State Employees' Retirement System of Illinois

2024 Actuarial Experience Study

July 1, 2021 — June 30, 2024

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July 25, 2025

Board of Trustees
State Employees' Retirement System of Illinois
2101 South Veterans Parkway
Springfield, Illinois 62794-9255

Subject: 2024 Actuarial Experience Study

Dear Members of the Board:

We are pleased to present our report on the results of the 2024 Actuarial Experience Study for the State Employees' Retirement System of Illinois ("SERS" or "System"). The purpose of the study is to evaluate the continued appropriateness of the actuarial assumptions used in the annual actuarial valuation by comparing actual experience to expected experience. Our study was primarily based on census information for the period from July 1, 2021, to June 30, 2024, as provided by SERS staff and used for recent actuarial valuations. The recommended mortality table assumption was based on experience from July 1, 2017, to June 30, 2020, and July 1, 2022, to June 30, 2024 in order to improve credibility and remove extraordinary mortality experience in FY 2021 and FY 2022 due to the effects of Covid-19. This report includes our recommended assumptions and methods effective for the June 30, 2025, actuarial valuation. It also provides the actuarial impact produced by these recommendations as though they had been effective for the June 30, 2024, actuarial valuation.

Pursuant to Public Act 99-0232, effective August 3, 2015, the five state systems shall conduct an actuarial experience study at least once every three years.

Our study includes a review of the experience associated with the following actuarial assumptions:

- Price inflation;
- Investment return;
- General wage inflation and payroll growth;
- Salary increases;
- Mortality;
- Retirement;
- Withdrawal (Turnover);
- Accelerated pension benefit payment program election;
- Deferred Vested member benefit adjustment; and
- Unused sick leave and optional service purchase adjustment.

Actuarial assumptions are set by the Board of Trustees. With the Board's approval of the recommendations in this report, we believe the actuarial condition of the System will be more accurately portrayed. The Board's decisions should be based on the appropriateness of each recommendation individually, not on their collective effect on the funding period or the unfunded liability.

This report should not be relied on for any purpose other than the purpose stated. This report may be provided to parties other than SERS only in its entirety and only with the permission of SERS. GRS is not responsible for unauthorized use of this report.

The results of the experience study and recommended assumptions set forth in this report are based on the data and actuarial techniques and methods previously described, and upon the provisions of the System as of the most recent actuarial valuation date, June 30, 2024. To the best of our knowledge, the information contained in this report is accurate and fairly presents the experience of members participating in the System for the period July 1, 2021, to June 30, 2024, as adjusted for the mortality experience period. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation, and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

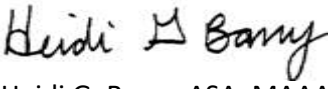
Alex Rivera, Heidi G. Barry, and Jeffrey T. Tebeau are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

We believe that the proposed actuarial assumptions that are the result of this experience study represent a reasonable estimate of expected future experience of the State Employees' Retirement System of Illinois.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Alex Rivera, FSA, EA, MAAA, FCA
Senior Consultant



Heidi G. Barry, ASA, MAAA, FCA
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SECTION A

EXECUTIVE SUMMARY

Executive Summary

The results of the three-year experience review of the State Employees' Retirement System of Illinois are presented in this report. Public Act 99-0232 requires an experience review once every three years.

The last comparable experience review was prepared for the period from July 1, 2018, to June 30, 2021. In this report, actual experience is compared to expected experience for the three-year period from July 1, 2021, to June 30, 2024, in order to evaluate and update the actuarial assumptions used for the most recent actuarial valuation as of June 30, 2024. The experience period was adjusted for the mortality assumption, due to extraordinary mortality experience from July 1, 2021, to June 30, 2022. The recommended mortality table assumption was based on experience from July 1, 2017, to June 30, 2020, and July 1, 2022, to June 30, 2024 in order to improve credibility and remove extraordinary mortality experience in FY 2021 and FY 2022 due to the effects of Covid-19. The cost impact of the updated assumptions was measured as of June 30, 2024. The updated actuarial assumptions are effective beginning with the actuarial valuation as of June 30, 2025.

Based on our review of the actuarial experience, we recommend the following updates to the principal actuarial valuation assumptions:

- Maintain the assumed investment return assumption of 6.75 percent.
- Increase the price inflation assumption of 2.25 percent to 2.40 percent.
- Increase the general payroll growth assumption of 2.75 percent to 2.90 percent.
- Increase the salary increase assumption to better reflect observed experience.
- Maintain the mortality tables as the Pub 2010 Below-Median Income General Healthy Retiree and Employee Mortality Tables for members covered under the Regular Benefit formula, and the Pub 2010 Below-Median Income Public Safety Healthy Retiree and Employee Mortality Tables for members covered under the Alternative Benefit formula, with updated adjustments for the Plan's credibility factors and future mortality improvements using Scale MP-2021.
- Decrease normal retirement rates and early retirement rates.
- Decrease termination rates for male members eligible for Tier 2 regular benefits. Increase termination rates for all other members.
- Update the Total Buyout election assumption from 3 percent to 4 percent.

Based on the preceding recommended assumptions, the actuarial liability as of June 30, 2024, and the fiscal year 2026 statutory contributions, are expected to change as follows:

Actuarial Valuation as of June 30, 2024 ($ in millions)	Actuarial Liability as of June 30, 2024		Fiscal Year 2026 Statutory Contribution	
Baseline	$ 55,697		$ 2,598	
Impact due to:				
• All Assumption Changes	946	1.7%	25	1.0%
Total Impact	$ 946	1.7%	$ 25	1.0%
After Recommended Changes	$ 56,643		$ 2,623	

The funded ratio as of June 30, 2024, and the fiscal year 2026 Statutory Contribution as a percent of pay, are expected to change as follows:

Actuarial Valuation as of June 30, 2024	Funded Ratio based on Market Value of Assets	Fiscal Year 2026 Statutory Contribution as a Percent of Pay
Baseline	45.6%	44.3%
Impact due to:		
• All Assumption Changes	-0.8%	0.2%
Total Impact	-0.8%	0.2%
After Recommended Changes	44.8%	44.5%

As shown in the above tables, costs are projected to rise as a result of changes to assumptions. The primary factors contributing to this increase include higher salary increase rates, higher assumed price inflation and cost-of-living adjustments for Tier 2 members, and adjustments to the mortality credibility rates.

The remainder of the report is an integral part of the Experience Study and includes:

- An introduction to key factors that were included in the study;
- An analysis of the experience and assumption recommendations;
- Cost impact of the proposed assumption changes; and
- Tables showing the recommended actuarial assumptions.

SECTION B

INTRODUCTION

Introduction

Background

For any pension plan, actuarial assumptions are selected that are intended to provide reasonable estimates of future expected events, such as investment returns, interest crediting, and patterns of retirement, turnover, and mortality. These assumptions, along with an actuarial cost method, an asset valuation method, the employee census data, and the System's provisions, are used to determine the actuarial liabilities and overall actuarially determined funding requirements for the System. The true cost to the System over time will be the actual benefit payments and expenses required by the System's provisions for the participant group under the System. To the extent the actual experience deviates from the actuarial assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future actuarially determined contributions and increase (reduce) the funded ratio.

A periodic review and update of the actuarial assumptions is one of many important components of understanding and managing the financial aspects of the State Employees' Retirement System of Illinois. Use of outdated or inappropriate assumptions can result in understated costs, which will lead to higher future contribution requirements, or perhaps an inability to pay benefits when due; or, on the other hand, produce overstated costs which place an unnecessarily large burden on the current generation of members, employers, and taxpayers.

A single set of actuarial assumptions is typically not expected to be suitable forever. As the actual experience unfolds or the future expectations change, the assumptions should be reviewed and adjusted accordingly.

It is important to recognize that the impact from various outcomes and the ability to adjust from experience deviating from the assumption are not symmetric. Due to compounding economic forces, legal limitations, and moral obligations, outcomes from underestimating future liabilities are much more difficult to manage than outcomes of overestimates. That asymmetric risk should be considered when the assumption set, investment policy, and funding policy are created. As such, the assumption set used in the actuarial valuation process needs to represent the best estimate of the future experience of the System and be at least as likely, if not more than likely, to overestimate the future liabilities versus underestimating them.

Using this strategic mindset, each assumption was analyzed compared to the actual experience of the System and general experience of other large public employee retirement funds. Changes in certain assumptions and methods are suggested based upon this comparison to remove any bias that may exist and to perhaps add in a slight margin for future adverse experience where appropriate. Next, the assumption set as a whole was analyzed for consistency and to ensure that the projection of liabilities was reasonable and consistent with historical trends.

Actuarial Standards of Practices ("ASOPs")

The Actuarial Standards Board ("ASB") provides guidance on measuring the costs of financing a retirement program through the following Actuarial Standards of Practices ("ASOPs"):

(1) ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*;
(2) ASOP No. 27, *Selection of Assumptions for Measuring Pension Obligations*;
(3) ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*;
(4) ASOP No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*; and
(5) ASOP No. 56, *Modeling*.

The recommended assumptions provided in this report are consistent with the preceding actuarial standards of practice.

Summary of Process

In determining liabilities and contribution rates for retirement plans, actuaries must make assumptions about the future. The actuarial assumptions are usually divided into two categories:

- Economic assumptions, which include:
  - Assumed rate of price inflation (as measured by the change in the Consumer Price Index for all Urban consumers)
    - Underlies all other economic assumptions
    - Basis for cost-of-living increases for members hired on or after January 1, 2011
  - Assumed long-term rate of return on investments
    - Rate at which projected benefits are reduced to present value
    - Rate for reversionary annuity factors
  - General wage increases
    - Reflects inflationary forces on increases in pay for all members
  - Rate of payroll growth
    - Reflects expectation of growth in total payroll and affects level percent of pay statutory contribution
- Demographic assumptions, which include:
  - Mortality rates
  - Retirement rates
  - Withdrawal (Turnover) rates

For some of these assumptions, such as the mortality rates, past experience provides important evidence about the future. For others, such as the investment return assumption, the link between past and future results is much weaker. In either case, actuaries should review the System's assumptions periodically and determine whether these assumptions are consistent with both actual past experience and anticipated future experience.

The last such actuarial experience study was performed following the June 30, 2021, actuarial valuation and the recommendations were first effective with the June 30, 2022, actuarial valuation. For this experience study, we have reviewed the System's experience for many of the assumptions for the

three-year period from July 1, 2021, through June 30, 2024. Mortality experience was reviewed for the periods from July 1, 2017, to June 30, 2020, and July 1, 2022, to June 30,2024.

In conducting experience studies, actuaries generally use data over a period of several years. This is necessary in order to gather enough data so that the results are statistically significant. In addition, if the study period is too short, the impact of the current economic conditions may lead to misleading results. It is known, for example, that the health of the general economy can impact salary increase rates and withdrawal rates. Using results gathered during a short-term boom or bust period will not be representative of the long-term trends in these assumptions. Also, the adoption of legislation, such as plan improvements or changes in salary schedules, will sometimes cause a short-term distortion in the experience. For example, if an early retirement window was opened during the study period, we would usually see a short-term spike in the number of retirements followed by a decline of retirements for the following two to four years. Using a longer period prevents giving too much weight to such short-term effects. On the other hand, using a much longer period could dampen real changes that may be occurring, such as mortality improvement or a change in the ages at which members retire.

In an experience study, we first determine the number of deaths, retirements, etc. that occurred during the period. Then we determine the number expected to occur, based on the current actuarial assumptions. The number of “expected” decrements is determined by multiplying the probability of the occurrence at the given age by the “exposures” at that same age. For example, consider a rate of retirement of 5.00 percent at age 55. The number of exposures can only be those members who are age 55 and eligible for retirement at that time. Thus, they are considered “exposed” to that assumption. Finally, we calculate the A/E ratio, where "A" is the actual number (of retirements, for example) and "E" is the expected number. If the current assumptions were “perfect,” the A/E ratio would be 100 percent. When it varies much from this figure, it is a sign that new assumptions may be needed. However, in some cases we prefer to set our assumptions to produce an A/E ratio a little above or below 100 percent, in order to introduce some conservatism. Of course, we not only look at the assumptions as a whole, but we also review how well they fit the actual results by gender, by age, and by service.

If the data leads the actuary to conclude that new tables are needed, the actuary may "graduate" or smooth the results, since the raw results can be quite uneven from age to age or from service to service.

Please bear in mind while the recommended assumption set represents our best estimate, there are other reasonable assumptions sets that could be supported. Some other reasonable assumption sets would show higher or lower liabilities or costs.

Summary of Recommendations

Our recommended changes to the current actuarial assumptions are summarized as follows:

Economic Assumptions

- **Price inflation:** We recommend increasing the rate of price inflation from 2.25 percent to 2.40 percent.

- **Investment return:** We recommend maintaining the nominal investment return assumption of 6.75 percent. Based on blended capital market assumptions from independent sources and the System's current asset allocation, over the next 20 years the likelihood assets will earn at least 6.75 percent per year is 57.91 percent. Based on a shorter 10-year horizon, the likelihood assets will earn at least 6.75 percent is 52.09 percent. Given the plan's low funded ratio, we recommend placing more weight on the 10-year horizon results

- **Payroll growth assumption:** We recommend increasing the general payroll growth assumption of 2.75 percent to 2.90 percent, which reflects an underlying general price inflation assumption of 2.40 percent.

- **Salary increase:** We recommend increasing the salary increase assumption to better reflect observed experience.

Mortality Assumptions

- We recommend maintaining the post-retirement mortality tables as the Pub-2010 Below-Median Income General Healthy Retiree Mortality tables for Regular Formula members and the Pub-2010 Below-Median Income Public Safety Healthy Retiree Mortality tables for Alternative Formula members.

- We recommend maintaining pre-retirement mortality tables for active employees as the Pub-2010 General Employee Mortality tables for Regular Formula members and the Pub-2010 Public Safety Employee Mortality tables for Alternative Formula members.

- We also recommend assuming mortality rates will improve in the future using a fully generational approach, with the most recently published projection scale, MP-2021.

- We recommend applying scaling factors to the base mortality tables; i.e., Pub-2010 General Tables and Public Safety tables, to partially reflect observed mortality experience to the extent it is credible.

Other Demographic Assumptions

- **Normal retirement rates:** Overall, the actual rates of retirement were lower than expected. We recommend slightly decreasing the overall rates to better reflect observed experience.

- **Early retirement rates:** Overall, experience was generally lower than expected for Tier 1 male members and Tier 2 members and higher than expected for Tier 1 female members. We recommend adjusting the rates to better reflect observed experience.

- **Turnover rates:** Overall, the observed experience showed that more members terminated employment than expected. We recommend increasing the rates of termination, for most of the covered groups.

- **Load for inactive members eligible for deferred vested pension benefits:** Based on recent experience, we recommend changing the current assumption of 15 percent to 13 percent for Regular Formula members and 13 percent to 12 percent for Alterative Formula members. This load represents additional cost due to participation in a reciprocal system.

- **Marriage assumption:** We recommend maintaining the current assumption of 85 percent of active male participants and 65 percent of active female participants. Actual marital status at benefit commencement is used for retired members, if available.

- **Unused sick leave and optional service purchases:** We recommend maintaining the current assumption of increasing each current and future active member's service by 5.0 months to reflect additional service credit received at retirement due to converting unused sick leave and vacation days and purchasing applicable optional service.

- **Disability load:** We recommend maintaining the current disability load on the normal cost as a percentage of pay because in general disabled members receive disability benefits for a short period and are considered active members for valuation purposes.

- **COLA buyout election percentage:** We recommend maintaining the current COLA Buyout assumption and increasing the Total Buyout assumption from 3.0 percent to 4.0 percent.

We also recommend increasing the amortization period used to develop the Actuarially Determined Contribution from 16 years to 20 years.

SECTION C

ANALYSIS OF EXPERIENCE AND RECOMMENDATIONS

Economic Assumptions

Economic assumptions reflect the effects of economic forces on the projections of retirement benefits payable from the System and in the discounting of those benefits to present value. These assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected spreads over price inflation. The key economic assumptions are:

- Assumed Rate of Inflation – The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions.
- Assumed Rate of Investment Return – The rate at which projected future benefits under the pension plan are reduced to present value.
- Rate of General Annual Pay Increases – This reflects inflationary forces on increases in pay for individual members.

Actuarial Standard of Practice No. 27

Actuarial Standard of Practice No. 27, Selection of Assumptions for Measuring Pension Obligations, provides guidance to actuaries on giving advice on selecting economic assumptions for measuring obligations for defined benefit plans. ASOP No. 27 was revised and adopted by the Actuarial Standards Board (ASB) in December 2023. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions.

As no one knows what the future holds, it is necessary for an actuary to estimate possible future economic outcomes. Recognizing that there is not one right answer, the current standard calls for an actuary to develop a reasonable economic assumption. ASOP No. 27 (Doc. No. 211) adopted by the Actuarial Standards Board (ASB) in December 2023 defines a reasonable economic assumption as an assumption that has the following characteristics:

(a) It is appropriate for the purpose of the measurement;
(b) It reflects current and historical data that is relevant to selecting the assumption for the measurement date, to the extent such relevant data is reasonably available;
(c) It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data (if any), or a combination thereof; and
(d) It is expected to have no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included or when alternative assumptions are used for the assessment of risk, in accordance with ASOP No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*.

However, the standard explicitly advises an actuary not to give undue weight to recent experience that is not sufficiently credible.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular actuarial valuation, each economic assumption should be consistent with every other economic assumption over the measurement period. Generally, the economic assumptions are much more subjective in nature than the demographic assumptions.

Economic Assumptions

Inflation Assumption

By "inflation," we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies most of the other economic assumptions. It impacts investment return, salary increases, and overall payroll growth. The current annual inflation assumption is 2.25 percent.

Over the three-year period from June 2021 through June 2024, the CPI-U has increased at an average annual rate of 4.96 percent. **However, the assumed inflation rate is only weakly tied to past results.**

The following table shows the average inflation over various periods, ending June 2024.

Fiscal Year	Annual Increase in CPI-U
2019-20	0.65%
2020-21	5.39%
2021-22	9.06%
2022-23	2.97%
2023-24	2.97%
3-Year Average	4.96%
5-Year Average	4.17%
10-Year Average	2.80%
20-Year Average	2.55%
25-Year Average	2.58%
30-Year Average	2.54%
40-Year Average	2.81%
50-Year Average	3.79%

Future Inflation Expectations

Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, economic assumptions are less reliably based on recent past experience than are the demographic assumptions. Therefore, it is important not to give undue weight to recent experience. We must also consider future expectations as well.

Although historically high increases in CPI were observed in 2021 and into 2022, persisting long-term trends in these measures are generally in line with the current assumption. We will continue to monitor this assumption based on the spectrum of expectations from various sources.

One source of information about future inflation is the market for US Treasury bonds. Simplistically, the difference in yield between non-indexed and indexed treasury bonds should be a reasonable estimate of what the bond market expects on a forward-looking basis for inflation. According to inflation rate forecasts from the Federal Reserve Bank of St. Louis, as of January 1, 2025, the difference for 20-year bonds implies that inflation over the next 20 years would average 2.50 percent. The difference in yield for 30-year bonds implies 2.35 percent inflation over the next 30 years.

Economic Assumptions

The following tables present a summary of inflation rate forecasts from the Federal Reserve.

Federal Reserve Bank of Cleveland	July 2021	July 2022	July 2023	July 2024	January 2025
30-Year Expectation	2.02%	2.37%	2.27%	2.47%	2.52%
20-Year Expectation	1.85%	2.29%	2.17%	2.42%	2.48%
10-Year Expectation	1.62%	2.22%	2.06%	2.37%	2.43%
5-Year Expectation	1.55%	2.29%	2.09%	2.39%	2.45%

Federal Reserve Bank of St. Louis	July 2021	July 2022	July 2023	July 2024	January 2025
30-Year Breakeven Inflation	2.23%	2.22%	2.27%	2.28%	2.35%
20-Year Breakeven Inflation	2.39%	2.60%	2.55%	2.47%	2.50%
10-Year Breakeven Inflation	2.33%	2.36%	2.30%	2.27%	2.40%

However, this analysis is known to be imperfect as it ignores the inflation risk premium that buyers of U.S. Treasury bonds often demand as well as possible differences in liquidity between U.S. Treasury bonds and Treasury Inflation Protected Securities (TIPS).

Another point of reference is the Social Security Administration's (SSA) 2024 Trustees Report, in which the Office of the Chief Actuary is projecting a long-term average ultimate annual inflation rate of 2.40 percent under the intermediate cost assumption. The ultimate inflation assumption is 1.80 percent and 3.00 percent respectively in the low cost and high cost projection scenarios. The Social Security Trustees report uses the ultimate rates for their 75-year projections, much longer than the longest horizon we can discern from Treasuries and TIPS.

We also surveyed the inflation assumption used by various investment consulting firms. In our sample of these firms, the inflation assumption ranged from 2.10 percent to 2.70 percent, with an average of 2.39 percent in the short term (10 years or less) and 2.48 percent in the long term (20 to 30 years).

Economic Assumptions

The following table provides inflation forecasts from various sources.

Forward-Looking Price Inflation Forecasts[a]	
Congressional Budget Office[b]	
5-Year Annual Average	2.44%
10-Year Annual Average	2.32%
Federal Reserve Bank of Philadelphia[c]	
5-Year Annual Average	2.40%
10-Year Annual Average	2.23%
Federal Reserve Bank of Cleveland[d]	
10-Year Expectation	2.32%
20-Year Expectation	2.38%
30-Year Expectation	2.44%
Federal Reserve Bank of St. Louis[e]	
10-Year Breakeven Inflation	2.30%
20-Year Breakeven Inflation	2.42%
30-Year Breakeven Inflation	2.27%
U.S. Department of the Treasury[f]	
10-Year Breakeven Inflation	2.27%
20-Year Breakeven Inflation	2.45%
30-Year Breakeven Inflation	2.30%
50-Year Breakeven Inflation	2.37%
100-Year Breakeven Inflation	2.42%
Social Security Trustees[g]	
Ultimate Intermediate Assumption	2.40%

[a] **End of the Fourth Quarter, 2024**. Version 2025-01-27 by Gabriel, Roeder, Smith & Company

[b] *An Update to the Budget and Economic Outlook: 2024 to 2034* , Release Date: June 2024, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2024 - 2028), 10-Year Annual Average (2024 - 2033).

[c] *Fourth Quarter 2024 Survey of Professional Forecasters* , Release Date: November 15, 2024, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2024 - 2028), 10-Year Annual Average (2024 - 2033).

[d] Inflation Expectations, Model output date: December 1, 2024.

[e] The breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: December, 2024.

[f] The Treasury Breakeven Inflation (TBI) Curve, Monthly Average Rates, December, 2024.

[g] *The 2024 Annual Report of The Board of Trustees of The Federal Old-Age And Survivors Insurance and Federal Disability Insurance Trust Funds* , May 6, 2024, p. 10, Key Assumptions and Summary Measures for Long-Range (75-year) Projections, Intermediate, Consumer Price Index (CPI-W).

Economic Assumptions

The following table shows inflation forecasts from various professional experts at different points in time.

Forward-Looking Price Inflation Forecasts				
	6/30/2023	12/31/2023	6/30/2024	12/31/2024
Congressional Budget Office				
5-Year Annual Average	2.83%	2.83%	2.44%	2.44%
10-Year Annual Average	2.57%	2.57%	2.32%	2.32%
Federal Reserve Bank of Philadelphia				
5-Year Annual Average	2.50%	2.60%	2.50%	2.40%
10-Year Annual Average	2.36%	2.40%	2.33%	2.23%
Federal Reserve Bank of Cleveland				
10-Year Expectation	1.75%	2.28%	2.37%	2.32%
20-Year Expectation	1.96%	2.33%	2.41%	2.38%
30-Year Expectation	2.11%	2.39%	2.46%	2.44%
Federal Reserve Bank of St. Louis				
10-Year Breakeven Inflation	2.20%	2.18%	2.26%	2.30%
20-Year Breakeven Inflation	2.48%	2.42%	2.43%	2.42%
30-Year Breakeven Inflation	2.23%	2.19%	2.27%	2.27%
U.S. Department of the Treasury				
10-Year Breakeven Inflation	2.10%	2.09%	2.19%	2.27%
20-Year Breakeven Inflation	2.40%	2.37%	2.43%	2.45%
30-Year Breakeven Inflation	2.19%	2.19%	2.27%	2.30%
50-Year Breakeven Inflation	2.29%	2.29%	2.36%	2.37%
100-Year Breakeven Inflation	2.37%	2.36%	2.43%	2.42%
Social Security Trustees				
Ultimate Intermediate Assumption	2.40%	2.40%	2.40%	2.40%

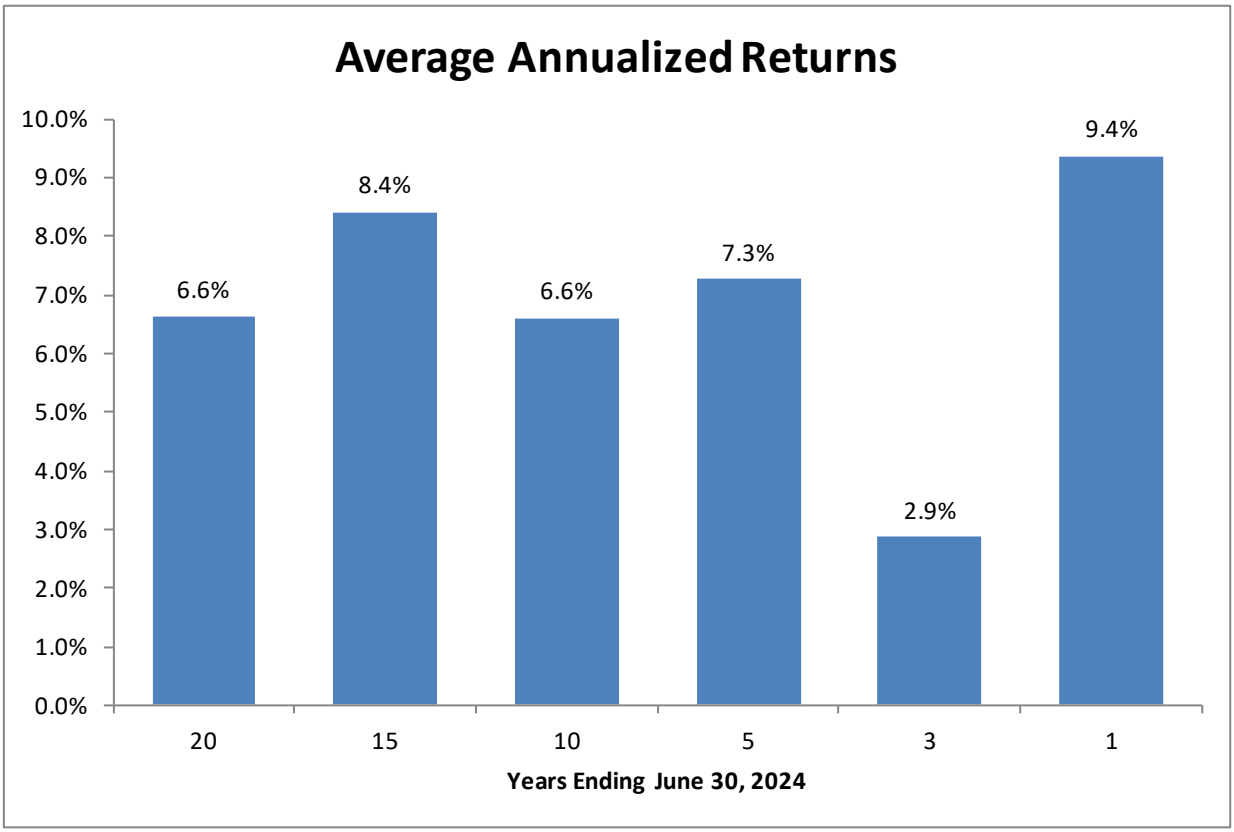
Recommendation

Based on this information, our opinion is that it would be reasonable to increase the current price inflation assumption from 2.25 percent to 2.40 percent. It is important to remember any change in this assumption also affects all other economic assumptions, as shown in the following discussion.

Investment Return Assumption

The investment return assumption is one of the principal assumptions used in any actuarial valuation of a retirement plan. It is used to discount future expected benefit payments to the actuarial valuation date in order to determine the liabilities of the plans. Even a small change to this assumption can produce significant changes to the liabilities and contribution rates. Currently, it is assumed that future investment returns will average 6.75 percent per year, net of investment expenses.

The chart below shows the historical annualized history of the System's market returns through fiscal year end 2024.



Real Return

The allocation of assets within the universe of investment options will have a significant impact on the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Based on information provided by SERS and ISBI shown on the following page is a table with the System's current target asset allocation and capital market assumptions based on a 20-year horizon.

Asset Category	Current Target	10-Year Expected Return	20-Year Expected Return	Standard Deviation
U.S. Equity	22.00%	6.90%	8.50%	17.00%
Developed Market Equity (non-US)	13.00%	7.70%	8.90%	18.00%
Emerging Market Equity	8.00%	7.60%	8.90%	22.00%
Private Equity	10.00%	9.90%	11.20%	25.00%
High Yield Bonds	2.00%	6.50%	6.80%	11.00%
Private Debt	10.00%	9.20%	9.20%	15.00%
Investment Grade Bonds	14.00%	4.60%	4.80%	4.00%
Long-term Government Bonds	5.00%	4.30%	5.00%	12.00%
TIPS	3.00%	4.30%	4.70%	7.00%
Real Estate	10.00%	6.30%	8.00%	16.00%
Infrastructure	3.00%	7.40%	9.00%	18.00%
Total	**100.00%**			

Based on page 18 of the 2024 ISBI Asset Allocation Review and Risk Analysis report issued by Meketa Investment Group.

The following table shows a comparison of the probability of exceeding 6.75 percent over the next 20 years based on the 2024 ISBI Asset Allocation Review and Risk Analysis report issued by Meketa Investment Group and the GRS projection model and Meketa's capital market assumptions:

Projection Model	Return	Inflation Assumption	Probability of Exceeding Return Over Next 20 Years
Meketa[1]	6.75%	2.40%	74%
GRS	6.75%	2.40%	69%

[1] *Based on page 22 of the 2024 ISBI Asset Allocation Review and Risk Analysis report issued by Meketa Investment Group.*

We applied the System's target asset allocation, and performed an analysis using capital market assumptions (CMAs) from a sample of 13 nationally known investment firms. Eight of the firms provided capital market expectations for longer-time horizons (20 to 30 years). Twelve firms provided capital market expectations for shorter-time horizons (10 years or less).

These firms periodically issue reports that describe their capital market assumptions; that is, their estimates of expected returns, volatility, and correlations among the different asset classes. The assumptions for most of the investment consultants are for 2025. While some of these assumptions may be based upon historical analysis, many of these firms also incorporate forward-looking adjustments to better reflect near-term and long-term expectations. The estimates for core investments (i.e., fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds.

The current nominal investment return assumption of 6.75 percent is based on an inflation assumption of 2.25 percent and a real return of 4.50 percent.

Given the System's current target asset allocation and the capital market assumptions from the investment firms, the development of the average nominal return, net of investment expenses, is provided in the tables shown on the following page.

Short-Term Investment Horizon (10 years or less) Assumptions – One-Year Arithmetic Returns

Short-Term Capital Market Assumption Set (CMA)	CMA Expected Nominal Return	CMA Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal One-year Arithmetic Return Net of Expenses (4)+(5)	Annualized Standard Deviation of Expected Return
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	6.63%	2.35%	4.28%	2.40%	6.68%	12.35%
2	7.14%	2.60%	4.54%	2.40%	6.94%	12.58%
3	7.66%	2.51%	5.15%	2.40%	7.55%	12.38%
4	7.57%	2.40%	5.17%	2.40%	7.57%	12.35%
5	7.69%	2.42%	5.27%	2.40%	7.67%	13.14%
6	8.07%	2.70%	5.37%	2.40%	7.77%	13.48%
7	7.74%	2.34%	5.40%	2.40%	7.80%	12.32%
8	7.86%	2.41%	5.45%	2.40%	7.85%	11.53%
9	7.75%	2.31%	5.44%	2.40%	7.84%	11.24%
10	7.69%	2.10%	5.59%	2.40%	7.99%	12.57%
11	7.84%	2.30%	5.54%	2.40%	7.94%	11.50%
12	7.73%	2.21%	5.53%	2.40%	7.93%	11.28%
Average	**7.62%**	**2.39%**	**5.23%**	**2.40%**	**7.63%**	**12.23%**

Long-Term Investment Horizon (20 to 30 years) Assumptions – One-Year Arithmetic Returns

Long-Term Capital Market Assumption Set (CMA)	CMA Expected Nominal Return	CMA Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal One-year Arithmetic Return Net of Expenses (4)+(5)	Annualized Standard Deviation of Expected Return
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	6.82%	2.50%	4.32%	2.40%	6.72%	11.28%
2	8.16%	2.70%	5.46%	2.40%	7.86%	12.58%
3	7.70%	2.20%	5.50%	2.40%	7.90%	12.35%
4	7.97%	2.30%	5.67%	2.40%	8.07%	13.14%
5	7.92%	2.32%	5.60%	2.40%	8.00%	11.53%
6	8.69%	2.70%	5.99%	2.40%	8.39%	13.48%
7	8.26%	2.40%	5.86%	2.40%	8.26%	11.50%
8	9.13%	2.74%	6.39%	2.40%	8.79%	12.32%
Average	**8.08%**	**2.48%**	**5.60%**	**2.40%**	**8.00%**	**12.27%**

Based on each investment firm's assumptions, we estimated the expected real return of the System's portfolio (col. (4)). Next, based on the actuary's recommended inflation, we estimated the expected one-year arithmetic return net of expenses (col. (6)). The average one-year arithmetic return is 7.63 percent

using short-term investment horizon assumptions, and 8.00 percent using long-term investment horizon assumptions. Based on the long-term capital market assumptions for Meketa and the recommended price inflation assumption of 2.40 percent, the average one-year arithmetic return is 8.79 percent.

Long-Term Capital Market Assumption Set (CMA)	CMA Expected Nominal Return	CMA Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal One-year Arithmetic Return Net of Expenses (4)+(5)	Annualized Standard Deviation of Expected Return
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Meketa	9.13%	2.74%	6.39%	2.40%	8.79%	12.32%

However, in addition to examining the expected one-year arithmetic return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net returns that could be expected to be produced by the investment portfolio.

The tables shown on the following page provide the 40th, 50th, and 60th percentiles of the geometric average (10-year for short-term investment horizon and 20-year for long-term investment horizon) of the expected nominal return, net of expenses based on the recommended inflation assumption of 2.40 percent. The tables also show the probability of exceeding the baseline 6.75 percent assumption and alternative lower assumptions.

Short-Term Investment Horizon (10 years or less) – Annualized 10-Year Geometric Returns

Short-Term Capital Market Assumption	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of Exceeding
	40th	50th	60th	6.75%
(1)	(2)	(3)	(4)	(5)
1	4.99%	5.97%	6.95%	42.01%
2	5.22%	6.21%	7.21%	44.58%
3	5.87%	6.84%	7.83%	50.97%
4	5.89%	6.87%	7.85%	51.21%
5	5.84%	6.88%	7.93%	51.26%
6	5.88%	6.94%	8.01%	51.80%
7	6.13%	7.10%	8.09%	53.66%
8	6.32%	7.24%	8.16%	55.36%
9	6.37%	7.26%	8.16%	55.76%
10	6.28%	7.27%	8.27%	55.26%
11	6.43%	7.34%	8.25%	56.48%
12	6.45%	7.34%	8.24%	56.69%
Average	**5.97%**	**6.94%**	**7.91%**	**52.09%**

Long-Term Investment Horizon (20 to 30 years) – Annualized 20-Year Geometric Returns

Long-Term Capital Market Assumption Set (CMA)	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of Exceeding
	40th	50th	60th	6.75%
(1)	(2)	(3)	(4)	(5)
1	5.50%	6.13%	6.77%	40.28%
2	6.43%	7.13%	7.84%	55.49%
3	6.51%	7.20%	7.90%	56.55%
4	6.55%	7.28%	8.02%	57.26%
5	6.75%	7.39%	8.04%	59.94%
6	6.81%	7.56%	8.32%	60.72%
7	7.01%	7.66%	8.31%	63.96%
8	7.41%	8.10%	8.79%	69.09%
Average	**6.62%**	**7.31%**	**8.00%**	**57.91%**

Meketa (20 years)

Long-Term Capital Market Assumption Set (CMA)	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of Exceeding
	40th	50th	60th	6.75%
(1)	(2)	(3)	(4)	(5)
Meketa	7.41%	8.10%	8.79%	69.09%

As these tables indicate, the average expected rate of return at the 50th percentile based on (1) the System's current target asset allocation, (2) the recommended inflation assumption of 2.40 percent and (3) the capital market assumptions from the investment consultants is 6.94 percent under the shorter-term investment horizon and 7.31 percent under the longer-term investment horizon. Based on the capital market assumptions from Meketa, the average expected rate of return at the 50th percentile is 8.10 percent under the longer-term horizon.

Additionally, the average results of the investment firms with shorter-term expectations indicate there is about a 52.09 percent chance that the System will produce an average return that exceeds 6.75 percent in the next 10 years.

The average results of the investment firms with longer-term expectations indicate there is about a 57.91 percent chance that the System will produce an average return that exceeds 6.75 percent in the next 20 years.

A key factor to consider when evaluating short-term or long-term investment projections is the relative level of assets available to pay benefits over the next 10 years to 25 years. Using current assumptions and liability measures as of June 30, 2024, the present value of benefits expected to be paid over the next 10 years make up about 50 percent of the accrued liability. The market value of assets at June 30, 2024, is sufficient to cover only about 50 percent of the present value of projected benefits for the 10-year period.

Consequently, it is important to consider both short-term and long-term expectations when setting economic assumptions.

Recommendation

Based on our analysis of the expected investment return and the current target asset allocation, we recommend maintaining the investment return assumption to 6.75 percent for the actuarial valuation as of June 30, 2024, reflecting an inflation assumption of 2.40 percent.

The current investment return assumption consists of an inflation assumption of 2.25 percent and a real rate of return assumption of 4.50 percent. The proposed investment return assumption consists of an inflation assumption of 2.40 percent and real rate of return assumption of 4.35 percent.

We recommend that the assumed investment return be monitored for continued appropriateness between experience reviews. Also, any significant changes in the target asset allocation of the System may warrant an additional review of the rate of return assumption.

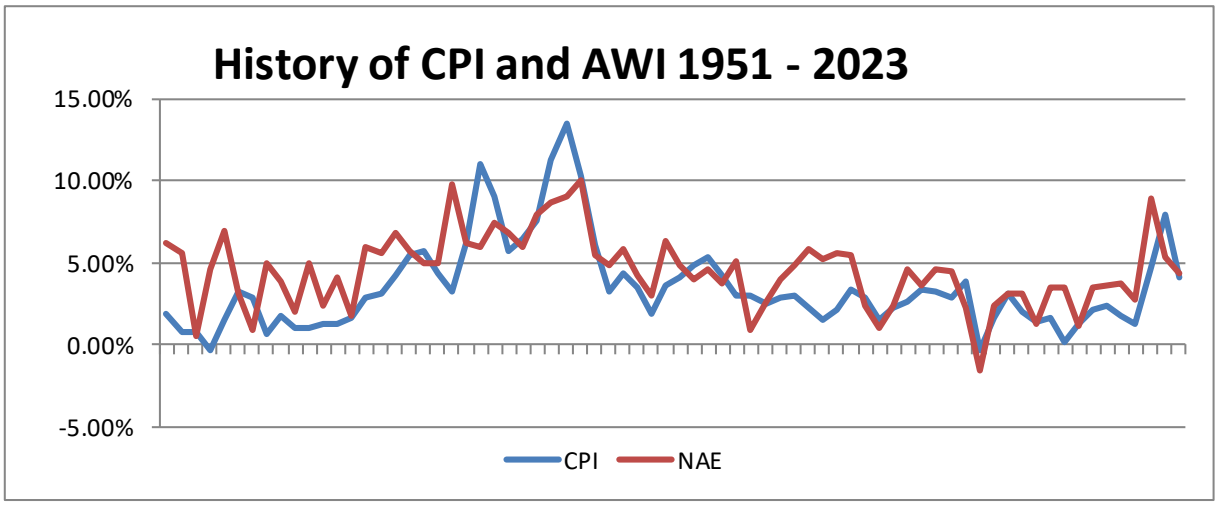
We believe that this assumption can be supported by the Actuarial Standard of Practice No. 27. Under the Standard, all economic assumptions must be selected to be consistent with the purpose of the measurement. The purpose of the measurement is to determine the contribution rate which will lead to the accumulation of assets to pay benefits when due.

General Wage Inflation and Payroll Growth

A General Wage Inflation ("GWI") assumption represents the real wage growth over time in the general economy. It is the assumption on how much the pay scales themselves will change year to year, not necessarily how much the pay increases received by individuals are, or even necessarily how the payroll in total may change, which can be affected by population changes, etc. Wage inflation consists of two components, (1) a portion due to pure price inflation (i.e., increases due to changes in the CPI), and (2) increases in average salary levels in excess of pure price inflation (i.e., increases due to changes in productivity levels, supply and demand in the labor market, and other macroeconomic factors).

The Average Wage Index ("AWI"), formerly named the National Average Earnings ("NAE"), series published in connection with the operation of the Social Security program is a useful proxy for measuring general changes in wage levels in the economy. Increases in AWI typically exceed increases in the Consumer Price Index ("CPI"), although there are periods where the patterns are reversed. The economic argument for wages exceeding prices in the long run is that CPI is based on the prices of a fixed basket of goods whereas wages reflect innovations, real productivity growth, labor supply and demand, and other factors in addition to pure price inflation.

The following graph compares CPI and AWI over the past 73 years.



Economic Assumptions

The following table shows the average inflation and increase in the AWI through 2023.

Years	Annual Increases in		
	Prices (CPI-U)	Wages (AWI)	Difference
1964-1973	3.79%	5.60%	1.81%
1974-1983	8.41%	7.23%	-1.18%
1984-1993	3.79%	4.65%	0.86%
1994-2003	2.45%	3.95%	1.50%
2004-2013	2.39%	2.80%	0.41%
2014-2023	2.72%	4.03%	1.31%
3-Year Average	4.96%	6.20%	1.23%
5-Year Average	4.17%	5.02%	0.85%
10-Year Average	2.80%	4.03%	1.23%
20-Year Average	2.55%	3.41%	0.86%
25-Year Average	2.58%	3.40%	0.82%
30-Year Average	2.54%	3.59%	1.05%
40-Year Average	2.81%	3.76%	0.95%
50-Year Average	3.79%	4.44%	0.66%
60-Year Average	3.77%	4.63%	0.86%
65-Year Average	3.64%	4.56%	0.92%

Since 1951, for the national economy as a whole, wage inflation has been about 1.02 percent higher than price inflation each year. For the last 10 years, for the national economy as a whole, wage inflation has been 4.03 percent, outpacing price inflation by about 1.23 percent. However, that spread will likely be viewed as skewed due to the historically volatile inflation during the past decade.

As with the investment return assumption, past experience does not necessarily dictate future expectations. Current expectations are mixed on whether price and wage inflation will remain high in the short term, particularly due to the aftereffects of recent federal government spending. For a long-term view, the 2024 Annual Report from the Trustees of the Social Security Administration (SSA) assumes an intermediate average ultimate CPI of 2.40 percent over the next 75 years and an ultimate intermediate growth assumption for average wages in covered employment of 3.56 percent. The SSA report provides alternate "High-cost" assumptions of 1.80 percent CPI/2.34 percent wages and "Low-cost" assumptions of 3.00 percent CPI/4.79 percent wages.

Recommendation

While the ongoing pressure on the ability of states to sustain across the board increases in wages is consistent with historical norms, we do not believe there is justification to increase the assumption for productivity increases; in other words, to increase the assumed gap between price increases and wage growth. In fact, we recommend maintaining the assumption for productivity increases of 0.50 percent. Combining this recommendation with our recommendation for price inflation of 2.40 percent implies a wage inflation assumption of 2.90 percent. These assumptions are summarized below:

	SERS Wage Inflation and Payroll Growth Assumption	
	Current Assumption	Recommended Assumption
Price Inflation	2.25%	2.40%
Productivity Increases	0.50%	0.50%
Total Wage Inflation	2.75%	2.90%

Salary Increase

Most actuaries recommend salary increase assumptions that include elements which depend on the member's age or service. Generally, younger or shorter-service employees receive higher merit and promotion salary increases. As the employee's age or service increases, these salary increases tend to decrease.

Over the experience study period, actual salary increases for plan members averaged 8.51 percent compared to expected total increases of 3.97 percent. Expected real increases were 3.97 percent less 2.25 percent, or 1.72 percent. Actual total increases were 8.51 percent, which was more than the actual inflation of 3.29 percent, resulting in an actual real increase of 5.22 percent. For purposes of calculating the actual real increase component, inflation was measured as the average rate as of December 31st from "Employment Cost Index, Wages and Salaries, By Occupation and Industry Groups: State and Local Government Workers: Public Administration" published by the Bureau of Labor Statistics over the experience study period. The graph on page C-16 shows the total salary increase including price inflation.

This assumption was developed using both Tier One and Tier Two data and is applicable to both Tier One and Tier Two members.

Table I and Graph I compare the salary experience, current assumptions, and recommended assumptions by years of service for each of the following:

- Table I – Salary Experience by Age
- Graph I – Salary Experience by Age

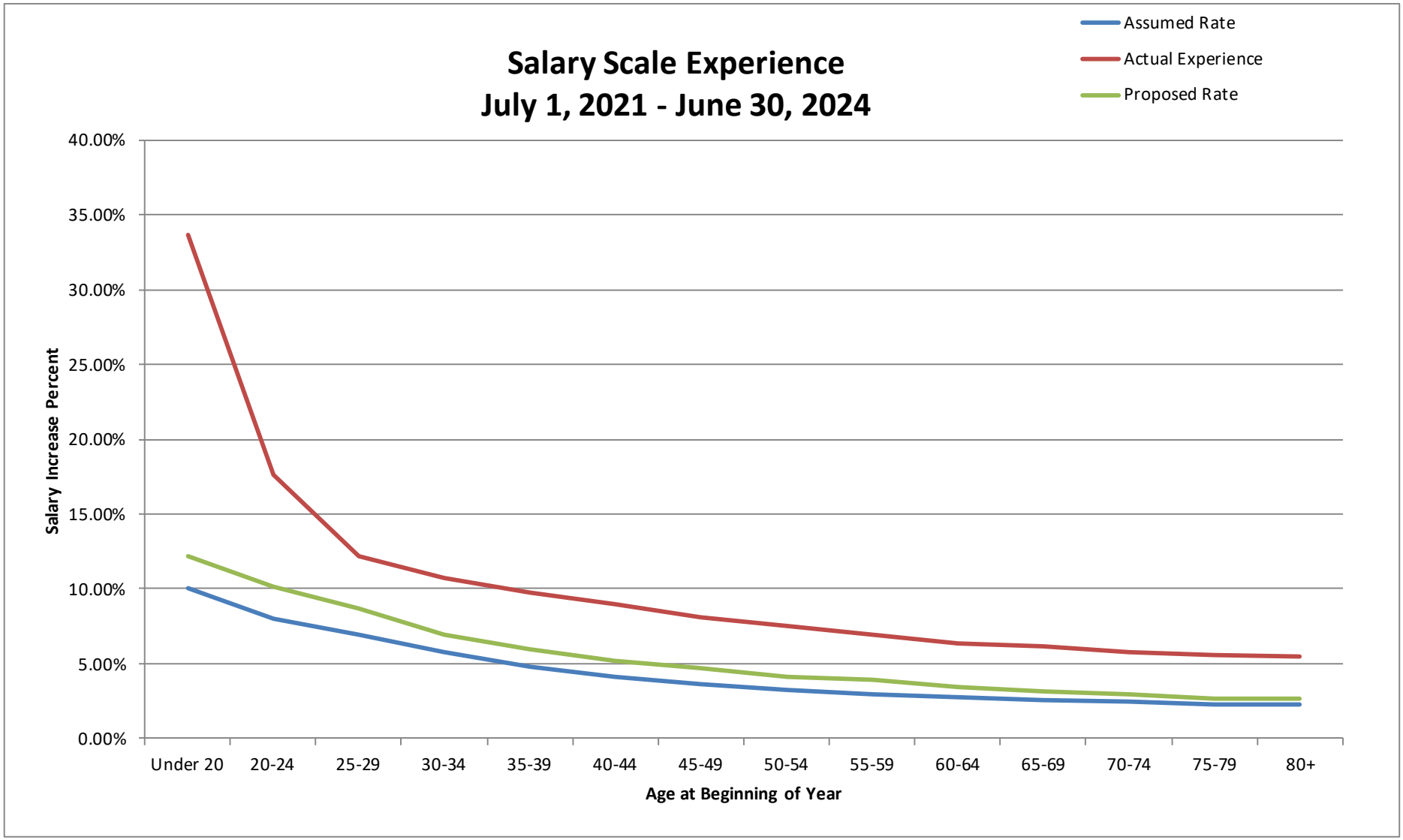
Economic Assumptions

Table I

Age at Beginning of Year	Number	Actual		Expected Current Year	Actual Real Increase[1]	Actual Total Increase	Expected Real Increase[2]	Expected Total Increase	Proposed Real Increase[3]	Proposed Total Increase
		Prior Year	Current Year							
Under 20	150	4,564,351	6,100,677	5,020,788	30.37%	33.66%	7.75%	10.00%	9.75%	12.15%
20-24	2,870	145,384,254	171,014,146	156,970,567	14.34%	17.63%	5.72%	7.97%	7.75%	10.15%
25-29	10,660	659,844,153	740,284,499	705,364,064	8.90%	12.19%	4.65%	6.90%	6.26%	8.66%
30-34	18,011	1,267,910,171	1,404,111,377	1,341,392,343	7.45%	10.74%	3.55%	5.80%	4.56%	6.96%
35-39	20,676	1,593,498,896	1,749,043,578	1,670,130,815	6.47%	9.76%	2.56%	4.81%	3.52%	5.92%
40-44	22,495	1,847,001,528	2,013,191,294	1,922,648,732	5.71%	9.00%	1.85%	4.10%	2.83%	5.23%
45-49	24,935	2,198,394,335	2,376,961,971	2,277,654,456	4.83%	8.12%	1.36%	3.61%	2.35%	4.75%
50-54	26,224	2,293,778,361	2,467,287,279	2,368,270,069	4.27%	7.56%	1.00%	3.25%	1.73%	4.13%
55-59	20,709	1,764,544,571	1,887,098,382	1,817,329,010	3.66%	6.95%	0.74%	2.99%	1.49%	3.89%
60-64	13,466	1,120,418,528	1,191,767,117	1,151,371,044	3.08%	6.37%	0.51%	2.76%	1.00%	3.40%
65-69	4,866	406,920,426	431,943,671	417,262,226	2.86%	6.15%	0.29%	2.54%	0.75%	3.15%
70-74	1,477	123,733,416	130,811,475	126,802,863	2.43%	5.72%	0.23%	2.48%	0.50%	2.90%
75-79	417	33,774,977	35,659,815	34,550,174	2.29%	5.58%	0.05%	2.30%	0.25%	2.65%
80+	122	9,211,303	9,718,133	9,418,559	2.21%	5.50%	0.00%	2.25%	0.25%	2.65%
Total	**167,078**	**13,468,979,270**	**14,614,993,414**	**14,004,185,710**	**5.22%**	**8.51%**	**1.72%**	**3.97%**	**2.61%**	**5.01%**

[1] Total increase less average inflation of 3.29 percent.
[2] Total increase less assumed inflation of 2.25 percent.
[3] Total proposed increase less proposed inflation of 2.40 percent.

Graph I


Salary Scale Experience
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Salary Increase Percent
Under 20
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80+
Age at Beginning of Year

Demographic Assumptions

The following pages present the analysis of the demographic assumptions. These assumptions include assumed rates of mortality among active and retired members, retirement patterns, turnover patterns, and disability patterns. These patterns generally take the form of tables of rates of incidence based on age and/or years of service.

Absent any significant changes in benefit provisions, these assumptions generally exhibit reasonable consistency over periods of time. As a result, each demographic assumption is normally reviewed by relating actual experience to that assumed over the recent past.

Actuarial Standard of Practice No. 27 – Selection Assumptions for Measuring Pension Obligations

ASOP No. 27 applies to actuaries when they are selecting demographic assumptions to measure obligations under any defined benefit pension plan that is not a social insurance program as described in Section 1.2, Scope, of ASOP No. 32, Social Insurance.

The actuary should identify the types of demographic assumptions to use for a specific measurement. In doing so, the actuary should determine the following:

(a) The purpose of the measurement;
(b) The plan provisions or benefits and factors that will affect the timing and value of any potential benefit payments;
(c) The characteristics of the obligation to be measured (such as measurement period, pattern of plan payments over time, open or closed group, and volatility);
(d) The contingencies that give rise to benefits or result in loss of benefits; and
(e) The characteristics of the covered group.

Not every contingency requires a separate assumption. For example, for a plan that is expected to provide benefits of equal value to employees who voluntarily terminate employment or become disabled, retire, or die, the actuary may use an assumption that reflects some or all of the above contingencies in combination rather than selecting a separate assumption for each.

Analysis Approach

The analysis of demographic experience is conducted for each assumption using a measure known as the "Actual to Expected (A/E) Ratio." The A/E Ratio is simply the ratio of the actual number of occurrences of the event to which the assumption applies (e.g., deaths or retirements) to the number expected to occur in accordance with the assumption. An A/E Ratio of 1.00 indicates that the assumption precisely predicted the number of occurrences. An A/E Ratio exceeding 1.00 indicates that the assumption underestimated actual experience. Conversely, an A/E Ratio lower than 1.00 indicates that the assumption overestimated actual experience.

Demographic Assumptions

These are statistical analyses. As a result, there are several considerations we must keep in mind as we analyze these ratios:

1. An actuarial assumption is designed to reflect average experience over long periods of time (30 - 50 years). As a result:
   (a) A deviation between actual experience and that expected from our assumptions for one or two years does not necessarily mean that the assumption should be changed.
   (b) A change in actuarial assumption should result if the experience indicates a consistent pattern which is different from that assumed over a period of years.
2. The larger the amount of data available, the more reliable the statistics used in the analysis. As a result:
   (a) Events that occur with great frequency (e.g., general employment turnover) are more credibly predictable than those occurring less frequently (e.g., active member death).
   (b) In all cases, data covering the entire study period produces more credible results than data for a single year.
   (c) Year by year experience is helpful only in identifying trends and determining whether the three-year data is truly reflective of the entire period.

For most demographic assumptions the analysis is based on actuarial valuation data for the three-year period from July 1, 2021, to June 30, 2024. For the recommended mortality table assumption, the analysis is based on experience from July 1, 2017, to June 30, 2020, and July 1, 2022, to July 1, 2024 in order to improve credibility and remove the extraordinary mortality experience in FY 2021 and FY 2022 due to the effects of Covid-19.

Mortality

Post-retirement mortality is an important component in cost calculations and should be updated from time to time to reflect current and expected future longevity improvements. Pre-retirement mortality is a relatively minor component in cost calculations. The frequency of pre-retirement deaths is so low that mortality assumptions based on actual experience can only be produced for very large retirement systems.

Actuarial Standards of Practice

Actuarial Standards of Practice (ASOP) No. 27 Disclosure Section 4.1.1 states, "The disclosure of the mortality assumption should contain sufficient detail to permit another qualified actuary to understand any adjustment to reflect mortality improvement from the effective date of the table to the measurement date and the provision made for future mortality improvement. If the actuary assumes zero mortality improvement after the measurement date, the actuary should state that no provision was made for future mortality improvement." The current mortality rates used in the actuarial valuation include a provision for future mortality improvement.

The Pub-2010 Mortality Tables

The Society of Actuaries' (SOA's) Retirement Plans Experience Committee (RPEC) released mortality tables in 2019 (the Pub-2010 tables) which reflect the improvement in longevity of the studied group of public sector pension plan participants, and which also reflects projected future improvements for current and future generations of participants.

The approach we have taken to recommend a mortality assumption for the SERS actuarial valuation is based on the RPEC 2019 model described by the Society of Actuaries (SOA). In effect, we select a base mortality table from the Pub-2010 mortality tables (consisting of general employees, public safety, and teachers mortality tables for actives; retirees, disabled plan members, and contingent survivor members) and a mortality improvement scale based on the 2-dimensional MP-2021 mortality improvement scales. The MP-2021 is the most recent mortality projection scale issued by the RPEC.

The preliminary MP-2022 projection scale would have reflected mortality experience during 2020 (which was significantly impacted by COVID-19) and would have required significant adjustments to the projection model to consider the impact. Although it is was originally anticipated that the SOA would release new improvement scales annually, due to the pandemic, it will likely be around five years before another update is released. For purposes of SERS actuarial valuations, we recommend maintaining the MP-2021 improvement scales until the next experience study, even if a new projection scale is released prior to the next experience study. The mortality improvement scale is applied to the Pub-2010 table to reflect improvements in mortality that are expected to occur with each new generation of participants.

Mortality Assumption

Findings

The mortality experience was reviewed on a benefit weighted basis for retired members in pay status and on a headcount basis for active members. The observed experience was compared to the current mortality tables and updated baseline mortality tables:

- Current and Proposed Regular Benefit Formula ***baseline*** mortality tables: Pub-2010 Below-Median Income General Healthy Retiree Mortality Tables and projected for fully generational mortality improvements from 2010 using Scale MP-2021
- Current and Proposed Alternative Benefit Formula ***baseline*** mortality tables: Pub-2010 Below-Median Income Public Safety Healthy Retiree Mortality Tables and projected for fully generational mortality improvements from 2010 using Scale MP-2021

Data from July 1, 2020 to June 30, 2022 was excluded due to the COVID-19 pandemic. In order to increase the credibility of the data for the experience analysis, data from the prior experience study covering July 1, 2017 to June 30, 2020 was included for a total of five years of mortality data.

The tables shown on the following pages, applicable to retired member mortality experience, compare the actual benefit weighted deaths to the expected benefit weighted deaths using the current tables, proposed baseline tables, and the recommended tables with credibility scaling.

Mortality Assumption

The following table uses the General Healthy Retirees benefit-weighted mortality tables and applies to SERS retirees covered under the Regular Benefit formula.

	General Retirees Benefit Weighted Deaths ($ in 10,000)			
Retiree Experience	Expected Using Current Mortality Table	Actual	Expected Using Baseline Mortality Table Without Scaling Pub-2010 Below-Median Income General Healthy Retiree [a]	Expected Using Proposed Mortality Table With Scaling Pub-2010 Below-Median Income General Healthy Retiree [b]
Male Retirees	$11,299	$11,200	$12,417	$11,200
Female Retirees	$9,569	$9,387	$8,310	$9,387

[a] *Baseline Table: Pub-2010 Below-Median Income General Healthy Retiree.*

[b] *Proposed Table: Pub-2010 Below-Median Income General Healthy Retiree, with a scaling factor of 90% for males and 113% for females.*

When compared to the current mortality tables, the experience on a benefit weighted basis shows that actual experience is below expectation for males and females.

We applied credibility and "best-fit" factors to the baseline mortality tables to recognize a portion of the observed mortality experience. The credibility factor applies more weight to the observed mortality experience as the sample size of the group and number of deaths increases. The "best-fit" factor compares actual deaths during the experience period to expected deaths during the period using a base mortality table.

The following table shows the development of the scaling factor that is applied to the recommended base mortality tables (Pub-2010 Below-Median Income General Healthy Retiree Mortality) for SERS annuitants covered under the Regular Benefit Formula.

	General Retirees Benefit Weighted Deaths ($ in 10,000)					
Retiree Experience	Fully Credible Target Deaths Using Baseline Table [a,b] (a)	Observed Deaths (b)	Expected Deaths Using Baseline Table (c)	Credibility Factor $(d)=(b/a)^{1/2}$	Best Fit Factor (e)=(b)/(c)	Scaling Factor Applied to Baseline Table (d) x (e) + [1-(d)] x 100%
Male Retirees	$5,841	$11,200	$12,417	100%	90%	90%
Female Retirees	$4,109	$9,387	$8,310	100%	113%	113%

[a] *Baseline Table: Pub-2010 Below-Median General Healthy Retiree.*

[b] *Minimum number of expected benefit weighted deaths needed for plan experience to be fully credible.*

Mortality Assumption

The following table uses the Public Safety Healthy Retirees benefit-weighted mortality tables and applies to SERS retirees covered under Alternative Benefit Formula.

	Public Safety Retirees Benefit Weighted Deaths ($ in 10,000)			
Retiree Experience	Expected Using Current Mortality Table	Actual	Expected Using Baseline Mortality Table Without Scaling Pub-2010 Below-Median Income Public Safety Healthy Retiree [a]	Expected Using Proposed Mortality Table With Scaling Pub-2010 Below-Median Income Public Safety Healthy Retiree [b]
Male Retirees	$6,975	$7,214	$7,190	$7,213
Female Retirees	$1,063	$1,064	$1,032	$1,046

[a] *Baseline Table: Pub-2010 Below-Median Income Public Safety Healthy Retiree.*

[b] *Proposed Table: Pub-2010 Below-Median Income Public Safety Healthy Retiree, with a scaling factor of 100% for males and 101% for females.*

Although the experience has limited credibility, when compared to the current mortality table the experience on a benefit weighted basis shows that actual experience is above expectation for males and close to expectations for females.

We applied credibility and "best-fit" factors to the baseline mortality tables to recognize a portion of the observed mortality experience. The credibility factor applies more weight to the observed mortality experience as the sample size of the group and number of deaths increases. The "best-fit" factor compares actual deaths during the experience period to expected deaths during the period using a base mortality table.

The following table shows the development of the scaling factor that is applied to the recommended base mortality tables (Pub-2010 Below-Median Income Public Safety Healthy Retiree Mortality) for SERS annuitants covered under the Alternative Benefit Formula.

	Public Safety Retirees Benefit Weighted Deaths ($ in 10,000)					
Retiree Experience	Fully Credible Target Deaths Using Baseline Table [a,b] (a)	Observed Deaths (b)	Expected Deaths Using Baseline Table (c)	Credibility Factor (d)=(b/a)$^{1/2}$	Best Fit Factor (e)=(b)/(c)	Scaling Factor Applied to Baseline Table (d) x (e) + [1-(d)] x 100%
Male Retirees	$8,046	$7,214	$7,190	95%	100%	100%
Female Retirees	$6,053	$1,064	$1,032	42%	103%	101%

[a] *Baseline Table: Pub-2010 Public Safety Healthy Retiree.*

[b] *Minimum number of expected liability weighted deaths needed for plan experience to be fully credible.*

Mortality Assumption

The experience for active members is even less credible when compared to the experience of retired members.

Current mortality assumptions for active members are based on the following:

- General Employees: Pub-2010 General Employee Mortality Tables with a scaling factor of 84% for males and 92% for females.
- Public Safety Employees: Pub-2010 Public Safety Employee Mortality Tables with a scaling factor of 90% for males and 100% for females.
- These tables also include generational mortality improvements using the MP-2021 two-dimensional mortality improvement scales.
- Five percent of deaths among active employees are assumed to be in the performance of their duty.

The following tables use the General Employees headcount-weighted mortality tables and apply to SERS members covered under the SERS Regular Benefit Formula.

	General Employees Headcount Weighted Deaths			
Pre-Retirement Experience	Expected Using Current Mortality Table	Actual	Expected Using Baseline Mortality Table Without Scaling Pub-2010 General Employee[a]	Expected Using Proposed Mortality Table With Scaling Pub-2010 General Employee [b]
Male Members	179	85	214	177
Female Members	142	92	154	136

[a] *Baseline Table: Pub-2010 General Employee.*
[b] *Proposed Table: Pub-2010 General Employee, with a scaling factor of 83% for males and 88% for females.*

The following table shows the development of the scaling factor that is applied to the recommended base mortality table (Pub-2010 General Employee) for SERS employees covered under the Regular Benefit Formula.

	General Employees Headcount Weighted Deaths					
Active Member Experience	Fully Credible Target Deaths Using Baseline Table [a] (a)	Observed Deaths (b)	Expected Deaths Using Baseline Table (c)	Credibility Factor (d)=(b/a)$^{1/2}$	Best Fit Factor (e)=(b)/(c)	Scaling Factor Applied to Baseline Table (d) x (e) + [1-(d)] x 100%
Male Employees	1,082	85	214	28%	40%	83%
Female Employees	1,082	92	154	29%	60%	88%

[a] *Baseline Table: Pub-2010 General Employee.*

Mortality Assumption

The following tables use the Public Safety Employees headcount-weighted mortality tables and apply to SERS members covered under the Alternative Benefit Formula.

	Public Safety Headcount Weighted Deaths			
Pre-Retirement Experience	Expected Using Current Mortality Table	Actual	Expected Using Baseline Mortality Table Without Scaling Pub-2010 Public Safety Employee [a]	Expected Using Proposed Mortality Table With Scaling Pub-2010 Public Safety Employee [b]
Male Members	74	38	83	73
Female Members	20	15	20	19

[a] *Baseline Table: Pub-2010 Public Safety Employee.*

[b] *Proposed Table: Pub-2010 Public Safety Employee, with a scaling factor of 90% for males and 97% for females.*

The following table shows the development of the scaling factor that is applied to the recommended base mortality table (Pub-2010 Public Safety Employee) for SERS employees covered under the Alternative Benefit Formula.

	Public Safety Headcount Weighted Deaths					
Active Member Experience	Fully Credible Target Deaths Using Baseline Table [a] (a)	Observed Deaths (b)	Expected Deaths Using Baseline Table (c)	Credibility Factor $(d)=(b/a)^{1/2}$	Best Fit Factor (e)=(b)/(c)	Scaling Factor Applied to Baseline Table (d) x (e) + [1-(d)] x 100%
Male Employees	1,082	38	83	19%	46%	90%
Female Employees	1,082	15	20	12%	76%	97%

[a] *Baseline Table: Pub-2010 Public Safety Employee.*

Mortality Assumption

Recommendation

We reviewed the mortality experience separately for active members and retirees during the five-year study period. Details of the results are shown on the following pages.

Following is a summary of the current mortality assumptions:

General Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 General Employee, sex distinct	84%	92%
Post-retirement	Pub-2010 Below-Median Income General Healthy Retiree sex distinct	91%	115%

Public Safety Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 Public Safety Employee, sex distinct	90%	100%
Post-retirement	Pub-2010 Below-Median Income Public Safety Healthy Retiree, sex distinct	97%	103%

Future mortality improvements are reflected by projecting the base mortality tables forward from the year 2010 using the MP-2021 projection scale.

Following is a summary of the recommended mortality assumptions:

General Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 General Employee, sex distinct	83%	88%
Post-retirement	Pub-2010 Below-Median Income General Healthy Retiree sex distinct	90%	113%

Public Safety Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 Public Safety Employee, sex distinct	90%	97%
Post-retirement	Pub-2010 Below-Median Income Public Safety Healthy Retiree, sex distinct	100%	101%

Future mortality improvements are reflected by projecting the base mortality tables forward from the year 2010 using the MP-2021 projection scale.

Mortality Assumption

A Note about Mortality Rates

The recommended mortality assumptions include generational mortality improvements, which means that the probability of a 60-year-old retired male dying in any particular year is lower for a 60-year-old born in 1994 than a 60-year-old born in 1954.

The use of generational mortality tables is based on the assumption that life expectancy increases from generation to generation. Simply put, this means that the life expectancy of someone born in 1994 is greater than that of someone born in 1954.

The following tables contain the mortality experience for the experience study period:

- Table II(a) and Graphs II(a)(i) and II(a)(ii) – Post-Retirement Mortality Experience – General
- Table II(b) and Graphs II(b)(i) and II(b)(ii) – Post-Retirement Mortality Experience – Public Safety
- Table II(c) and Graphs II(c)(i) and II(c)(ii) – Pre-Retirement Mortality Experience – General
- Table II(d) and Graphs II(d)(i) and II(d)(ii) – Pre-Retirement Mortality Experience – Public Safety

Mortality Assumption

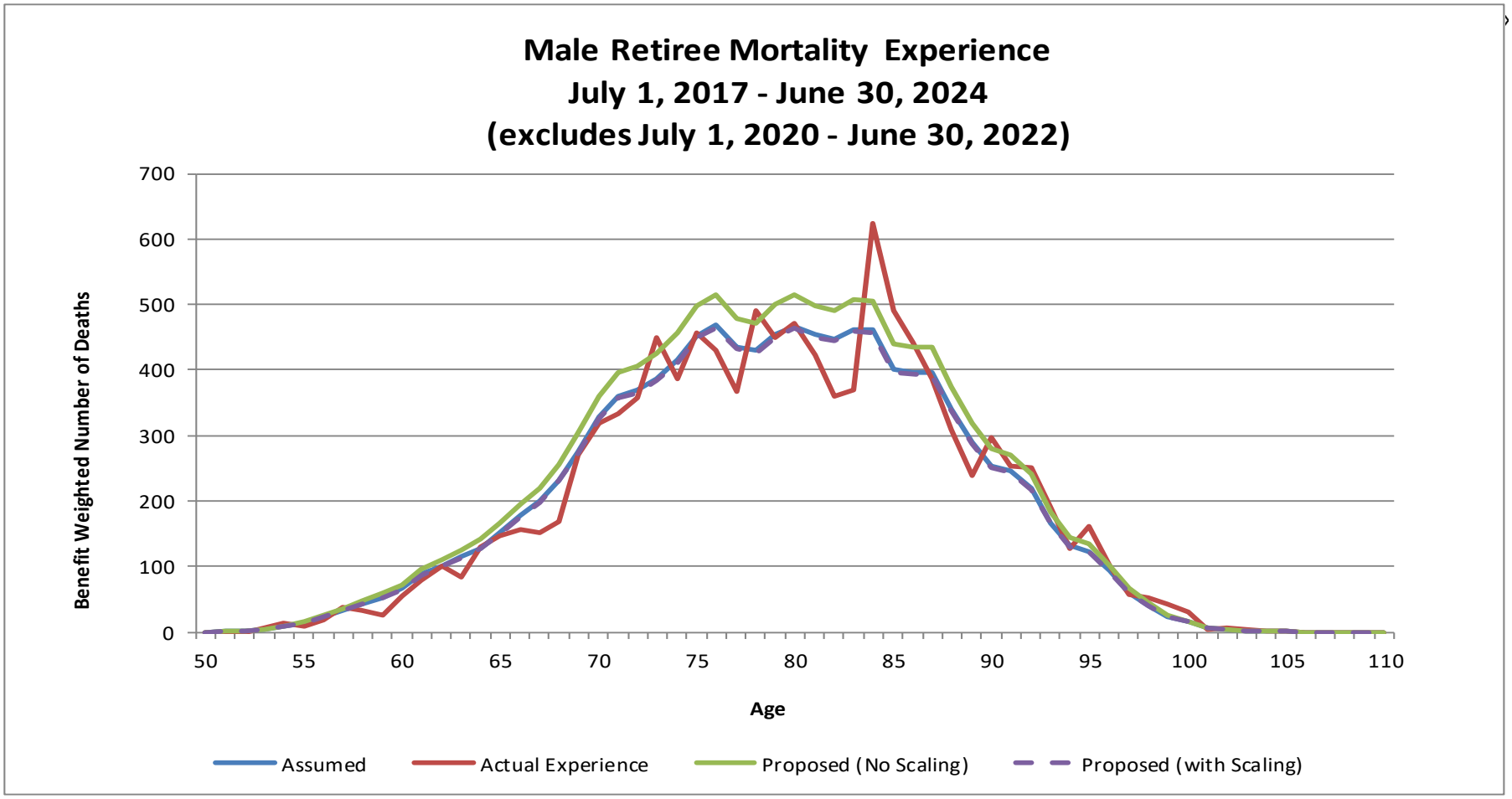
Table II(a) General

Male Retiree Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
	Benefit Weighted ($ in 10,000)		Actual	Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 54	$ 1,401	$ 17	1.232%	$ 10	0.736%	1.67	$ 10	0.730%	1.69
55-59	18,119	123	0.676%	164	0.907%	0.75	163	0.899%	0.75
60-64	44,808	445	0.993%	496	1.106%	0.90	491	1.097%	0.91
65-69	73,306	890	1.215%	1,036	1.413%	0.86	1,027	1.401%	0.87
70-74	87,554	1,846	2.108%	1,858	2.122%	0.99	1,842	2.103%	1.00
75-79	64,658	2,194	3.393%	2,239	3.463%	0.98	2,220	3.433%	0.99
80-84	38,106	2,244	5.889%	2,291	6.012%	0.98	2,271	5.959%	0.99
85-89	17,931	1,867	10.414%	1,822	10.161%	1.02	1,806	10.072%	1.03
90-94	6,400	1,119	17.476%	1,016	15.873%	1.10	1,007	15.734%	1.11
95-99	1,542	410	26.579%	339	21.987%	1.21	336	21.793%	1.22
100-104	92	44	47.388%	27	29.696%	1.60	27	29.435%	1.61
105+	2	2	100.000%	1	37.344%	2.68	1	37.015%	2.70
Totals:	**$ 353,919**	**$ 11,200**	**3.165%**	**$ 11,299**	**3.193%**	**0.99**	**$ 11,200**	**3.165%**	**1.00**
Female Retiree Mortality Experience									
Under 54	$ 2,144	$ -	0.000%	$ 11	0.511%	0.00	$ 11	0.501%	0.00
55-59	25,431	131	0.515%	151	0.594%	0.87	148	0.583%	0.88
60-64	65,747	335	0.509%	456	0.694%	0.73	448	0.681%	0.75
65-69	91,719	769	0.838%	845	0.921%	0.91	829	0.904%	0.93
70-74	85,811	1,386	1.615%	1,295	1.509%	1.07	1,270	1.480%	1.09
75-79	58,291	1,562	2.680%	1,561	2.678%	1.00	1,531	2.627%	1.02
80-84	34,242	1,758	5.133%	1,685	4.920%	1.04	1,653	4.827%	1.06
85-89	17,150	1,523	8.881%	1,570	9.153%	0.97	1,540	8.979%	0.99
90-94	7,899	1,180	14.933%	1,256	15.896%	0.94	1,232	15.594%	0.96
95-99	2,475	588	23.740%	591	23.886%	0.99	580	23.432%	1.01
100-104	387	140	36.015%	133	34.334%	1.05	130	33.681%	1.07
105+	34	17	50.741%	16	46.875%	1.08	16	45.984%	1.10
Totals:	**$ 391,329**	**$ 9,387**	**2.399%**	**$ 9,569**	**2.445%**	**0.98**	**$ 9,387**	**2.399%**	**1.00**
Grand Totals:	**$ 745,248**	**$ 20,587**	**2.762%**	**$ 20,869**	**2.800%**	**0.99**	**$ 20,587**	**2.762%**	**1.00**

Expected deaths under the current and proposed assumptions are on a liability weighted basis.

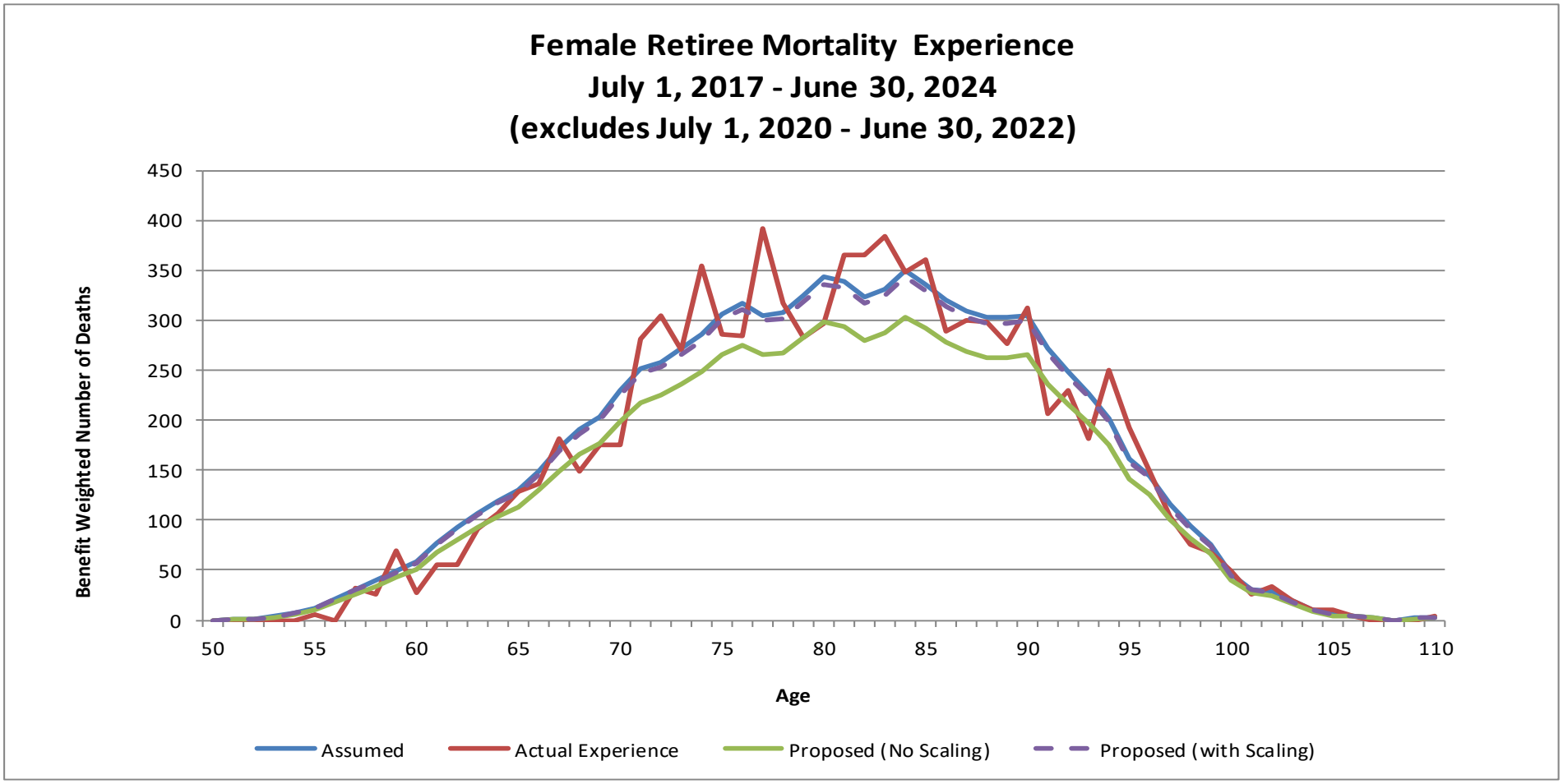
Mortality Assumption

Graph II(a)(i) General Male



Mortality Assumption

Graph II(a)(ii) General Female



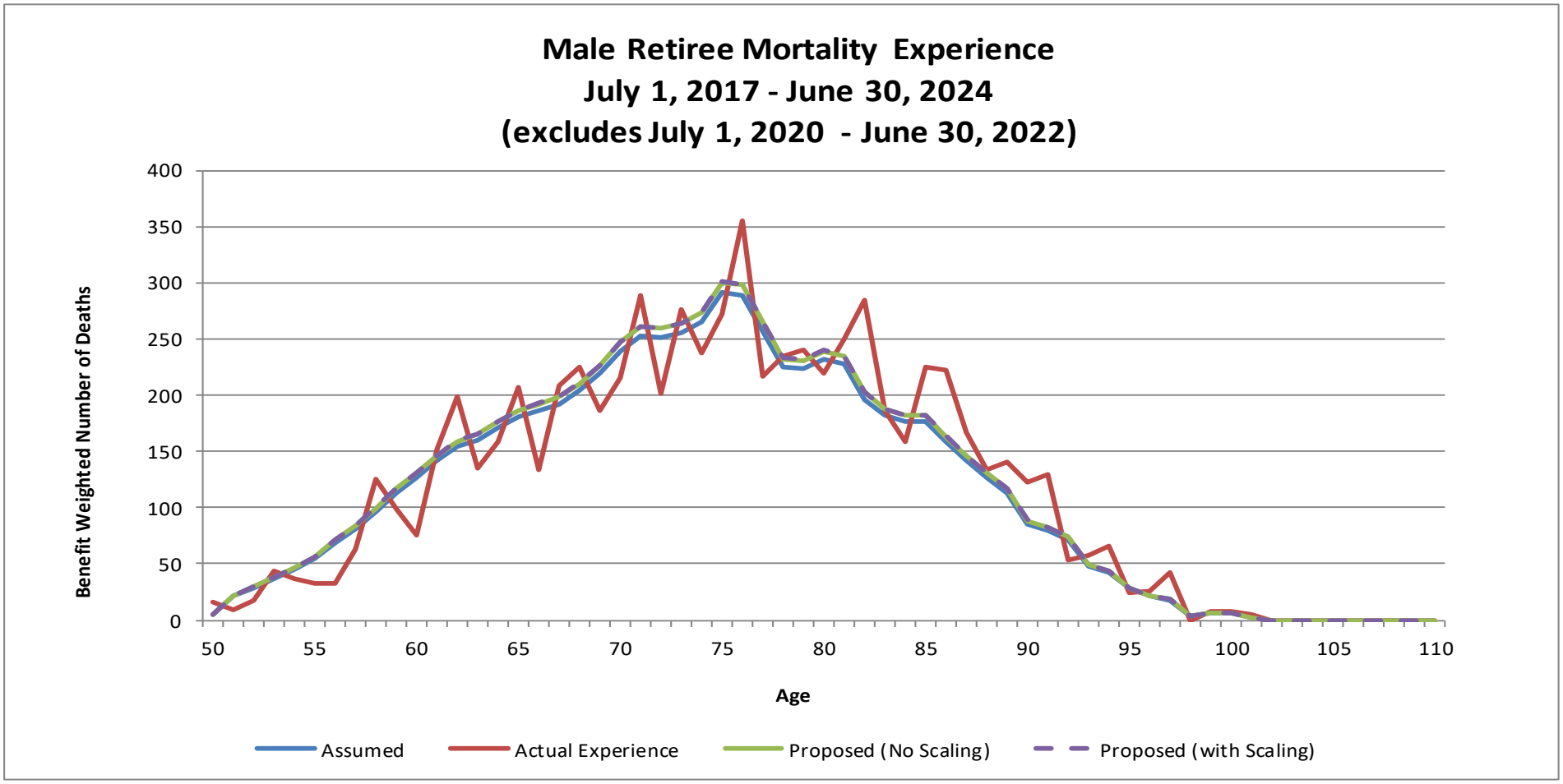
Mortality Assumption

Table II(b) Public Safety

Male Retiree Mortality Experience										
	Actual Experience			Current Assumptions			Proposed Assumptions			
	Benefit Weighted ($ in 10,000)		Actual	Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 54	$ 35,581	$ 122	0.344%	$ 135	0.381%	0.90	$ 140	0.394%	0.87
55-59	72,211	351	0.485%	414	0.574%	0.85	429	0.594%	0.82
60-64	84,828	720	0.848%	752	0.887%	0.96	778	0.917%	0.93
65-69	73,420	960	1.307%	982	1.337%	0.98	1,015	1.383%	0.95
70-74	59,116	1,218	2.061%	1,263	2.137%	0.96	1,307	2.210%	0.93
75-79	36,040	1,317	3.655%	1,286	3.568%	1.02	1,330	3.690%	0.99
80-84	16,155	1,099	6.801%	1,013	6.274%	1.08	1,048	6.488%	1.05
85-89	6,626	888	13.397%	716	10.813%	1.24	741	11.183%	1.20
90-94	1,878	429	22.827%	327	17.425%	1.31	338	18.021%	1.27
95-99	320	98	30.737%	76	23.687%	1.30	78	24.498%	1.25
100-104	28	12	43.197%	9	30.673%	1.41	9	31.722%	1.36
105+	-	-		-			-		
Totals:	**$ 386,203**	**$ 7,214**	**1.868%**	**$ 6,975**	**1.806%**	**1.03**	**$ 7,213**	**1.868%**	**1.00**
Female Retiree Mortality Experience									
Under 54	$ 5,451	$ 14	0.248%	$ 12	0.212%	1.17	$ 11	0.209%	1.19
55-59	14,543	26	0.177%	56	0.382%	0.46	55	0.376%	0.47
60-64	19,970	78	0.391%	126	0.629%	0.62	124	0.619%	0.63
65-69	18,293	178	0.972%	177	0.969%	1.00	174	0.954%	1.02
70-74	12,389	189	1.525%	197	1.589%	0.96	194	1.564%	0.98
75-79	7,323	293	3.997%	205	2.802%	1.43	202	2.758%	1.45
80-84	3,083	137	4.452%	152	4.921%	0.90	149	4.843%	0.92
85-89	918	87	9.447%	79	8.619%	1.10	78	8.483%	1.11
90-94	295	53	18.081%	43	14.566%	1.24	42	14.336%	1.26
95-99	70	5	7.695%	15	21.211%	0.36	15	20.875%	0.37
100-104	6	4	73.234%	2	29.870%	2.45	2	29.396%	2.49
105+	-	-		-			-		
Totals:	**$ 82,342**	**$ 1,064**	**1.292%**	**$ 1,063**	**1.290%**	**1.00**	**$ 1,046**	**1.270%**	**1.02**
Grand Totals:	**$ 468,545**	**$ 8,278**	**1.767%**	**$ 8,037**	**1.715%**	**1.03**	**$ 8,259**	**1.763%**	**1.00**

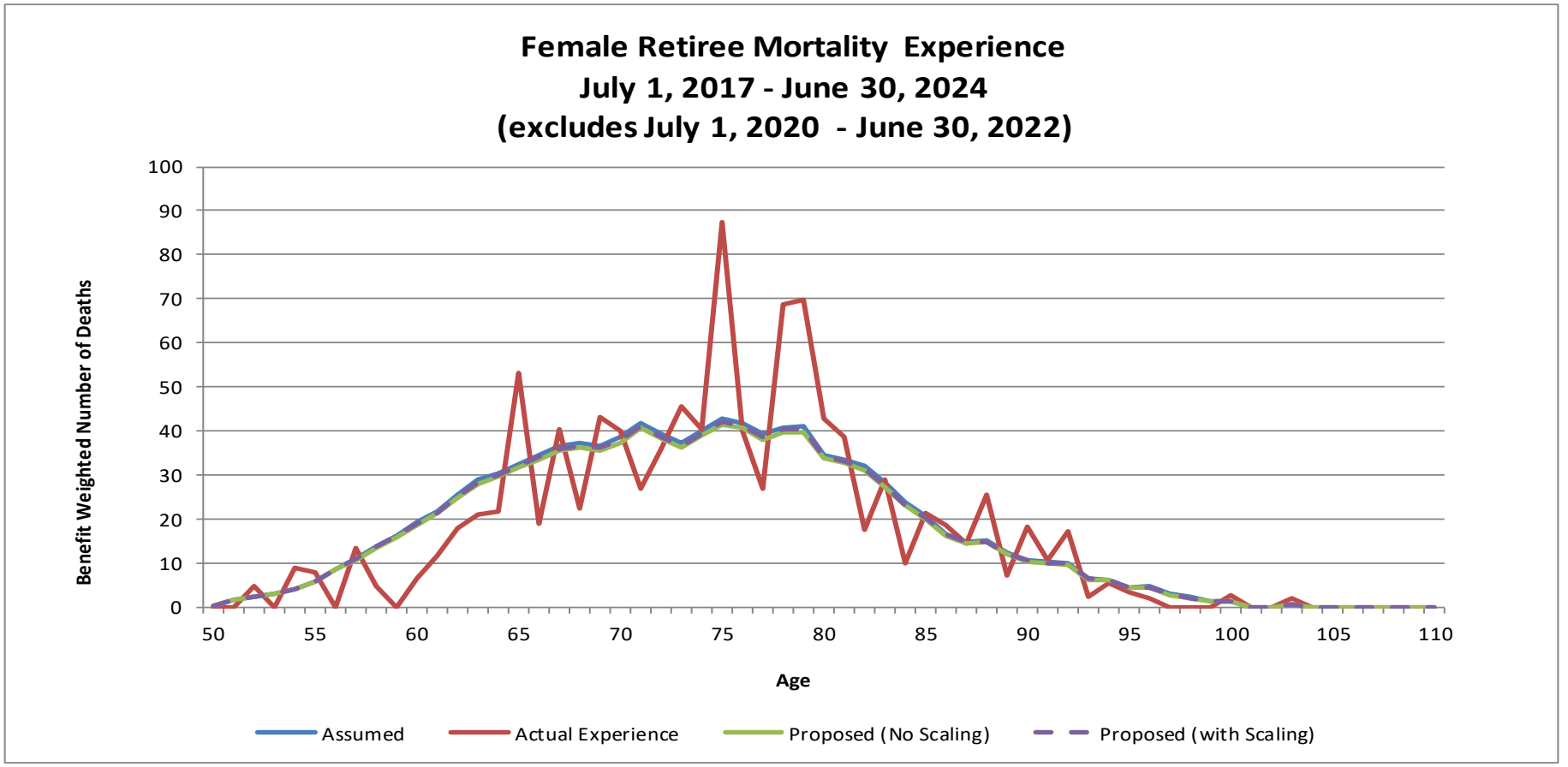
Mortality Assumption

Graph II(b)(i) Public Safety Male



Mortality Assumption

Graph II(b)(ii) Public Safety Female

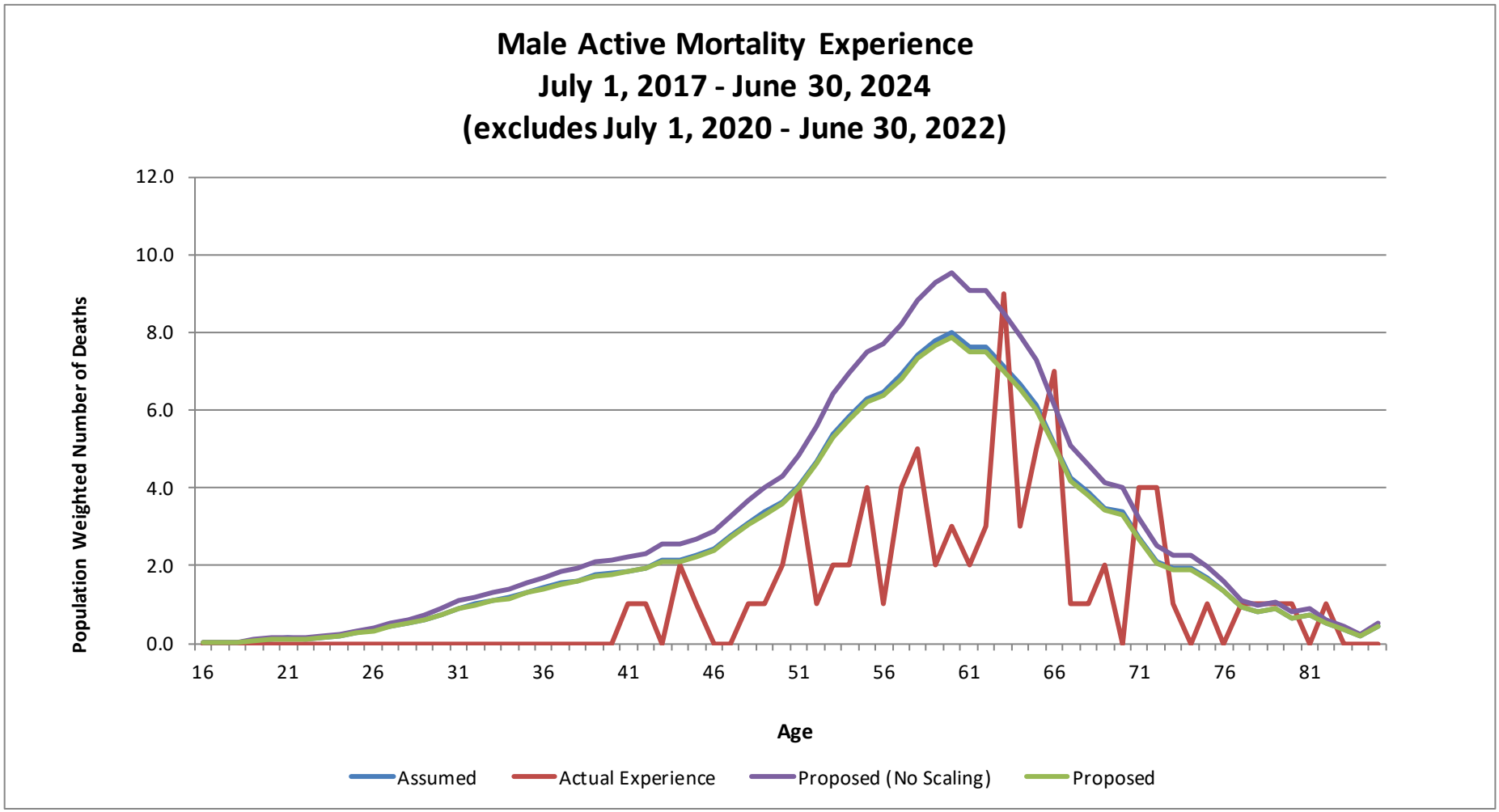


Mortality Assumption

Table II(c) Active General

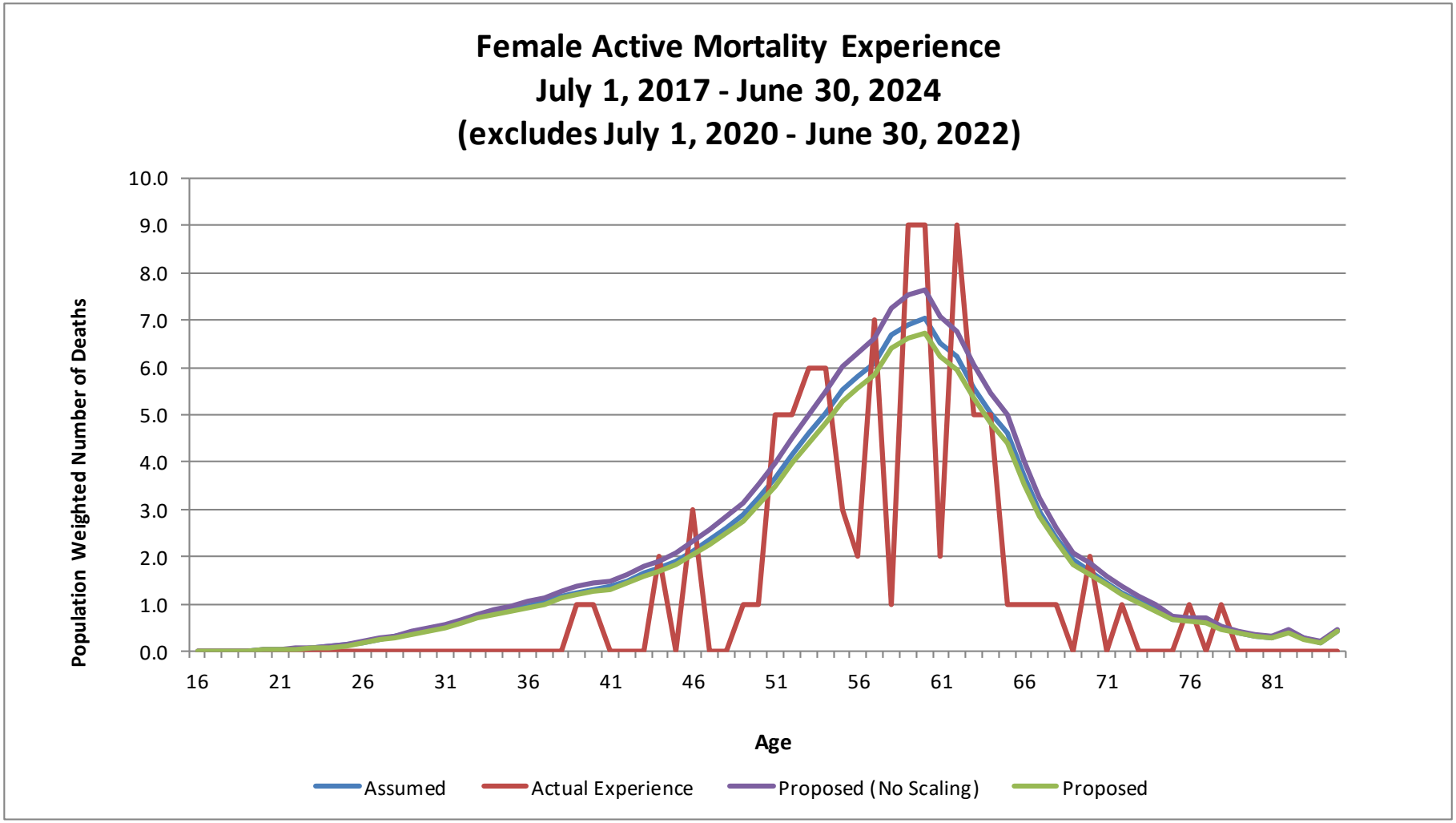
Male Active Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
	Population Weighted			Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Actual Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 20	373	0	0.000%	0	0.032%	0.00	0	0.032%	0.00
20-24	2,202	0	0.000%	1	0.033%	0.00	1	0.033%	0.00
25-29	5,107	0	0.000%	2	0.042%	0.00	2	0.041%	0.00
30-34	8,094	0	0.000%	5	0.061%	0.00	5	0.060%	0.00
35-39	9,547	0	0.000%	8	0.080%	0.00	8	0.079%	0.00
40-44	10,469	4	0.038%	10	0.094%	0.41	10	0.093%	0.41
45-49	11,869	3	0.025%	14	0.117%	0.22	14	0.115%	0.22
50-54	14,235	11	0.077%	24	0.166%	0.47	23	0.163%	0.47
55-59	13,765	16	0.116%	35	0.254%	0.46	34	0.250%	0.47
60-64	9,905	20	0.202%	37	0.374%	0.54	36	0.368%	0.55
65-69	4,478	16	0.357%	23	0.510%	0.70	23	0.503%	0.71
70-74	1,662	9	0.542%	12	0.722%	0.75	12	0.711%	0.76
75 and over	644	6	0.932%	10	1.503%	0.62	10	1.480%	0.63
Totals:	**92,350**	**85**	**0.092%**	**179**	**0.194%**	**0.47**	**177**	**0.191%**	**0.48**
Less than 60:	**75,661**	**34**	**0.045%**	**98**	**0.129%**	**0.35**	**96**	**0.127%**	**0.35**
Female Active Mortality Experience									
	Population Weighted			Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Actual Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 20	253	0	0.000%	0	0.013%	0.00	0	0.013%	0.00
20-24	2,250	0	0.000%	0	0.013%	0.00	0	0.013%	0.00
25-29	6,925	0	0.000%	1	0.018%	0.00	1	0.017%	0.00
30-34	11,021	0	0.000%	3	0.028%	0.00	3	0.027%	0.00
35-39	13,340	1	0.007%	5	0.040%	0.19	5	0.038%	0.20
40-44	15,171	3	0.020%	8	0.050%	0.40	7	0.048%	0.41
45-49	17,973	4	0.022%	12	0.066%	0.34	11	0.063%	0.35
50-54	20,653	23	0.111%	21	0.100%	1.11	20	0.096%	1.16
55-59	19,626	22	0.112%	31	0.158%	0.71	30	0.151%	0.74
60-64	13,207	30	0.227%	30	0.230%	0.99	29	0.220%	1.03
65-69	4,836	4	0.083%	16	0.323%	0.26	15	0.309%	0.27
70-74	1,276	3	0.235%	6	0.501%	0.47	6	0.480%	0.49
75 and over	465	2	0.430%	8	1.735%	0.25	8	1.662%	0.26
Totals:	**126,996**	**92**	**0.072%**	**142**	**0.112%**	**0.65**	**136**	**0.107%**	**0.68**
Less than 60:	**107,212**	**53**	**0.049%**	**81**	**0.076%**	**0.65**	**78**	**0.073%**	**0.68**
Grand Totals:	**219,346**	**177**	**0.081%**	**321**	**0.146%**	**0.55**	**312**	**0.142%**	**0.57**
Less than 60:	**182,873**	**87**	**0.048%**	**179**	**0.098%**	**0.49**	**174**	**0.095%**	**0.50**

Graph II(c)(i) Active General Male



Expected deaths under the current and proposed assumptions are on a population weighted basis.

Graph II(c)(ii) Active General Female



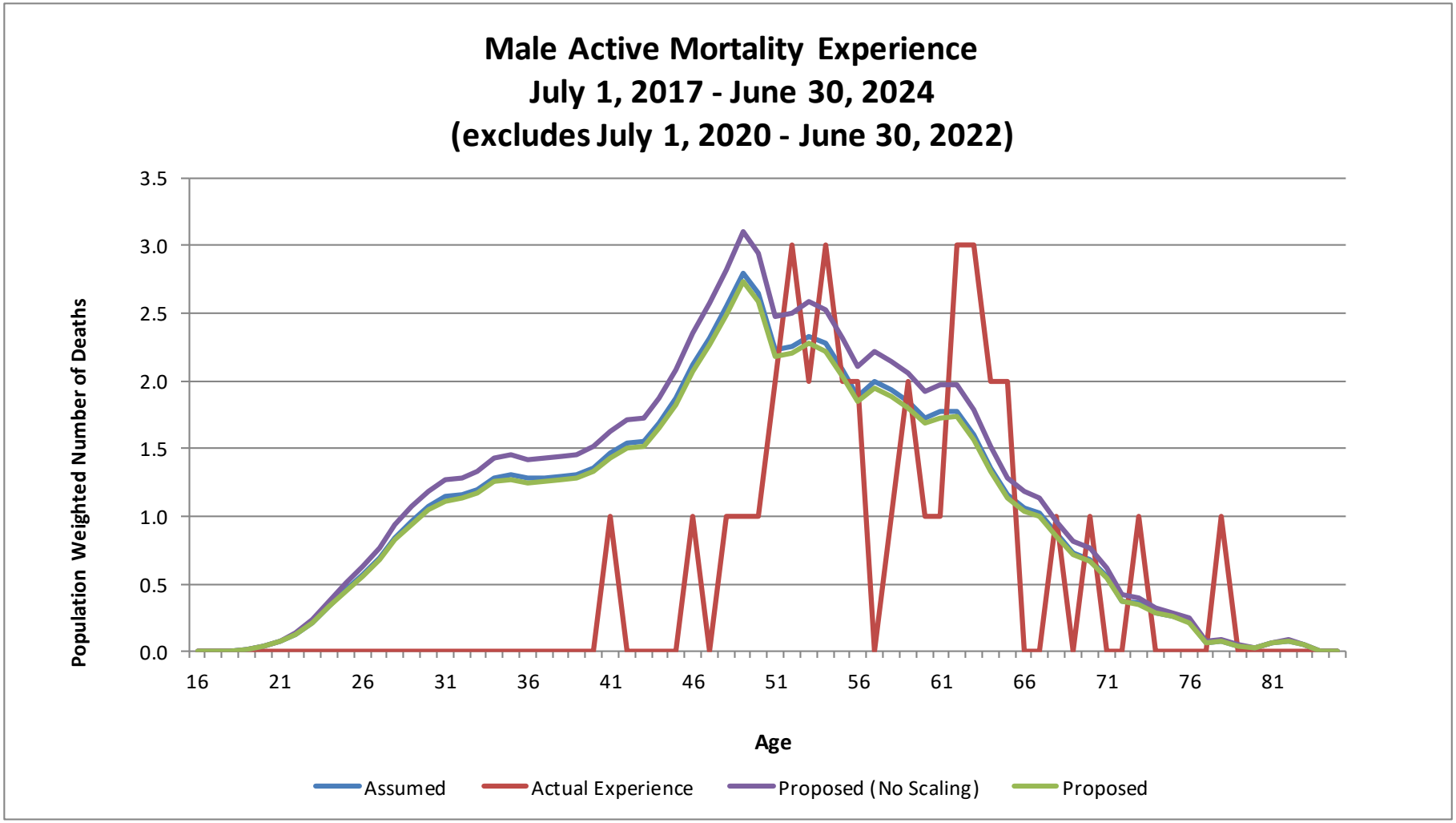
Expected deaths under the current and proposed assumptions are on a population weighted basis.

Mortality Assumption

Table II(d) Active Public Safety

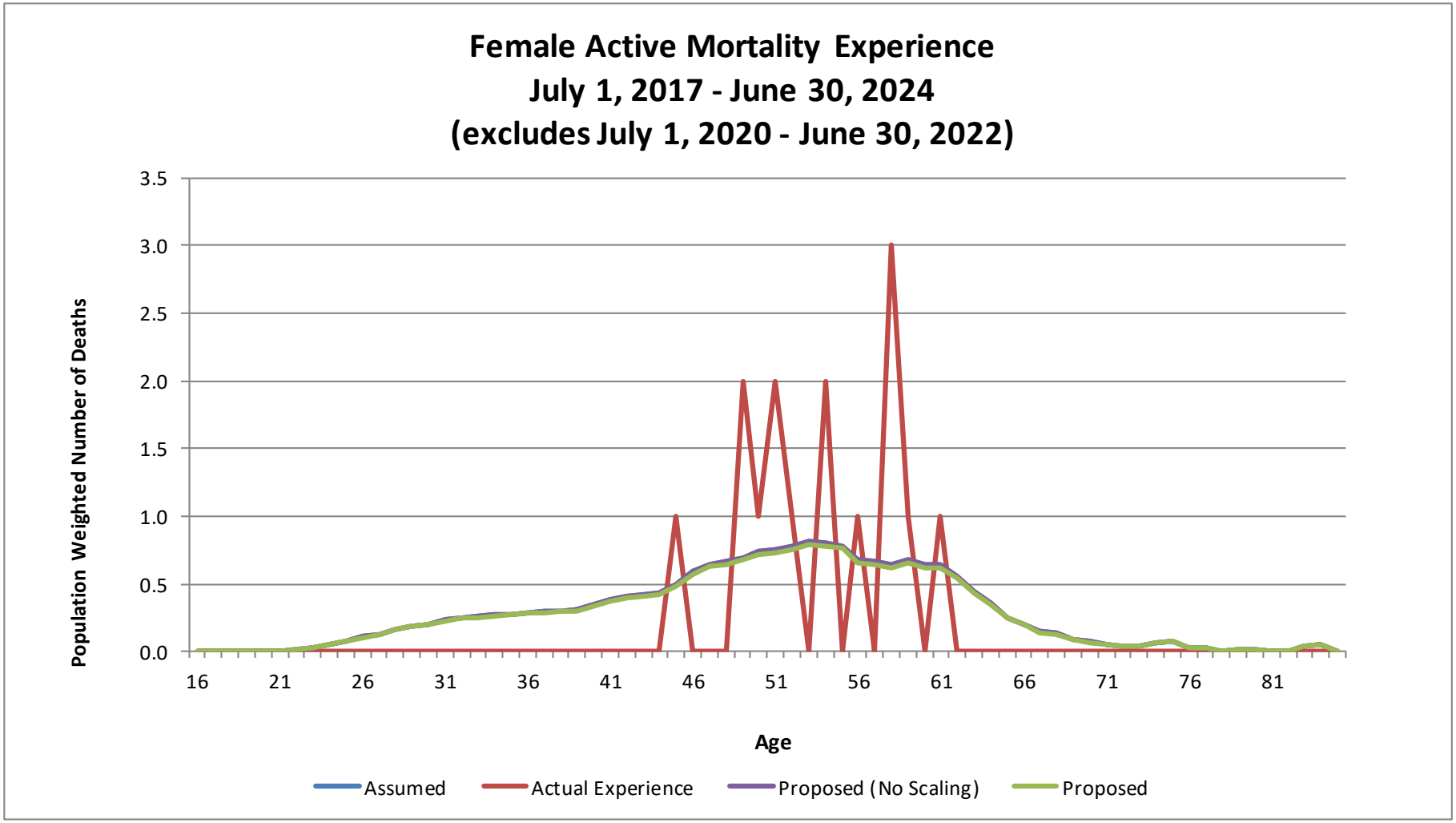
Male Active Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
	Population Weighted			Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Actual Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 20	36	0	0.000%	0	0.038%	0.00	0	0.037%	0.00
20-24	1,858	0	0.000%	1	0.042%	0.00	1	0.041%	0.00
25-29	6,812	0	0.000%	4	0.052%	0.00	3	0.050%	0.00
30-34	9,056	0	0.000%	6	0.065%	0.00	6	0.063%	0.00
35-39	8,694	0	0.000%	6	0.074%	0.00	6	0.073%	0.00
40-44	9,334	1	0.011%	8	0.081%	0.13	7	0.080%	0.13
45-49	12,156	3	0.025%	12	0.096%	0.26	11	0.094%	0.26
50-54	9,037	11	0.122%	12	0.130%	0.94	11	0.127%	0.96
55-59	4,782	7	0.146%	10	0.204%	0.72	10	0.199%	0.74
60-64	2,489	10	0.402%	8	0.331%	1.21	8	0.323%	1.24
65-69	931	3	0.322%	5	0.520%	0.62	5	0.508%	0.63
70-74	261	2	0.766%	2	0.866%	0.88	2	0.846%	0.91
75 and over	56	1	1.786%	2	2.941%	0.61	2	2.873%	0.62
Totals:	**65,502**	**38**	**0.058%**	**74**	**0.114%**	**0.51**	**73**	**0.111%**	**0.52**
Less than 60:	**61,765**	**22**	**0.036%**	**57**	**0.093%**	**0.38**	**56**	**0.091%**	**0.39**
Female Active Mortality Experience									
	Population Weighted			Expected	Assumed	Actual /	Expected	Proposed	Actual /
Age	Exposures	Deaths	Actual Rate	Deaths	Rate	Expected	Deaths	Rate	Expected
Under 20	5	0	0.000%	0	0.016%	0.00	0	0.016%	0.00
20-24	501	0	0.000%	0	0.021%	0.00	0	0.021%	0.00
25-29	2,194	0	0.000%	1	0.031%	0.00	1	0.030%	0.00
30-34	2,757	0	0.000%	1	0.044%	0.00	1	0.043%	0.00
35-39	2,528	0	0.000%	1	0.058%	0.00	1	0.056%	0.00
40-44	2,988	0	0.000%	2	0.066%	0.00	2	0.064%	0.00
45-49	3,863	3	0.078%	3	0.080%	0.97	3	0.078%	1.00
50-54	3,486	6	0.172%	4	0.112%	1.54	4	0.108%	1.59
55-59	2,069	5	0.242%	3	0.166%	1.45	3	0.161%	1.50
60-64	1,170	1	0.085%	3	0.225%	0.38	3	0.218%	0.39
65-69	270	0	0.000%	1	0.307%	0.00	1	0.297%	0.00
70-74	46	0	0.000%	0	0.596%	0.00	0	0.577%	0.00
75 and over	16	0	0.000%	0	1.492%	0.00	0	1.446%	0.00
Totals:	**21,893**	**15**	**0.069%**	**20**	**0.091%**	**0.76**	**19**	**0.088%**	**0.78**
Less than 60:	**20,391**	**14**	**0.069%**	**16**	**0.078%**	**0.88**	**15**	**0.075%**	**0.91**
Grand Totals:	**87,395**	**53**	**0.061%**	**94**	**0.108%**	**0.56**	**92**	**0.105%**	**0.58**
Less than 60:	**82,156**	**36**	**0.044%**	**73**	**0.089%**	**0.49**	**71**	**0.087%**	**0.50**

Graph II(d)(i) Active Public Safety Male



Expected deaths under the current and proposed assumptions are on a population weighted basis.

Graph II(d)(ii) Active Public Safety Female



Expected deaths under the current and proposed assumptions are on a population weighted basis.

Retirement Assumption

Retirement

The System provisions establish the minimum eligibility requirements for retirement as follows:
Upon termination of State service, a member is eligible for a pension at age 60 with at least eight years of pension credit or at any age with 35 or more years of credit.

General formula members are eligible for a retirement annuity if the sum of the member's age plus years (and whole months) of pension credit equals or exceeds 85. General formula members between ages 55 and 60 with at least 25 years of pension credit are eligible for a retirement annuity reduced by one-half of 1 percent for each month the member is under age 60. Certain positions in the Department of Corrections were placed under the general formula effective July 1, 2005.

Members serving in a position in which service toward the Alternative Retirement Annuity may be earned are eligible to receive the Alternative Retirement Annuity at age 50 with at least 25 years of alternative pension credit or at age 55 with at least 20 years of alternative pension credit in such a position. Security employees of the Department of Human Services were placed under the alternative formula, effective January 1, 2001. Certain members of the Department of Transportation and the Toll Highway Authority were placed under the alternative formula effective August 1, 2001.

The above provisions apply to Tier One members only.

Retirement cost, however, is determined not by the minimum eligibility requirements, but by the ages at which members actually retire. The valuation does not assume that everyone retires at earliest eligibility. The assumption about the timing of retirement once eligibility has been established is a major component in cost calculations. Note that higher rates of retirement at earlier retirement ages or years of service upon attaining retirement eligibility generally result in higher actuarially determined contributions, and vice versa.

Experience during the last three years was considered in the analysis shown on the following pages. The "Exposures" column shows the number of employees eligible to retire at various years of service or ages throughout the experience period. An individual could potentially be counted up to three times if eligible each year in the period. By tabulating employees in this fashion we are able to answer the question: "For all employees eligible at condition X, how many retired?"

Retirement Assumption

Tier One

Normal Retirement Experience – Regular Formula

Current and past experience has shown that retirement rates under this System are correlated with age. Currently, the System uses age-based rates with higher rates at key ages, with 100 percent retirement at age 75. We recommend the following changes:

- For both male and female members, a decrease in overall rates to reflect the actual experience of the System.

Applying the proposed rates to historical data generates the following number of retirements by age at retirement:

	Regular Formula - Number of Retirements					
	Male Members			Female Members		
Nearest Age	Actual	Current Assumption	Proposed Assumption	Actual	Current Assumption	Proposed Assumption
50-54	97	75	81	133	130	130
55-59	337	347	341	506	501	489
60-64	588	612	604	971	1007	986
65-69	370	423	417	537	586	575
70-74	134	147	142	149	154	154
75+	72	345	345	48	270	270
Total	**1,598**	**1,949**	**1,930**	**2,344**	**2,648**	**2,604**
Total Excluding 75+	**1,526**	**1,604**	**1,585**	**2,296**	**2,378**	**2,334**

Early Retirement Experience – Regular Formula

Early retirement experience was generally lower than the current early retirement rates for male members and higher for female members. We recommend the following changes:

- For male members, we recommend a decrease in the rates at ages 55, 58 and 59, no change to the rate at age 56, and an increase in the rate at age 57.
- For female members, we recommend an increase in the rates from ages 56 to 59 and no change to the rate at age 55.

Retirement Experience and Recommendations

The tables and graphs on the following pages show experience for normal and early retirement.

- Table III(a) and Graph III(a) – Normal Retirement Experience – Male
- Table III(b) and Graph III(b) – Normal Retirement Experience – Female
- Table III(c) and Graph III(c) – Early Retirement Experience – Male
- Table III(d) and Graph III(d) – Early Retirement Experience – Female

Retirement Assumption

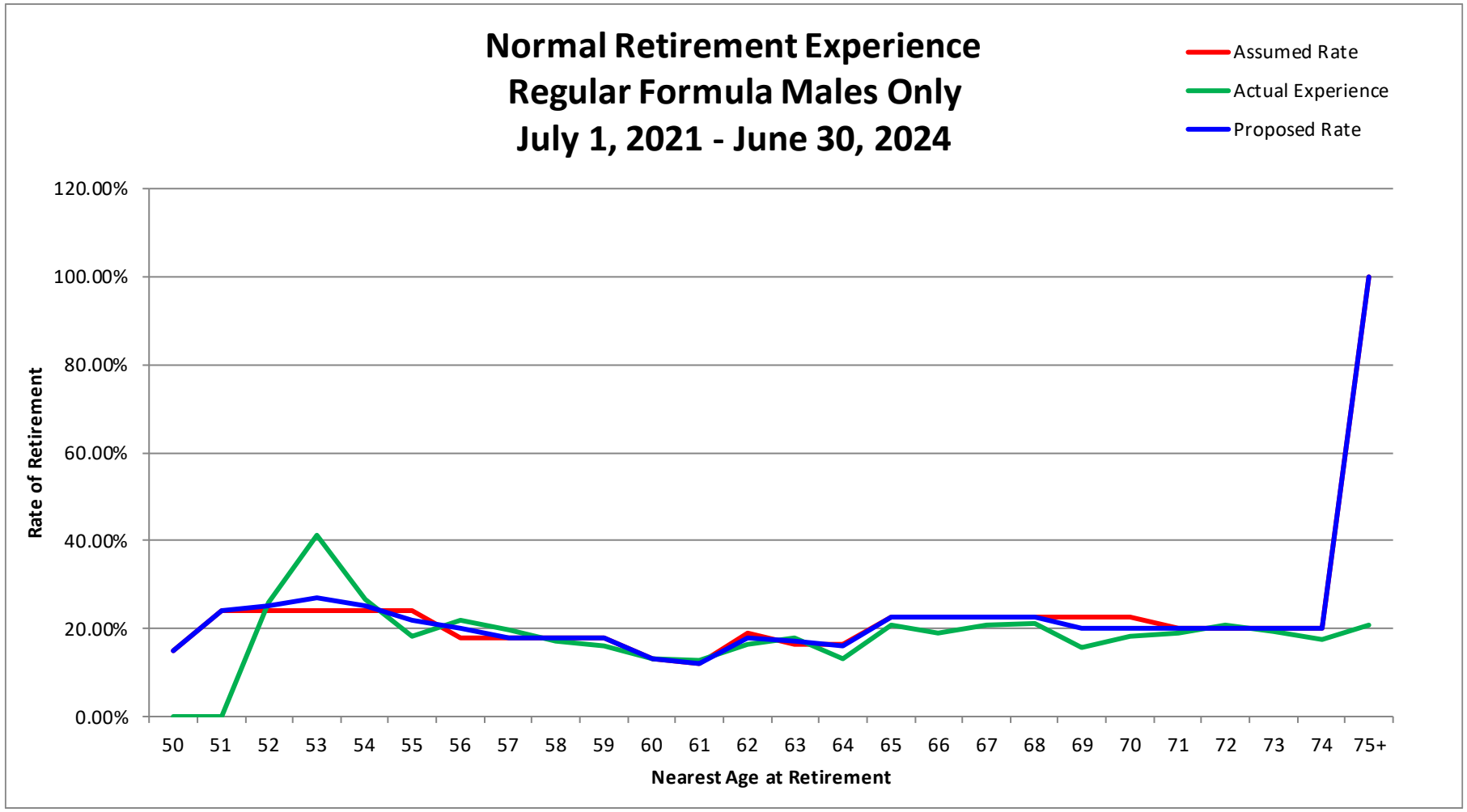
Tier One Regular Formula Male
Normal Retirement

Table III(a)

Normal Retirement Experience- Regular Formula Male Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
50	0	0		0	15.0%		0	15.0%	
51	0	0		0	24.0%		0	24.0%	
52	27	7	25.9%	6	24.0%	1.2	7	25.0%	1.0
53	92	38	41.3%	22	24.0%	1.7	25	27.0%	1.5
54	196	52	26.5%	47	24.0%	1.1	49	25.0%	1.1
55	297	54	18.2%	71	24.0%	0.8	65	22.0%	0.8
56	323	70	21.7%	58	18.0%	1.2	58	20.0%	1.2
57	369	73	19.8%	66	18.0%	1.1	66	18.0%	1.1
58	394	68	17.3%	71	18.0%	1.0	71	18.0%	1.0
59	448	72	16.1%	81	18.0%	0.9	81	18.0%	0.9
60	989	129	13.0%	129	13.0%	1.0	129	13.0%	1.0
61	910	116	12.7%	109	12.0%	1.1	109	12.0%	1.1
62	822	136	16.5%	156	19.0%	0.9	148	18.0%	0.9
63	726	130	17.9%	120	16.5%	1.1	123	17.0%	1.1
64	592	77	13.0%	98	16.5%	0.8	95	16.0%	0.8
65	512	106	20.7%	115	22.5%	0.9	115	22.5%	0.9
66	425	80	18.8%	96	22.5%	0.8	96	22.5%	0.8
67	384	80	20.8%	86	22.5%	0.9	86	22.5%	0.9
68	301	64	21.3%	68	22.5%	0.9	68	22.5%	0.9
69	258	40	15.5%	58	22.5%	0.7	52	20.0%	0.8
70	224	41	18.3%	50	22.5%	0.8	45	20.0%	0.9
71	170	32	18.8%	34	20.0%	0.9	34	20.0%	0.9
72	120	25	20.8%	24	20.0%	1.0	24	20.0%	1.0
73	99	19	19.2%	20	20.0%	1.0	20	20.0%	1.0
74	97	17	17.5%	19	20.0%	0.9	19	20.0%	0.9
75+	345	72	20.9%	345	100.0%	0.2	345	100.0%	0.2
Totals:	**9,120**	**1,598**	**17.5%**	**1,949**	**21.4%**	**0.8**	**1,930**	**21.2%**	**0.8**
Excluding 75+:	**8,775**	**1,526**	**17.4%**	**1,604**	**18.3%**	**1.0**	**1,585**	**18.1%**	**1.0**

Tier One

Graph III(a)



Tier One Regular Formula Female
Normal Retirement

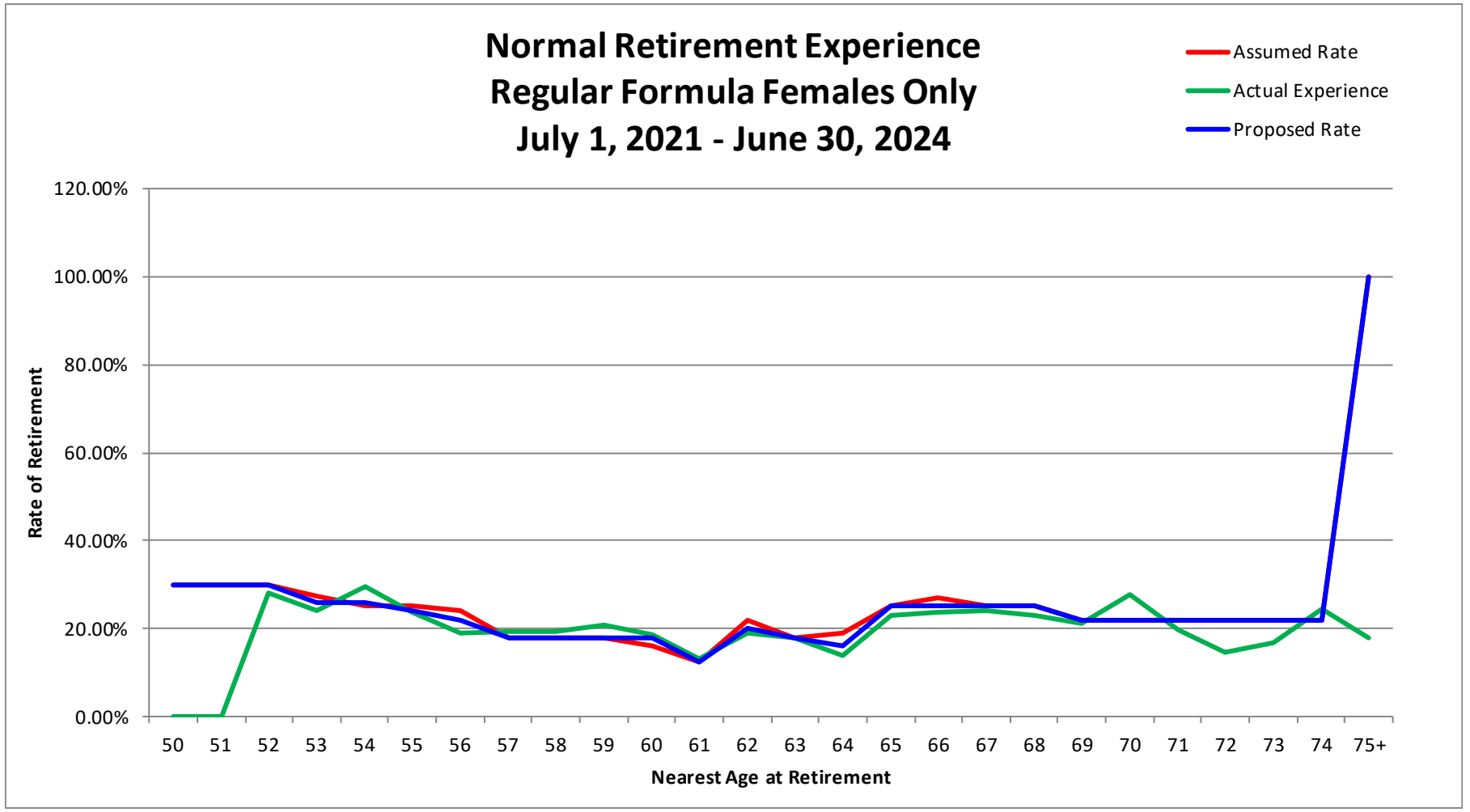
Table III(b)

Normal Retirement Experience - Regular Formula Female Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
50	0	0		0	30.0%		0	30.0%	
51	10	0	0.0%	3	30.0%	0.0	3	30.0%	0.0
52	57	16	28.1%	17	30.0%	0.9	17	30.0%	0.9
53	145	35	24.1%	40	27.5%	0.9	38	26.0%	0.9
54	278	82	29.5%	70	25.0%	1.2	72	26.0%	1.1
55	354	84	23.7%	89	25.0%	0.9	85	24.0%	1.0
56	430	82	19.1%	103	24.0%	0.8	95	22.0%	0.9
57	516	99	19.2%	93	18.0%	1.1	93	18.0%	1.1
58	585	112	19.1%	105	18.0%	1.1	105	18.0%	1.1
59	617	129	20.9%	111	18.0%	1.2	111	18.0%	1.2
60	1,491	276	18.5%	239	16.0%	1.2	268	18.0%	1.0
61	1,307	171	13.1%	163	12.5%	1.0	163	12.5%	1.0
62	1,207	229	19.0%	266	22.0%	0.9	241	20.0%	1.0
63	1,001	179	17.9%	180	18.0%	1.0	180	18.0%	1.0
64	836	116	13.9%	159	19.0%	0.7	134	16.0%	0.9
65	716	163	22.8%	179	25.0%	0.9	179	25.0%	0.9
66	559	132	23.6%	151	27.0%	0.9	140	25.0%	0.9
67	442	107	24.2%	111	25.0%	1.0	111	25.0%	1.0
68	339	78	23.0%	85	25.0%	0.9	85	25.0%	0.9
69	272	57	21.0%	60	22.0%	1.0	60	22.0%	1.0
70	221	61	27.6%	49	22.0%	1.2	49	22.0%	1.2
71	173	34	19.7%	38	22.0%	0.9	38	22.0%	0.9
72	137	20	14.6%	30	22.0%	0.7	30	22.0%	0.7
73	102	17	16.7%	22	22.0%	0.8	22	22.0%	0.8
74	70	17	24.3%	15	22.0%	1.1	15	22.0%	1.1
75+	270	48	17.8%	270	100.0%	0.2	270	100.0%	0.2
Totals:	**12,135**	**2,344**	**19.3%**	**2,648**	**21.8%**	**0.9**	**2,604**	**21.5%**	**0.9**
Excluding 75+:	**11,865**	**2,296**	**19.4%**	**2,378**	**20.0%**	**1.0**	**2,334**	**19.7%**	**1.0**

Retirement Assumption

Tier One

Graph III(b)



Tier One Regular Formula Male
Early Retirement

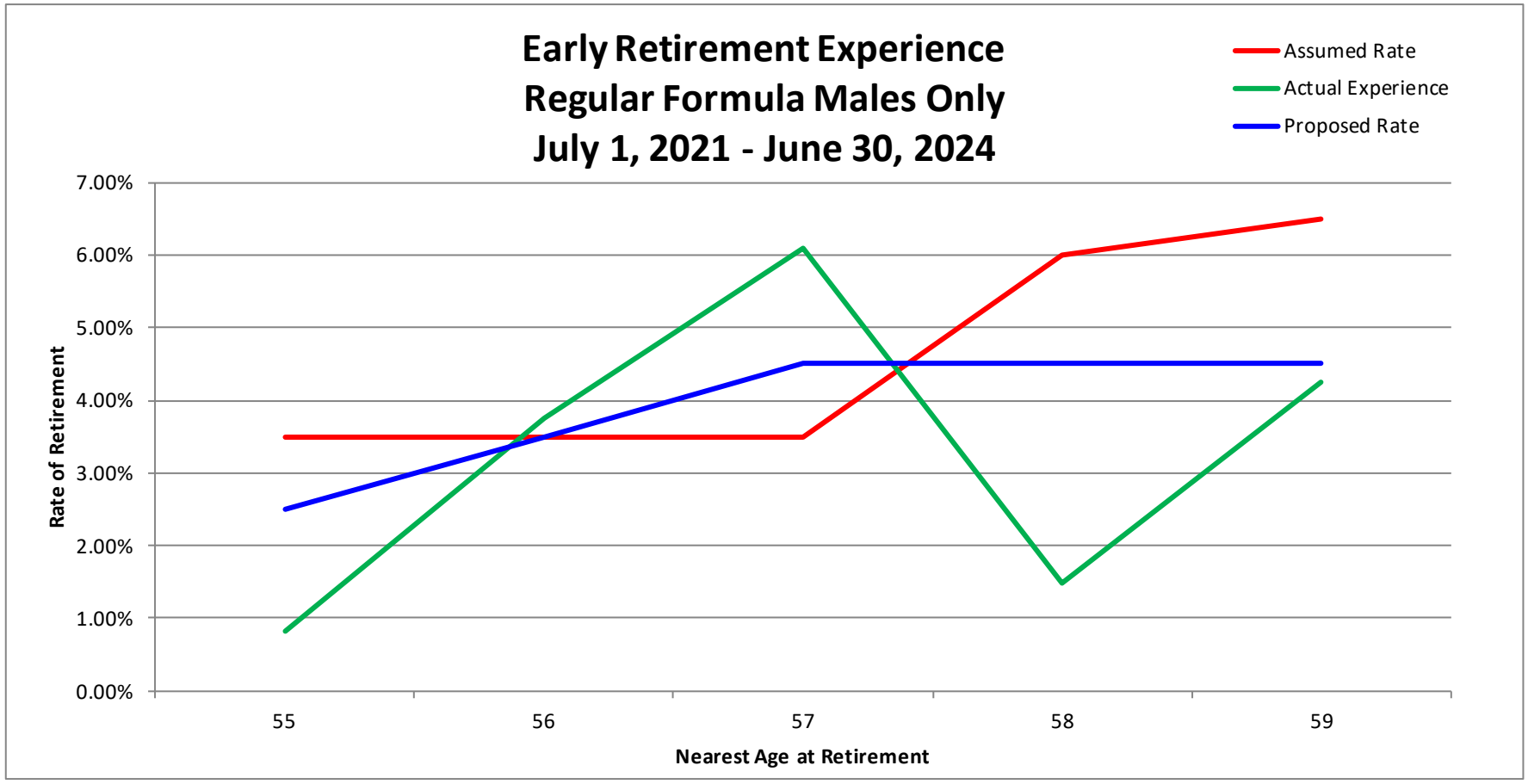
Table III(c)

Early Retirement Experience - Regular Formula Male Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
55	241	2	0.8%	8	3.5%	0.3	6	2.5%	0.3
56	160	6	3.8%	6	3.5%	1.0	6	3.5%	1.0
57	115	7	6.1%	4	3.5%	1.8	5	4.5%	1.4
58	68	1	1.5%	4	6.0%	0.3	3	4.5%	0.3
59	47	2	4.3%	3	6.5%	0.7	2	4.5%	1.0
Totals:	**631**	**18**	**2.9%**	**25**	**4.0%**	**0.7**	**22**	**3.5%**	**0.8**

Retirement Assumption

Tier One

Graph III(c)



Tier One Regular Formula Female
Early Retirement

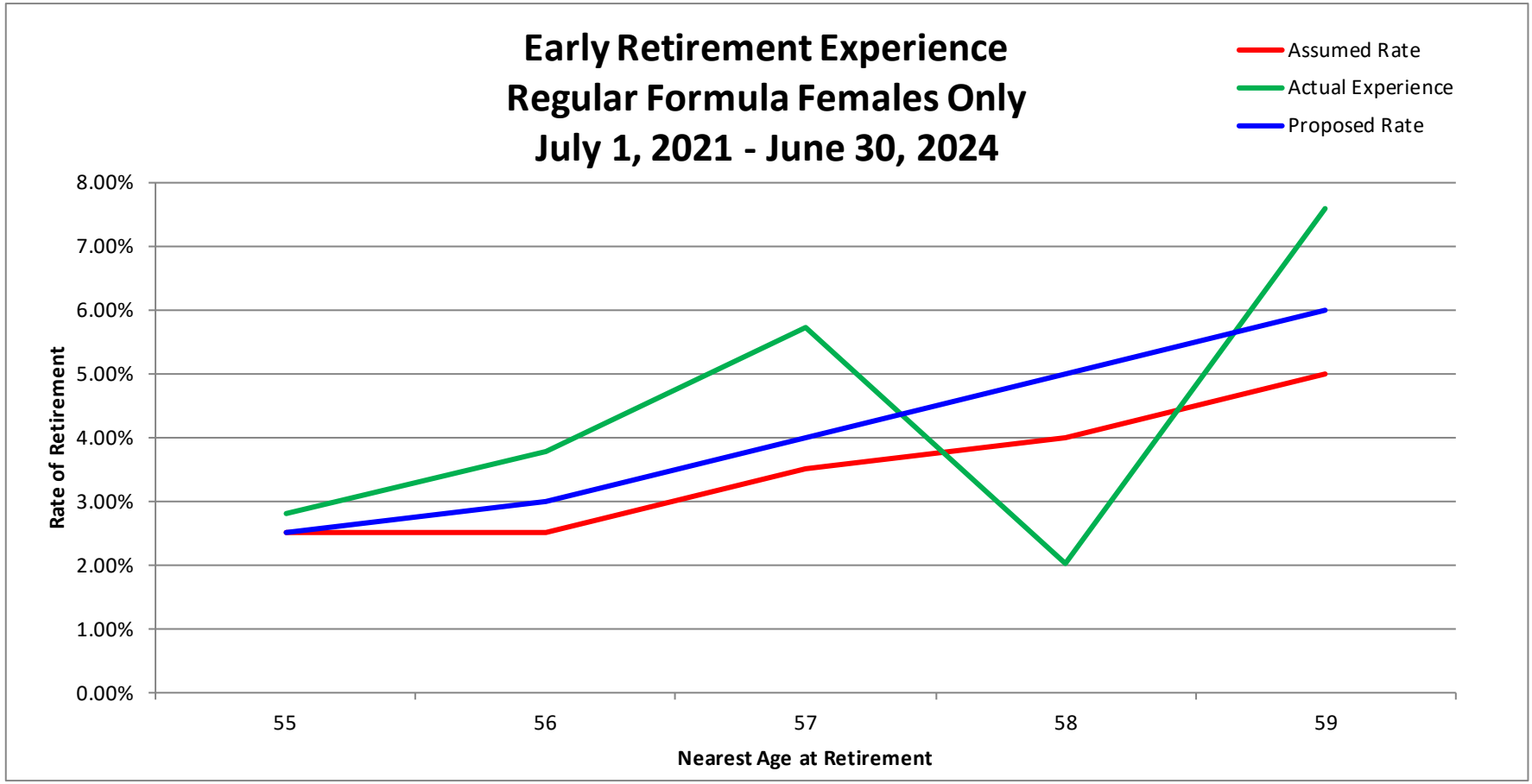
Table III(d)

Early Retirement Experience - Regular Formula Female Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
55	321	9	2.8%	8	2.5%	1.1	8	2.5%	1.1
56	264	10	3.8%	7	2.5%	1.4	8	3.0%	1.3
57	175	10	5.7%	6	3.5%	1.7	7	4.0%	1.4
58	99	2	2.0%	4	4.0%	0.5	5	5.0%	0.4
59	66	5	7.6%	3	5.0%	1.7	4	6.0%	1.3
Totals:	**925**	**36**	**3.9%**	**28**	**3.0%**	**1.3**	**32**	**3.5%**	**1.1**

Retirement Assumption

Tier One

Graph III(d)



Retirement Assumption

Tier One

Normal Retirement Experience – Alternative Formula

Current and past experience has shown that retirement rates under this System are correlated with age. Currently, the System uses age-based rates with higher rates at key ages, with 100 percent retirement at age 72.

Generally speaking, members are eligible to receive alternative formula benefits provided they are age 50 with at least 25 years of alternative formula pension credit or at age 55 with at least 20 years of alternative formula pension credit. During the analysis, it was noted that a number of members working in positions in which alternative formula pension credit is accrued were retiring based upon regular formula eligibility. As a result, we continue to recommend that this experience be recognized and accounted for in the valuation. We have developed separate rates for those members who could potentially retire based upon regular formula eligibility and benefit provisions.

Normal retirement experience was generally lower than the current normal retirement rates for male and female members. For member's eligible for retirement based upon the alternative formula eligibility, we are recommending changes to the rates to reflect the actual experience of the System.

For alternative formula members eligible for retirement under the alternative formula provisions, applying the proposed rates to historical data generates the following number of retirements by age at retirement:

	Alternative Formula - Number of Retirements					
	Male Members			Female Members		
Nearest Age	Actual	Current Assumption	Proposed Assumption	Actual	Current Assumption	Proposed Assumption
50-54	830	806	812	201	169	186
55-59	467	444	449	165	150	157
60-64	196	229	219	74	100	87
65-69	93	96	87	38	57	45
70-74	18	56	32	3	14	9
75+	5	26	26	1	3	3
Total	**1,609**	**1,657**	**1,625**	**482**	**493**	**487**
Total Excluding 75+	**1,604**	**1,631**	**1,599**	**481**	**490**	**484**

Retirement Assumption

Tier One

For alternative formula members eligible for retirement under the regular formula provisions, applying the proposed rates to historical data generates the following number of retirements by age at retirement:

Nearest Age	Alternative Formula - Number of Retirements					
	Male Members			Female Members		
	Actual	Current Assumption	Proposed Assumption	Actual	Current Assumption	Proposed Assumption
60-64	33	44	38	27	22	25
65-69	49	48	49	10	19	16
70-71	9	7	6	1	2	2
72+	7	58	58	1	3	3
Total	**98**	**157**	**151**	**39**	**46**	**46**
Total Excluding 72+	**91**	**99**	**93**	**38**	**43**	**43**

The tables and graphs on the following pages show experience for normal and early retirement.

- Table III(e) and Graph III(e) – Normal Retirement Experience – Alternative Formula Male Members – Eligible for Retirement Under the Alternative Formula Provisions
- Table III(f) and Graph III(f) – Normal Retirement Experience – Alternative Formula Female Members – Eligible for Retirement Under the Alternative Formula Provisions
- Table III(g) and Graph III(g) – Normal Retirement Experience – Alternative Formula Male Members – Eligible for Retirement Under the Regular Formula Provisions
- Table III(h) and Graph III(h) – Normal Retirement Experience – Alternative Formula Female Members – Eligible for Retirement Under the Regular Formula Provisions

Retirement Assumption

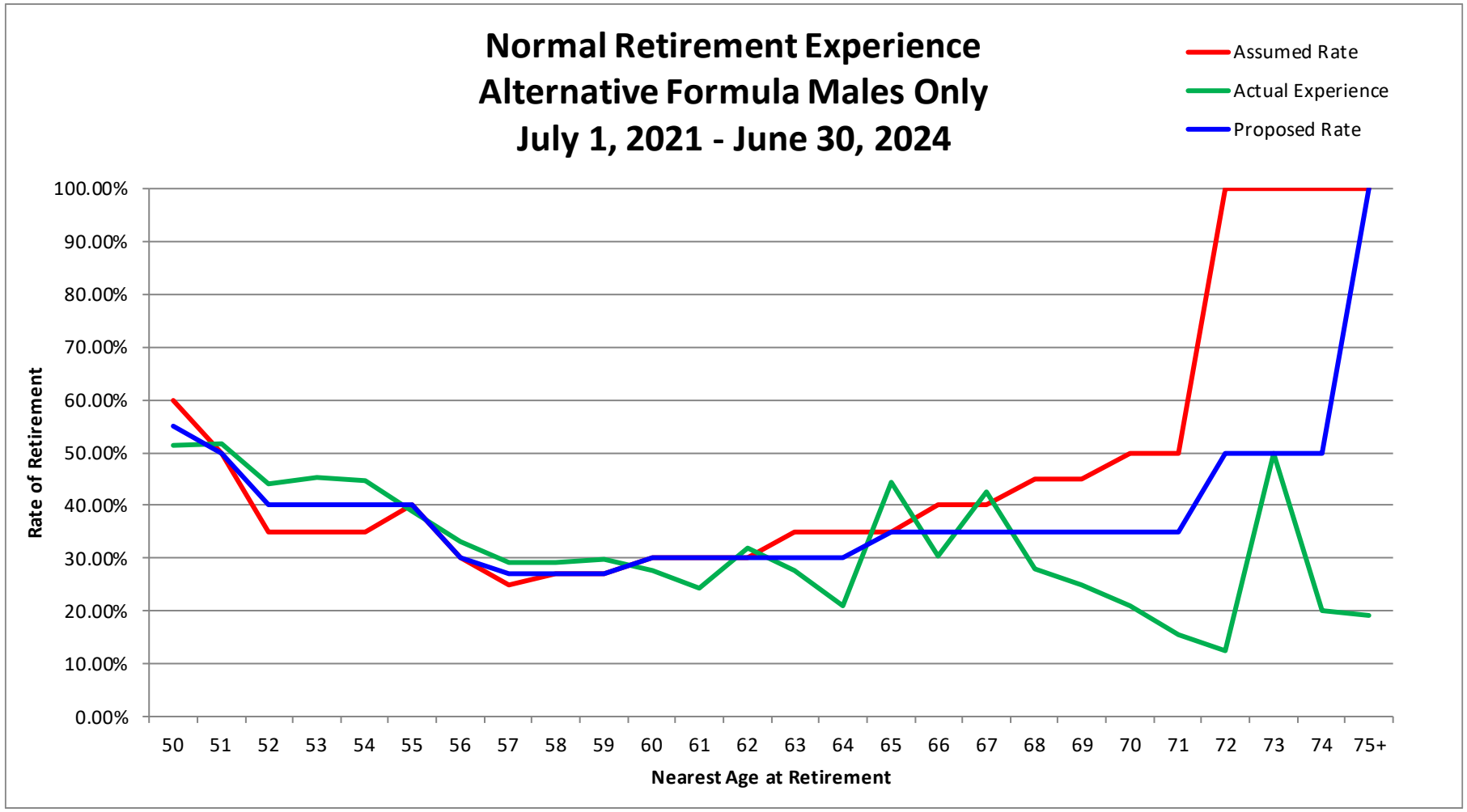
Tier One Alternative Formula Male

Table III(e)

Normal Retirement Experience - Alternative Formula Male Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
50	596	307	51.5%	358	60.0%	0.9	328	55.0%	0.9
51	387	200	51.7%	194	50.0%	1.0	194	50.0%	1.0
52	299	132	44.1%	105	35.0%	1.3	120	40.0%	1.1
53	232	105	45.3%	81	35.0%	1.3	93	40.0%	1.1
54	193	86	44.6%	68	35.0%	1.3	77	40.0%	1.1
55	480	186	38.8%	192	40.0%	1.0	192	40.0%	1.0
56	286	95	33.2%	86	30.0%	1.1	86	30.0%	1.1
57	229	67	29.3%	57	25.0%	1.2	62	27.0%	1.1
58	216	63	29.2%	58	27.0%	1.1	58	27.0%	1.1
59	188	56	29.8%	51	27.0%	1.1	51	27.0%	1.1
60	198	55	27.8%	59	30.0%	0.9	59	30.0%	0.9
61	185	45	24.3%	56	30.0%	0.8	56	30.0%	0.8
62	144	46	31.9%	43	30.0%	1.1	43	30.0%	1.1
63	112	31	27.7%	39	35.0%	0.8	34	30.0%	0.9
64	91	19	20.9%	32	35.0%	0.6	27	30.0%	0.7
65	99	44	44.4%	35	35.0%	1.3	35	35.0%	1.3
66	56	17	30.4%	22	40.0%	0.8	20	35.0%	0.9
67	47	20	42.6%	19	40.0%	1.1	16	35.0%	1.3
68	25	7	28.0%	11	45.0%	0.6	9	35.0%	0.8
69	20	5	25.0%	9	45.0%	0.6	7	35.0%	0.7
70	19	4	21.1%	10	50.0%	0.4	7	35.0%	0.6
71	13	2	15.4%	7	50.0%	0.3	5	35.0%	0.4
72	16	2	12.5%	16	100.0%	0.1	8	50.0%	0.3
73	18	9	50.0%	18	100.0%	0.5	9	50.0%	1.0
74	5	1	20.0%	5	100.0%	0.2	3	50.0%	0.3
75+	26	5	19.2%	26	100.0%	0.2	26	100.0%	0.2
Totals:	**4,180**	**1,609**	**38.5%**	**1,657**	**39.6%**	**1.0**	**1,625**	**38.9%**	**1.0**
Excluding 75+:	**4,154**	**1,604**	**38.6%**	**1,631**	**39.3%**	**1.0**	**1,599**	**38.5%**	**1.0**

Tier One

Graph III(e)



Retirement Assumption

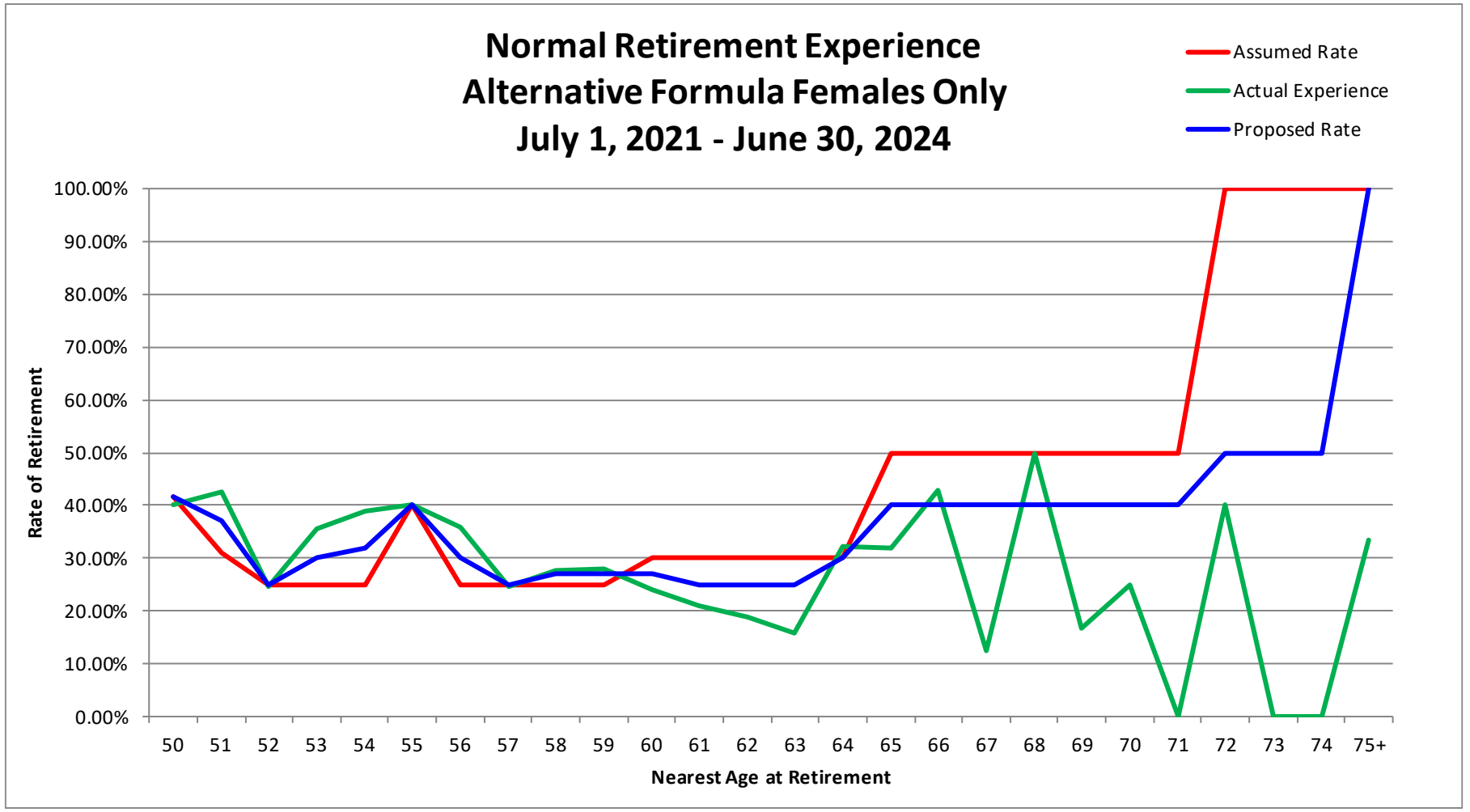
Tier One Alternative Formula Female

Table III(f)

Normal Retirement Experience - Alternative Formula FeFem Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
50	150	60	40.0%	62	41.5%	1.0	62	41.5%	1.0
51	122	52	42.6%	38	31.0%	1.4	45	37.0%	1.2
52	98	24	24.5%	25	25.0%	1.0	25	25.0%	1.0
53	93	33	35.5%	23	25.0%	1.4	28	30.0%	1.2
54	82	32	39.0%	21	25.0%	1.5	26	32.0%	1.2
55	155	62	40.0%	62	40.0%	1.0	62	40.0%	1.0
56	103	37	35.9%	26	25.0%	1.4	31	30.0%	1.2
57	85	21	24.7%	21	25.0%	1.0	21	25.0%	1.0
58	83	23	27.7%	21	25.0%	1.1	22	27.0%	1.0
59	79	22	27.8%	20	25.0%	1.1	21	27.0%	1.0
60	87	21	24.1%	26	30.0%	0.8	23	27.0%	0.9
61	72	15	20.8%	22	30.0%	0.7	18	25.0%	0.8
62	64	12	18.8%	19	30.0%	0.6	16	25.0%	0.8
63	57	9	15.8%	17	30.0%	0.5	14	25.0%	0.6
64	53	17	32.1%	16	30.0%	1.1	16	30.0%	1.1
65	50	16	32.0%	25	50.0%	0.6	20	40.0%	0.8
66	28	12	42.9%	14	50.0%	0.9	11	40.0%	1.1
67	16	2	12.5%	8	50.0%	0.3	6	40.0%	0.3
68	14	7	50.0%	7	50.0%	1.0	6	40.0%	1.2
69	6	1	16.7%	3	50.0%	0.3	2	40.0%	0.5
70	4	1	25.0%	2	50.0%	0.5	2	40.0%	0.5
71	2	0	0.0%	1	50.0%	0.0	1	40.0%	0.0
72	5	2	40.0%	5	100.0%	0.4	3	50.0%	0.7
73	4	0	0.0%	4	100.0%	0.0	2	50.0%	0.0
74	2	0	0.0%	2	100.0%	0.0	1	50.0%	0.0
75+	3	1	33.3%	3	100.0%	0.3	3	100.0%	0.3
Totals:	**1,517**	**482**	**31.8%**	**493**	**32.5%**	**1.0**	**487**	**32.1%**	**1.0**
Excluding 75+:	**1,514**	**481**	**31.8%**	**490**	**32.4%**	**1.0**	**484**	**32.0%**	**1.0**

Tier One

Graph III(f)



Tier One Alternative Formula Male
Eligible for Retirement under the Regular Formula Provisions

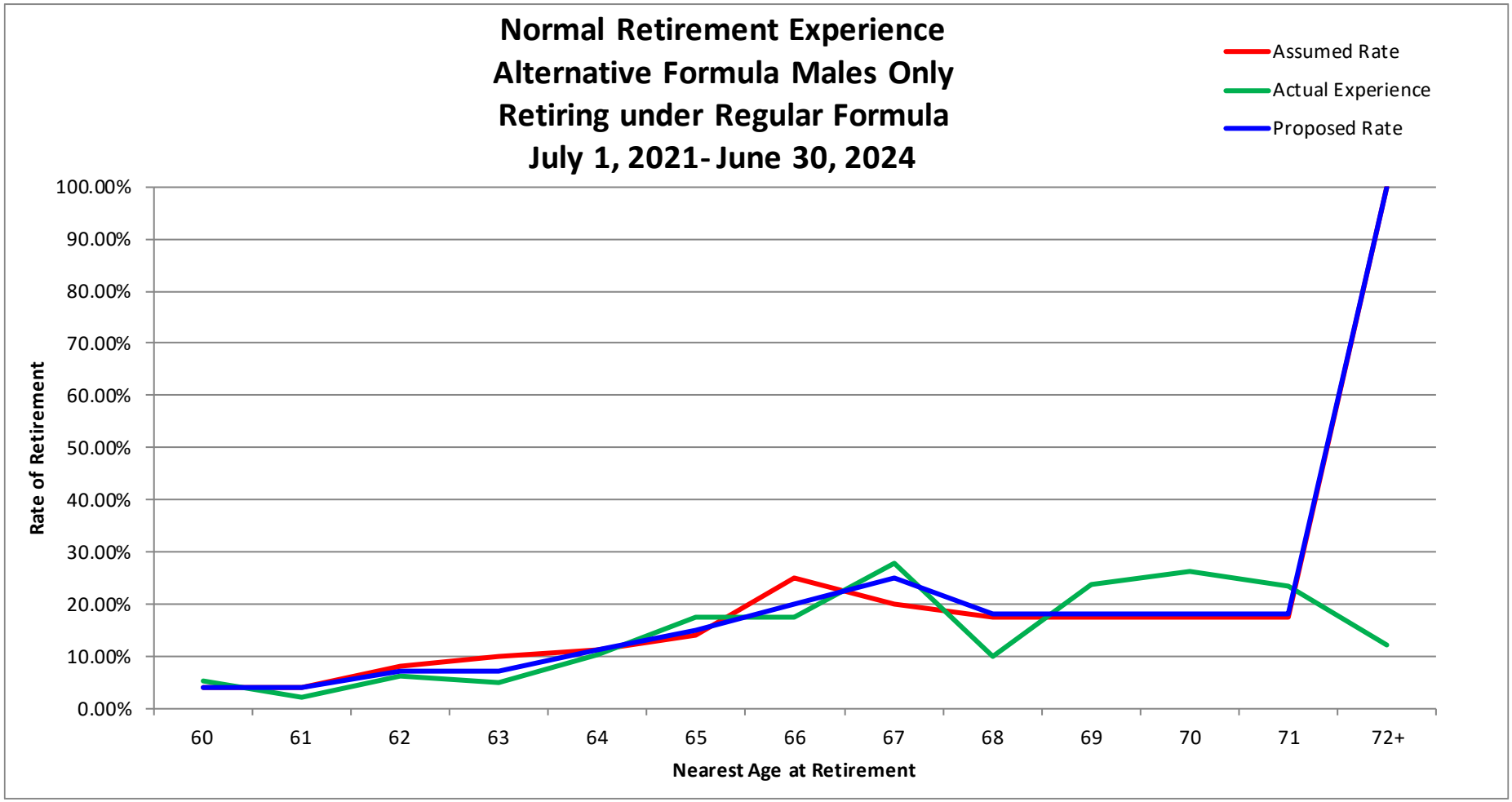
Table III(g)

Normal Retirement Experience - Alternative Formula Male Members - Eligible for Retirement under the Regular Formula Provisions									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
60	150	8	5.3%	6	4.0%	1.3	6	4.0%	1.3
61	140	3	2.1%	6	4.0%	0.5	6	4.0%	0.5
62	130	8	6.2%	11	8.0%	0.7	9	7.0%	0.9
63	104	5	4.8%	11	10.0%	0.5	7	7.0%	0.7
64	89	9	10.1%	10	11.0%	0.9	10	11.0%	0.9
65	75	13	17.3%	11	14.0%	1.2	11	15.0%	1.2
66	74	13	17.6%	17	25.0%	0.8	15	20.0%	0.9
67	54	15	27.8%	11	20.0%	1.4	14	25.0%	1.1
68	30	3	10.0%	5	17.5%	0.6	5	18.0%	0.6
69	21	5	23.8%	4	17.5%	1.3	4	18.0%	1.3
70	19	5	26.3%	4	17.5%	1.3	3	18.0%	1.7
71	17	4	23.5%	3	17.5%	1.3	3	18.0%	1.3
72+	58	7	12.1%	58	100.0%	0.1	58	100.0%	0.1
Totals:	**961**	**98**	**10.2%**	**157**	**16.3%**	**0.6**	**151**	**15.7%**	**0.6**
Excluding 72+:	**903**	**91**	**10.1%**	**99**	**11.0%**	**0.9**	**93**	**10.3%**	**1.0**

Retirement Assumption

Tier One

Graph III(g)



Tier One Alternative Formula Female
Eligible for Retirement under the Regular Formula Provisions

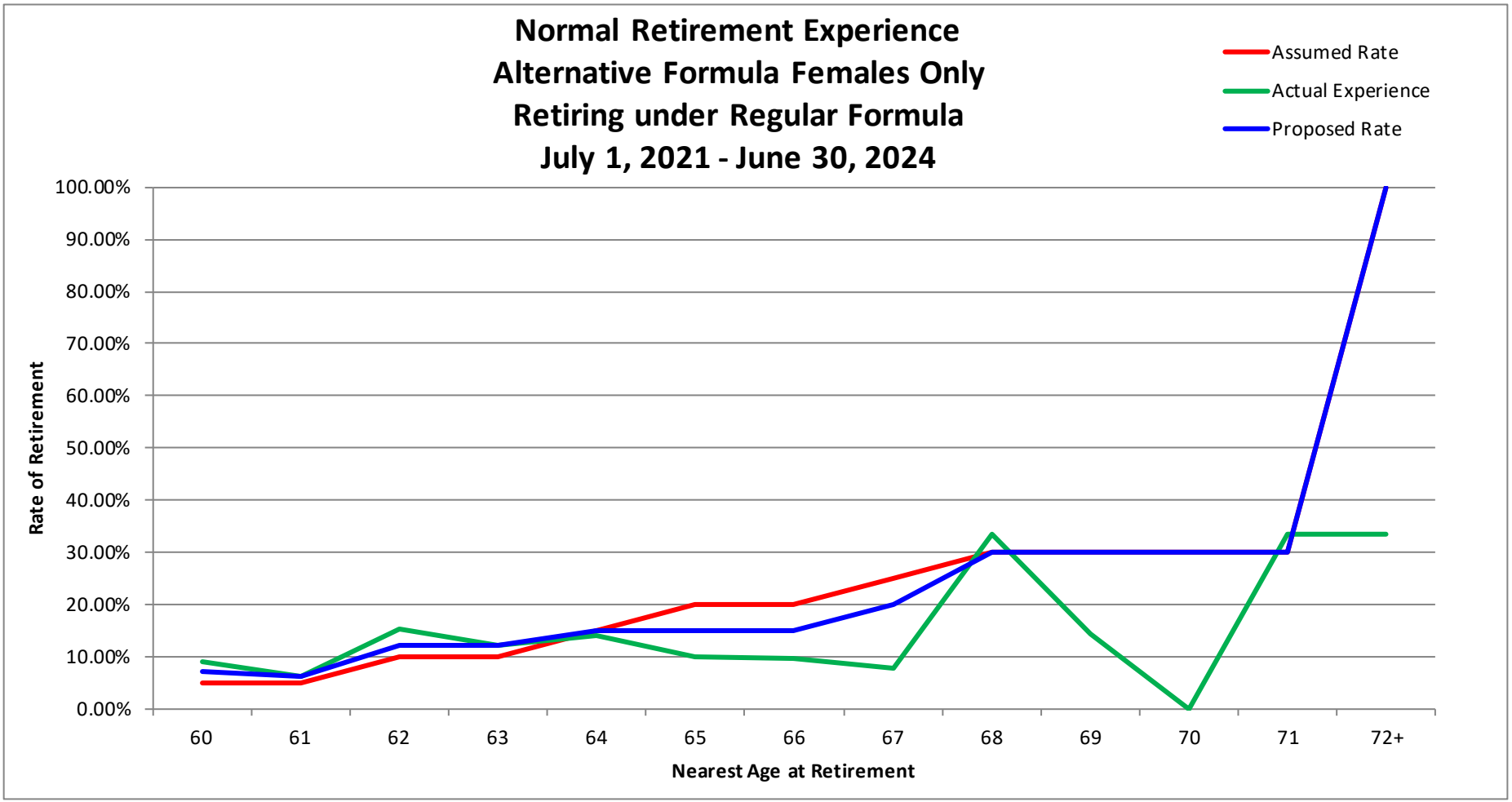
Table III(h)

Normal Retirement Experience - Alternative Formula Female Members - Eligible for Retirement under the Regular Formula Provisions									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
60	66	6	9.1%	3	5.0%	2.0	5	7.0%	1.2
61	65	4	6.2%	3	5.0%	1.3	4	6.0%	1.0
62	46	7	15.2%	6	10.0%	1.2	6	12.0%	1.2
63	41	5	12.2%	5	10.0%	1.0	5	12.0%	1.0
64	36	5	13.9%	5	15.0%	1.0	5	15.0%	1.0
65	30	3	10.0%	7	20.0%	0.4	5	15.0%	0.6
66	21	2	9.5%	4	20.0%	0.5	3	15.0%	0.7
67	13	1	7.7%	3	25.0%	0.3	3	20.0%	0.3
68	9	3	33.3%	3	30.0%	1.0	3	30.0%	1.0
69	7	1	14.3%	2	30.0%	0.5	2	30.0%	0.5
70	4	0	0.0%	1	30.0%	0.0	1	30.0%	0.0
71	3	1	33.3%	1	30.0%	1.0	1	30.0%	1.0
72+	3	1	33.3%	3	100.0%	0.3	3	100.0%	0.3
Totals:	**344**	**39**	**11.3%**	**46**	**13.4%**	**0.8**	**46**	**13.4%**	**0.8**
Excluding 72+:	**341**	**38**	**11.1%**	**43**	**12.6%**	**0.9**	**43**	**12.6%**	**0.9**

Retirement Assumption

Tier One

Graph III(h)



Tier Two Regular Formula

Since there was limited retirement experience for Tier Two members, the current normal retirement assumptions were developed based upon our future expectation of the group's behavior. During the experience period, there were fewer retirements than expected, although experience was limited.

Early retirement experience for male and female members was generally lower than the current early retirement rates.

We are recommending slight adjustments to the retirement rates for Tier Two members eligible for regular formula benefits.

	Members Eligible For Early Retirement			
Nearest Age	Current Assumed Rate		Proposed Assumed Rate	
at Retirement	Male	Female	Male	Female
62	30%	30%	10%	10%
63	15%	15%	10%	10%
64	15%	15%	10%	10%
65	15%	15%	20%	20%
66	15%	15%	20%	20%

	Members Eligible For Normal Retirement			
Nearest Age	Current Assumed Rate		Proposed Assumed Rate	
at Retirement	Male	Female	Male	Female
67	50.0%	50.0%	50.0%	50.0%
68	32.5%	32.5%	30.0%	30.0%
69	32.5%	32.5%	30.0%	30.0%
70	32.5%	32.5%	30.0%	30.0%
71	20.0%	20.0%	20.0%	20.0%
72	20.0%	20.0%	20.0%	20.0%
73	20.0%	20.0%	20.0%	20.0%
74	20.0%	20.0%	20.0%	20.0%
75+	100.0%	100.0%	100.0%	100.0%

The tables and graphs on the following pages show experience for early retirement.

- Table III(i) and Graph III(i) – Early Retirement Experience – Regular Formula Male Members
- Table III(j) and Graph III(j) – Early Retirement Experience – Regular Formula Female Members

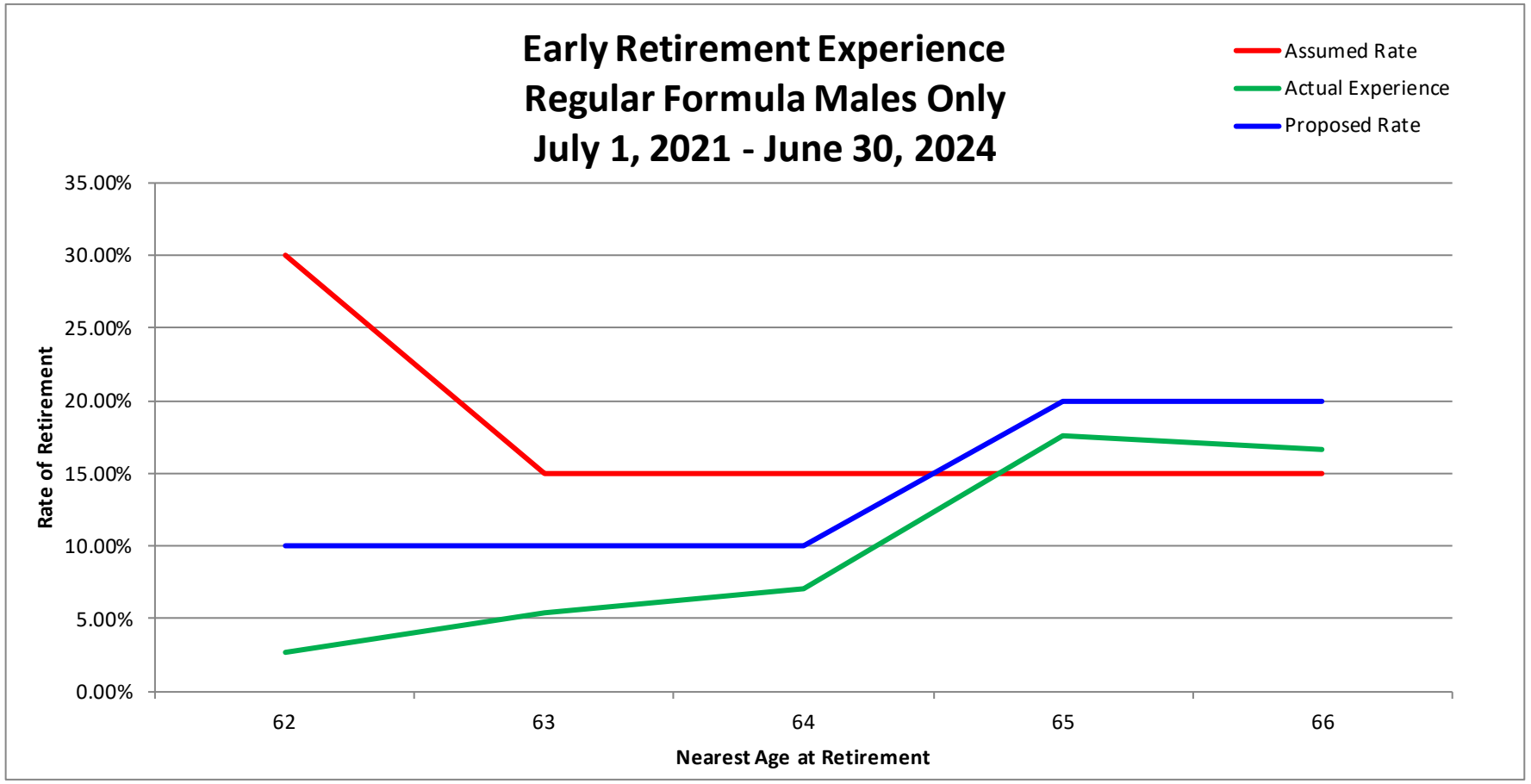
Tier Two Regular Formula Male
Early Retirement

Table III(i)

Early Retirement Experience - Regular Formula Male Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
62	76	2	2.6%	23	30.0%	0.1	8	10.0%	0.3
63	74	4	5.4%	11	15.0%	0.4	7	10.0%	0.5
64	71	5	7.0%	11	15.0%	0.5	7	10.0%	0.7
65	74	13	17.6%	11	15.0%	1.2	15	20.0%	0.9
66	54	9	16.7%	8	15.0%	1.1	11	20.0%	0.8
Totals:	**349**	**33**	**9.5%**	**64**	**18.3%**	**0.5**	**48**	**13.7%**	**0.7**

Tier Two

Graph III(i)



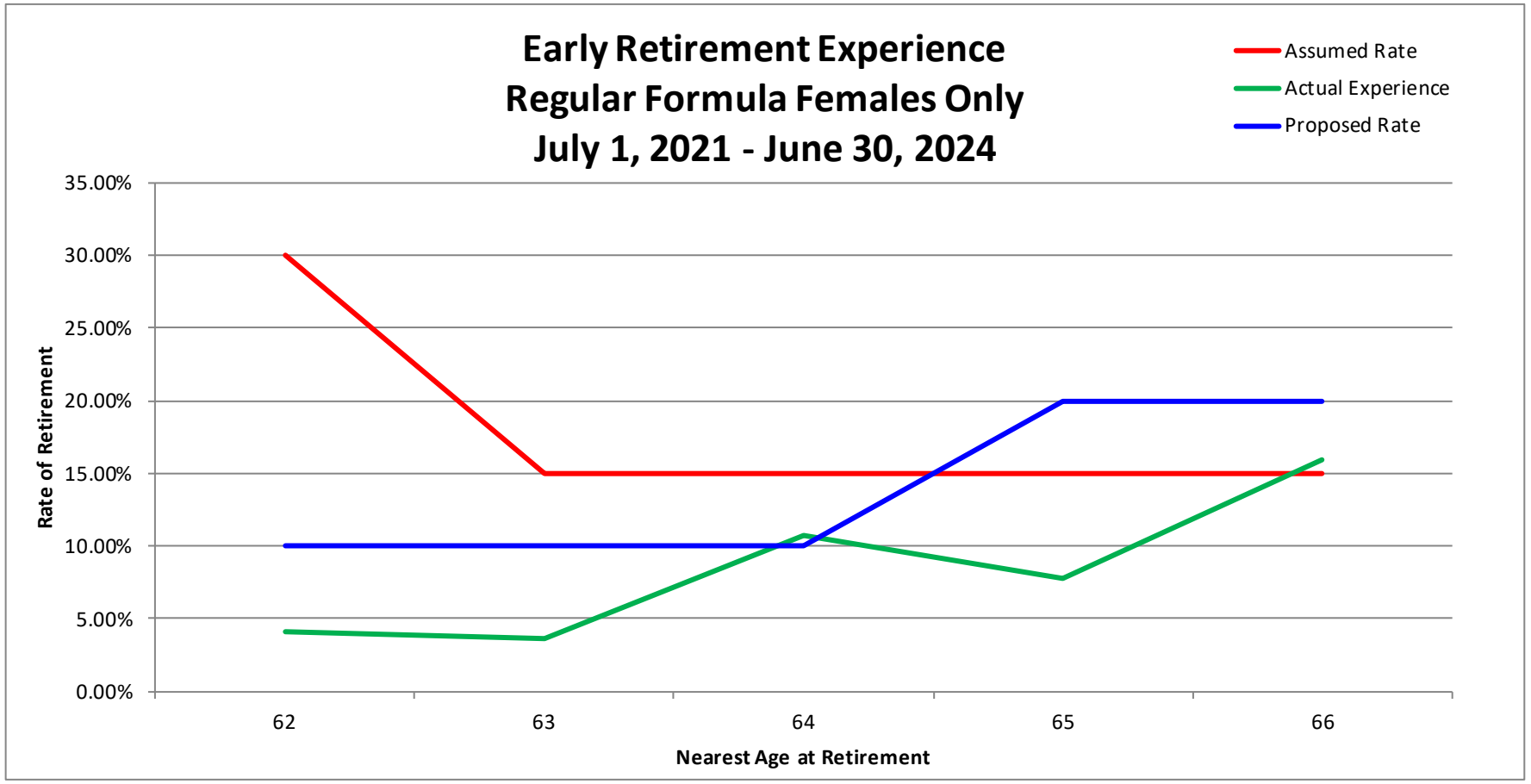
Tier Two Regular Formula Female
Early Retirement

Table III(j)

Early Retirement Experience - Regular Formula Female Members									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
62	74	3	4.1%	22	30.0%	0.1	7	10.0%	0.4
63	83	3	3.6%	12	15.0%	0.3	8	10.0%	0.4
64	75	8	10.7%	11	15.0%	0.7	8	10.0%	1.1
65	64	5	7.8%	10	15.0%	0.5	13	20.0%	0.4
66	63	10	15.9%	9	15.0%	1.1	13	20.0%	0.8
Totals:	**359**	**29**	**8.1%**	**64**	**17.8%**	**0.5**	**49**	**13.5%**	**0.6**

Tier Two

Graph III(j)



Tier Two Alternative Formula

Since there was limited retirement experience for Tier Two members, the current normal retirement assumptions were developed based upon our future expectation of the group's behavior.

We are recommending slight adjustments to the retirement rates for Tier Two members eligible for alternative formula benefits:

	Members Eligible For Normal Retirement			
Nearest Age at Retirement	Current Assumed Rate		Proposed Assumed Rate	
	Male	Female	Male	Female
60	50%	50%	50%	50%
61	25%	30%	25%	30%
62	25%	35%	25%	35%
63	30%	30%	30%	30%
64	30%	35%	30%	35%
65	30%	50%	25%	45%
66	30%	50%	25%	45%
67	30%	50%	25%	45%
68	30%	50%	25%	45%
69	40%	50%	35%	45%
70	45%	50%	40%	45%
71	45%	50%	40%	45%
72	100%	100%	50%	50%
73	100%	100%	50%	50%
74	100%	100%	50%	50%
75+	100%	100%	100%	100%

Turnover Assumption

Turnover

Currently, turnover rates are based solely on service. The experience supports maintaining this structure.

Turnover experience during the last three years was considered in the analysis shown on the following pages. The "Exposures" column shows the number of employees at various years of service throughout the experience period.

The "Turnover" column shows the number of employees at various ages who have gone from active status for reasons other than retirement and death. This includes members moving to inactive status and members terminating and receiving a refund of contributions, and disabled members.

This assumption was analyzed for both Tier One and Tier Two members.

There were fewer terminations than expected under the current assumptions for Tier Two male members eligible for regular formula benefits. We recommend decreasing the rates for these members.

For the remaining groups, there were more terminations than expected under the current assumptions. Based on our analysis, we recommend increasing the rates for Tier One members, Tier Two female members eligible for regular formula benefits, and Tier Two members eligible for alternative formula benefits.

Observed termination experience for members with 30 or more years of service may include terminated members who are expected to retire during the following year.

The tables and graphs on the following pages show termination experience by age.

- Table IV(a) and Graph IV(a) – Regular Formula Tier 1 by Service – Male
- Table IV(b) and Graph IV(b) – Regular Formula Tier 1 by Service – Female
- Table IV(c) and Graph IV(c) – Alternative Formula Tier 1 by Service – Male
- Table IV(d) and Graph IV(d) – Alternative Formula Tier 1 by Service – Female
- Table IV(e) and Graph IV(e) – Regular Formula Tier 2 by Service – Male
- Table IV(f) and Graph IV(f) – Regular Formula Tier 2 by Service – Female
- Table IV(g) and Graph IV(g) – Alternative Formula Tier 2 by Service – Male
- Table IV(h) and Graph IV(h) – Alternative Formula Tier 2 by Service – Female

Table IV(a)

Termination Experience by Service - Regular Formula Male Tier 1 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	103	24	0	24	23.30%	25	24.00%	1.0	25	24.00%	1.0
2	532	73	24	49	9.21%	48	9.00%	1.0	48	9.00%	1.0
3	537	51	15	36	6.70%	38	7.00%	1.1	38	7.00%	1.1
4	512	29	13	16	3.13%	31	6.00%	1.9	31	6.00%	1.9
5	534	35	9	26	4.87%	32	6.00%	1.2	32	6.00%	1.2
6	482	26	11	15	3.11%	20	4.10%	1.3	19	4.00%	1.3
7	401	21	7	14	3.49%	18	4.50%	1.3	16	4.00%	1.1
8	333	15	6	9	2.70%	13	4.00%	1.4	13	4.00%	1.4
9	319	22	7	15	4.70%	10	3.00%	0.7	13	4.00%	0.9
10	316	25	7	18	5.70%	9	3.00%	0.5	13	4.00%	0.7
11	332	26	10	16	4.82%	10	3.00%	0.6	13	4.00%	0.8
12	532	22	3	19	3.57%	13	2.50%	0.7	19	3.50%	1.0
13	689	36	10	26	3.77%	17	2.50%	0.7	24	3.50%	0.9
14	818	41	3	38	4.65%	20	2.50%	0.5	29	3.50%	0.8
15	752	39	3	36	4.79%	19	2.50%	0.5	26	3.50%	0.7
16	776	23	5	18	2.32%	17	2.25%	0.9	19	2.50%	1.1
17	735	23	5	18	2.45%	15	2.00%	0.8	18	2.50%	1.0
18	679	23	6	17	2.50%	14	2.00%	0.8	17	2.50%	1.0
19	622	20	1	19	3.05%	12	2.00%	0.6	16	2.50%	0.8
20	653	30	5	25	3.83%	13	2.00%	0.5	16	2.50%	0.6
21	766	25	2	23	3.00%	15	2.00%	0.7	19	2.50%	0.8
22	933	23	4	19	2.04%	19	2.00%	1.0	21	2.25%	1.1
23	1,020	21	3	18	1.76%	20	2.00%	1.1	23	2.25%	1.3
24	1,033	27	5	22	2.13%	21	2.00%	1.0	23	2.25%	1.0
25	783	20	3	17	2.17%	16	2.00%	0.9	18	2.25%	1.1
26	500	14	3	11	2.20%	10	2.00%	0.9	11	2.25%	1.0
27	356	11	2	9	2.53%	7	2.00%	0.8	8	2.25%	0.9
28	315	11	0	11	3.49%	6	2.00%	0.5	7	2.25%	0.6
29	280	14	2	12	4.29%	6	2.00%	0.5	6	2.25%	0.5
30+	556	81	0	81	14.57%	11	2.00%	0.1	13	2.25%	0.2
	17,199	**851**	**174**	**677**	**3.94%**	**525**	**3.05%**	**0.8**	**594**	**3.45%**	**0.9**

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(a)

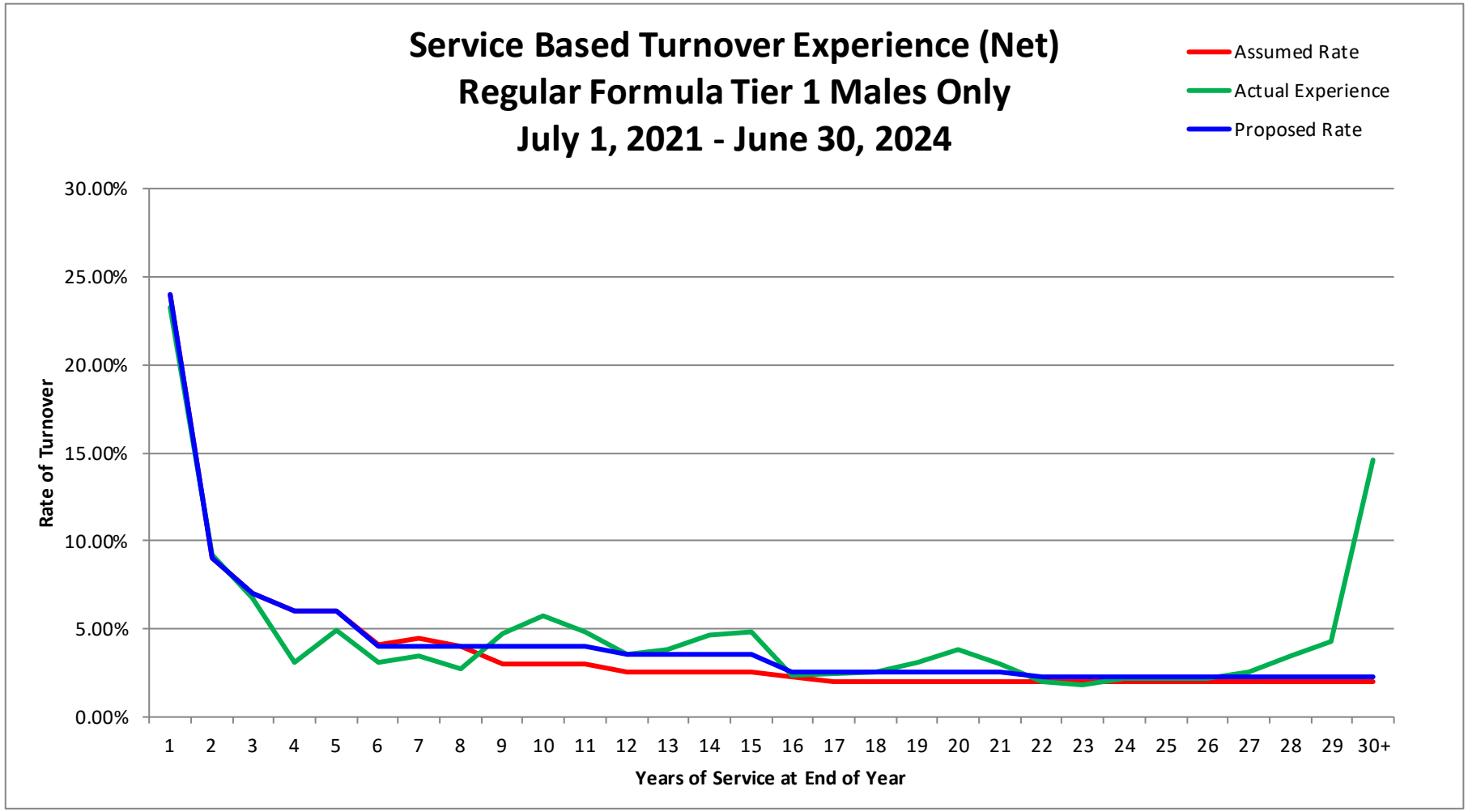

Service Based Turnover Experience (Net)
Regular Formula Tier 1 Males Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Rate of Turnover
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(b)

Termination Experience by Service - Regular Formula Female Tier 1 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	140	30	0	30	21.43%	31	22.00%	1.0	31	22.00%	1.0
2	845	123	32	91	10.77%	76	9.00%	0.8	76	10.00%	0.8
3	873	94	31	63	7.22%	48	5.50%	0.8	48	6.00%	0.8
4	928	77	21	56	6.03%	51	5.50%	0.9	51	6.00%	0.9
5	1,014	65	19	46	4.54%	46	4.50%	1.0	46	4.50%	1.0
6	939	58	10	48	5.11%	38	4.00%	0.8	38	4.50%	0.8
7	811	53	6	47	5.80%	28	3.50%	0.6	28	4.50%	0.6
8	750	33	12	21	2.80%	26	3.50%	1.2	30	4.00%	1.4
9	797	45	9	36	4.52%	28	3.50%	0.8	32	4.00%	0.9
10	785	53	15	38	4.84%	27	3.50%	0.7	31	4.00%	0.8
11	677	33	8	25	3.69%	20	3.00%	0.8	27	4.00%	1.1
12	799	47	21	26	3.25%	24	3.00%	0.9	24	3.00%	0.9
13	911	44	10	34	3.73%	23	2.50%	0.7	27	3.00%	0.8
14	1,117	49	9	40	3.58%	28	2.50%	0.7	34	3.00%	0.9
15	1,087	49	18	31	2.85%	27	2.50%	0.9	30	2.75%	1.0
16	1,212	47	11	36	2.97%	30	2.50%	0.8	33	2.75%	0.9
17	1,183	36	7	29	2.45%	24	2.00%	0.8	33	2.75%	1.1
18	1,054	47	11	36	3.42%	21	2.00%	0.6	29	2.75%	0.8
19	932	30	6	24	2.58%	19	2.00%	0.8	26	2.75%	1.1
20	943	29	14	15	1.59%	19	2.00%	1.3	26	2.75%	1.7
21	1,120	48	9	39	3.48%	20	1.75%	0.5	31	2.75%	0.8
22	1,377	54	13	41	2.98%	24	1.75%	0.6	38	2.75%	0.9
23	1,515	39	12	27	1.78%	27	1.75%	1.0	38	2.50%	1.4
24	1,527	44	4	40	2.62%	27	1.75%	0.7	38	2.50%	1.0
25	1,072	24	4	20	1.87%	19	1.75%	1.0	27	2.50%	1.4
26	626	31	1	30	4.79%	9	1.50%	0.3	16	2.50%	0.5
27	476	17	1	16	3.36%	7	1.50%	0.4	12	2.50%	0.8
28	427	15	0	15	3.51%	6	1.50%	0.4	11	2.50%	0.7
29	410	31	0	31	7.56%	6	1.50%	0.2	10	2.50%	0.3
30+	773	129	1	128	16.56%	12	1.50%	0.1	19	2.50%	0.1
	27,120	**1,474**	**315**	**1,159**	**4.27%**	**791**	**2.92%**	**0.7**	**940**	**3.47%**	**0.8**

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(b)

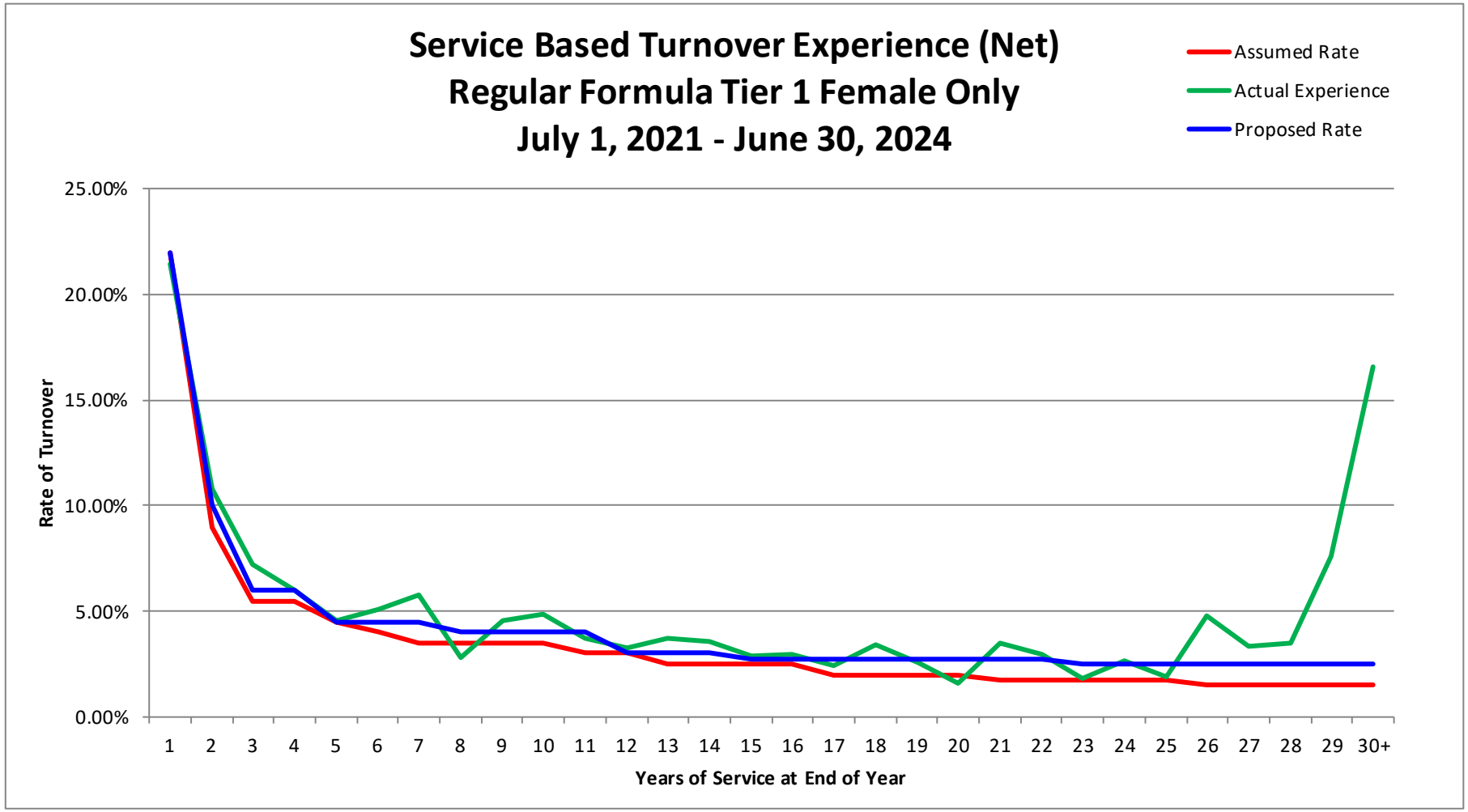

Service Based Turnover Experience (Net)
Regular Formula Tier 1 Female Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Rate of Turnover
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(c)

Termination Experience by Service- Alternative Formula Male Tier 1 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	18	3	0	3	16.67%	1	3.00%	0.3	2	9.00%	0.7
2	111	12	17	0	0.00%	3	3.00%		3	3.00%	
3	153	12	41	0	0.00%	5	3.00%		5	3.00%	
4	183	19	38	0	0.00%	5	3.00%		5	3.00%	
5	218	12	22	0	0.00%	7	3.00%		7	3.00%	
6	201	10	12	0	0.00%	6	3.00%		6	3.00%	
7	209	15	17	0	0.00%	6	3.00%		6	3.00%	
8	228	11	10	1	0.44%	7	3.00%	7.0	7	3.00%	7.0
9	264	13	6	7	2.65%	5	2.00%	0.7	5	2.00%	0.7
10	270	11	9	2	0.74%	5	2.00%	2.5	5	2.00%	2.5
11	292	14	8	6	2.05%	4	1.50%	0.7	5	1.75%	0.8
12	757	13	10	3	0.40%	11	1.50%	3.7	13	1.75%	4.3
13	1,008	24	7	17	1.69%	15	1.50%	0.9	15	1.50%	0.9
14	1,149	29	10	19	1.65%	17	1.50%	0.9	17	1.50%	0.9
15	767	17	9	8	1.04%	12	1.50%	1.5	12	1.50%	1.5
16	678	14	6	8	1.18%	10	1.50%	1.3	10	1.50%	1.3
17	556	17	7	10	1.80%	8	1.50%	0.8	8	1.50%	0.8
18	656	14	4	10	1.52%	10	1.50%	1.0	10	1.50%	1.0
19	672	11	6	5	0.74%	10	1.50%	2.0	10	1.50%	2.0
20	696	24	7	17	2.44%	10	1.50%	0.6	10	1.50%	0.6
21	908	39	5	34	3.74%	14	1.50%	0.4	14	1.50%	0.4
22	1,043	32	7	25	2.40%	16	1.50%	0.6	16	1.50%	0.6
23	1,267	37	6	31	2.45%	19	1.50%	0.6	19	1.50%	0.6
24	1,233	33	5	28	2.27%	18	1.50%	0.6	18	1.50%	0.6
25	858	51	3	48	5.59%	13	1.50%	0.3	13	1.50%	0.3
26	451	29	1	28	6.21%	7	1.50%	0.3	7	1.50%	0.3
27	274	27	3	24	8.76%	4	1.50%	0.2	4	1.50%	0.2
28	170	16	1	15	8.82%	3	1.50%	0.2	3	1.50%	0.2
29	84	6	0	6	7.14%	1	1.50%	0.2	1	1.50%	0.2
30+	41	17	0	17	41.46%	1	1.50%	0.1	1	1.50%	0.1
	15,415	**582**	**277**	**372**	**2.41%**	**253**	**1.64%**	**0.7**	**257**	**1.67%**	**0.7**

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(c)

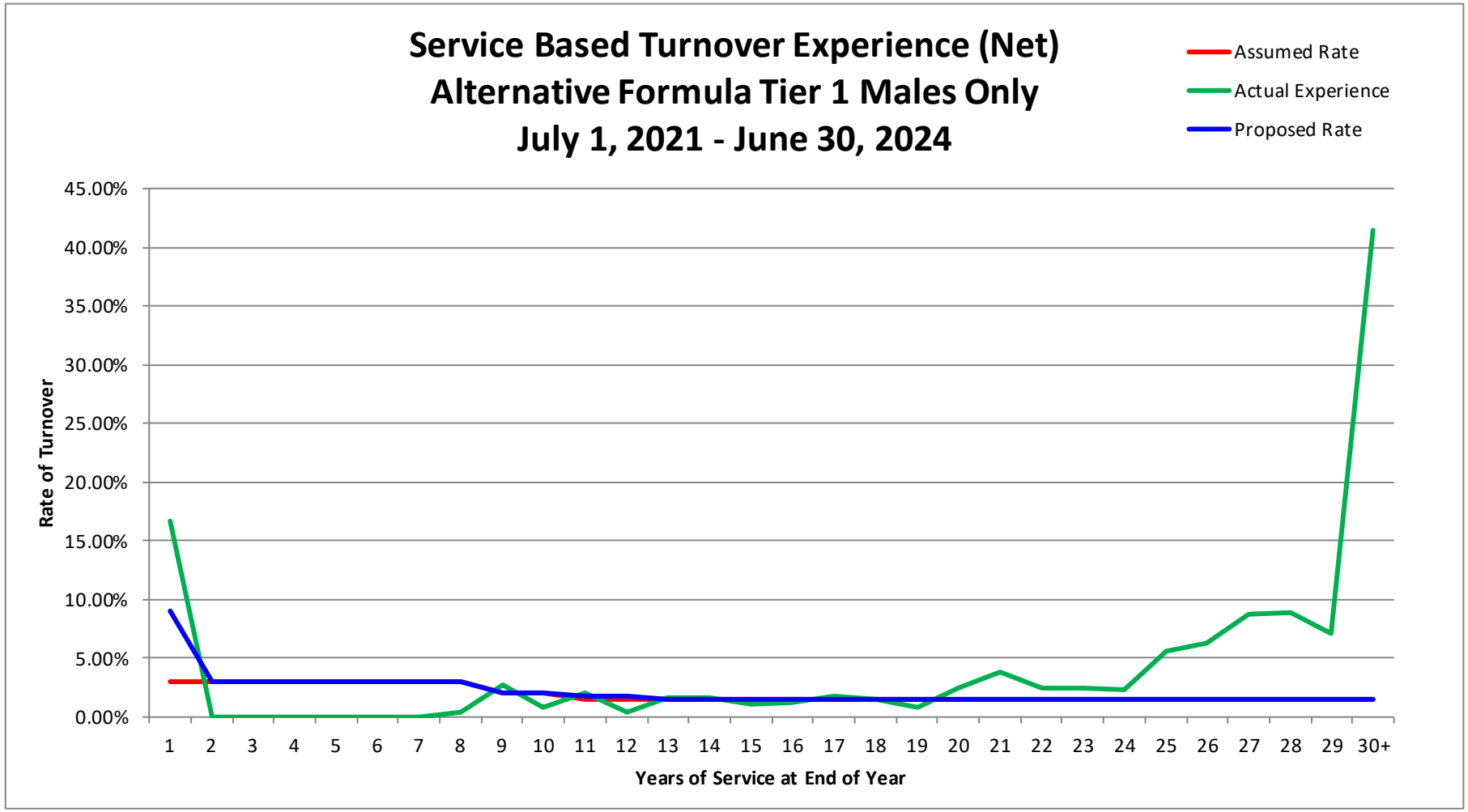

Service Based Turnover Experience (Net)
Alternative Formula Tier 1 Males Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Rate of Turnover
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(d)

Termination Experience by Service - Alternative Formula Female Tier 1 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	20	3	0	3	15.00%	1	7.00%	0.3	2	10.00%	0.7
2	89	11	5	6	6.74%	6	7.00%	1.0	6	7.00%	1.0
3	104	6	7	0	0.00%	7	6.50%		7	6.50%	
4	126	13	2	11	8.73%	8	6.00%	0.7	8	6.00%	0.7
5	153	12	5	7	4.58%	9	6.00%	1.3	9	6.00%	1.3
6	138	10	4	6	4.35%	7	5.00%	1.2	7	5.00%	1.2
7	125	11	3	8	6.40%	5	4.00%	0.6	5	5.00%	0.6
8	151	7	2	5	3.31%	5	3.00%	1.0	5	3.00%	1.0
9	161	5	7	0	0.00%	3	2.00%		5	3.00%	
10	154	9	1	8	5.19%	3	2.00%	0.4	4	2.50%	0.5
11	129	7	1	6	4.65%	3	2.00%	0.5	3	2.50%	0.5
12	165	8	2	6	3.64%	3	1.75%	0.5	3	2.00%	0.5
13	237	7	5	2	0.84%	4	1.75%	2.0	4	1.75%	2.0
14	295	6	1	5	1.69%	5	1.75%	1.0	5	1.75%	1.0
15	236	5	2	3	1.27%	4	1.75%	1.3	4	1.75%	1.3
16	202	5	0	5	2.48%	4	1.75%	0.8	4	1.75%	0.8
17	182	3	1	2	1.10%	3	1.50%	1.5	3	1.50%	1.5
18	179	2	3	0	0.00%	3	1.50%		3	1.50%	
19	186	4	4	0	0.00%	3	1.50%		3	1.50%	
20	161	7	0	7	4.35%	2	1.25%	0.3	2	1.50%	0.3
21	205	13	4	9	4.39%	3	1.25%	0.3	3	1.50%	0.3
22	239	9	1	8	3.35%	3	1.25%	0.4	4	1.50%	0.5
23	314	8	3	5	1.59%	4	1.25%	0.8	5	1.50%	1.0
24	308	7	3	4	1.30%	4	1.25%	1.0	5	1.50%	1.3
25	209	7	0	7	3.35%	2	1.00%	0.3	3	1.25%	0.4
26	87	14	0	14	16.09%	1	1.00%	0.1	1	1.25%	0.1
27	69	6	0	6	8.70%	1	1.00%	0.2	1	1.25%	0.2
28	50	4	0	4	8.00%	1	1.00%	0.3	1	1.25%	0.3
29	23	2	0	2	8.70%	0	1.00%	0.0	0	1.25%	0.0
30+	21	6	0	6	28.57%	0	1.00%	0.0	0	1.25%	0.0
	4,718	**217**	**66**	**155**	**3.29%**	**107**	**2.27%**	**0.7**	**115**	**2.44%**	**0.7**

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(d)

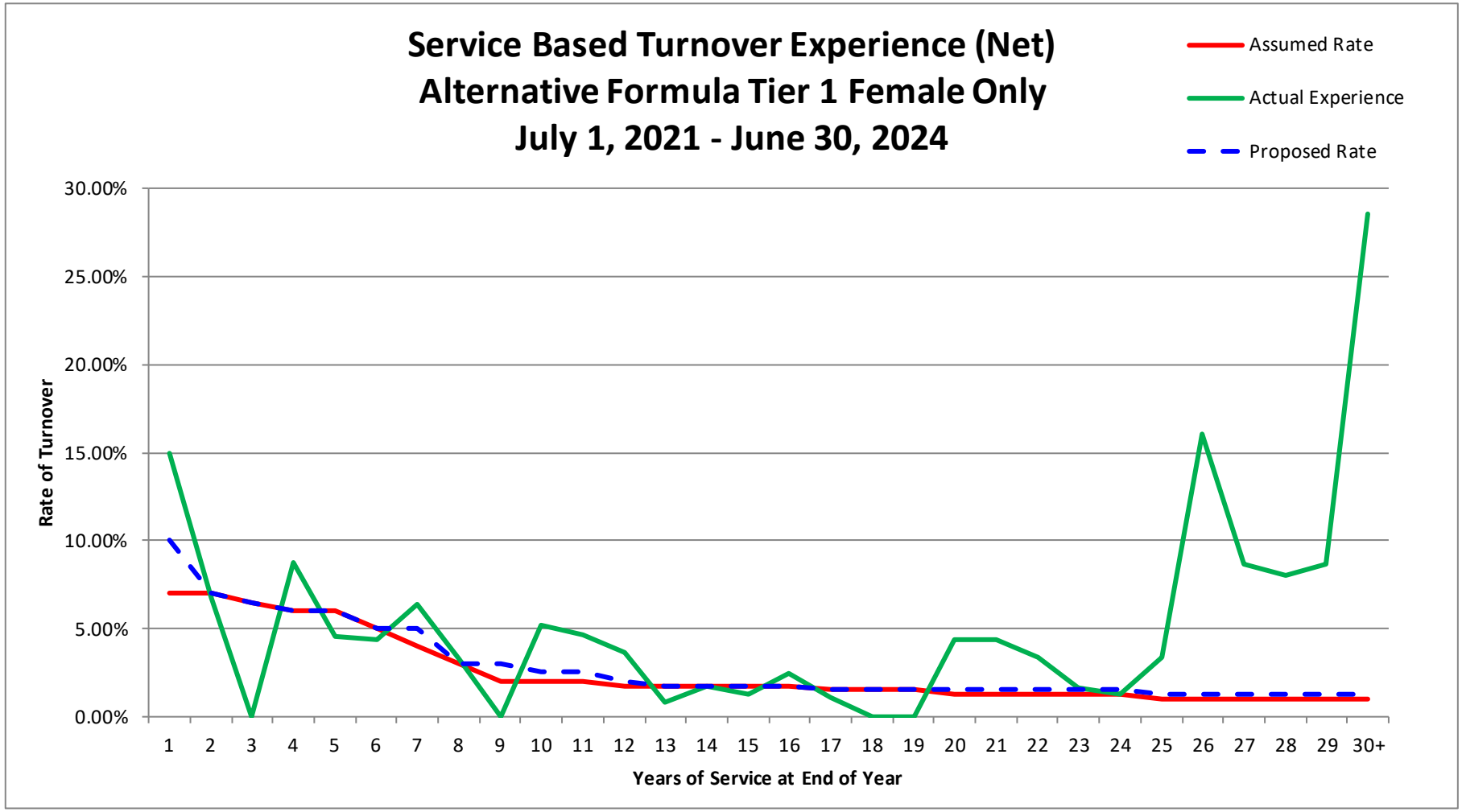

Service Based Turnover Experience (Net)
Alternative Formula Tier 1 Female Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(e)

Termination Experience by Service - Regular Formula Male Tier 2 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	926	342	0	342	36.93%	306	33.00%	0.9	324	35.00%	0.9
2	3,732	834	208	626	16.77%	616	16.50%	1.0	616	16.50%	1.0
3	3,272	375	258	117	3.58%	196	6.00%	1.7	180	5.50%	1.5
4	3,248	291	142	149	4.59%	195	6.00%	1.3	179	5.50%	1.2
5	3,189	238	61	177	5.55%	183	5.75%	1.0	159	5.00%	0.9
6	2,810	177	52	125	4.45%	141	5.00%	1.1	126	4.50%	1.0
7	2,320	128	22	106	4.57%	104	4.50%	1.0	104	4.50%	1.0
8	2,137	117	20	97	4.54%	96	4.50%	1.0	96	4.50%	1.0
9	2,131	107	15	92	4.32%	64	3.00%	0.7	75	3.50%	0.8
10	1,808	77	15	62	3.43%	54	3.00%	0.9	63	3.50%	1.0
11	1,383	66	12	54	3.90%	41	3.00%	0.8	48	3.50%	0.9
12	895	51	10	41	4.58%	22	2.50%	0.5	31	3.50%	0.8
13	493	17	3	14	2.84%	12	2.50%	0.9	12	2.50%	0.9
14	169	6	2	4	2.37%	4	2.50%	1.0	4	2.50%	1.0
15	14	0	0	0	0.00%	0	2.00%		0	2.50%	
16	8	0	0	0	0.00%	0	2.00%		0	2.50%	
17	1	0	0	0	0.00%	0	2.00%		0	2.50%	
18	0	0	0	0		0	2.00%		0	2.50%	
19	0	0	0	0		0	2.00%		0	2.50%	
20	0	0	0	0		0	2.00%		0	2.50%	
21	0	0	0	0		0	2.50%		0	2.50%	
22	0	0	0	0		0	2.50%		0	2.50%	
23	0	0	0	0		0	2.50%		0	2.50%	
24	0	0	0	0		0	2.50%		0	2.50%	
25	0	0	0	0		0	2.00%		0	2.25%	
26	0	0	0	0		0	2.00%		0	2.25%	
27	0	0	0	0		0	2.00%		0	2.25%	
28	0	0	0	0		0	2.00%		0	2.25%	
29	0	0	0	0		0	2.00%		0	2.25%	
30+	0	0	0	0		0	2.00%		0	2.25%	
	28,536	**2,826**	**820**	**2,006**	**7.03%**	**2,034**	**7.13%**	**1.0**	**2,017**	**7.07%**	**1.0**

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(e)

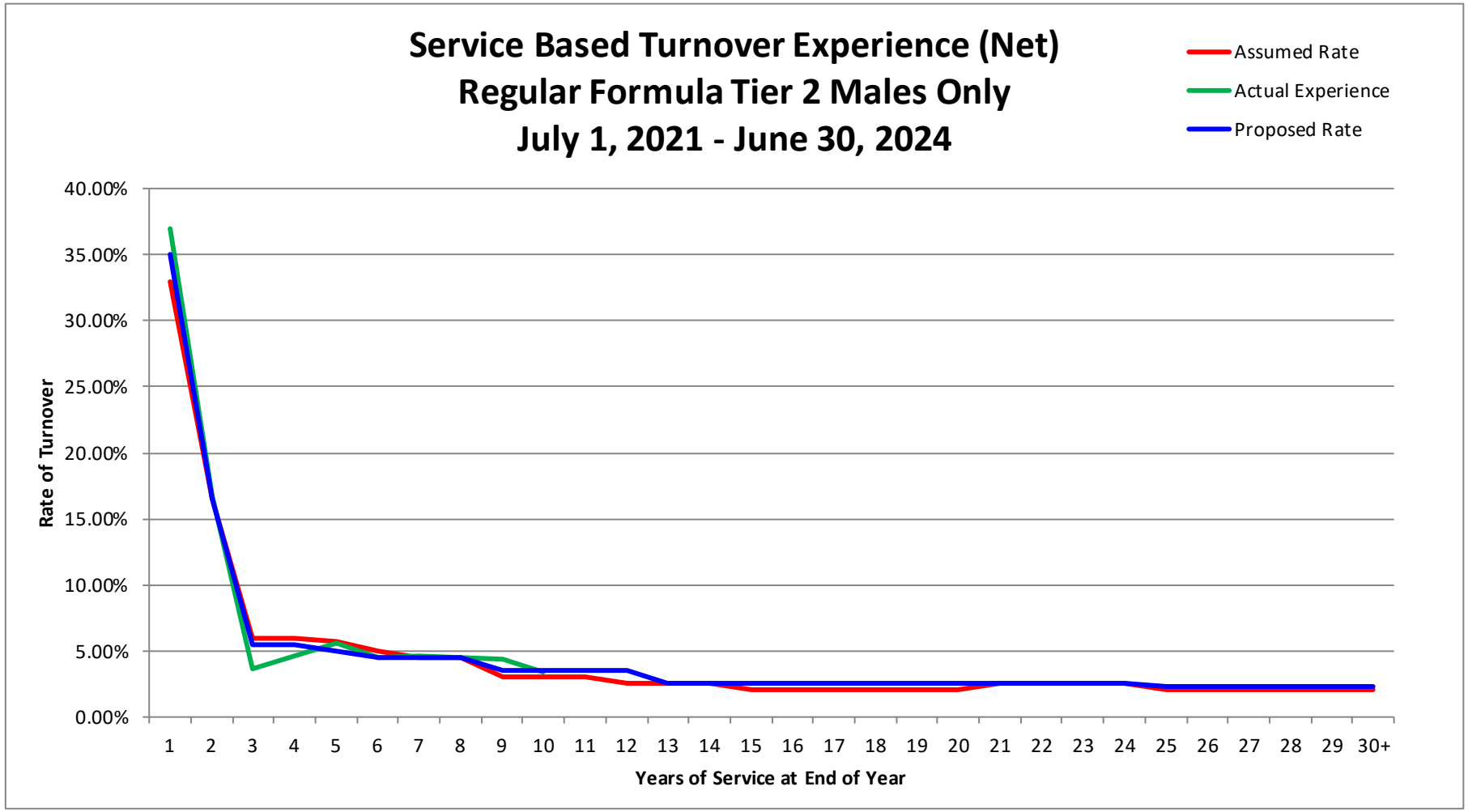

Service Based Turnover Experience (Net)
Regular Formula Tier 2 Males Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Rate of Turnover
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(f)

Termination Experience by Service - Regular Formula Female Tier 2 Members												
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions			
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]	
1	1,180	346	0	346	29.32%	330	28.00%	1.0	330	28.00%	1.0	
2	5,419	1,034	147	887	16.37%	813	15.00%	0.9	867	16.00%	1.0	
3	4,878	547	131	416	8.53%	390	8.00%	0.9	390	8.00%	0.9	
4	4,502	441	87	354	7.86%	315	7.00%	0.9	315	7.00%	0.9	
5	4,366	335	80	255	5.84%	284	6.50%	1.1	284	6.50%	1.1	
6	3,555	230	42	188	5.29%	196	5.50%	1.0	196	5.50%	1.0	
7	2,899	199	36	163	5.62%	145	5.00%	0.9	145	5.00%	0.9	
8	2,621	145	38	107	4.08%	105	4.00%	1.0	105	4.00%	1.0	
9	2,714	138	27	111	4.09%	81	3.00%	0.7	95	3.50%	0.9	
10	2,266	85	21	64	2.82%	79	3.50%	1.2	79	3.50%	1.2	
11	1,598	83	12	71	4.44%	48	3.00%	0.7	56	3.50%	0.8	
12	850	57	7	50	5.88%	26	3.00%	0.5	30	3.50%	0.6	
13	468	19	6	13	2.78%	12	2.50%	0.9	16	3.50%	1.2	
14	190	7	3	4	2.11%	5	2.50%	1.3	5	2.50%	1.3	
15	2	0	0	0	0.00%	0	2.50%		0	2.50%		
16	0	0	0	0		0	2.50%		0	2.50%		
17	0	0	0	0		0	2.00%		0	2.50%		
18	0	0	0	0		0	2.00%		0	2.50%		
19	0	0	0	0		0	2.00%		0	2.50%		
20	0	0	0	0		0	2.00%		0	2.50%		
21	0	0	0	0		0	1.50%		0	2.50%		
22	0	0	0	0		0	1.50%		0	2.50%		
23	0	0	0	0		0	1.50%		0	2.50%		
24	0	0	0	0		0	1.50%		0	2.50%		
25	0	0	0	0		0	1.50%		0	2.50%		
26	0	0	0	0		0	1.50%		0	2.50%		
27	0	0	0	0		0	1.50%		0	2.50%		
28	0	0	0	0		0	1.50%		0	2.50%		
29	0	0	0	0		0	1.50%		0	2.50%		
30+	0	0	0	0		0	1.50%		0	2.50%		
	37,508	3,666	637	3,029	8.08%	2,829	7.54%	0.9	2,913	7.77%	1.0	

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(f)

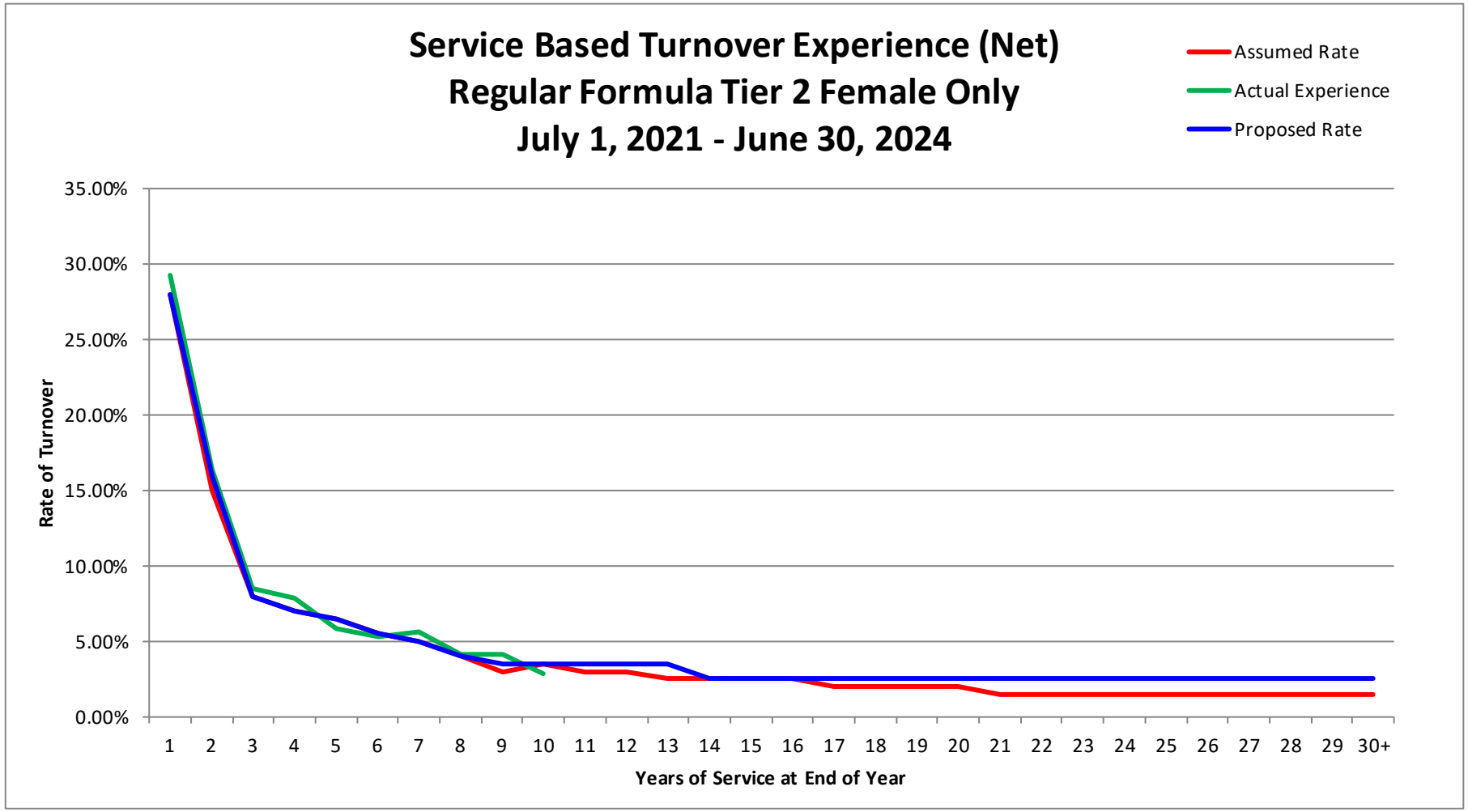

Service Based Turnover Experience (Net)
Regular Formula Tier 2 Female Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Table IV(g)

Termination Experience by Service - Alternative Formula Male Tier 2 Members												
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions			
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]	
1	300	27	0	27	9.00%	30	10.00%	1.1	30	10.00%	1.1	
2	1,480	160	29	131	8.85%	118	8.00%	0.9	126	8.50%	1.0	
3	1,574	129	19	110	6.99%	98	6.25%	0.9	110	7.00%	1.0	
4	1,614	145	20	125	7.74%	89	5.50%	0.7	97	6.00%	0.8	
5	1,742	118	17	101	5.80%	74	4.25%	0.7	87	5.00%	0.9	
6	1,730	113	15	98	5.66%	52	3.00%	0.5	69	4.00%	0.7	
7	1,679	92	9	83	4.94%	42	2.50%	0.5	67	4.00%	0.8	
8	1,711	87	14	73	4.27%	38	2.25%	0.5	51	3.00%	0.7	
9	1,535	45	11	34	2.21%	23	1.50%	0.7	31	2.00%	0.9	
10	1,353	41	6	35	2.59%	20	1.50%	0.6	27	2.00%	0.8	
11	978	22	4	18	1.84%	15	1.50%	0.8	17	1.75%	0.9	
12	746	23	6	17	2.28%	11	1.50%	0.6	13	1.75%	0.8	
13	430	8	5	3	0.70%	6	1.50%	2.0	6	1.50%	2.0	
14	191	5	0	5	2.62%	3	1.50%	0.6	3	1.50%	0.6	
15	8	0	1	0	0.00%	0	1.50%		0	1.50%		
16	5	0	0	0	0.00%	0	1.50%		0	1.50%		
17	5	0	0	0	0.00%	0	1.50%		0	1.50%		
18	2	0	0	0	0.00%	0	1.50%		0	1.50%		
19	0	0	0	0		0	1.50%		0	1.50%		
20	0	0	0	0		0	1.50%		0	1.50%		
21	0	0	0	0		0	1.50%		0	1.50%		
22	0	0	0	0		0	1.50%		0	1.50%		
23	0	0	0	0		0	1.50%		0	1.50%		
24	0	0	0	0		0	1.50%		0	1.50%		
25	0	0	0	0		0	1.50%		0	1.50%		
26	0	0	0	0		0	1.50%		0	1.50%		
27	0	0	0	0		0	1.50%		0	1.50%		
28	0	0	0	0		0	1.50%		0	1.50%		
29	0	0	0	0		0	1.50%		0	1.50%		
30+	0	0	0	0		0	1.50%		0	1.50%		
	17,083	**1,015**	**156**	**860**	**5.03%**	**619**	**3.62%**	**0.7**	**734**	**4.30%**	**0.9**	

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(g)

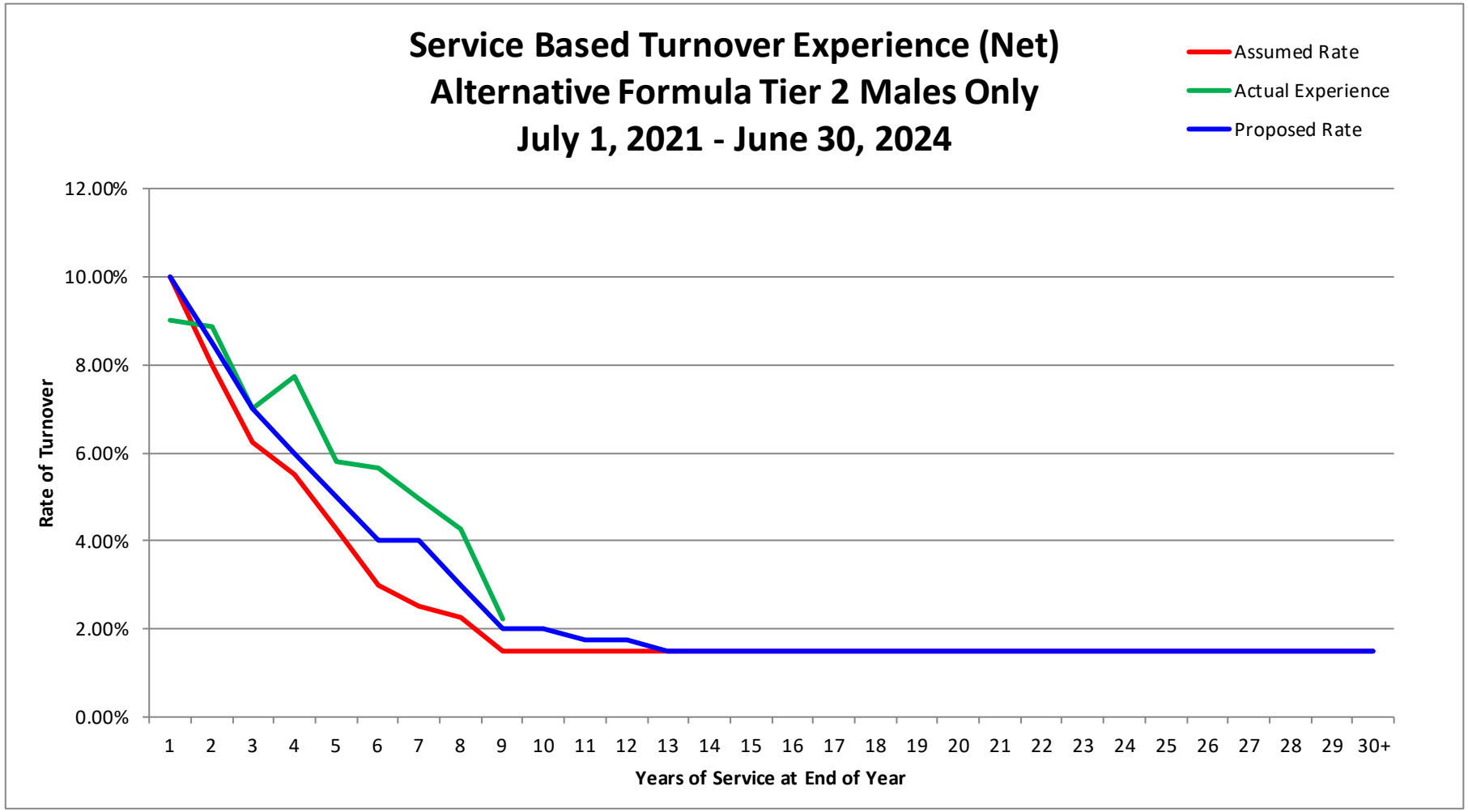

Service Based Turnover Experience (Net)
Alternative Formula Tier 2 Males Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
Rate of Turnover
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

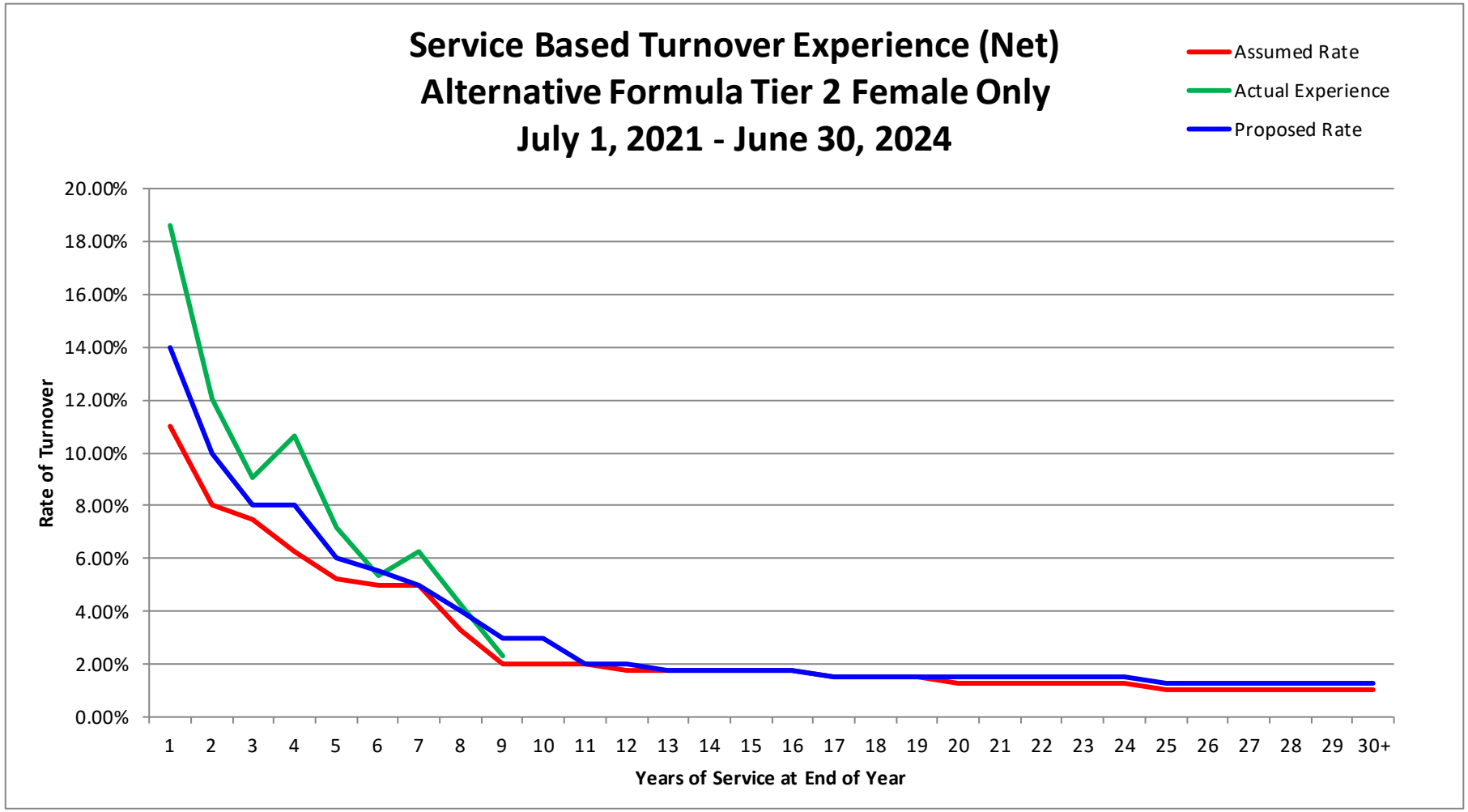
Table IV(h)

Termination Experience by Service - Alternative Formula Female Tier 2 Members											
Service (End of Year)	Actual Experience					Current Assumptions			Proposed Assumptions		
	Exposures	Turnover	Rehires	Net Turnover	Actual Rate[1]	Expected Turnover	Assumed Rate	Actual/ Expected[2]	Expected Turnover	Proposed Rate	Actual/ Expected[2]
1	113	21	0	21	18.58%	12	11.00%	0.6	16	14.00%	0.8
2	647	91	13	78	12.06%	52	8.00%	0.7	65	10.00%	0.8
3	672	72	11	61	9.08%	50	7.50%	0.8	54	8.00%	0.9
4	810	101	15	86	10.62%	51	6.25%	0.6	65	8.00%	0.8
5	882	84	21	63	7.14%	46	5.25%	0.7	53	6.00%	0.8
6	766	57	16	41	5.35%	38	5.00%	0.9	42	5.50%	1.0
7	624	48	9	39	6.25%	31	5.00%	0.8	31	5.00%	0.8
8	492	30	9	21	4.27%	16	3.25%	0.8	20	4.00%	1.0
9	481	16	5	11	2.29%	10	2.00%	0.9	14	3.00%	1.3
10	383	18	1	17	4.44%	8	2.00%	0.5	11	3.00%	0.6
11	263	7	3	4	1.52%	5	2.00%	1.3	5	2.00%	1.3
12	173	4	1	3	1.73%	3	1.75%	1.0	3	2.00%	1.0
13	111	6	1	5	4.50%	2	1.75%	0.4	2	1.75%	0.4
14	41	1	1	0	0.00%	1	1.75%		1	1.75%	
15	0	0	0	0		0	1.75%		0	1.75%	
16	1	0	0	0	0.00%	0	1.75%		0	1.75%	
17	0	0	0	0		0	1.50%		0	1.50%	
18	0	0	0	0		0	1.50%		0	1.50%	
19	0	0	0	0		0	1.50%		0	1.50%	
20	0	0	0	0		0	1.25%		0	1.50%	
21	0	0	0	0		0	1.25%		0	1.50%	
22	0	0	0	0		0	1.25%		0	1.50%	
23	0	0	0	0		0	1.25%		0	1.50%	
24	0	0	0	0		0	1.25%		0	1.50%	
25	0	0	0	0		0	1.00%		0	1.25%	
26	0	0	0	0		0	1.00%		0	1.25%	
27	0	0	0	0		0	1.00%		0	1.25%	
28	0	0	0	0		0	1.00%		0	1.25%	
29	0	0	0	0		0	1.00%		0	1.25%	
30+	0	0	0	0		0	1.00%		0	1.25%	
	6,459	556	106	450	6.97%	325	5.03%	0.7	382	5.91%	0.8

[1] Reflects actual turnover net of inactive members who returned to active service.

[2] Actual to expected ratio based on net turnover.

Graph IV(h)


Service Based Turnover Experience (Net)
Alternative Formula Tier 2 Female Only
July 1, 2021 - June 30, 2024
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
20.00%
18.00%
16.00%
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+
Years of Service at End of Year

Marriage Assumption

85.0 percent of active male participants and 65.0 percent of active female participants are assumed to be married. The female spouse is assumed to be three years younger than the male spouse for active member valuation purposes. Actual marital status at benefit commencement is used for retirees, if available; otherwise the active marriage assumptions are used for retirees.

Load for Inactive Members Eligible for Deferred Vested Pension Benefits

Currently, deferred vested liability is increased by 15 percent for Regular Formula members and 13 percent for Alternative Formula members to account for increases in final average salary due primarily to participation in a reciprocal system.

For inactive members who retired from July 1, 2021, to June 30, 2024, the ratio of actual retirement benefits to estimated retirement benefits was approximately 13 percent for Regular Formula members and 12 percent for Alternative Formula members. We recommend an assumption of 13 percent for Regular Formula members and 12 percent for Alternative Formula members.

	2022	2023	2024	Total
Number of deferred vested members who retired during the year				
Regular formula members	283	199	273	755
Alternative formula members	81	38	96	215
Average estimated monthly benefits				
Regular formula members	$ 1,869	$ 1,780	$ 1,990	$ 1,889
Alternative formula members	$ 4,285	$ 4,320	$ 5,222	$ 4,710
Average updated monthly benefits at retirement				
Regular formula members	$ 2,147	$ 2,001	$ 2,204	$ 2,129
Alternative formula members	$ 4,830	$ 5,091	$ 5,730	$ 5,278
Average percentage increase in estimated benefits at retirement				
Regular formula members	15%	12%	11%	13%
Alternative formula members	13%	18%	10%	12%

Data excludes member records with percentage increases in the top 9% and bottom 9%.

Unused Sick Leave and Optional Service Purchases

Members who have accumulated unused sick leave and vacation days at retirement are eligible to receive additional service credit to increase their retirement benefits. In addition, members who qualify for optional service may purchase optional service credit prior to retirement. We have reviewed data provided by the System regarding the number of new retirees each year that have either received additional service credit for unused sick leave or have purchased optional service. Based on this analysis, we recommend maintaining the current assumption of increasing each current and future active member's service by 5.0 months to reflect additional service credit received at retirement.

Fiscal Year	New Retirees	New Retirees with Unused Sick Leave	New Retirees with No Unused Sick Leave	Total Unused Sick Leave Years	Average Unused Sick Leave Years
2022	2,950	2,168	782	640	0.295
2023	2,744	2,080	664	629	0.302
2024	2,304	1,633	671	485	0.297
Total	**7,998**	**5,881**	**2,117**	**1,753**	**0.298**

Percent of New Retirees who Receive Additional Service Due to Unused Sick Leave	**73.53%**
Average Years of Unused Sick Leave for New Retirees During Fiscal Years 2022-2024	**0.2981**
Expected Years of Unused Sick Leave at Retirement for Current and Future Active Members	**0.2192**

Fiscal Year	New Retirees	New Retirees with Optional Service	New Retirees with No Optional Service	Total Optional Service Years	Average Optional Service Years
2022	1,616	1,598	18	341	0.214
2023	1,581	1,544	37	320	0.207
2024	1,170	1,134	36	238	0.210
Total	**4,367**	**4,276**	**91**	**900**	**0.210**

Percent of New Retirees who Purchase Optional Service	**97.92%**
Average Years of Optional Service for New Retirees During Fiscal Years 2022-2024	**0.2104**
Expected Years of Optional Service Purchased at Retirement for Current and Future Active Members	**0.2060**
Total Years Service is Increased	**0.4252**

Disability

Because members who receive disability benefits typically spend less than one year on disability, they are assumed to return to work and are considered active members. There is currently a load of 1.07 percent of pay on the normal cost applied to reflect the near-term cash flow. We have reviewed the history of disability benefit payments as disclosed in the System's Financial Statements. Based on this analysis, we recommend maintaining the load on the normal cost as a percentage of pay, which is approximately equal to 110 percent of the most recent disability benefit payments to reflect the near-term cash flow. This assumption will be updated at each valuation date as experience emerges.

	Total Disability Benefit Payments	Covered Payroll	Disability Payments as a % of Payroll	Annual Increase in Disability Payments
2024	$ 55,955,451	$ 5,641,862,000	0.99%	-8.76%
2023	61,328,489	5,050,982,000	1.21%	-7.49%
2022	66,294,620	4,820,284,000	1.38%	3.77%
2021	63,886,642	4,705,249,000	1.36%	1.49%

Accelerated Pension Benefit Payment Program Election Assumption

In accordance with Public Act 100-0587 and Public Act 101-0010,

- Eligible Tier 1 active members may elect the "COLA Buyout," through June 30, 2026, in which the member receives reduced and delayed COLA benefits at retirement and an accelerated pension benefit payment.
- Eligible inactive Tier 1 and Tier 2 members may elect the "Total Buyout," through June 30, 2026, in which the member receives an accelerated pension benefit payment in lieu of an annuity at retirement.

With respect to the COLA Buyout, 20 percent of Regular Formula members, 45 percent of Alternative Formula members not covered by Social Security, and 40 percent of Alternative Formula members covered by Social Security are assumed to elect the COLA Buyout. The election percentages are based on experience through June 2025 as provided by SERS. With respect to the Total Buyout, 4 percent are assumed to elect the Total Buyout. The election percentages apply until the end of each Buyout Program; i.e., June 30, 2026. The following table shows Accelerated Pension Benefit Payments available experience through June 2025, and updated assumptions:

Group	Elected Buyout	Declined Buyout	Observed Rate	Prior Assumption	Updated Assumption
COLA Buyout					
Regular Formula	2,648	9,697	21%	20%	20%
Alternative Formula not covered by Social Security	303	330	48%	45%	45%
Alternative Formula covered by Social Security	1,894	2,497	43%	40%	40%
Total Buyout	193	3,600	5%	3%	4%

The Total Buyout rate is based on limited experience data given the low incidence of election.

Actuarial Standard of Practice No. 4

Actuarial Standards of Practice No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, provides guidance on cost allocation procedures and contribution allocation procedures. It also provides guidance for coordinating and integrating all elements of an actuarial valuation of a pension plan including:

1. Measurement of pension obligations and determination of funded status;
2. Assignment of pension obligations to time period such as actuarially determined contributions and periodic costs;
3. Development of a cost allocation procedure used to develop periodic costs;
4. Development of a contribution allocation procedure used to develop actuarially determined contributions;
5. Determination of types and levels of benefits supported by specified cost or contribution levels; and
6. Projection of pension obligations, periodic costs, or actuarially determined contributions, and other related measurements such as cash flows projections and projections of a plan's funded status.

When developing an amortization method used to calculate the actuarially determined contributions, the actuary should consider the following:

1. Whether the amortization method is open or closed;
2. Source of amortization base;
3. Anticipated pattern of amortization payment, including length of time until amortization payments exceed nominal interest on the outstanding balance;
4. Whether amortization base is positive or negative;
5. Duration of actuarial accrued liability;
6. Average remaining service lifetime active plan participants; and
7. Funded status of the plan or period to plan insolvency.

Actuary should assess whether the unfunded actuarial accrued liability is expected to be fully amortized.

The current statutory policy tends to back-load and defer contributions, and therefore does not produce a reasonable actuarially determined contribution based on the criteria listed above.

At the April 21, 2015, Board meeting, the Board adopted a policy, for purposes of financial reporting under GASB Statement Nos. 67 and 68, which provides for the annual financing of SERS' normal cost and amortizing the unfunded liability over 25 years as a level percent of capped payroll (16 years remaining as of the 2024 valuation). We believe the actuarially determined contribution calculated according to this policy is reasonable.

We recommend SERS update the amortization policy to be a 20-year closed period beginning with the actuarial valuation as of June 30, 2025.

SECTION D

COST IMPACT

Cost Impact

The impact of adopting the recommended assumptions is summarized in the following tables. The results are based on the June 30, 2024, actuarial valuation.

		Valuation Baseline	Experience Study Changing All Assumptions
1	Number of Members		
	a. Active	65,508	65,508
	b. Inactive:		
	i. Eligible for deferred vested pension benefits (43 based on SERS service alone. An additional 110 are eligible when reciprocal service is added to SERS service).	3,675	3,675
	ii. Eligible for return of contributions only	31,736	31,736
	c. Current Benefit Recipients:		
	i. Retirement annuities	64,915	64,915
	ii. Survivor annuities	12,483	12,483
	iii. Disability annuities	1,399	1,399
	d. Eligible for Deferred Benefits:		
	i. Retirement annuities	43	43
	ii. Survivor annuities	110	110
	e. Total	179,869	179,869
2	Covered Payroll Provided by System	$ 5,641,862,499	$ 5,641,862,499
3	Annualized Benefit Payments Currently Being Made		
	a. Retirement (Includes those eligible for deferred benefits)	$ 3,007,255,017	$ 3,007,255,017
	b. Survivor (Includes those eligible for deferred benefits)	230,443,751	230,443,751
	c. Disability	46,719,630	46,719,630
	d. Total	$ 3,284,418,398	$ 3,284,418,398
4	Actuarial Liability—Annuitants		
	a. Current Benefit Recipients:		
	i. Retirement annuities	$ 38,243,488,758	$ 38,635,911,561
	ii. Survivor annuities	2,304,472,619	2,350,104,208
	iii. Disability annuities	390,284,273	399,611,227
	b. Eligible for Deferred Benefits:		
	i. Retirement annuities	6,907,072	7,025,292
	ii. Survivor annuities	6,649,214	6,633,002
	c. Total	$ 40,951,801,936	$ 41,399,285,290

Cost Impact

		Valuation Baseline	Experience Study Changing All Assumptions
5	Actuarial Liability—Inactive Members		
	a. Eligible for Deferred Vested Pension Benefits	$ 765,026,868	$ 740,557,160
	b. Eligible for Return of Contributions Only	91,848,750	91,848,750
	c. Total	$ 856,875,618	$ 832,405,910
6	Active Members		
	a. Pension Benefits	$ 9,556,122,036	$ 9,823,095,480
	b. Cost-of-Living Adjustments	3,669,303,642	3,822,656,297
	c. Death Benefits		
	i. Occupational	$ 12,192,351	$ 12,219,125
	ii. Non-occupational	105,976,010	107,068,537
	iii. Refund	54,680,592	59,707,483
	iv. Total	$ 172,848,953	$ 178,995,145
	d. Disability	$ -	$ -
	e. Withdrawal	489,938,551	586,612,657
	f. Total	$ 13,888,213,182	$ 14,411,359,579
7	Total Actuarial Liability (4 + 5 + 6)	$ 55,696,890,736	$ 56,643,050,779
8	Market Value of Assets (MVA)	$ 25,396,815,011	$ 25,396,815,011
9	Unfunded Actuarial Liability Based on MVA (7 – 8)	$ 30,300,075,725	$ 31,246,235,768
10	Funded Percentage Based on MVA (8 ÷ 7)	45.60%	44.84%
11	Actuarial Value of Assets (AVA)	$ 25,528,760,746	$ 25,528,760,746
12	Unfunded Actuarial Liability Based on AVA (7 – 11)	$ 30,168,129,990	$ 31,114,290,033
13	Funded Percentage Based on AVA (11 ÷ 7) [a]	45.84%	45.07%
14	Total Normal Cost	914,447,786	952,620,527
15	Employee Contributions	$ 316,891,797	$ 316,891,797
16	Annual Employer Normal Cost	$ 597,555,989	$ 635,728,730
	(% uncapped payroll)	10.59%	11.27%

[a] *The funded status measure is appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.*

Cost Impact

Actuarial Valuation Date: June 30, 2024 Fiscal Year Ending: June 30, 2026	Valuation Baseline	Changing All Assumptions
Estimated Statutory Contributions:		
· Annual Amount[a]	$ 2,597,558,000	$ 2,622,895,000
· Percentage of Projected Capped Payroll for Fiscal Year	44.310%	44.542%
Actuarially Determined Contribution[b] (ADC):		
· Annual Amount	$ 3,293,438,275	$ 2,994,444,717
· Percentage of Projected Capped Payroll for Fiscal Year	56.181%	50.852%
Membership		
· Number of		
- Active Members	65,508	65,508
- Inactives - Eligible for Deferred Vested Benefit	3,675	3,675
- Inactives - Eligible for Return of Contributions	31,736	31,736
- Members Receiving Payments	78,797	78,797
- Members Eligible for Deferred Benefits	153	153
- Total	179,869	179,869
· Covered Uncapped Payroll Provided by System	$ 5,641,862,499	$ 5,641,862,499
· Projected Capped Payroll For Fiscal Year[c]	$ 5,862,239,215	$ 5,888,587,449
· Annualized Benefit Payments	$ 3,284,418,398	$ 3,284,418,398
Assets		
· Market Value of Assets (MVA)	$ 25,396,815,011	$ 25,396,815,011
· Actuarial Value of Assets (AVA)	$ 25,528,760,746	$ 25,528,760,746
· Return on MVA	9.37%	9.37%
· Return on AVA	6.64%	6.64%
· Ratio – AVA to MVA	100.52%	100.52%
Actuarial Information		
· Employer Normal Cost Amount	$ 597,555,989	$ 635,728,730
· Actuarial Accrued Liability (AAL)	$ 55,696,890,736	$ 56,643,050,779
· Unfunded Actuarial Accrued Liability (UAAL)	$ 30,168,129,990	$ 31,114,290,033
· Funded Ratio based on AVA	45.84%	45.07%
· UAAL as % of Covered Payroll	534.72%	551.49%
· Funded Ratio based on MVA	45.60%	44.84%

[a] *The estimated statutory contribution amounts for fiscal years 2025 and 2026 are based on projected capped payrolls for fiscal years 2025 and 2026, respectively, using June 30, 2024, census data.*

[b] *For contributions in fiscal years ending on and after June 30, 2017, the Board adopted a recommended policy used to develop the Actuarially Determined Contribution (ADC) as defined in GASB Statements Nos. 67 and 68. The policy adopted by the Board calculates the ADC as the Normal Cost plus a 25-year level percent of capped payroll closed-period amortization of the Unfunded Accrued Liability. As of June 30, 2024, the remaining amortization period is 16 years. The recommended amortization period used for the experience study is 20 years. The ADC is used for financial reporting purposes only.*

[c] *Based on June 30, 2024, census data.*

Cost Impact

Actuarial Accrued Liability and Actuarial Value of Assets
Determined as of June 30, 2024
($ in millions)

Year	Actuarial Accrued Liability		Actuarial Value of Assets	
		Experience Study		Experience Study
	Valuation Baseline	Changing All Assumptions	Valuation Baseline	Changing All Assumptions
2025	$ 56,894	$ 57,894	$ 27,138	$ 27,089
2026	58,013	59,077	27,779	27,707
2027	59,054	60,188	28,994	28,924
2028	60,012	61,223	30,230	30,183
2029	60,888	62,184	31,319	31,321
2034	64,074	65,868	36,926	37,446
2039	65,486	67,825	44,792	46,122
2044	65,772	68,635	56,235	58,647
2045	65,790	68,759	59,210	61,884

Normal cost rate includes administrative expenses.
State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023.
Total expenses include benefit payments, refunds, and administrative expenses.
Actuarial accrued liability and assets are measured at Plan Year End.
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.

Required State Contribution
Determined as of June 30, 2024
($ in millions)

Year	Contribution Dollar		Contribution Percent	
		Experience Study		Experience Study
	Valuation Baseline	Changing All Assumptions	Valuation Baseline	Changing All Assumptions
2025	$ 2,813	$ 2,813	48.80%	48.80%
2026	2,598	2,623	44.31%	44.54%
2027	2,609	2,656	43.75%	44.15%
2028	2,673	2,741	44.07%	44.61%
2029	2,706	2,797	43.84%	44.54%
2034	3,168	3,321	46.72%	47.52%
2039	3,505	3,689	46.72%	47.52%
2044	3,915	4,132	46.72%	47.52%
2045	4,005	4,230	46.72%	47.52%
Total Cont. Through 2045	**$ 67,363**	**$ 70,370**		
Present Value of Total Cont.	**$ 34,741**	**$ 36,099**		

Normal cost rate includes administrative expenses.
State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023.
Total expenses include benefit payments, refunds, and administrative expenses.
Actuarial accrued liability and assets are measured at Plan Year End.
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.

Unfunded Accrued Liability and Funded Ratio
Determined as of June 30, 2024
($ in millions)

Year	Unfunded Accrued Liability		Funded Ratio	
		Experience Study		Experience Study
	Valuation Baseline	Changing All Assumptions	Valuation Baseline	Changing All Assumptions
2025	$ 29,756	$ 30,805	47.70%	46.79%
2026	30,234	31,369	47.88%	46.90%
2027	30,060	31,264	49.10%	48.06%
2028	29,782	31,040	50.37%	49.30%
2029	29,569	30,863	51.44%	50.37%
2034	27,148	28,422	57.63%	56.85%
2039	20,694	21,703	68.40%	68.00%
2044	9,537	9,988	85.50%	85.45%
2045	6,580	6,875	90.00%	90.00%

Normal cost rate includes administrative expenses.
State contribution based on the requirements of Public Act 88-0593, as amended by Public Act 90-0065, Public Act 94-0004, Public Act 96-0043, and Public Act 100-0023.
Total expenses include benefit payments, refunds, and administrative expenses.
Actuarial accrued liability and assets are measured at Plan Year End.
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.

SECTION E

RECOMMENDED ACTUARIAL ASSUMPTIONS

Actuarial Cost Method as Mandated by 40 ILCS 5/14-131, Adopted June 30, 1989

The projected unit credit normal cost method is used. Under this method, the projected pension at retirement age is first calculated and the present value at the individual member's current or attained age is determined. The normal cost for the member for the current year is equal to the actuarial present value divided by the member's projected service at retirement. The normal cost for the plan for the year is the sum of the individual normal costs.

The actuarial liability at any point in time is the present value of the projected pensions at that time less the present value of future normal costs.

For ancillary benefits for active members, in particular death and survivor benefits, termination benefits and the post-retirement increases, the same procedure as outlined above is followed.

Estimated annual administrative expenses are added to the normal cost.

For actuarial valuation purposes, as well as projection purposes, an actuarial value of assets is used.

Recommended Actuarial Assumptions

Mortality

Recommended mortality assumptions for general employees and retirees covered under the Regular Benefit Formula are shown in the following table.

General Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 General Employee, sex distinct	83%	88%
Post-retirement	Pub-2010 Below-Median Income General Healthy Retiree sex distinct	90%	113%

Recommended mortality assumptions for Public Safety employees and retirees covered under the Alternative Benefit Formula are shown in the following table.

Public Safety Employees and Retirees	Proposed Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement	Pub-2010 Public Safety Employee, sex distinct	90%	97%
Post-retirement	Pub-2010 Below-Median Income Public Safety Healthy Retiree, sex distinct	100%	101%

Interest

6.75 percent per year, compounded annually, net of investment expenses.

General Inflation

2.40 percent per year, compounded annually.

This assumption serves as the basis for the determination of Tier Two annual increases that are equal to the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.

Marriage Assumption

85.0 percent of active male participants and 65.0 percent of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees, if available; otherwise the active marriage assumptions are used for retirees.

Social Security Offset for Survivor Benefits

No offset assumption for male surviving spouses, because it is assumed their own PIA is as great as their spouses' PIA. Sixty percent of married male members are assumed to have a dual income household. For the dual income household, it is assumed the offset at age 60 is 45.0 percent of the original survivor benefit. It is assumed the offset at age 62 is 10.0 percent of the original survivor benefit. Furthermore, it is assumed that 50 percent of retirees on or after July 1, 2009, will elect to remove the offset provision. In exchange for the removal, the member's retirement annuity is reduced by 3.825 percent monthly as mandated by Statutes.

Termination

Illustrative rates of withdrawal from the plan are as follows for Tier One members:

Service Based Withdrawal - Tier 1 Members				
Service (End of Year)	Regular Formula Employees		Alternative Formula Employees	
	Males	Females	Males	Females
1	0.2400	0.2200	0.0900	0.1000
2	0.0900	0.1000	0.0300	0.0700
3	0.0700	0.0600	0.0300	0.0650
4	0.0600	0.0600	0.0300	0.0600
5	0.0600	0.0450	0.0300	0.0600
6	0.0400	0.0450	0.0300	0.0500
7	0.0400	0.0450	0.0300	0.0500
8	0.0400	0.0400	0.0300	0.0300
9	0.0400	0.0400	0.0200	0.0300
10	0.0400	0.0400	0.0200	0.0250
11	0.0400	0.0400	0.0175	0.0250
12	0.0350	0.0300	0.0175	0.0200
13	0.0350	0.0300	0.0150	0.0175
14	0.0350	0.0300	0.0150	0.0175
15	0.0350	0.0275	0.0150	0.0175
16	0.0250	0.0275	0.0150	0.0175
17	0.0250	0.0275	0.0150	0.0150
18	0.0250	0.0275	0.0150	0.0150
19	0.0250	0.0275	0.0150	0.0150
20	0.0250	0.0275	0.0150	0.0150
21	0.0250	0.0275	0.0150	0.0150
22	0.0225	0.0275	0.0150	0.0150
23	0.0225	0.0250	0.0150	0.0150
24	0.0225	0.0250	0.0150	0.0150
25	0.0225	0.0250	0.0150	0.0125
26	0.0225	0.0250	0.0150	0.0125
27	0.0225	0.0250	0.0150	0.0125
28	0.0225	0.0250	0.0150	0.0125
29	0.0225	0.0250	0.0150	0.0125
30+	0.0225	0.0250	0.0150	0.0125

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Salary Increases

Illustrative rates of total salary increase per individual employee per year, compounded annually:

Age	Annual Increase
25	9.56%
30	7.44%
35	6.34%
40	5.51%
45	4.94%
50	4.28%
55	3.98%
60	3.49%
65	3.25%
70	2.90%
75	2.75%
80	2.65%

The underlying salary increase assumption is based on a wage inflation assumption of 2.90 percent per year, comprised of 2.40 percent for general inflation plus 0.50 percent for productivity increases. The total salary increases shown above include general inflation, productivity increases, and an age-based component for merit, promotion, and longevity. The total annual increase on and after age 80 equals 2.40 percent.

Disability

Because members who receive disability benefits typically spend less than one year on disability, they are considered active members. Therefore, a load of 1.07 percent of pay on the normal cost is applied to reflect the near-term cash flow. This assumption is based on 110 percent of the most recent disability benefit payment information as a percent of payroll and will be updated at each actuarial valuation date as experience emerges.

415(b) and 401(a)(17) Limits

No explicit assumption is made with respect to these items.

Accelerated Pension Benefit Payment Program Election Assumption

In accordance with Public Act 100-0587 and Public Act 101-0010,

- Eligible Tier 1 active members may elect the "COLA Buyout," through June 30, 2026, in which the member receives reduced and delayed COLA benefits at retirement and an accelerated pension benefit payment.
- Eligible inactive Tier 1 and Tier 2 members may elect the "Total Buyout," through June 30, 2026, in which the member receives an accelerated pension benefit payment in lieu of an annuity at retirement.

With respect to the COLA Buyout, 20 percent of Regular Formula members, 45 percent of Alternative Formula members not covered by Social Security, and 40 percent of Alternative Formula members covered by Social Security are assumed to elect the COLA Buyout. The election percentages are based on experience through June 2025 as provided by SERS. With respect to the Total Buyout, 4 percent are assumed to elect the Total Buyout. The election percentages apply until the end of each Buyout Program; i.e., June 30, 2026. The following table shows Accelerated Pension Benefit Payments available experience through June 2025, and updated assumptions:

Group	Elected Buyout	Declined Buyout	Observed Rate	Prior Assumption	Updated Assumption
COLA Buyout					
Regular Formula	2,648	9,697	21%	20%	20%
Alternative Formula not covered by Social Security	303	330	48%	45%	45%
Alternative Formula covered by Social Security	1,894	2,497	43%	40%	40%
Total Buyout	193	3,600	5%	3%	4%

Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the actuarial valuation date. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have the same demographic profile as new entrants in the 15 years prior to the actuarial valuation date. The average increase in uncapped payroll for the projection period is 2.75 percent per year. New entrants not covered by Social Security are assumed to participate in the Tier 2 defined benefit plan.

New Entrant Benefit Groups												
Age Group	New Entrants Eligible for Regular Formula Benefits who are Covered by Social Security		New Entrants Eligible for Regular Formula Benefits who are not Covered by Social Security		New Entrants in Positions Formerly Eligible for Alternative Formula Benefits who are Covered by Social Security and are now Eligible for Regular Formula Benefits		New Entrants Eligible for Alternative Formula Benefits who are Covered by Social Security		New Entrants in Positions Formerly Eligible for Alternative Formula Benefits who are not Covered by Social Security and are now Eligible for Regular Formula Benefits		New Entrants Eligible for Alternative Formula Benefits who are not Covered by Social Security		Total	
	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary
Under 20	172	6,673,506			174	8,784,251	9	388,927					355	15,846,684
20-24	3,122	138,338,961	1	45,283	1,910	102,396,484	228	11,037,099	357	24,029,783	2	73,858	5,620	275,921,468
25-29	5,403	283,031,088			2,089	123,389,778	288	16,799,195	479	34,810,124	1	47,402	8,260	458,077,587
30-34	5,018	294,198,359			1,230	78,868,764	257	16,921,066	277	21,245,776	1	64,109	6,783	411,298,074
35-39	4,326	271,407,792			821	56,411,512	224	15,260,574	93	7,498,327			5,464	350,578,205
40-44	4,159	272,315,173	2	134,293	658	47,395,004	189	14,181,389	54	4,505,857			5,062	338,531,716
45-49	3,555	237,201,206	2	147,253	465	33,779,543	165	12,587,492	29	2,346,159			4,216	286,061,653
50-54	3,015	204,605,351	13	991,698	296	21,490,602	119	9,274,179	51	4,566,550			3,494	240,928,380
55-59	1,949	127,955,475	3	245,832	154	11,077,878	60	4,494,916	26	2,495,725			2,192	146,269,826
60-64	724	47,577,794	1	76,634	56	4,032,884	18	1,157,939	2	235,240			801	53,080,491
65-69	62	3,591,116			3	201,595	6	407,812					71	4,200,523
70 & Over														
Total	31,505	$ 1,886,895,821	22	$ 1,640,993	7,856	$ 487,828,295	1,563	$ 102,510,588	1,368	$ 101,733,541	4	$ 185,369	42,318	$ 2,580,794,607
Avg. Salary		$ 59,892		$ 74,591		$ 62,096		$ 65,586		$ 74,367		$ 46,342		$ 60,986
Avg. Age		37.99		49.94		31.63		35.99		30.05		27.27		36.48
Percent Male		41%		86%		72%		63%		90%		100%		49%

Retirement – Tier One

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates for Regular Formula Employees		
Age	Males	Females
50	15.00%	30.00%
51	24.00%	30.00%
52	25.00%	30.00%
53	27.00%	26.00%
54	25.00%	26.00%
55	22.00%	24.00%
56	20.00%	22.00%
57	18.00%	18.00%
58	18.00%	18.00%
59	18.00%	18.00%
60	13.00%	18.00%
61	12.00%	12.50%
62	18.00%	20.00%
63	17.00%	18.00%
64	16.00%	16.00%
65	22.50%	25.00%
66	22.50%	25.00%
67	22.50%	25.00%
68	22.50%	25.00%
69	20.00%	22.00%
70	20.00%	22.00%
71	20.00%	22.00%
72	20.00%	22.00%
73	20.00%	22.00%
74	20.00%	22.00%
75	100.00%	100.00%

Early Retirement Rates for Regular Formula Employees		
Age	Males	Females
55	2.50%	2.50%
56	3.50%	3.00%
57	4.50%	4.00%
58	4.50%	5.00%
59	4.50%	6.00%

Retirement Rates for Alternative Formula Employees				
	Eligible for Alternative Formula Benefits Only		Eligible for Regular Formula Benefits Only	
Age	Males	Females	Males	Females
50	55.00%	41.50%	N/A	N/A
51	50.00%	37.00%	N/A	N/A
52	40.00%	25.00%	N/A	N/A
53	40.00%	30.00%	N/A	N/A
54	40.00%	32.00%	N/A	N/A
55	40.00%	40.00%	N/A	N/A
56	30.00%	30.00%	N/A	N/A
57	27.00%	25.00%	N/A	N/A
58	27.00%	27.00%	N/A	N/A
59	27.00%	27.00%	N/A	N/A
60	30.00%	27.00%	4.00%	7.00%
61	30.00%	25.00%	4.00%	6.00%
62	30.00%	25.00%	7.00%	12.00%
63	30.00%	25.00%	7.00%	12.00%
64	30.00%	30.00%	11.00%	15.00%
65	35.00%	40.00%	15.00%	15.00%
66	35.00%	40.00%	20.00%	15.00%
67	35.00%	40.00%	25.00%	20.00%
68	35.00%	40.00%	18.00%	30.00%
69	35.00%	40.00%	18.00%	30.00%
70	35.00%	40.00%	18.00%	30.00%
71	35.00%	40.00%	18.00%	30.00%
72	50.00%	50.00%	100.00%	100.00%
73	50.00%	50.00%	100.00%	100.00%
74	50.00%	50.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%

Assets

Assets available for benefits are determined as described on page 55 of the valuation report. The asset valuation method is prescribed by statute, and does not appear to allow a corridor; therefore, a corridor has not been established.

Expenses

As estimated and advised by SERS staff, based on current expenses and are expected to increase in relation to the projected capped payroll.

Spouse's Age

The female spouse is assumed to be three years younger than the male spouse for active member valuation purposes.

Children

It is assumed that married members have 2.2 children, one year apart in age.

The age of the youngest child of a deceased employee at his date of death is assumed to be as follows:

Age at Death of Employee	Age of Youngest Child	Age at Death of Employee	Age of Youngest Child
20	2	40	6
25	3	45	8
30	4	50	10
35	5	55	12
		60	14

Overtime and Shift Differentials

Reported earnings include base pay alone. It is assumed that overtime and shift differentials will increase total payroll by 3.5 percent over reported earnings.

Load for Inactive Members Eligible for Deferred Vested Pension Benefits

Load of 13 percent for Regular Formula members and 12 percent for Alternative Formula members. The load reflects a liability attributable to inactive members eligible for deferred vested pension benefits for potential increases in final average salary due to participation in a reciprocal system after termination.

Unused Sick Leave and Optional Service Purchases

Current and future active member's service is increased 5.0 months to account for increases of service at retirement due to converting unused sick leave and vacation days and purchasing applicable optional service.

Missing Data

If year-to-date earnings were not available, then the monthly pay rate is used. If both year-to-date earnings and the monthly pay rate are not available, the annual rate of pay is assumed to be the rate of pay for the population as a whole on the actuarial valuation date. For members with less than a year of service, the annual rate of pay is based on the greater of year-to-date earnings or annualized pay rate. If a birth date was not available, the member was assumed to be age 35.

Decrement Timing

All decrements are assumed to occur mid-year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Disability and turnover decrements do not operate after a member reaches retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Assumptions as a Result of Public Act 96-0889 Adopted June 30, 2016

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Members hired after December 31, 2010, eligible for the regular formula benefits will retire according to the following age-based retirement rates:

Retirement Rates for Regular Formula Employees			
Age	Employees Eligible For Normal Retirement	Age	Employees Eligible For Early Retirement
67	50.00%	62	10.00%
68	30.00%	63	10.00%
69	30.00%	64	10.00%
70	30.00%	65	20.00%
71	20.00%	66	20.00%
72	20.00%		
73	20.00%		
74	20.00%		
75	100.00%		

Members hired after December 31, 2010, eligible for the alternative formula benefits will retire according to the following age-based retirement rates:

Retirement Rates for Alternative Formula Employees Tier 2 Members		
Age	Males	Females
60	50.00%	50.00%
61	25.00%	30.00%
62	25.00%	35.00%
63	30.00%	30.00%
64	30.00%	35.00%
65	25.00%	45.00%
66	25.00%	45.00%
67	25.00%	45.00%
68	25.00%	45.00%
69	35.00%	45.00%
70	40.00%	45.00%
71	40.00%	45.00%
72	50.00%	50.00%
73	50.00%	50.00%
74	50.00%	50.00%
75+	100.00%	100.00%

Illustrative rates of withdrawal from the plan are as follows for members hired after December 31, 2010:

Service Based Withdrawal - Tier 2 Members				
Service (End of Year)	Regular Formula Employees		Alternative Formula Employees	
	Males	Females	Males	Females
1	0.3500	0.2800	0.1000	0.1400
2	0.1650	0.1600	0.0850	0.1000
3	0.0550	0.0800	0.0700	0.0800
4	0.0550	0.0700	0.0600	0.0800
5	0.0500	0.0650	0.0500	0.0600
6	0.0450	0.0550	0.0400	0.0550
7	0.0450	0.0500	0.0400	0.0500
8	0.0450	0.0400	0.0300	0.0400
9	0.0350	0.0350	0.0200	0.0300
10	0.0350	0.0350	0.0200	0.0300
11	0.0350	0.0350	0.0175	0.0200
12	0.0350	0.0350	0.0175	0.0200
13	0.0250	0.0350	0.0150	0.0175
14	0.0250	0.0250	0.0150	0.0175
15	0.0250	0.0250	0.0150	0.0175
16	0.0250	0.0250	0.0150	0.0175
17	0.0250	0.0250	0.0150	0.0150
18	0.0250	0.0250	0.0150	0.0150
19	0.0250	0.0250	0.0150	0.0150
20	0.0250	0.0250	0.0150	0.0150
21	0.0250	0.0250	0.0150	0.0150
22	0.0250	0.0250	0.0150	0.0150
23	0.0250	0.0250	0.0150	0.0150
24	0.0250	0.0250	0.0150	0.0150
25	0.0225	0.0250	0.0150	0.0125
26	0.0225	0.0250	0.0150	0.0125
27	0.0225	0.0250	0.0150	0.0125
28	0.0225	0.0250	0.0150	0.0125
29	0.0225	0.0250	0.0150	0.0125
30+	0.0225	0.0250	0.0150	0.0125

State Contributions under P.A. 93-0002

In general, for each year during the life of the GOB program, the state contributions to the System are to be calculated as follows:

1. Calculation of the contribution maximum
    a. A projection of contributions will be made from the actuarial valuation date to June 30, 2045. Such projection will be based on hypothetical asset values determined using the following assumptions:
        i) That the System had received no portion of the general obligation bond proceeds in excess of the scheduled contributions for the remainder of fiscal 2003 and for the entirety of 2004,
        ii) That the hypothetical state contributions had been made each fiscal year from 2005 through the actuarial valuation date, based on the funding process in place prior to P.A. 93-0002 (without regard to prior state minimum requirements),
        iii) That the actual amounts of member contributions and the actual cash outflows (benefit payments, refunds and administrative expenses) for each year prior to the actuarial valuation date were realized, and
        iv) That the hypothetical fund earned returns in each prior fiscal year equal to the rate of total return actually earned by the retirement fund in that year.
    b. The hypothetical asset values developed in a., above, will not exceed the actual assets of the fund.
    c. A projection of maximum contributions for each year of the GOB program will be performed each year, by reducing the contributions produced in a., above, by the respective amount of debt service allocated to the System for each year.
2. Calculation of the contribution with GOB proceeds
    a. The basic projection of state contributions from the actuarial valuation date through June 30, 2045, will be made, taking into account all assets of the System, including the GOB proceeds.
    b. State contribution rates (expressed as a percentage of covered pay), in the pattern required by the funding sections of the statutes, are calculated.
    c. In those projections, the dollars of state contributions which are added to assets each year during the GOB program are limited by the contribution maximum. Because the bonds are to be liquidated by the end of fiscal 2033, there is no contribution maximum thereafter.

State Contributions under P.A. 94-0004

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/14-108.3 (f)-(g):

> (f) The System shall determine the amount of the increase in the present value of future benefits resulting from the granting of early retirement incentives under this Section and shall report that amount to the Governor and the Commission on Government Forecasting and Accountability on or after the effective date of this amendatory Act of the 93rd General Assembly and on or before November 15, 2004. Beginning with State fiscal year 2008, the increase reported under this subsection (f) shall be included in the calculation of the required State contribution under Section 14-131.
>
> (g) In addition to the contributions otherwise required under this Article, the State shall appropriate and pay to the System an amount equal to $70,000,000 in State fiscal years 2004 and 2005.

State Contributions under P.A. 96-0043

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/14-131:

> (g) For purposes of determining the required State contribution to the System, the value of the System's assets shall be equal to the actuarial value of the System's assets, which shall be calculated as follows:
>
> > As of June 30, 2008, the actuarial value of the System's assets shall be equal to the market value of the assets as of that date. In determining the actuarial value of the System's assets for fiscal years after June 30, 2008, any actuarial gains or losses from investment return incurred in a fiscal year shall be recognized in equal annual amounts over the five-year period following that fiscal year.
>
> (h) For purposes of determining the required State contribution to the System for a particular year, the actuarial value of assets shall be assumed to earn a rate of return equal to the System's actuarially assumed rate of return.

State Contributions under P.A. 100-0023

Public Act ("P.A.") 100-0023, effective July 6, 2017, modified the State's funding policy to include smoothing State contribution rate increases or decreases due to changes in actuarial assumptions, including investment return assumptions, over a five-year period in equal annual amounts beginning in fiscal year 2018. In addition, changes in actuarial or investment assumptions that increased or decreased the State contribution rate in fiscal years 2014 through 2017 are to be smoothed over a five-year period in equal annual amounts, applying only to the portion of the five-year phase-in that is applicable to fiscal years on and after 2018.

Following the preceding legislation, we have calculated the required contribution, the results are shown in the summary section of this report.

Phase-in of the Financial Impact of Assumption Changes

Following is a table with the recognition schedule for the phase-in of actuarial assumption changes required under Public Act 100-0023. The following actuarial assumption changes were made:

1. Beginning with the June 30, 2016, actuarial valuation, there were changes to the economic and demographic assumptions.
2. Beginning with the June 30, 2018, actuarial valuation, there were changes to the economic assumptions.
3. Beginning with the June 30, 2019, actuarial valuation, there were changes to the economic and demographic assumptions.
4. Beginning with the June 30, 2021, actuarial valuation, there were changes to the demographic assumptions.
5. Beginning with the June 30, 2022, actuarial valuation, there were changes to the economic and demographic assumptions.
6. Beginning with the June 30, 2024, actuarial valuation, there were changes to the demographic assumptions.
7. Beginning with the June 30, 2024, actuarial valuation, there were changes to the economic and demographic assumptions due to an experience review. [a]

Valuation Year Ending June 30,	2020	2021	2022	2023	2024	2024	2025	2026	2027	2028
Applicable Fiscal Year Ending June 30,	2022	2023	2024	2025	2026	2026	2027	2028	2029	2030
					$ in Millions After Impact of GOB Proceeds					
Contribution Before Assumption Change										
(1) Contribution Dollar	$ -	$ 2,485.315	$ 2,517.699	$ -	$ 2,598.201	$ 2,596.542				
(2) Contribution Rate	0.000%	51.030%	51.117%	0.000%	44.321%	44.293%				
Contribution After Assumption Change										
(3) Contribution Dollar	$ -	$ 2,483.184	$ 2,435.839	$ -	$ 2,596.542	$ 2,651.171				
(4) Contribution Rate	0.000%	50.986%	49.527%	0.000%	44.293%	45.022%				
(5) Assumption Change Impact as a Percentage of Capped Payroll [(4) - (2)]	0.000%	-0.044%	-1.590%	0.000%	-0.028%	0.729%				
(6) Assumption Change Impact Recognized This Year (5-year Recognition)										
(6a) From This Year	0.000%	-0.009%	-0.318%	0.000%	-0.006%	0.140%				
(6b) From One Year Ago	-0.015%	0.000%	-0.009%	-0.318%	0.000%	0.000%	0.140%			
(6c) From Two Years Ago	0.077%	-0.015%	0.000%	-0.009%	-0.318%	-0.318%	0.000%	0.140%		
(6d) From Three Years Ago	0.000%	0.077%	-0.015%	0.000%	-0.009%	-0.009%	-0.318%	0.000%	0.140%	
(6e) From Four Years Ago	1.412%	0.000%	0.077%	-0.014%	0.000%	0.000%	-0.008%	-0.318%	0.000%	0.141%
(6f) Total Recognized Assumption Change Impact	1.474%	0.053%	-0.265%	-0.341%	-0.333%	-0.187%	-0.186%	-0.178%	0.140%	0.141%

[a] *The June 30, 2024, phase-in adjustments for the change in assumptions due to the experience review study will be re-measured as of June 30, 2025, and will become effective beginning with the June 30, 2025, actuarial valuation.*