50 & Under	\$ 2,994,132	\$ -	0.0%	\$ 4,326	0.1%	\$ 4,156
51	1,799,835	-	0.0%	3,852	0.2%	2,991
52	2,444,422	-	0.0%	5,585	0.2%	4,615
53	3,140,799	-	0.0%	7,574	0.2%	6,738
54	3,286,011	-	0.0%	8,519	0.3%	8,025
55	4,429,024	-	0.0%	12,440	0.3%	12,252
56	5,560,550	-	0.0%	16,837	0.3%	17,420
57	6,190,348	65,501	1.1%	20,339	0.3%	21,888
58	6,823,376	58,877	0.9%	24,473	0.4%	26,999
59	8,096,885	92,112	1.1%	31,406	0.4%	35,778
60	8,295,336	44,294	0.5%	35,016	0.4%	40,584
61	8,581,376	-	0.0%	39,539	0.5%	46,267
62	9,203,096	45,676	0.5%	46,120	0.5%	54,405

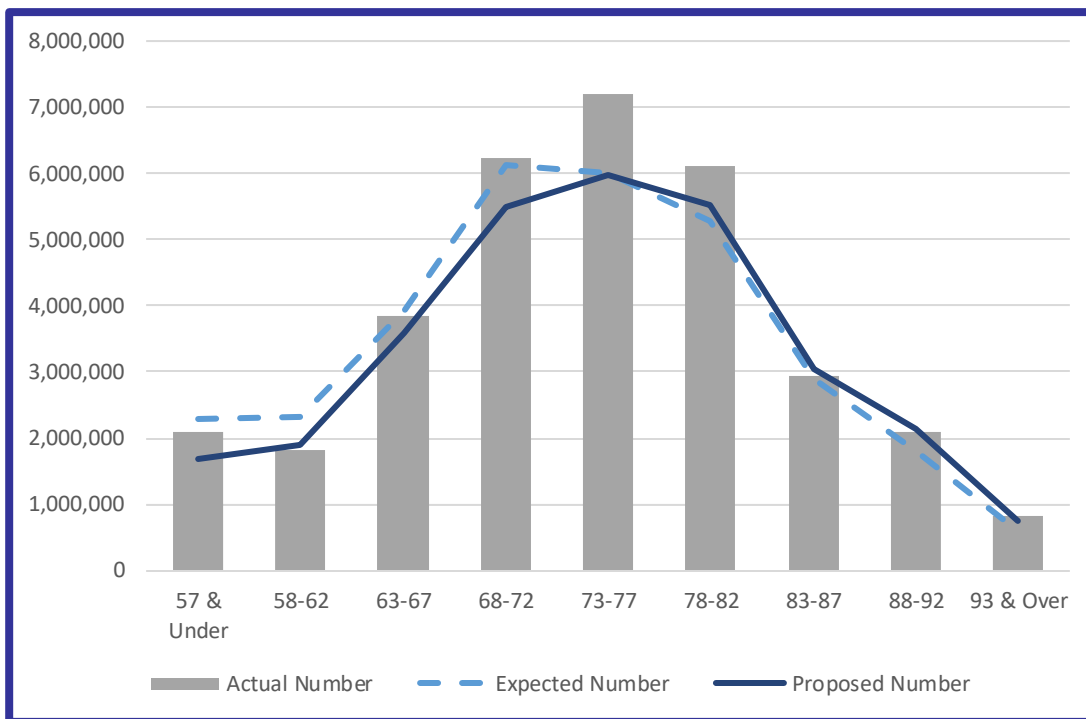


**Summary of Mortality Experience among Healthy Retirees
Female (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
63	\$ 9,390,278	\$ -	0.0%	\$ 50,966	0.5%	\$ 60,786	0.6%
64	8,597,158	-	0.0%	50,636	0.6%	60,744	0.7%
65	8,192,242	37,213	0.5%	52,213	0.6%	63,313	0.8%
66	7,537,848	-	0.0%	52,144	0.7%	63,730	0.8%
67	6,477,406	50,040	0.8%	48,773	0.8%	60,105	0.9%
68	5,408,646	-	0.0%	60,528	1.1%	55,259	1.0%
69	5,012,913	-	0.0%	61,266	1.2%	56,631	1.1%
70	4,236,986	92,327	2.2%	56,909	1.3%	53,132	1.3%
71	3,515,603	52,955	1.5%	51,683	1.5%	49,086	1.4%
72	3,320,638	139,924	4.2%	53,865	1.6%	51,805	1.6%
73	2,428,233	45,132	1.9%	43,325	1.8%	42,382	1.7%
74	2,014,377	-	0.0%	39,714	2.0%	39,402	2.0%
75	1,519,483	-	0.0%	33,105	2.2%	33,345	2.2%
76	1,226,345	45,974	3.7%	29,607	2.4%	30,210	2.5%
77	647,853	-	0.0%	17,533	2.7%	17,913	2.8%
78	517,266	55,341	10.7%	16,967	3.3%	16,059	3.1%
79	288,880	-	0.0%	10,538	3.6%	10,062	3.5%
80	198,751	22,725	11.4%	8,212	4.1%	7,767	3.9%
81	140,850	-	0.0%	6,554	4.7%	6,172	4.4%
82	104,860	-	0.0%	5,465	5.2%	5,148	4.9%
83	106,548	-	0.0%	6,189	5.8%	5,857	5.5%
84	250,846	-	0.0%	16,531	6.6%	15,431	6.2%
85	207,680	67,924	32.7%	15,401	7.4%	14,289	6.9%
86	140,836	21,310	15.1%	11,717	8.3%	10,829	7.7%
87	120,606	-	0.0%	11,185	9.3%	10,361	8.6%
88	121,686	-	0.0%	12,578	10.3%	11,677	9.6%
89	-	-	0.0%	-	0.0%	-	10.7%
90	-	-	0.0%	-	0.0%	-	12.0%
91	-	-	0.0%	-	0.0%	-	13.2%
92	-	-	0.0%	-	0.0%	-	14.5%
93	-	-	0.0%	-	0.0%	-	15.8%
94	-	-	0.0%	-	0.0%	-	17.1%
95	-	-	0.0%	-	0.0%	-	18.3%
96	-	-	0.0%	-	0.0%	-	19.8%
97	26,619	26,619	100.0%	6,804	25.6%	5,668	21.3%
98	-	-	0.0%	-	0.0%	-	23.0%
99	-	-	0.0%	-	0.0%	-	24.8%
100 & Over	-	-	0.0%	-	0.0%	-	0.0%
Total	\$ 142,596,628	\$ 963,944	0.7%	\$ 1,086,432	0.8%	\$ 1,139,280	0.8%



Summary of Mortality Experience among Disabled Retirees Total



Actual	Expected	Proposed
\$33.14M	\$31.26M	\$30.1M
Actual/Expected		Actual/Proposed
106%		110%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
45 & Under	\$ 38,608,306	\$ 248,167	0.6%	\$ 169,419	0.4%	\$ 110,256	0.3%
46	12,494,025	105,494	0.8%	70,055	0.6%	40,865	0.3%
47	15,547,594	112,258	0.7%	90,812	0.6%	53,821	0.3%
48	18,521,124	44,054	0.2%	111,604	0.6%	67,806	0.4%
49	21,368,178	102,936	0.5%	133,665	0.6%	84,050	0.4%
50	24,297,543	90,331	0.4%	158,167	0.7%	103,032	0.4%
51	26,779,283	98,247	0.4%	180,476	0.7%	120,471	0.4%
52	28,729,820	201,855	0.7%	200,915	0.7%	138,016	0.5%
53	28,968,052	35,115	0.1%	209,305	0.7%	150,057	0.5%
54	31,153,875	129,208	0.4%	229,467	0.7%	173,328	0.6%
55	30,163,072	193,072	0.6%	229,886	0.8%	183,305	0.6%
56	31,955,961	414,746	1.3%	251,998	0.8%	213,064	0.7%
57	31,347,623	324,320	1.0%	257,305	0.8%	231,389	0.7%
58	32,377,863	262,036	0.8%	275,495	0.9%	264,475	0.8%
59	34,623,040	423,509	1.2%	304,913	0.9%	312,130	0.9%

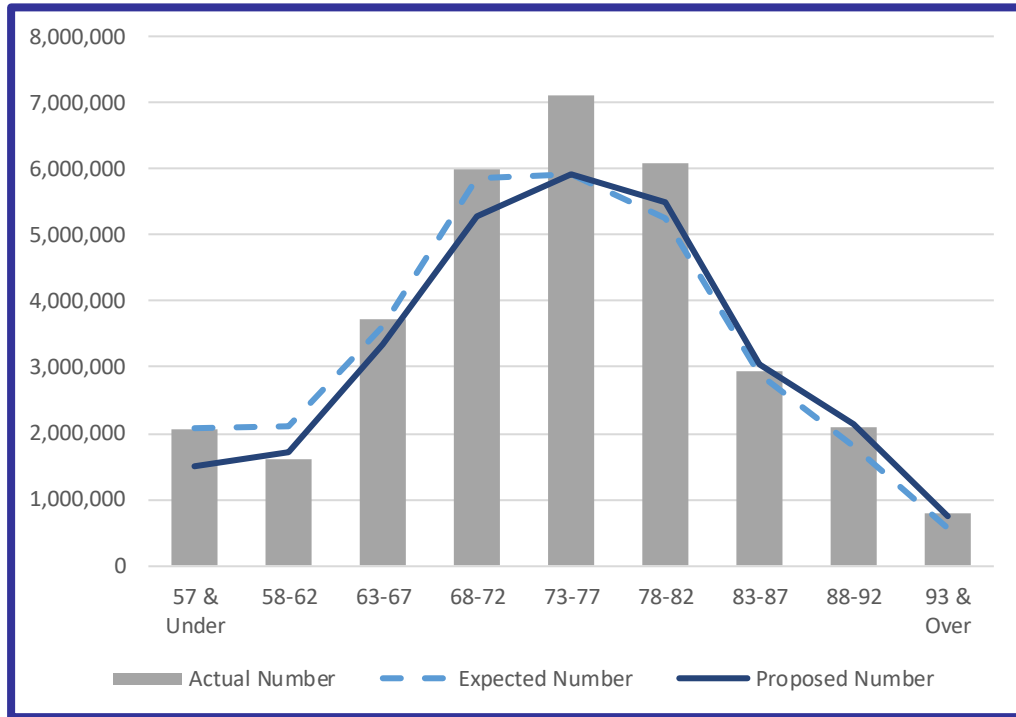


**Summary of Mortality Experience among Disabled Retirees
Total (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
60	\$ 38,706,129	\$ 310,505	0.8%	\$ 540,260	1.4%	\$ 384,791	1.0%
61	40,514,371	362,626	0.9%	580,782	1.4%	441,484	1.1%
62	41,951,223	462,039	1.1%	625,445	1.5%	500,488	1.2%
63	45,221,995	797,939	1.8%	702,574	1.6%	591,262	1.3%
64	46,146,012	513,158	1.1%	745,874	1.6%	657,504	1.4%
65	46,339,703	768,065	1.7%	783,358	1.7%	719,110	1.6%
66	46,454,512	846,815	1.8%	820,469	1.8%	783,498	1.7%
67	46,571,282	920,119	2.0%	861,136	1.8%	850,303	1.8%
68	46,604,164	1,253,266	2.7%	898,077	1.9%	920,708	2.0%
69	46,707,432	1,027,373	2.2%	953,391	2.0%	1,006,057	2.2%
70	48,210,631	1,414,639	2.9%	1,414,906	2.9%	1,132,307	2.3%
71	46,115,311	1,035,575	2.2%	1,429,994	3.1%	1,188,428	2.6%
72	44,035,838	1,512,429	3.4%	1,447,324	3.3%	1,251,666	2.8%
73	38,870,804	1,503,020	3.9%	1,358,181	3.5%	1,228,137	3.2%
74	35,588,605	1,793,784	5.0%	1,323,089	3.7%	1,257,266	3.5%
75	28,777,796	1,266,135	4.4%	1,144,380	4.0%	1,140,282	4.0%
76	26,253,382	1,369,123	5.2%	1,113,986	4.2%	1,168,442	4.5%
77	23,644,507	1,256,697	5.3%	1,074,248	4.5%	1,185,507	5.0%
78	22,215,491	1,176,731	5.3%	1,081,736	4.9%	1,245,973	5.6%
79	18,852,447	1,230,563	6.5%	985,687	5.2%	1,176,080	6.2%
80	16,180,308	1,419,675	8.8%	1,194,061	7.4%	1,123,429	6.9%
81	13,590,186	1,294,959	9.5%	1,084,712	8.0%	1,044,205	7.7%
82	10,897,968	994,749	9.1%	943,036	8.7%	925,537	8.5%
83	8,195,832	430,830	5.3%	770,693	9.4%	772,929	9.4%
84	6,837,326	1,094,656	16.0%	696,219	10.2%	717,257	10.5%
85	5,090,637	556,303	10.9%	561,969	11.0%	594,408	11.7%
86	3,959,832	513,625	13.0%	474,552	12.0%	515,019	13.0%
87	3,063,701	335,961	11.0%	401,298	13.1%	446,843	14.6%
88	2,684,698	304,337	11.3%	384,352	14.3%	438,449	16.3%
89	2,748,883	471,740	17.2%	430,265	15.7%	501,968	18.3%
90	2,315,911	575,460	24.8%	392,431	16.9%	471,984	20.4%
91	1,758,063	477,467	27.2%	322,839	18.4%	396,456	22.6%
92	1,358,589	255,141	18.8%	266,086	19.6%	335,251	24.7%
93	1,106,911	290,593	26.3%	233,149	21.1%	295,888	26.7%
94	724,189	201,326	27.8%	162,020	22.4%	205,215	28.3%
95	465,740	222,371	47.7%	109,835	23.6%	139,836	30.0%
96	134,106	23,582	17.6%	34,720	25.9%	43,907	32.7%
97	111,964	50,516	45.1%	30,464	27.2%	39,099	34.9%
98	18,120	-	0.0%	5,303	29.3%	6,751	37.3%
99	18,480	18,480	100.0%	5,675	30.7%	7,349	39.8%
Total	\$ 1,265,978,438	\$ 33,137,724	2.6%	\$ 31,262,056	2.5%	\$ 30,097,139	2.4%



Summary of Mortality Experience among Disabled Retirees Male



Actual	Expected	Proposed
\$32.37M	\$30.08M	\$29.18M
Actual/Expected		Actual/Proposed
108%		111%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
45 & Under	\$ 31,802,971	\$ 248,167	0.8%	\$ 151,971	0.5%	\$ 97,136	0.3%
46	10,398,557	77,075	0.7%	63,091	0.6%	36,249	0.3%
47	13,131,166	112,258	0.9%	82,371	0.6%	48,221	0.4%
48	15,498,655	44,054	0.3%	100,536	0.6%	60,388	0.4%
49	18,062,477	102,936	0.6%	120,997	0.7%	75,405	0.4%
50	20,782,237	90,331	0.4%	144,036	0.7%	93,187	0.4%
51	22,887,510	98,247	0.4%	164,030	0.7%	108,492	0.5%
52	24,516,677	201,855	0.8%	182,102	0.7%	123,680	0.5%
53	24,892,824	35,115	0.1%	190,104	0.8%	134,714	0.5%
54	25,955,497	129,208	0.5%	203,707	0.8%	151,646	0.6%
55	25,450,311	193,072	0.8%	205,303	0.8%	161,551	0.6%
56	27,218,468	414,746	1.5%	226,085	0.8%	188,947	0.7%
57	27,314,586	324,320	1.2%	234,207	0.9%	208,861	0.8%
58	28,392,403	262,036	0.9%	251,724	0.9%	240,125	0.8%
59	30,255,834	363,515	1.2%	277,834	0.9%	283,168	0.9%

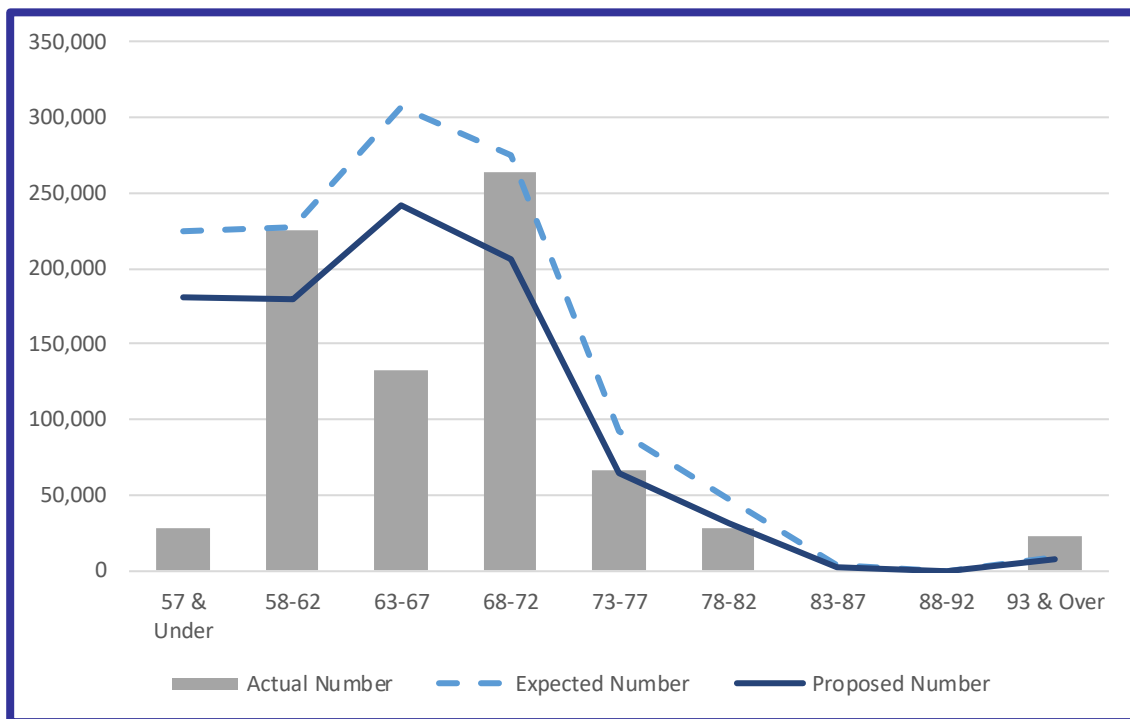


**Summary of Mortality Experience among Disabled Retirees
Male (Continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
60	\$ 33,828,932	\$ 276,443	0.8%	\$ 489,624	1.4%	\$ 349,861	1.0%
61	34,883,893	322,185	0.9%	519,686	1.5%	398,162	1.1%
62	36,112,517	371,847	1.0%	560,377	1.6%	452,460	1.3%
63	39,471,408	726,477	1.8%	636,312	1.6%	540,817	1.4%
64	40,691,174	495,146	1.2%	680,379	1.7%	606,585	1.5%
65	41,462,795	768,065	1.9%	721,978	1.7%	670,628	1.6%
66	42,181,755	830,735	2.0%	764,557	1.8%	738,221	1.8%
67	42,426,477	892,940	2.1%	803,970	1.9%	803,298	1.9%
68	42,556,365	1,195,742	2.8%	839,304	2.0%	871,443	2.0%
69	43,393,599	992,473	2.3%	902,187	2.1%	962,616	2.2%
70	45,128,596	1,322,934	2.9%	1,349,995	3.0%	1,088,594	2.4%
71	43,717,603	1,035,575	2.4%	1,376,047	3.1%	1,151,527	2.6%
72	42,122,731	1,433,037	3.4%	1,400,939	3.3%	1,219,626	2.9%
73	37,615,461	1,466,883	3.9%	1,325,298	3.5%	1,205,206	3.2%
74	34,758,971	1,763,030	5.1%	1,299,641	3.7%	1,240,716	3.6%
75	28,256,569	1,266,135	4.5%	1,128,321	4.0%	1,128,916	4.0%
76	25,855,189	1,369,123	5.3%	1,100,727	4.3%	1,158,937	4.5%
77	23,478,729	1,256,697	5.4%	1,068,219	4.5%	1,181,168	5.0%
78	22,025,634	1,176,731	5.3%	1,074,189	4.9%	1,240,472	5.6%
79	18,601,049	1,230,563	6.6%	974,789	5.2%	1,167,907	6.3%
80	16,042,553	1,419,675	8.8%	1,185,340	7.4%	1,118,405	7.0%
81	13,451,028	1,294,959	9.6%	1,075,200	8.0%	1,038,514	7.7%
82	10,757,408	966,483	9.0%	932,672	8.7%	919,097	8.5%
83	8,146,392	430,830	5.3%	766,742	9.4%	770,393	9.5%
84	6,837,326	1,094,656	16.0%	696,219	10.2%	717,257	10.5%
85	5,090,637	556,303	10.9%	561,969	11.0%	594,408	11.7%
86	3,959,832	513,625	13.0%	474,552	12.0%	515,019	13.0%
87	3,063,701	335,961	11.0%	401,298	13.1%	446,843	14.6%
88	2,684,698	304,337	11.3%	384,352	14.3%	438,449	16.3%
89	2,748,883	471,740	17.2%	430,265	15.7%	501,968	18.3%
90	2,315,911	575,460	24.8%	392,431	16.9%	471,984	20.4%
91	1,758,063	477,467	27.2%	322,839	18.4%	396,456	22.6%
92	1,358,589	255,141	18.8%	266,086	19.6%	335,251	24.7%
93	1,106,911	290,593	26.3%	233,149	21.1%	295,888	26.7%
94	701,811	201,326	28.7%	157,712	22.5%	201,548	28.7%
95	443,002	199,633	45.1%	105,177	23.7%	135,786	30.7%
96	134,106	23,582	17.6%	34,720	25.9%	43,907	32.7%
97	111,964	50,516	45.1%	30,464	27.2%	39,099	34.9%
98	18,120	-	0.0%	5,303	29.3%	6,751	37.3%
99	18,480	18,480	100.0%	5,675	30.7%	7,349	39.8%
Total	\$ 1,145,879,033	\$ 32,370,465	2.8%	\$ 30,076,802	2.6%	\$ 29,183,300	2.5%



Summary of Mortality Experience among Disabled Retirees Female



Actual	Expected	Proposed
\$0.77M	\$1.19M	\$0.91M
Actual/Expected		Actual/Proposed
65%		84%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
45 & Under	\$ 6,805,335	\$ -	0.0%	\$ 17,447	0.3%	\$ 13,120	0.2%
46	2,095,467	28,419	1.4%	6,963	0.3%	4,616	0.2%
47	2,416,428	-	0.0%	8,442	0.3%	5,600	0.2%
48	3,022,470	-	0.0%	11,068	0.4%	7,418	0.2%
49	3,305,701	-	0.0%	12,668	0.4%	8,644	0.3%
50	3,515,306	-	0.0%	14,131	0.4%	9,845	0.3%
51	3,891,774	-	0.0%	16,446	0.4%	11,980	0.3%
52	4,213,143	-	0.0%	18,813	0.4%	14,335	0.3%
53	4,075,228	-	0.0%	19,201	0.5%	15,344	0.4%
54	5,198,378	-	0.0%	25,760	0.5%	21,682	0.4%
55	4,712,761	-	0.0%	24,583	0.5%	21,754	0.5%
56	4,737,493	-	0.0%	25,913	0.5%	24,117	0.5%
57	4,033,037	-	0.0%	23,098	0.6%	22,528	0.6%
58	3,985,460	-	0.0%	23,771	0.6%	24,350	0.6%
59	4,367,206	59,994	1.4%	27,080	0.6%	28,962	0.7%

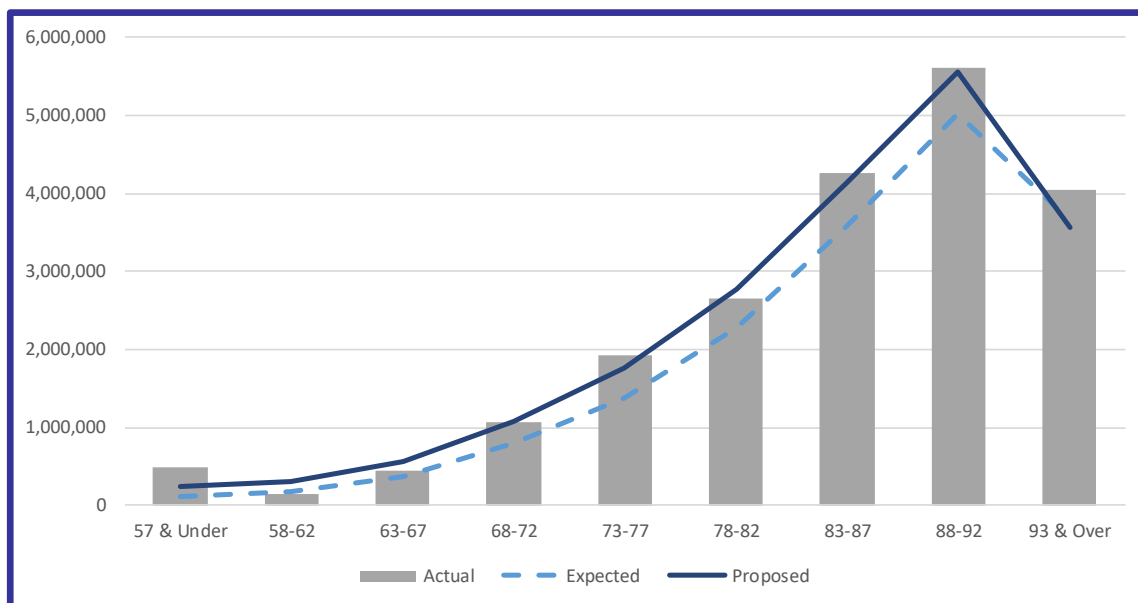


**Summary of Mortality Experience among Disabled Retirees
Female (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
60	\$ 4,877,197	\$ 34,062	0.7%	\$ 50,635	1.0%	\$ 34,930	0.7%
61	5,630,478	40,442	0.7%	61,096	1.1%	43,323	0.8%
62	5,838,705	90,192	1.5%	65,068	1.1%	48,029	0.8%
63	5,750,587	71,462	1.2%	66,262	1.2%	50,444	0.9%
64	5,454,837	18,012	0.3%	65,495	1.2%	50,919	0.9%
65	4,876,908	-	0.0%	61,380	1.3%	48,482	1.0%
66	4,272,757	16,080	0.4%	55,912	1.3%	45,277	1.1%
67	4,144,805	27,179	0.7%	57,166	1.4%	47,005	1.1%
68	4,047,798	57,524	1.4%	58,773	1.5%	49,265	1.2%
69	3,313,833	34,900	1.1%	51,203	1.5%	43,441	1.3%
70	3,082,035	91,705	3.0%	64,911	2.1%	43,714	1.4%
71	2,397,708	-	0.0%	53,947	2.2%	36,901	1.5%
72	1,913,107	79,392	4.1%	46,385	2.4%	32,039	1.7%
73	1,255,343	36,137	2.9%	32,883	2.6%	22,930	1.8%
74	829,634	30,754	3.7%	23,448	2.8%	16,550	2.0%
75	521,227	-	0.0%	16,059	3.1%	11,366	2.2%
76	398,193	-	0.0%	13,259	3.3%	9,506	2.4%
77	165,779	-	0.0%	6,029	3.6%	4,339	2.6%
78	189,857	-	0.0%	7,547	4.0%	5,502	2.9%
79	251,398	-	0.0%	10,898	4.3%	8,173	3.3%
80	137,756	-	0.0%	8,720	6.3%	5,024	3.6%
81	139,158	-	0.0%	9,512	6.8%	5,691	4.1%
82	140,560	28,267	20.1%	10,364	7.4%	6,440	4.6%
83	49,440	-	0.0%	3,951	8.0%	2,536	5.1%
84	-	-	0.0%	-	0.0%	-	5.7%
85	-	-	0.0%	-	0.0%	-	6.4%
86	-	-	0.0%	-	0.0%	-	7.2%
87	-	-	0.0%	-	0.0%	-	8.0%
88	-	-	0.0%	-	0.0%	-	9.0%
89	-	-	0.0%	-	0.0%	-	10.0%
90	-	-	0.0%	-	0.0%	-	11.2%
91	-	-	0.0%	-	0.0%	-	12.4%
92	-	-	0.0%	-	0.0%	-	13.7%
93	-	-	0.0%	-	0.0%	-	15.0%
94	22,378	-	0.0%	4,308	19.3%	3,666	16.4%
95	22,738	22,738	100.0%	4,657	20.5%	4,051	17.8%
96	-	-	0.0%	-	0.0%	-	19.4%
97	-	-	0.0%	-	0.0%	-	21.1%
98	-	-	0.0%	-	0.0%	-	22.8%
99	-	-	0.0%	-	0.0%	-	24.7%
Total	\$ 120,099,405	\$ 767,259	0.6%	\$ 1,185,254	1.0%	\$ 913,840	0.8%



Summary of Mortality Experience among Contingent Annuitants Total



Actual	Expected	Proposed
\$20.64M	\$17.32M	\$19.99M
Actual/Expected		Actual/Proposed
119%		103%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
40 & Under	\$ 8,429,821	\$ 283,002	0.0%	\$ 2,588	0.1%	\$ 2,636	0.1%
41	216,633	-	0.0%	124	0.1%	218	0.1%
42	334,977	12,745	3.8%	205	0.1%	344	0.1%
43	497,684	1,416	0.3%	330	0.1%	528	0.1%
44	678,553	5,536	0.8%	492	0.1%	744	0.1%
45	864,278	11,328	1.3%	692	0.1%	5,131	0.6%
46	885,008	9,912	1.1%	780	0.1%	5,328	0.6%
47	1,384,837	2,832	0.2%	1,352	0.1%	8,513	0.6%
48	1,533,726	12,943	0.8%	1,670	0.1%	9,763	0.6%
49	1,518,483	24,368	1.6%	1,827	0.1%	9,996	0.7%
50	2,011,508	12,905	0.6%	6,643	0.3%	13,689	0.7%
51	2,148,392	14,633	0.7%	7,470	0.3%	15,511	0.7%
52	2,409,148	2,704	0.1%	8,874	0.4%	18,537	0.8%
53	2,812,233	15,427	0.5%	11,060	0.4%	23,186	0.8%
54	3,144,393	60,937	1.9%	13,237	0.4%	27,788	0.9%

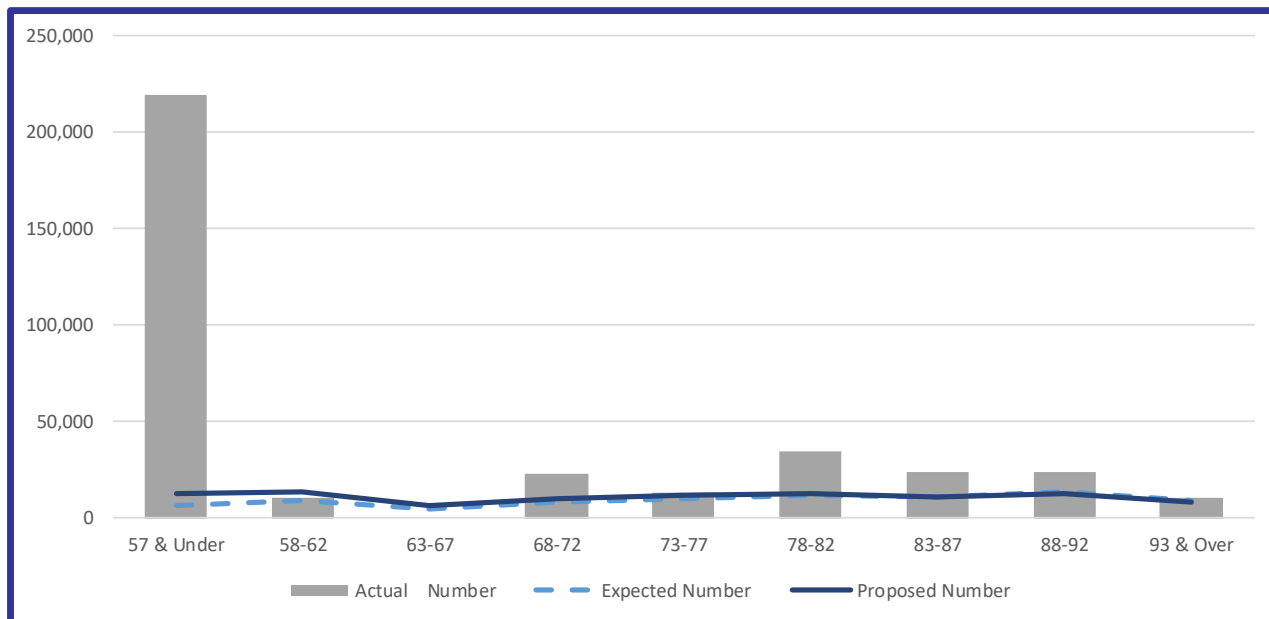


Summary of Mortality Experience among Contingent Annuitants Total (Continued)

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
55	\$ 3,264,348	\$ 2,704	0.1%	\$ 14,780	0.5%	\$ 30,915	0.9%
56	3,621,787	10,507	0.3%	17,672	0.5%	36,638	1.0%
57	3,659,913	2,920	0.1%	19,434	0.5%	39,452	1.1%
58	3,947,458	10,507	0.3%	22,895	0.6%	45,186	1.1%
59	4,043,230	-	0.0%	25,520	0.6%	48,862	1.2%
60	4,778,019	53,818	1.1%	32,660	0.7%	60,645	1.3%
61	5,535,004	28,254	0.5%	40,969	0.7%	73,490	1.3%
62	5,827,060	52,167	0.9%	46,505	0.8%	80,621	1.4%
63	6,198,911	31,324	0.5%	53,237	0.9%	89,171	1.4%
64	6,492,254	94,343	1.5%	60,400	0.9%	97,275	1.5%
65	7,004,670	109,484	1.6%	70,438	1.0%	109,275	1.6%
66	7,813,975	118,736	1.5%	85,297	1.1%	128,111	1.6%
67	8,205,394	94,780	1.2%	97,618	1.2%	142,154	1.7%
68	9,120,325	158,165	1.7%	118,408	1.3%	167,646	1.8%
69	10,006,057	176,276	1.8%	142,009	1.4%	196,355	2.0%
70	10,067,668	210,112	2.1%	156,650	1.6%	212,195	2.1%
71	10,513,893	290,570	2.8%	179,048	1.7%	239,177	2.3%
72	10,466,198	235,658	2.3%	195,729	1.9%	258,335	2.5%
73	10,214,535	278,752	2.7%	211,028	2.1%	274,950	2.7%
74	10,522,279	348,010	3.3%	240,761	2.3%	309,851	2.9%
75	10,387,765	382,954	3.7%	263,114	2.5%	335,314	3.2%
76	11,079,173	453,405	4.1%	310,438	2.8%	392,616	3.5%
77	11,315,555	463,074	4.1%	351,535	3.1%	440,844	3.9%
78	11,195,088	608,298	5.4%	387,231	3.5%	481,023	4.3%
79	10,951,501	602,778	5.5%	422,707	3.9%	519,478	4.7%
80	10,208,301	364,256	3.6%	440,124	4.3%	535,597	5.2%
81	10,135,699	527,482	5.2%	489,874	4.8%	589,800	5.8%
82	9,985,701	557,302	5.6%	541,569	5.4%	645,642	6.5%
83	9,869,200	772,615	7.8%	601,477	6.1%	710,084	7.2%
84	9,512,040	683,941	7.2%	652,342	6.9%	762,853	8.0%
85	9,253,302	871,912	9.4%	712,707	7.7%	828,198	9.0%
86	8,912,805	1,000,427	11.2%	773,143	8.7%	891,178	10.0%
87	8,552,844	926,745	10.8%	834,288	9.8%	954,737	11.2%
88	8,434,484	1,125,300	13.3%	923,429	10.9%	1,049,284	12.4%
89	8,104,438	1,179,962	14.6%	994,185	12.3%	1,119,179	13.8%
90	7,549,469	1,079,117	14.3%	1,035,443	13.7%	1,150,515	15.2%
91	6,971,004	1,187,398	17.0%	1,066,128	15.3%	1,167,733	16.8%
92	5,861,917	1,040,791	17.8%	992,889	16.9%	1,075,016	18.3%
93	4,793,149	879,880	18.4%	894,388	18.7%	959,714	20.0%
94	3,452,713	742,959	21.5%	705,981	20.4%	752,921	21.8%
95	2,438,251	711,070	29.2%	543,081	22.3%	578,022	23.7%
96	1,672,685	504,317	30.2%	407,960	24.4%	431,927	25.8%
97	1,249,032	440,009	35.2%	331,836	26.6%	350,829	28.1%
98	700,357	278,620	39.8%	202,074	28.9%	213,653	30.5%
99	460,581	131,446	28.5%	142,905	31.0%	152,332	33.1%
100 & Over	1,094,393	346,948	31.7%	413,596	37.8%	118,831	10.9%
Total	\$ 354,314,096	\$ 20,640,778	5.8%	\$ 17,322,844	4.9%	\$ 19,989,532	5.6%



Summary of Mortality Experience among Contingent Annuitants Male



Actual	Expected	Proposed
\$0.36M	\$0.09M	\$0.1M
Actual/Expected		Actual/Proposed
419%		358%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
40 & Under	\$ 3,803,250	\$ 154,802	0.0%	\$ 1,430	0.1%	\$ 983	0.1%
41	10,490	-	0.0%	9	0.1%	11	0.1%
42	10,147	2,832	27.9%	9	0.1%	11	0.1%
43	8,455	1,416	16.7%	8	0.1%	10	0.1%
44	15,548	5,536	35.6%	16	0.1%	18	0.1%
45	35,145	9,912	28.2%	40	0.1%	286	0.8%
46	34,139	8,496	24.9%	43	0.1%	280	0.8%
47	63,543	2,832	4.5%	90	0.1%	529	0.8%
48	110,666	2,832	2.6%	175	0.2%	938	0.8%
49	122,571	3,948	3.2%	216	0.2%	1,064	0.9%
50	138,223	3,982	2.9%	651	0.5%	1,287	0.9%
51	123,116	1,116	0.9%	628	0.5%	1,177	1.0%
52	103,858	2,704	2.6%	572	0.6%	1,025	1.0%
53	110,393	-	0.0%	653	0.6%	1,128	1.0%
54	98,023	2,758	2.8%	620	0.6%	1,041	1.1%

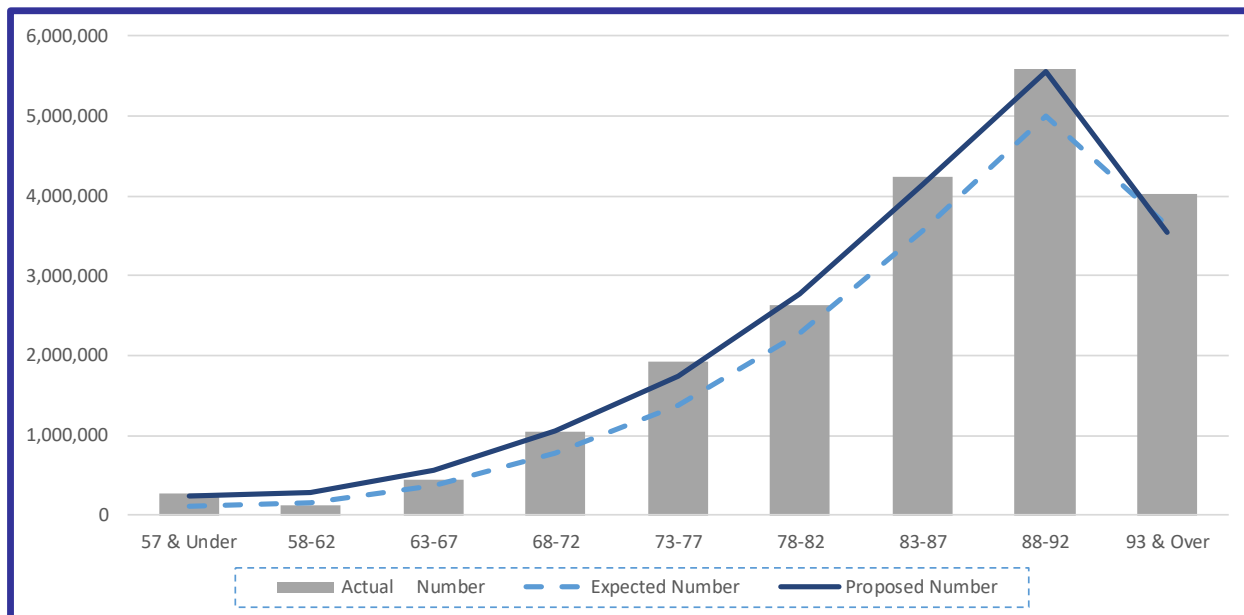


Summary of Mortality Experience among Contingent Annuitants Male (Continued)

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
55	\$ 75,281	\$ 2,704	3.6%	\$ 511	0.7%	\$ 835	1.1%
56	66,270	10,507	15.9%	482	0.7%	768	1.2%
57	90,449	2,920	3.2%	704	0.8%	1,099	1.2%
58	154,870	-	0.0%	1,290	0.8%	1,976	1.3%
59	188,702	-	0.0%	1,682	0.9%	2,529	1.3%
60	215,147	-	0.0%	2,047	1.0%	3,029	1.4%
61	241,814	10,705	4.4%	2,467	1.0%	3,575	1.5%
62	188,225	-	0.0%	2,061	1.1%	2,924	1.6%
63	103,917	-	0.0%	1,228	1.2%	1,696	1.6%
64	103,107	-	0.0%	1,306	1.3%	1,771	1.7%
65	45,344	-	0.0%	619	1.4%	821	1.8%
66	40,247	-	0.0%	599	1.5%	772	1.9%
67	83,209	-	0.0%	1,338	1.6%	1,699	2.0%
68	106,375	-	0.0%	1,851	1.7%	2,321	2.2%
69	118,363	9,913	8.4%	2,230	1.9%	2,771	2.3%
70	113,229	10,309	9.1%	2,309	2.0%	2,854	2.5%
71	58,159	2,866	4.9%	1,295	2.2%	1,585	2.7%
72	23,826	-	0.0%	580	2.4%	703	3.0%
73	57,153	-	0.0%	1,538	2.7%	1,833	3.2%
74	88,738	-	0.0%	2,617	2.9%	3,098	3.5%
75	76,113	10,111	13.3%	2,465	3.2%	2,897	3.8%
76	59,000	-	0.0%	2,097	3.6%	2,450	4.2%
77	26,098	2,920	11.2%	1,042	4.0%	1,183	4.5%
78	49,699	-	0.0%	2,202	4.4%	2,462	5.0%
79	64,001	34,728	54.3%	3,153	4.9%	3,469	5.4%
80	29,664	-	0.0%	1,606	5.4%	1,762	5.9%
81	37,919	-	0.0%	2,284	6.0%	2,473	6.5%
82	41,170	-	0.0%	2,828	6.9%	2,955	7.2%
83	30,730	-	0.0%	2,353	7.7%	2,428	7.9%
84	34,027	13,013	38.2%	2,897	8.5%	2,963	8.7%
85	10,507	-	0.0%	997	9.5%	1,009	9.6%
86	31,126	10,507	33.8%	3,333	10.7%	3,296	10.6%
87	10,111	-	0.0%	1,228	12.1%	1,179	11.7%
88	10,309	-	0.0%	1,389	13.5%	1,323	12.8%
89	13,211	-	0.0%	1,986	15.0%	1,865	14.1%
90	13,463	2,758	20.5%	2,243	16.7%	2,104	15.6%
91	31,667	21,159	66.8%	5,938	18.8%	5,470	17.3%
92	10,705	-	0.0%	2,173	20.3%	2,031	19.0%
93	-	-	0.0%	-	0.0%	-	20.7%
94	-	-	0.0%	-	0.0%	-	22.4%
95	-	-	0.0%	-	0.0%	-	24.1%
96	9,913	-	0.0%	2,858	28.8%	2,575	26.0%
97	10,111	-	0.0%	3,118	30.8%	2,819	27.9%
98	10,309	10,309	100.0%	3,394	32.9%	3,080	29.9%
99	-	-	0.0%	-	0.0%	-	32.0%
100 & Over	-	-	0.0%	-	0.0%	-	0.0%
Total	\$ 7,559,845	\$ 358,593	4.7%	\$ 85,501	1.1%	\$ 100,242	1.3%



Summary of Mortality Experience among Contingent Annuitants Female



Actual	Expected	Proposed
\$20.28M	\$17.24M	\$19.89M
Actual/Expected		Actual/Proposed
118%		102%

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
40 & Under	\$ 4,626,572	\$ 128,199	0.0%	\$ 1,158	0.1%	\$ 1,652	0.1%
41	206,142	-	0.0%	115	0.1%	207	0.1%
42	324,830	9,913	3.1%	196	0.1%	333	0.1%
43	489,229	-	0.0%	322	0.1%	518	0.1%
44	663,005	-	0.0%	476	0.1%	726	0.1%
45	829,134	1,416	0.2%	652	0.1%	4,845	0.6%
46	850,870	1,416	0.2%	736	0.1%	5,048	0.6%
47	1,321,294	-	0.0%	1,262	0.1%	7,985	0.6%
48	1,423,060	10,111	0.7%	1,494	0.1%	8,826	0.6%
49	1,395,912	20,420	1.5%	1,611	0.1%	8,932	0.6%
50	1,873,285	8,923	0.5%	5,992	0.3%	12,401	0.7%
51	2,025,276	13,517	0.7%	6,842	0.3%	14,333	0.7%
52	2,305,290	-	0.0%	8,302	0.4%	17,513	0.8%
53	2,701,839	15,427	0.6%	10,407	0.4%	22,058	0.8%
54	3,046,370	58,179	1.9%	12,617	0.4%	26,747	0.9%



**Summary of Mortality Experience among Contingent Annuitants
Female (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
55	\$ 3,189,067	\$ -	0.0%	\$ 14,269	0.4%	\$ 30,080	0.9%
56	3,555,517	-	0.0%	17,191	0.5%	35,870	1.0%
57	3,569,464	-	0.0%	18,731	0.5%	38,352	1.1%
58	3,792,587	10,507	0.3%	21,605	0.6%	43,210	1.1%
59	3,854,528	-	0.0%	23,838	0.6%	46,333	1.2%
60	4,562,871	53,818	1.2%	30,613	0.7%	57,616	1.3%
61	5,293,190	17,549	0.3%	38,502	0.7%	69,915	1.3%
62	5,638,835	52,167	0.9%	44,444	0.8%	77,697	1.4%
63	6,094,993	31,324	0.5%	52,008	0.9%	87,476	1.4%
64	6,389,148	94,343	1.5%	59,094	0.9%	95,504	1.5%
65	6,959,325	109,484	1.6%	69,819	1.0%	108,454	1.6%
66	7,773,728	118,736	1.5%	84,698	1.1%	127,339	1.6%
67	8,122,184	94,780	1.2%	96,280	1.2%	140,455	1.7%
68	9,013,950	158,165	1.8%	116,556	1.3%	165,325	1.8%
69	9,887,693	166,363	1.7%	139,779	1.4%	193,584	2.0%
70	9,954,439	199,803	2.0%	154,340	1.6%	209,340	2.1%
71	10,455,734	287,704	2.8%	177,754	1.7%	237,592	2.3%
72	10,442,372	235,658	2.3%	195,149	1.9%	257,632	2.5%
73	10,157,383	278,752	2.7%	209,489	2.1%	273,117	2.7%
74	10,433,541	348,010	3.3%	238,144	2.3%	306,753	2.9%
75	10,311,652	372,843	3.6%	260,648	2.5%	332,417	3.2%
76	11,020,173	453,405	4.1%	308,342	2.8%	390,165	3.5%
77	11,289,458	460,155	4.1%	350,494	3.1%	439,661	3.9%
78	11,145,389	608,298	5.5%	385,029	3.5%	478,560	4.3%
79	10,887,500	568,050	5.2%	419,554	3.9%	516,009	4.7%
80	10,178,638	364,256	3.6%	438,518	4.3%	533,835	5.2%
81	10,097,781	527,482	5.2%	487,589	4.8%	587,326	5.8%
82	9,944,531	557,302	5.6%	538,741	5.4%	642,687	6.5%
83	9,838,470	772,615	7.9%	599,124	6.1%	707,656	7.2%
84	9,478,013	670,929	7.1%	649,445	6.9%	759,890	8.0%
85	9,242,795	871,912	9.4%	711,709	7.7%	827,189	8.9%
86	8,881,680	989,920	11.1%	769,810	8.7%	887,882	10.0%
87	8,542,733	926,745	10.8%	833,061	9.8%	953,557	11.2%
88	8,424,174	1,125,300	13.4%	922,039	10.9%	1,047,961	12.4%
89	8,091,227	1,179,962	14.6%	992,199	12.3%	1,117,314	13.8%
90	7,536,006	1,076,359	14.3%	1,033,200	13.7%	1,148,411	15.2%
91	6,939,337	1,166,239	16.8%	1,060,190	15.3%	1,162,264	16.7%
92	5,851,212	1,040,791	17.8%	990,717	16.9%	1,072,985	18.3%
93	4,793,149	879,880	18.4%	894,388	18.7%	959,714	20.0%
94	3,452,713	742,959	21.5%	705,981	20.4%	752,921	21.8%
95	2,438,251	711,070	29.2%	543,081	22.3%	578,022	23.7%
96	1,662,772	504,317	30.3%	405,102	24.4%	429,352	25.8%
97	1,238,921	440,009	35.5%	328,718	26.5%	348,009	28.1%
98	690,048	268,311	38.9%	198,679	28.8%	210,572	30.5%
99	460,581	131,446	28.5%	142,905	31.0%	152,332	33.1%
100 & Over	1,094,393	346,948	31.7%	413,596	37.8%	118,831	10.9%
Total	\$ 346,754,250	\$ 20,282,185	5.8%	\$ 17,237,343	5.0%	\$ 19,889,290	5.7%



Summary of Mortality Experience among Active Members Male

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
Under 20	\$ 309,734	\$ -	0.0%	\$ 67	0.0%	\$ -	0.0%
20	2,545,486	-	0.0%	734	0.0%	1,157	0.0%
21	8,420,858	-	0.0%	2,666	0.0%	4,066	0.0%
22	26,728,673	43,717	0.2%	9,125	0.0%	13,457	0.1%
23	53,562,934	-	0.0%	18,975	0.0%	28,233	0.1%
24	86,399,079	128,565	0.1%	31,655	0.0%	46,870	0.1%
25	114,220,257	-	0.0%	40,437	0.0%	65,213	0.1%
26	142,742,737	58,277	0.0%	50,284	0.0%	85,812	0.1%
27	169,398,026	164,293	0.1%	60,222	0.0%	107,080	0.1%
28	195,642,132	68,625	0.0%	71,328	0.0%	129,771	0.1%
29	215,656,239	241,806	0.1%	80,686	0.0%	149,643	0.1%
30	234,743,753	-	0.0%	91,041	0.0%	169,682	0.1%
31	249,380,728	114,030	0.0%	100,072	0.0%	186,927	0.1%
32	265,085,965	106,698	0.0%	111,037	0.0%	205,015	0.1%
33	275,651,274	-	0.0%	120,074	0.0%	222,492	0.1%
34	281,066,445	25,871	0.0%	126,863	0.0%	231,333	0.1%
35	283,990,252	203,264	0.1%	132,255	0.0%	240,595	0.1%
36	287,034,992	36,747	0.0%	137,576	0.0%	248,380	0.1%
37	284,625,886	82,368	0.0%	138,240	0.0%	253,402	0.1%
38	286,706,948	224,222	0.1%	142,274	0.0%	260,439	0.1%
39	290,465,119	388,570	0.1%	149,579	0.1%	270,880	0.1%
40	294,068,052	72,816	0.0%	156,776	0.1%	279,420	0.1%
41	296,580,671	261,407	0.1%	164,381	0.1%	289,079	0.1%
42	303,739,614	77,265	0.0%	178,336	0.1%	302,208	0.1%
43	311,233,211	336,517	0.1%	193,678	0.1%	322,011	0.1%
44	327,659,342	290,500	0.1%	219,983	0.1%	347,859	0.1%
45	350,974,004	176,121	0.1%	255,218	0.1%	389,467	0.1%
46	385,654,616	89,566	0.0%	307,532	0.1%	447,132	0.1%
47	411,541,363	450,467	0.1%	360,404	0.1%	502,642	0.1%
48	434,257,333	709,055	0.2%	420,091	0.1%	563,168	0.1%
49	428,591,693	761,273	0.2%	458,313	0.1%	594,485	0.1%



Summary of Mortality Experience among Active Members Male (continued)

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
50	\$ 416,054,156	\$ 499,478	0.1%	\$ 491,211	0.1%	\$ 621,066	0.1%
51	389,828,856	432,721	0.1%	507,679	0.1%	629,786	0.2%
52	368,443,032	909,956	0.2%	532,150	0.1%	643,407	0.2%
53	348,775,634	595,496	0.2%	555,453	0.2%	664,304	0.2%
54	323,930,425	694,107	0.2%	566,776	0.2%	674,420	0.2%
55	290,263,844	439,668	0.2%	560,287	0.2%	661,040	0.2%
56	247,728,061	655,149	0.3%	522,210	0.2%	619,533	0.3%
57	187,476,866	207,515	0.1%	441,209	0.2%	515,599	0.3%
58	147,908,905	230,484	0.2%	386,636	0.3%	447,169	0.3%
59	113,474,137	192,609	0.2%	331,133	0.3%	378,410	0.3%
60	88,868,179	111,503	0.1%	288,647	0.3%	340,615	0.4%
61	67,004,641	145,404	0.2%	243,766	0.4%	280,984	0.4%
62	47,772,638	158,270	0.3%	196,264	0.4%	218,162	0.5%
63	33,377,044	183,272	0.5%	153,133	0.5%	165,500	0.5%
64	23,632,510	88,512	0.4%	118,695	0.5%	126,554	0.5%
65	15,054,677	112,881	0.7%	86,430	0.6%	86,836	0.6%
66	9,945,804	107,604	1.1%	63,694	0.6%	63,915	0.6%
67	6,122,192	186,014	3.0%	42,318	0.7%	43,912	0.7%
68	3,934,764	-	0.0%	38,497	1.0%	31,463	0.8%
69	3,529,156	82,513	2.3%	38,945	1.1%	31,501	0.9%
70	2,486,675	31,980	1.3%	10,401	0.4%	24,850	1.0%
71	1,597,308	-	0.0%	7,856	0.5%	17,917	1.1%
72	1,297,056	-	0.0%	5,621	0.4%	16,356	1.3%
73	675,082	-	0.0%	2,025	0.3%	9,598	1.4%
74	456,118	-	0.0%	913	0.2%	7,333	1.6%
75	279,188	-	0.0%	-	0.0%	5,080	1.8%
76	113,082	-	0.0%	-	0.0%	2,334	2.1%
77	147,968	-	0.0%	-	0.0%	3,466	2.3%
78	43,161	-	0.0%	-	0.0%	1,148	2.7%
79& Over	-	-	0.0%	-	0.0%	-	0.0%
Total	\$10,438,898,573	\$ 11,177,176	0.1%	\$ 10,521,853	0.1%	\$ 14,290,176	0.1%



**Summary of Mortality Experience among Active Members
Female**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
Under 20	\$ 49,181	\$ -	0.0%	\$ 8	0.0%	\$ -	0.0%
20	163,957	-	0.0%	17	0.0%	31	0.0%
21	676,953	-	0.0%	98	0.0%	146	0.0%
22	2,846,607	-	0.0%	367	0.0%	659	0.0%
23	7,110,582	-	0.0%	1,052	0.0%	1,844	0.0%
24	10,816,806	-	0.0%	1,703	0.0%	3,119	0.0%
25	14,101,116	-	0.0%	2,248	0.0%	4,326	0.0%
26	16,335,959	-	0.0%	2,620	0.0%	5,518	0.0%
27	18,474,394	-	0.0%	3,328	0.0%	6,828	0.0%
28	19,454,441	-	0.0%	3,745	0.0%	7,824	0.0%
29	20,499,447	-	0.0%	4,354	0.0%	8,913	0.0%
30	18,672,737	-	0.0%	4,246	0.0%	8,719	0.0%
31	18,072,427	-	0.0%	4,442	0.0%	8,997	0.0%
32	17,360,189	-	0.0%	4,412	0.0%	9,371	0.1%
33	17,310,456	82,290	0.5%	4,492	0.0%	9,793	0.1%
34	18,410,618	-	0.0%	5,126	0.0%	11,063	0.1%
35	18,013,773	-	0.0%	5,034	0.0%	11,378	0.1%
36	19,074,809	-	0.0%	5,826	0.0%	12,537	0.1%
37	19,360,574	-	0.0%	6,179	0.0%	13,125	0.1%
38	19,351,154	-	0.0%	6,620	0.0%	13,660	0.1%
39	18,476,135	-	0.0%	6,593	0.0%	13,262	0.1%
40	17,551,832	-	0.0%	6,691	0.0%	12,948	0.1%
41	18,126,892	-	0.0%	7,272	0.0%	13,885	0.1%
42	19,037,305	-	0.0%	8,155	0.0%	14,889	0.1%
43	18,855,712	-	0.0%	8,422	0.0%	15,242	0.1%
44	20,161,710	-	0.0%	9,600	0.0%	16,846	0.1%
45	23,127,764	-	0.0%	12,233	0.1%	20,011	0.1%
46	24,800,444	-	0.0%	14,169	0.1%	22,511	0.1%
47	27,160,474	-	0.0%	16,808	0.1%	25,922	0.1%
48	29,379,758	-	0.0%	19,920	0.1%	29,845	0.1%
49	28,222,645	-	0.0%	20,931	0.1%	30,311	0.1%



**Summary of Mortality Experience among Active Members
Female (continued)**

Age	Exposed	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
50	\$ 27,484,968	\$ -	0.0%	\$ 22,344	0.1%	\$ 31,814	0.1%
51	25,317,735	-	0.0%	22,562	0.1%	31,601	0.1%
52	23,041,710	-	0.0%	22,546	0.1%	31,007	0.1%
53	20,980,551	-	0.0%	22,556	0.1%	30,620	0.1%
54	19,249,405	128,593	0.7%	22,649	0.1%	30,367	0.2%
55	15,723,393	179,394	1.1%	20,287	0.1%	26,856	0.2%
56	13,232,286	-	0.0%	18,632	0.1%	24,309	0.2%
57	10,497,226	-	0.0%	16,009	0.2%	20,809	0.2%
58	8,654,050	-	0.0%	14,356	0.2%	18,338	0.2%
59	6,684,570	-	0.0%	12,015	0.2%	15,000	0.2%
60	5,774,032	-	0.0%	11,118	0.2%	13,718	0.2%
61	4,051,292	46,057	1.1%	8,361	0.2%	10,097	0.2%
62	3,533,635	-	0.0%	7,826	0.2%	9,238	0.3%
63	2,381,622	-	0.0%	5,312	0.2%	6,487	0.3%
64	1,526,017	-	0.0%	3,639	0.2%	4,323	0.3%
65	695,452	-	0.0%	1,878	0.3%	2,050	0.3%
66	386,621	-	0.0%	1,006	0.3%	1,285	0.3%
67	-	-	0.0%	-	0.0%	-	0.4%
68	-	-	0.0%	-	0.0%	-	0.4%
69	-	-	0.0%	-	0.0%	-	0.5%
70	-	-	0.0%	-	0.0%	-	0.6%
71	57,870	-	0.0%	-	0.0%	366	0.6%
72	-	-	0.0%	-	0.0%	-	0.7%
73	-	-	0.0%	-	0.0%	-	0.8%
74	-	-	0.0%	-	0.0%	-	1.0%
75	-	-	0.0%	-	0.0%	-	1.1%
76	-	-	0.0%	-	0.0%	-	1.3%
77	-	-	0.0%	-	0.0%	-	1.5%
78	-	-	0.0%	-	0.0%	-	1.7%
79& Over	-	-	0.0%	-	0.0%	-	0.0%
Total	\$ 710,329,287	\$ 436,335	0.1%	\$ 429,807	0.1%	\$ 661,808	0.1%



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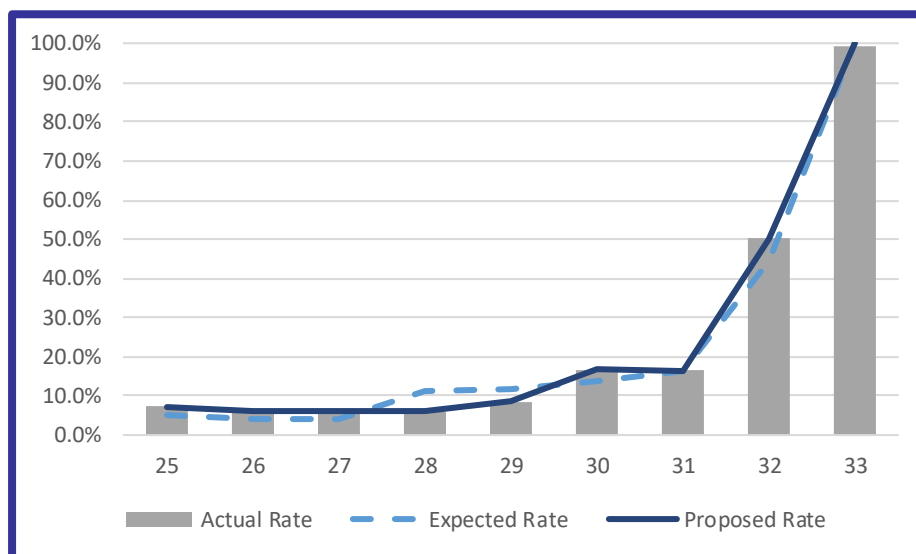


APPENDIX D

RETIREMENT



Summary of Retirement Experience among Active Members Police - Currently In DROP

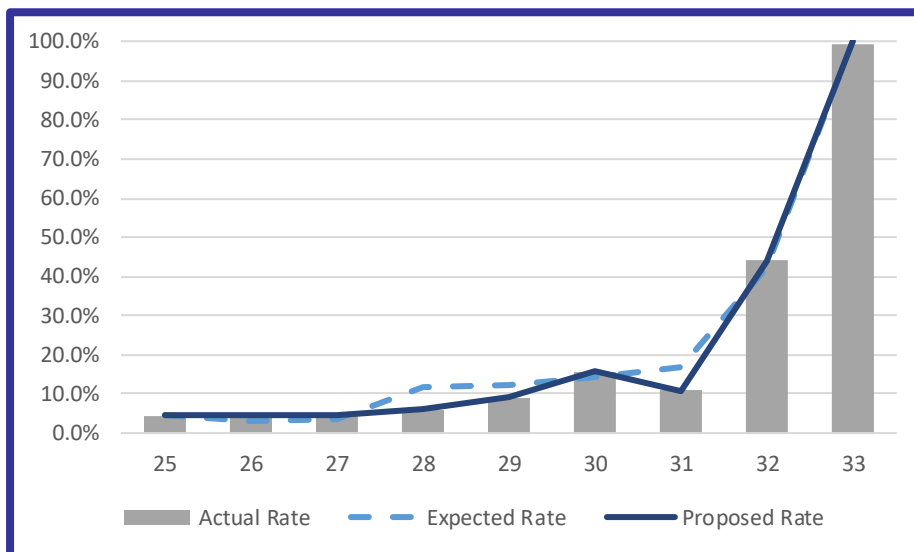


Actual	Expected	Proposed
\$162.61M	\$157.92M	\$161.64M
Actual/Expected		Actual/Proposed
103%		101%

Service	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
25	\$ 74,425,527	\$ 5,410,126	7.27%	\$ 3,636,655	4.89%	\$ 5,395,851	7.25%
26	154,878,448	9,537,573	6.16%	6,700,129	4.33%	9,292,707	6.00%
27	141,474,700	9,141,877	6.46%	6,126,708	4.33%	8,842,169	6.25%
28	136,387,056	8,364,252	6.13%	15,686,104	11.50%	8,183,223	6.00%
29	135,503,419	11,651,446	8.60%	15,643,900	11.55%	11,517,791	8.50%
30	121,877,995	20,531,994	16.85%	16,736,033	13.73%	20,414,564	16.75%
31	97,943,332	16,055,925	16.39%	16,125,476	16.46%	15,915,791	16.25%
32	83,118,321	41,638,210	50.10%	36,741,133	44.20%	41,559,161	50.00%
33	40,520,850	40,275,016	99.39%	40,520,850	100.00%	40,520,850	100.00%
Total	\$986,129,650	\$162,606,420	16.49%	\$157,916,989	16.01%	\$161,642,107	16.39%



Summary of Retirement Experience among Active Members Firefighters - Currently in DROP

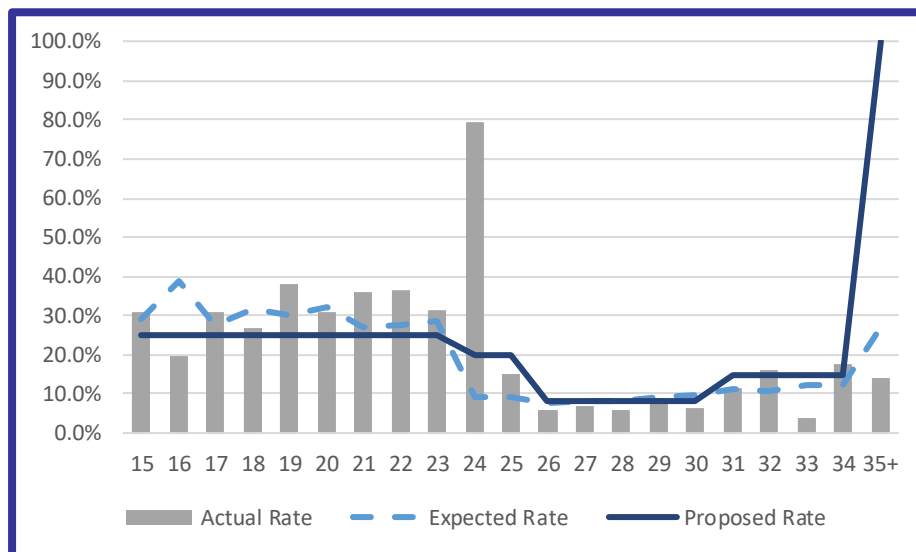


Actual	Expected	Proposed
\$140.82M	\$152.2M	\$142.23M
Actual/Expected		Actual/Proposed
93%		99%

Service	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
25	\$ 58,336,607	\$ 2,694,391	4.62%	\$ 2,650,297	4.54%	\$ 2,770,989	4.75%
26	134,349,146	6,105,752	4.54%	4,376,645	3.26%	6,381,584	4.75%
27	129,237,872	5,817,723	4.50%	4,766,756	3.69%	6,138,799	4.75%
28	124,222,860	7,242,238	5.83%	14,438,080	11.62%	7,453,372	6.00%
29	124,221,123	11,102,004	8.94%	15,049,193	12.11%	11,179,901	9.00%
30	109,471,372	17,176,386	15.69%	15,939,455	14.56%	17,241,741	15.75%
31	93,034,563	10,111,557	10.87%	15,564,777	16.73%	10,233,802	11.00%
32	82,905,294	36,541,142	44.08%	35,066,508	42.30%	36,478,329	44.00%
33	44,350,727	44,027,883	99.27%	44,350,727	100.00%	44,350,727	100.00%
Total	\$900,129,564	\$140,819,075	15.64%	\$152,202,439	16.91%	\$142,229,244	15.80%



Summary of Retirement Experience among Active Members Police – Not In DROP



Actual	Expected	Proposed
\$48.05M	\$31.43M	\$50.58M
Actual/Expected		Actual/Proposed
153%		95%

Compared to later service amounts the exposures at 24 years of service are minimal, but there is a large proportion of members retiring with 24 years of service because they are either service commuted members or because these members retired after mid-year and eligibility is determined at mid-year for the valuation. Refer to the numeric tables that follow.

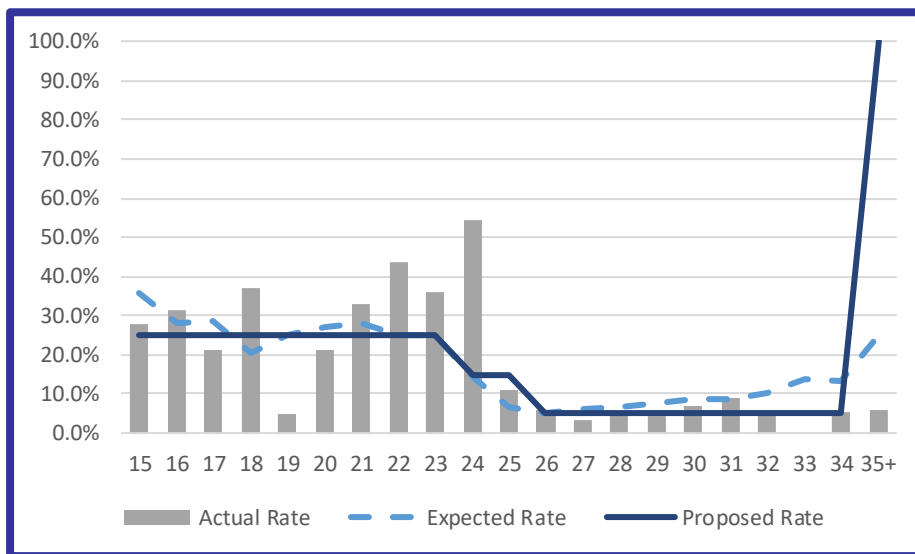


**Summary of Retirement Experience among Active Members
Police – Not In DROP (continued)**

Service	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
15	\$ 776,657	\$ 240,948	31.0%	\$ 225,458	29.0%	\$ 194,164	25.0%
16	1,205,395	235,703	19.6%	466,710	38.7%	301,349	25.0%
17	1,130,232	350,051	31.0%	310,089	27.4%	282,558	25.0%
18	952,705	253,634	26.6%	303,159	31.8%	238,176	25.0%
19	1,270,993	486,504	38.3%	384,057	30.2%	317,748	25.0%
20	1,438,811	443,067	30.8%	463,948	32.2%	359,703	25.0%
21	1,750,033	626,259	35.8%	472,233	27.0%	437,508	25.0%
22	2,291,543	842,702	36.8%	632,349	27.6%	572,886	25.0%
23	2,826,969	890,184	31.5%	809,369	28.6%	706,742	25.0%
24	13,116,198	10,415,688	79.4%	1,223,093	9.3%	2,623,240	20.0%
25	154,200,288	23,204,690	15.0%	13,978,276	9.1%	30,840,058	20.0%
26	49,822,421	3,064,574	6.2%	3,903,881	7.8%	3,985,794	8.0%
27	31,996,203	2,257,283	7.1%	2,562,801	8.0%	2,559,696	8.0%
28	23,407,272	1,438,431	6.1%	1,931,198	8.3%	1,872,582	8.0%
29	14,965,453	1,321,483	8.8%	1,372,381	9.2%	1,197,236	8.0%
30	7,874,303	508,096	6.5%	757,284	9.6%	629,944	8.0%
31	4,841,851	547,439	11.3%	534,351	11.0%	726,278	15.0%
32	2,816,781	455,860	16.2%	299,063	10.6%	422,517	15.0%
33	1,526,408	62,782	4.1%	184,174	12.1%	228,961	15.0%
34	695,334	123,213	17.7%	86,122	12.4%	104,300	15.0%
35+	1,978,004	279,821	14.1%	532,548	26.9%	1,978,004	100.0%
Total	\$ 320,883,854	\$ 48,048,411	14.97%	\$ 31,432,543	9.80%	\$ 50,579,444	15.76%



Summary of Retirement Experience among Active Members Firefighters – Not In DROP



Actual	Expected	Proposed
\$31.36M	\$23.97M	\$33.96M
Actual/Expected		Actual/Proposed
131%		92%

Compared to later service amounts the exposures at 24 years of service are minimal, but there is a large proportion of members retiring with 24 years of service because they are either service commuted members or because these members retired after mid-year and eligibility is determined at mid-year for the valuation. Refer to the numeric tables that follow.



**Summary of Retirement Experience among Active Members
Firefighters – Not In DROP (continued)**

Service	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
15	\$ 849,874	\$ 237,786	28.0%	\$ 304,785	35.9%	\$ 212,468	25.0%
16	915,090	286,426	31.3%	257,378	28.1%	228,773	25.0%
17	551,776	118,386	21.5%	159,265	28.9%	137,944	25.0%
18	931,729	347,411	37.3%	188,688	20.3%	232,932	25.0%
19	1,162,965	57,645	5.0%	293,162	25.2%	290,741	25.0%
20	2,288,145	481,468	21.0%	622,589	27.2%	572,036	25.0%
21	2,700,788	883,693	32.7%	760,693	28.2%	675,197	25.0%
22	2,920,583	1,276,211	43.7%	736,998	25.2%	730,146	25.0%
23	3,976,661	1,430,882	36.0%	998,786	25.1%	994,165	25.0%
24	8,851,325	4,819,708	54.5%	1,276,535	14.4%	1,327,699	15.0%
25	127,559,701	14,162,105	11.1%	8,668,387	6.8%	19,133,955	15.0%
26	44,509,072	2,693,528	6.1%	2,283,516	5.1%	2,225,454	5.0%
27	32,278,793	1,072,825	3.3%	1,929,450	6.0%	1,613,940	5.0%
28	24,402,650	1,209,637	5.0%	1,588,294	6.5%	1,220,132	5.0%
29	15,829,441	730,828	4.6%	1,215,725	7.7%	791,472	5.0%
30	8,839,527	623,899	7.1%	789,846	8.9%	441,976	5.0%
31	5,916,382	527,302	8.9%	529,756	9.0%	295,819	5.0%
32	3,427,330	187,668	5.5%	350,635	10.2%	171,367	5.0%
33	1,677,199	-	0.0%	229,677	13.7%	83,860	5.0%
34	1,126,336	58,441	5.2%	151,049	13.4%	56,317	5.0%
35+	2,526,777	149,414	5.9%	630,224	24.9%	2,526,777	100.0%
Total	\$ 293,242,144	\$ 31,355,263	10.69%	\$ 23,965,438	8.17%	\$ 33,963,170	11.58%



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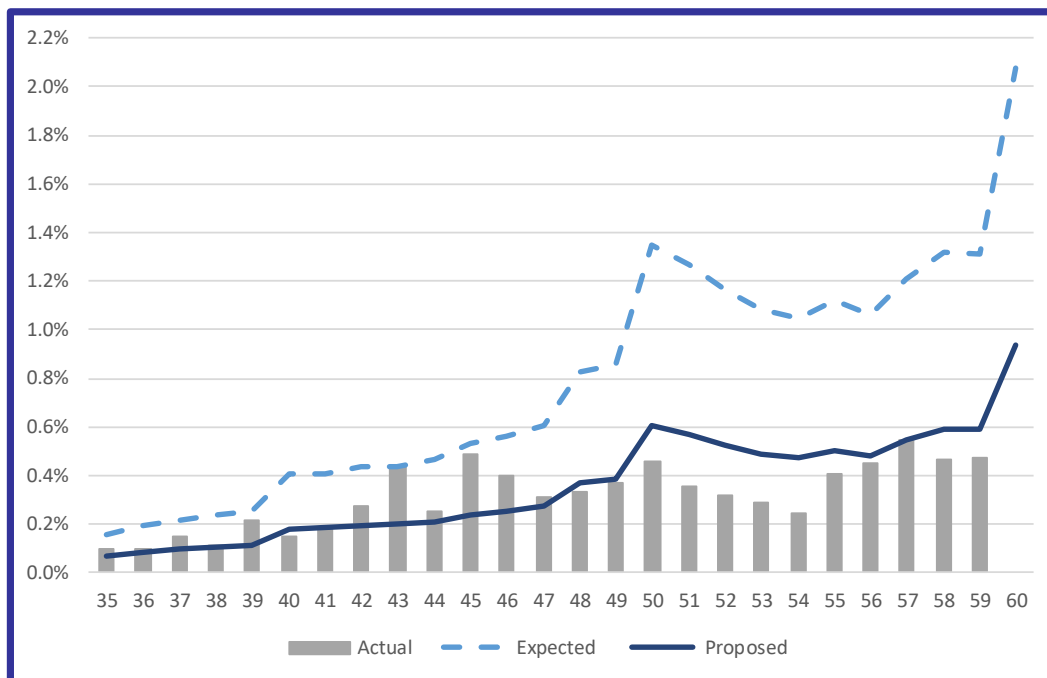


APPENDIX E

DISABILITY



Summary of Disability Experience among Active Members Police



Actual	Expected	Proposed
\$14.44M	\$35.6M	\$16.02M
Actual/Expected		Actual/Proposed
41%		90%

Age	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
20	\$ 277,254	\$ -	0.0000%	\$ 3	0.0010%	\$ 1	0.0005%
21	1,740,171	-	0.0000%	17	0.0010%	8	0.0005%
22	13,874,811	-	0.0000%	139	0.0010%	62	0.0005%
23	35,690,333	-	0.0000%	714	0.0020%	321	0.0009%
24	60,222,352	-	0.0000%	2,409	0.0040%	1,084	0.0018%
25	79,098,841	-	0.0000%	5,537	0.0070%	2,492	0.0032%
26	97,348,592	-	0.0000%	10,708	0.0110%	4,819	0.0050%
27	111,510,220	-	0.0000%	21,187	0.0190%	9,534	0.0086%
28	125,245,806	-	0.0000%	37,574	0.0300%	16,908	0.0135%
29	134,518,975	63,311	0.0471%	59,188	0.0440%	26,635	0.0198%
30	142,534,577	-	0.0000%	126,856	0.0890%	57,085	0.0401%
31	146,627,993	-	0.0000%	143,695	0.0980%	64,663	0.0441%
32	152,030,686	136,583	0.0898%	162,673	0.1070%	73,203	0.0482%
33	157,213,713	28,863	0.0184%	177,651	0.1130%	79,943	0.0509%
34	157,242,078	61,414	0.0391%	204,415	0.1300%	91,987	0.0585%

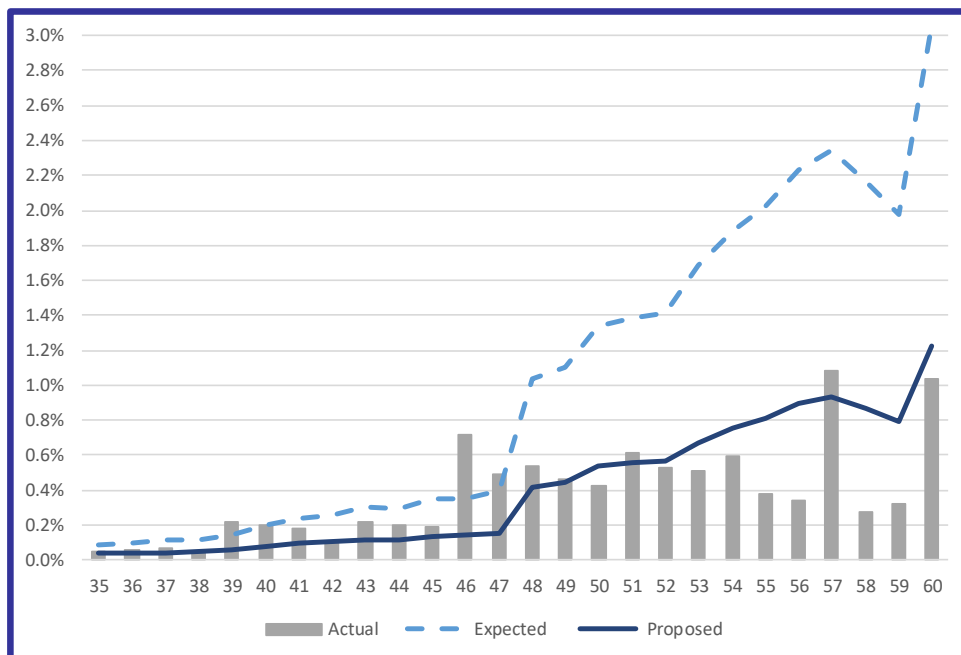


**Summary of Disability Experience among Active Members
Police (continued)**

Age	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
35	155,150,852	147,692	0.0952%	238,932	0.1540%	107,520	0.0693%
36	158,140,284	151,949	0.0961%	302,048	0.1910%	135,922	0.0860%
37	156,041,369	230,571	0.1478%	330,808	0.2120%	148,863	0.0954%
38	152,818,479	175,758	0.1150%	360,652	0.2360%	162,293	0.1062%
39	151,989,442	322,029	0.2119%	379,974	0.2500%	170,988	0.1125%
40	154,785,132	234,298	0.1514%	623,784	0.4030%	280,703	0.1814%
41	153,744,012	286,353	0.1863%	630,350	0.4100%	283,658	0.1845%
42	159,803,829	443,400	0.2775%	696,745	0.4360%	313,535	0.1962%
43	168,873,955	741,587	0.4391%	741,357	0.4390%	333,610	0.1976%
44	182,457,263	463,029	0.2538%	853,900	0.4680%	384,255	0.2106%
45	199,931,694	970,389	0.4854%	1,065,636	0.5330%	479,536	0.2399%
46	226,265,774	898,336	0.3970%	1,276,139	0.5640%	574,263	0.2538%
47	245,606,435	769,289	0.3132%	1,483,463	0.6040%	667,558	0.2718%
48	261,848,036	867,921	0.3315%	2,157,628	0.8240%	970,933	0.3708%
49	257,615,411	950,292	0.3689%	2,205,188	0.8560%	992,335	0.3852%
50	248,410,933	1,136,247	0.4574%	3,356,032	1.3510%	1,510,214	0.6080%
51	228,693,426	808,198	0.3534%	2,897,546	1.2670%	1,303,896	0.5702%
52	212,468,086	673,742	0.3171%	2,468,879	1.1620%	1,110,996	0.5229%
53	193,745,657	564,998	0.2916%	2,100,203	1.0840%	945,091	0.4878%
54	175,652,708	435,751	0.2481%	1,840,840	1.0480%	828,378	0.4716%
55	150,723,840	611,480	0.4057%	1,686,600	1.1190%	758,970	0.5036%
56	121,579,656	546,475	0.4495%	1,287,529	1.0590%	579,388	0.4766%
57	88,057,091	480,848	0.5461%	1,062,849	1.2070%	478,282	0.5432%
58	67,801,674	313,437	0.4623%	892,270	1.3160%	401,522	0.5922%
59	50,469,797	236,799	0.4692%	662,668	1.3130%	298,201	0.5909%
60	38,707,253	-	0.0000%	804,337	2.0780%	361,952	0.9351%
61	29,520,045	132,483	0.4488%	791,137	2.6800%	356,012	1.2060%
62	21,974,977	261,293	1.1890%	494,876	2.2520%	222,694	1.0134%
63	15,920,035	221,038	1.3884%	370,778	2.3290%	166,850	1.0481%
64	11,425,794	-	0.0000%	354,085	3.0990%	159,338	1.3946%
65	7,394,342	77,461	1.0476%	229,151	3.0990%	103,118	1.3946%
Total	\$ 5,862,793,682	\$ 14,443,314	0.2464%	\$ 35,599,148	0.6072%	\$ 16,019,617	0.2732%



Summary of Disability Experience among Active Members Firefighters



Actual	Expected	Proposed
\$16.19M	\$41.93M	\$16.77M
Actual/Expected		Actual/Proposed
39%		97%

Age	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
20	\$ 2,432,189	\$ -	0.0000%	\$ 24	0.0010%	\$ 10	0.0004%
21	7,357,640	-	0.0000%	74	0.0010%	29	0.0004%
22	15,700,468	-	0.0000%	157	0.0010%	63	0.0004%
23	24,983,183	-	0.0000%	250	0.0010%	100	0.0004%
24	36,993,534	-	0.0000%	1,110	0.0030%	444	0.0012%
25	49,222,532	-	0.0000%	2,461	0.0050%	984	0.0020%
26	61,730,105	-	0.0000%	8,025	0.0130%	3,210	0.0052%
27	76,362,199	-	0.0000%	12,982	0.0170%	5,193	0.0068%
28	89,850,768	-	0.0000%	19,767	0.0220%	7,907	0.0088%
29	101,636,710	38,104	0.0375%	27,442	0.0270%	10,977	0.0108%
30	110,881,914	47,538	0.0429%	24,394	0.0220%	9,758	0.0088%
31	120,825,161	-	0.0000%	48,330	0.0400%	19,332	0.0160%
32	130,415,468	-	0.0000%	65,208	0.0500%	26,083	0.0200%
33	135,808,017	65,355	0.0481%	90,991	0.0670%	36,397	0.0268%
34	142,234,985	117,720	0.0828%	119,477	0.0840%	47,791	0.0336%



Summary of Disability Experience among Members Firefighters (continued)

Age	Exposure	Actual	Actual Rate	Expected	Expected Rate	Proposed	Proposed Rate
35	146,853,174	77,486	0.0528%	133,636	0.0910%	53,455	0.0364%
36	147,969,516	86,689	0.0586%	149,449	0.1010%	59,780	0.0404%
37	147,945,092	102,504	0.0693%	164,219	0.1110%	65,688	0.0444%
38	153,299,623	76,508	0.0499%	183,960	0.1200%	73,584	0.0480%
39	156,951,812	344,139	0.2193%	226,011	0.1440%	90,404	0.0576%
40	156,834,752	307,589	0.1961%	319,943	0.2040%	127,977	0.0816%
41	160,963,550	290,307	0.1804%	381,484	0.2370%	152,593	0.0948%
42	162,973,090	166,537	0.1022%	415,581	0.2550%	166,233	0.1020%
43	161,214,968	346,073	0.2147%	483,645	0.3000%	193,458	0.1200%
44	165,363,789	331,030	0.2002%	487,823	0.2950%	195,129	0.1180%
45	174,170,074	339,053	0.1947%	604,370	0.3470%	241,748	0.1388%
46	184,189,287	1,316,780	0.7149%	640,979	0.3480%	256,391	0.1392%
47	193,095,402	949,736	0.4918%	760,796	0.3940%	304,318	0.1576%
48	201,789,056	1,095,314	0.5428%	2,086,499	1.0340%	834,600	0.4136%
49	199,198,927	931,316	0.4675%	2,203,140	1.1060%	881,256	0.4424%
50	195,128,191	825,681	0.4231%	2,608,864	1.3370%	1,043,546	0.5348%
51	186,453,165	1,139,434	0.6111%	2,586,105	1.3870%	1,034,442	0.5548%
52	179,016,656	944,062	0.5274%	2,522,345	1.4090%	1,008,938	0.5636%
53	176,010,528	903,482	0.5133%	2,967,537	1.6860%	1,187,015	0.6744%
54	167,527,122	1,001,748	0.5980%	3,157,886	1.8850%	1,263,154	0.7540%
55	155,352,942	587,303	0.3780%	3,145,897	2.0250%	1,258,359	0.8100%
56	139,380,690	479,405	0.3440%	3,112,371	2.2330%	1,244,948	0.8932%
57	109,917,001	1,189,160	1.0819%	2,570,959	2.3390%	1,028,383	0.9356%
58	88,761,281	244,257	0.2752%	1,919,906	2.1630%	767,963	0.8652%
59	69,688,910	223,909	0.3213%	1,380,537	1.9810%	552,215	0.7924%
60	55,934,959	579,957	1.0368%	1,711,610	3.0600%	684,644	1.2240%
61	41,535,888	178,740	0.4303%	1,230,708	2.9630%	492,283	1.1852%
62	29,331,296	388,430	1.3243%	909,563	3.1010%	363,825	1.2404%
63	19,838,631	72,169	0.3638%	854,053	4.3050%	341,621	1.7220%
64	13,732,733	276,908	2.0164%	987,384	7.1900%	394,953	2.8760%
65	8,355,787	128,820	1.5417%	600,781	7.1900%	240,312	2.8760%
Total	\$ 5,255,212,765	\$ 16,193,244	0.3081%	\$ 41,928,734	0.7979%	\$ 16,771,493	0.3191%



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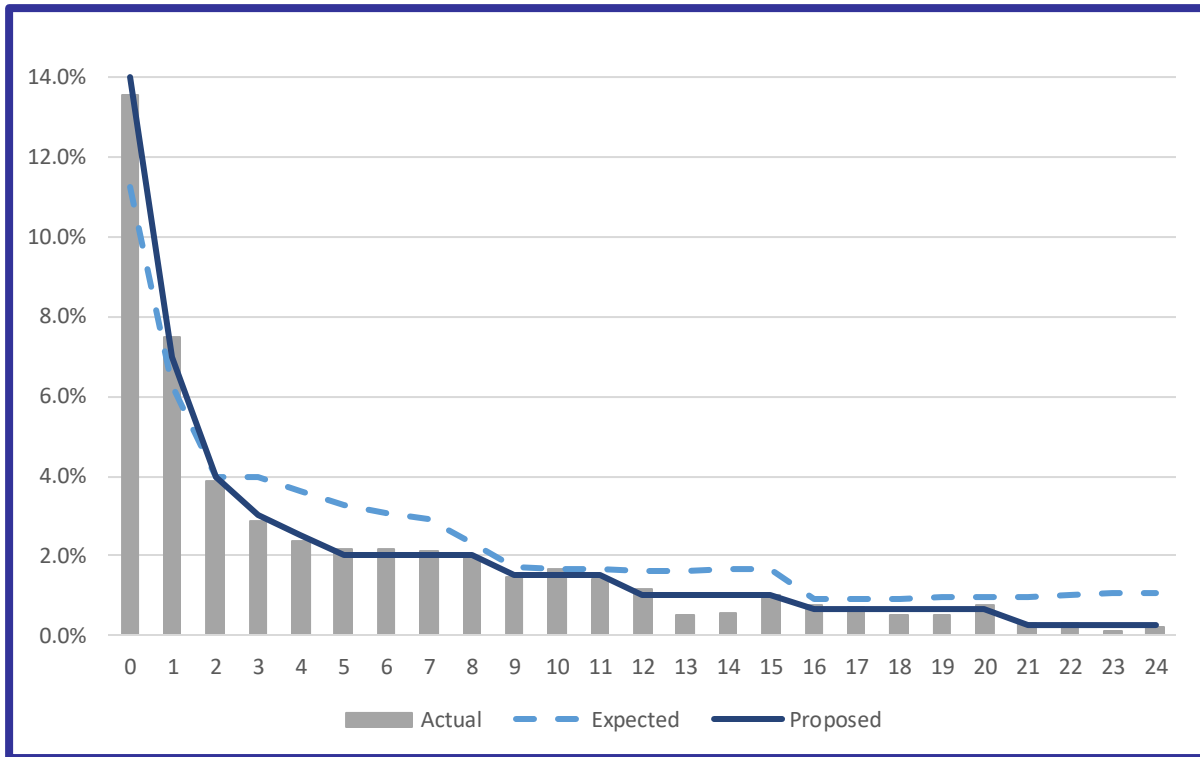


APPENDIX F

TERMINATION OF EMPLOYMENT



Summary of Withdrawal Experience among Active Members Police



Actual	Expected	Proposed
\$90.34M	\$110.67M	\$90.8M
Actual/Expected		Actual/Proposed
82%		99%

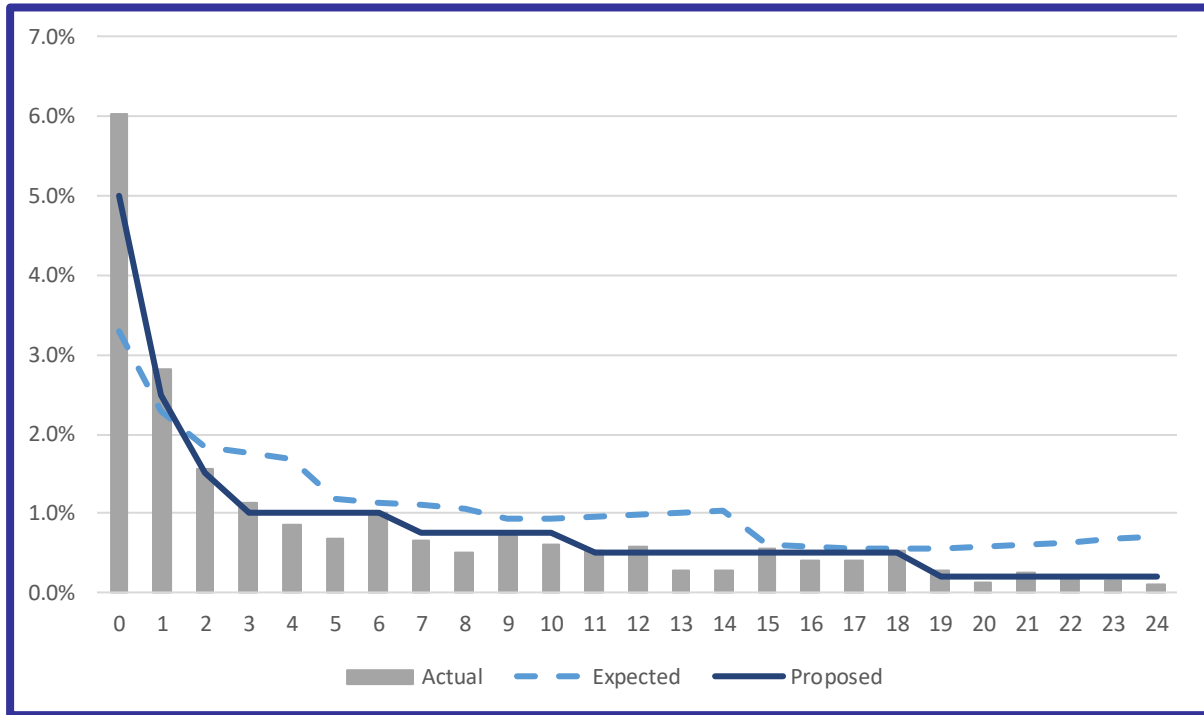


**Summary of Withdrawal Experience among Active Members
Police (continued)**

Service	Exposure	Actual	Actual Rates	Expected	Expected Rates	Proposed	Proposed Rates
0	\$ 137,201,477	\$ 18,596,630	13.554%	\$ 15,430,235	11.246%	\$ 19,208,207	14.000%
1	229,113,954	17,110,110	7.468%	14,435,360	6.301%	16,037,977	7.000%
2	230,476,990	8,974,372	3.894%	9,219,723	4.000%	9,219,080	4.000%
3	220,183,159	6,362,068	2.889%	8,789,338	3.992%	6,605,495	3.000%
4	215,058,735	5,112,663	2.377%	7,815,371	3.634%	5,376,468	2.500%
5	203,448,981	4,406,839	2.166%	6,642,487	3.265%	4,068,980	2.000%
6	185,112,469	4,044,894	2.185%	5,665,120	3.060%	3,702,249	2.000%
7	157,726,694	3,353,934	2.126%	4,624,941	2.932%	3,154,534	2.000%
8	138,388,976	2,748,706	1.986%	3,221,322	2.328%	2,767,780	2.000%
9	144,892,028	2,161,238	1.492%	2,501,597	1.727%	2,173,380	1.500%
10	145,902,558	2,468,047	1.692%	2,452,859	1.681%	2,188,538	1.500%
11	148,012,801	2,088,612	1.411%	2,456,348	1.660%	2,220,192	1.500%
12	157,081,969	1,835,573	1.169%	2,548,287	1.622%	1,570,820	1.000%
13	155,865,973	840,726	0.539%	2,540,535	1.630%	1,558,660	1.000%
14	150,022,133	835,907	0.557%	2,467,898	1.645%	1,500,221	1.000%
15	148,541,895	1,521,793	1.024%	2,467,898	1.661%	1,485,419	1.000%
16	151,694,881	1,174,140	0.774%	1,424,631	0.939%	986,017	0.650%
17	164,949,483	1,145,976	0.695%	1,544,013	0.936%	1,072,172	0.650%
18	174,631,865	906,194	0.519%	1,635,991	0.937%	1,135,107	0.650%
19	189,212,210	939,284	0.496%	1,792,496	0.947%	1,229,879	0.650%
20	205,021,425	1,603,426	0.782%	1,953,596	0.953%	1,332,639	0.650%
21	217,332,732	677,383	0.312%	2,126,632	0.979%	543,332	0.250%
22	220,474,300	728,612	0.330%	2,215,623	1.005%	551,186	0.250%
23	224,227,171	248,833	0.111%	2,336,720	1.042%	560,568	0.250%
24	218,942,716	451,886	0.206%	2,360,866	1.078%	547,357	0.250%
Total	\$ 4,533,517,575	\$ 90,337,847	1.993%	\$ 110,669,889	2.441%	\$ 90,796,256	2.003%



Summary of Withdrawal Experience among Active Members Firefighters



Actual	Expected	Proposed
\$30.1M	\$42.37M	\$30.56M
Actual/Expected		Actual/Proposed
71%		98%



APPENDIX F - TERMINATION OF EMPLOYMENT

Summary of Disability Experience among Members
Firefighters (continued)

Service	Exposure	Actual	Actual Rates	Expected	Expected Rates	Proposed	Proposed Rates
0	\$ 74,555,224	\$ 4,493,788	6.027%	\$ 2,450,578	3.287%	\$ 3,727,761	5.000%
1	183,184,629	5,175,820	2.825%	4,211,699	2.299%	4,579,616	2.500%
2	188,688,497	2,930,301	1.553%	3,478,569	1.844%	2,830,327	1.500%
3	184,703,651	2,084,161	1.128%	3,273,081	1.772%	1,847,037	1.000%
4	181,096,695	1,548,811	0.855%	3,035,855	1.676%	1,810,967	1.000%
5	171,923,168	1,174,962	0.683%	2,048,117	1.191%	1,719,232	1.000%
6	164,030,109	1,663,693	1.014%	1,874,877	1.143%	1,640,301	1.000%
7	151,360,076	999,602	0.660%	1,678,719	1.109%	1,135,201	0.750%
8	133,422,124	670,377	0.502%	1,405,601	1.053%	1,000,666	0.750%
9	132,731,695	986,368	0.743%	1,241,591	0.935%	995,488	0.750%
10	136,399,623	830,384	0.609%	1,287,301	0.944%	1,022,997	0.750%
11	129,579,291	681,748	0.526%	1,245,317	0.961%	647,896	0.500%
12	129,183,190	755,166	0.585%	1,268,362	0.982%	645,916	0.500%
13	131,303,877	368,136	0.280%	1,325,013	1.009%	656,519	0.500%
14	135,250,007	367,722	0.272%	1,394,291	1.031%	676,250	0.500%
15	135,857,882	763,438	0.562%	812,646	0.598%	679,289	0.500%
16	156,908,590	641,215	0.409%	910,011	0.580%	784,543	0.500%
17	173,184,628	722,316	0.417%	975,673	0.563%	865,923	0.500%
18	188,595,513	1,027,899	0.545%	1,057,590	0.561%	942,978	0.500%
19	193,514,589	551,906	0.285%	1,096,604	0.567%	387,029	0.200%
20	211,148,479	258,555	0.122%	1,224,356	0.580%	422,297	0.200%
21	207,302,943	535,220	0.258%	1,269,370	0.612%	414,606	0.200%
22	197,027,471	401,558	0.204%	1,263,213	0.641%	394,055	0.200%
23	187,439,906	275,801	0.147%	1,265,829	0.675%	374,880	0.200%
24	180,857,214	192,749	0.107%	1,279,815	0.708%	361,714	0.200%
Total	\$ 4,059,249,072	\$ 30,101,694	0.742%	\$ 42,374,079	1.044%	\$ 30,563,488	0.753%



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APPENDIX G

SALARY INCREASES

**Summary of Merit Salary Experience among Active Members**

Service	Beginning of Year Salary	End of Year Salary	Actual Rate	Current Rate	Proposed Rate
0	\$ 596,161	\$ 669,654	12.33%	10.50%	10.50%
1	412,825	451,687	9.41%	9.00%	9.00%
2	405,707	441,554	8.84%	8.00%	8.00%
3	393,043	420,460	6.98%	6.00%	6.00%
4	373,110	391,062	4.81%	4.50%	4.50%
5	351,473	364,977	3.84%	3.75%	3.75%
6	310,241	323,376	4.23%	3.75%	3.75%
7	279,581	291,045	4.10%	3.75%	3.75%
8	272,680	282,466	3.59%	3.75%	3.75%
9	279,556	289,232	3.46%	3.75%	3.75%
10	275,440	284,451	3.27%	3.75%	3.75%
11	284,044	293,069	3.18%	3.75%	3.75%
12	296,132	306,561	3.52%	3.75%	3.75%
13	282,425	292,201	3.46%	3.75%	3.75%
14	283,261	292,385	3.22%	3.75%	3.75%
15	306,730	316,998	3.35%	3.75%	3.75%
16	344,305	355,877	3.36%	3.75%	3.75%
17	367,535	378,784	3.06%	3.75%	3.75%
18	392,033	405,474	3.43%	3.75%	3.75%
19	415,459	430,520	3.63%	3.75%	3.75%
20	428,437	444,327	3.71%	3.75%	3.75%
21	431,595	448,577	3.93%	3.75%	3.75%
22	432,987	447,339	3.31%	3.75%	3.75%
23	408,940	422,030	3.20%	3.75%	3.75%
24	349,790	357,517	2.21%	3.75%	3.75%
25	308,418	316,491	2.62%	3.75%	3.75%
26	289,305	296,949	2.64%	3.75%	3.75%
27	266,262	273,300	2.64%	3.75%	3.75%
28	245,915	251,922	2.44%	3.75%	3.75%
29	204,505	209,850	2.61%	3.75%	3.75%
30	172,483	177,400	2.85%	3.75%	3.75%
Total	10,460,378	10,927,535	4.47%	4.62%	4.62%



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