Georgia Judicial Retirement System

Experience Study for the Five-Year Period Ending June 30, 2024

Submitted: December 4, 2025

CavMac
Actuarial Consulting Services

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Board of Trustees
Georgia Judicial Retirement System
Suite 400, Two Northside 75
Atlanta, GA 30318

Members of the Board:

We are pleased to submit the results of an investigation of the economic and demographic experience for the Georgia Judicial Retirement System. The investigation has been made in accordance with Section 47-3-23(b) of the retirement law which provides that at least once in every five-year period, the actuary shall make an actuarial investigation into the mortality, service and compensation experience of the members and beneficiaries of the Retirement System. The purpose of the investigation is to assess the reasonability of the actuarial assumptions and methods currently used by the Retirement System. This investigation covers the five-year period from July 1, 2019 to June 30, 2024. As a result of this investigation, it is recommended that revised demographic tables be adopted by the Board for future use. We also recommend a change to the COLA assumption. We do not recommend any other changes to the economic assumptions and methods from the 2024 valuation.

The investigation of the demographic experience of members of the System includes all active and retired members as well as beneficiaries of deceased members. The experience was investigated separately for males and females where gender is a basis for material differences in experience.

The number of members expected to separate from active service, the expected rates of salary increase, and the expected number of post-retirement deaths were obtained by use of the rates determined in the last experience investigation and adopted by the Board of Trustees. The results of the investigation indicate that the assumed rates of separation from active service due to withdrawal, disability, death and retirement and rates of post-retirement mortality need revision in order to provide a better fit between the actual and anticipated experience of the Retirement System. As a result of the investigation, new withdrawal, disability, retirement and mortality tables have been developed which reflect more closely the actual experience of the membership.

All new assumptions are shown in the attached tables throughout the report. In the actuary's judgment, the recommended assumptions are suitable for use until further experience indicates that modifications are desirable.

In order to prepare the measurement of the impact on liabilities in this report, we have utilized actuarial models that we developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

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

We further certify that, in our opinion, the assumptions developed in this report satisfy Actuarial Standards of Practice, in particular, No. 27 (Selection of Assumptions for Measuring Pension Obligations).

We note that as we prepare this report, the world has been in a pandemic during much of the experience study period. We have taken this into consideration as we reviewed the experience, particularly regarding mortality, retirement, termination, disability, and salary increase patterns. While we do not believe that there is yet sufficient data to warrant the significant modification of any of our assumptions specifically due to COVID-19, we will continue to monitor the emerging data and advise the Board in the future of any adjustments that we believe would be appropriate.

The experience investigation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. Edward Koebel and Ben Mobley meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Edward J. Koebel, FCA, EA, MAAA
Chief Executive Officer

Ben Mobley, ASA, FCA, MAAA
Consulting Actuary

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SECTION I – EXECUTIVE SUMMARY

The purpose of an actuarial valuation is to provide the best estimate of the expected future costs of a retirement system. An actuarial valuation for the Georgia Judicial Retirement System (System) is prepared annually to determine the actuarial contribution rates required to fund the system on an actuarial reserve basis (i.e., the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the system). The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of investment return, death, termination of employment, retirement age, and salary changes to estimate the obligations of the system.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have adequately anticipated the actual emerging experience. This information, along with the professional judgment of System personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to recognize that actual experience is reported in the short term while assumptions are intended to be long-term estimates of experience. Therefore, actual experience is expected to vary from study period to study period, without necessarily indicating a change in assumptions is needed.

CavMac has performed a study of the experience of the System for the five-year period ending June 30, 2024. This report presents the results, analysis, and resulting recommendations of our study. It is anticipated that the changes, if approved, will first be reflected in the June 30, 2025 actuarial valuation.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Actuarial Standards of Practice adopted by the Actuarial Standards Board (ASB). While the recommended assumptions represent our best estimate of future experience, there are other reasonable assumption sets that could be supported by the results of this experience study. Those other sets of reasonable assumptions could produce liabilities and costs that are either higher or lower.

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process, and differences between actuaries in this area are generally minor. However, the setting of assumptions differs, as it is more art than science. In this report, we have recommended changes to certain assumptions. To explain our thought process, we offer a brief summary of our philosophy:

- **Do Not Overreact**: When we see significant changes in experience, we generally do not adjust our rates to reflect the entire degree of difference. We will typically recommend rates somewhere between the old rates and the new experience. If the experience during the next study period shows the same result, we will probably recognize the trend at that point in time or at least move further in the direction of the observed experience. On the other hand, if experience returns closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.

- **Anticipate Trends**: If there is an identified trend that is expected to continue, we believe that this should be more fully recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.

- **Simplify**: In general, we attempt to identify which factors are significant and eliminate or ignore the ones that do not materially improve the accuracy of the liability projections.

The following summarizes the findings and recommendations with regard to the assumptions utilized for the plan. Detailed explanations for the recommendations are found in the sections that follow.

Recommended Economic Assumptions

Economic assumptions are some of the most visible and significant assumptions used in the valuation process. The items in the broad economy modeled by these assumptions can be very volatile over short periods of time, as clearly seen in the economic recovery from the pandemic in 2021 followed by the downward trend in global markets in 2022. Our goal is to focus on the emerging long-term trends in the midst of this volatility so that we can then apply reasonable assumptions.

Most of the economic assumptions used by actuaries are developed through a building-block approach. For example, the expected return on assets is based on the expectation for inflation plus the expected real return on assets. As this is usually the most significant source of annual gains and losses to a mature pension plan, it is important that each of these components, inflation and real return, are primarily based on long-term future expectation and not the short-term historical performance.

At the core of the economic assumptions is the inflation assumption. As we discuss later in the report, although the plan has experienced higher than normal inflation recently due to the recovery from the pandemic, we believe that long-term inflation will settle back down in the pre-pandemic 2.50% range. Therefore, **we are recommending that the price inflation assumption be maintained at 2.50%**.

We are recommending that the long-term expected return on assets assumption remain at 7.00%, reflecting the 2.50% inflation assumption and a 4.50% real rate of return assumption. This will be discussed in detail later in this report, but a real rate of return of 4.50% is supported by the forecasting models developed using the Department of Investment Services (DIS) capital market assumptions and the System's target asset allocation. Further analysis of the 41 sets of capital market assumptions included in the Horizon Actuarial Services, LLC. Survey conducted in 2025 and the System's target asset allocation also support this recommendation.

We are also recommending that the general wage inflation assumption be set at a rate of 3.00%. Although there have been higher rates of wage inflation in the last two years, it is primarily attributable to higher-than-expected inflation rather than the real (above price inflation) rate of wage increases.

We are also recommending that the annual Cost-of-Living Adjustment (COLA) assumption be set at 1.20% annually. There is currently no annual COLA assumption for JRS. However, in recent years, the JRS Board has based its COLA recommendation for JRS retirees on the same formula that is utilized and outlined in the ERS Funding Policy. It is our understanding that this methodology shall continue in the future. Therefore, based on stochastic modeling analysis using current JRS funding projections, we believe this assumption should be set at 1.20% annually.

Actuarial Methods

The basic actuarial methodologies used in the valuation process include the:

- Actuarial Cost Method
- Asset Valuation Method
- Amortization Method

Based on our review, discussed in full detail in Section IV of this report, we recommend no changes in these actuarial methods at this time.

Recommended Demographic Assumption Changes

In the experience study, actual demographic experience for the study period is compared to that expected based on the current actuarial assumption. Comparing the actual incidence of the event to what was expected (called the Actual-to-Expected ratio, or A/E ratio) then provides the basis for our analysis.

Mortality is perhaps the most important demographic assumption when valuing the liabilities of a pension plan. The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying in recent years. There have been significant improvements in longevity in the past, although there are different opinions about future expectations. We believe it is prudent to anticipate that this trend will continue to some degree in the future.

Plans currently reflect mortality improvements with the use of a generational mortality approach. This approach directly anticipates future improvements in mortality by using a different set of mortality rates for each year of birth, with the rates for later years of birth assuming lower mortality rates than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2045 has a longer life expectancy than a member who turns age 65 in 2025. When using generational mortality, the A/E ratios for the observed experience are set near 100% since future mortality improvements will be taken into account directly in the actuarial valuation process.

The current mortality assumptions are based on the Pub-2010 family of mortality tables using a generational mortality approach as described above. The Society of Actuaries (SOA) published these mortality tables in 2019 which were developed exclusively from public sector retirement system experience. There was an update to these tables in 2025 called the Pub-2016 family of mortality tables. Since the System has minimal mortality experience, we recommend that the rates of mortality be revised to the same mortality tables used

for the Employees' Retirement System of Georgia. **Therefore, we are recommending changes to this new family of mortality tables. We are also recommending change to the most recent mortality improvement scale, MP-2021. These published mortality tables will be discussed in the demographic section of this report.**

The following is a list of other recommended changes to the demographic assumptions for the System.

Assumption	Recommended Change
Retirement	Recommend changes to the rates of retirement to better anticipate retirement patterns in the future
Disability	Recommend lowering current assumption due to no disability retirements during the study period
Withdrawal	Recommend increasing rates of withdrawal and splitting into service categories (under 10 years of service and 10 or more years of service)
Salary Scale	Recommend no change to current assumption

Section V of this report provides additional details of these recommended demographic changes.

Recommended Other Assumption and Method Changes

The table below lists the other assumptions and methods that are considered in our valuations that should be reviewed during the experience study.

Assumption or Method	Recommended Change
Administrative Expenses	Recommend change to current assumption from 1.35% of payroll to 1.50% of payroll
Option Factors	Recommend change in current option factors to reflect change in mortality table
Percent Married	Recommend no change to current assumption
Spousal Age Difference	Recommend no change to current assumption

Section VI of this report provides additional details of these recommended changes.

SECTION II – FINANCIAL IMPACT

Although the assumption changes, if approved, will first be reflected in the June 30, 2025 valuation, we have provided the following table which highlights the impact of the recommended changes on the unfunded accrued liability (UAL), amortization period, actuarially determined employer contribution (ADEC), and funded ratio based on the June 30, 2024 valuation results.

Impact on Principal Valuation Results ($1,000s)		
	Valuation Results 2024	**Recommended Assumptions**
Unfunded Accrued Liability (UAL)	($27,413)	$14,979
Funded Ratio	105.0%	97.5%
Blended Amortization Period (in years)	9.9	20
Actuarially Determined Employer Contribution		
Normal Rate*	14.08%	15.81%
Unfunded Accrued Liability Rate	(4.98)%	2.07%
Total Rate	9.10%	17.88%

*Includes administrative expenses

SECTION III – ECONOMIC ASSUMPTIONS

There are three economic assumptions used in the actuarial valuations performed for the System. They are:

- Price Inflation
- Investment Return
- Wage Inflation

Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Assumptions for Measuring Pension Obligations,"* provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans and was revised in January 2025. The revised standard now requires that each economic assumption selected by the actuary should be reasonable which means it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has 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 and disclosed, or when alternative assumptions are used for the assessment of risk.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

As part of our analysis for the actuarial assumptions used in the Governmental Accounting Standards Board (GASB) No. 67 report as of June 30, 2025, we reviewed the System's economic assumptions and found them to be reasonable. We have included most of that analysis of the System's economic assumptions in this report and recommend no further revisions at this time.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27, as revised in January 2025. The following table shows our recommendation followed by detailed discussions of each assumption.

SECTION III – ECONOMIC ASSUMPTIONS

Item	Current	Proposed
Price Inflation	2.50%	2.50%
Real Rate of Return	4.50%	4.50%
Investment Return	7.00%	7.00%
Price Inflation	2.50%	2.50%
Real Wage Growth	0.50%	0.50%
Wage Inflation	3.00%	3.00%

SECTION III – ECONOMIC ASSUMPTIONS

Price Inflation

Background: Assumed price inflation is used as the basis for both the investment return assumption and the wage inflation assumption. These latter two assumptions will be discussed in detail in the following sections.

It is important that the price inflation assumption be consistently applied throughout the economic assumptions utilized in an actuarial valuation. This is called for in ASOP No. 27 and is also required to meet the parameters for determining pension liabilities and expenses under Governmental Accounting Standards Board (GASB) Statements No. 67 and 68.

The current price inflation assumption is 2.50% per year.

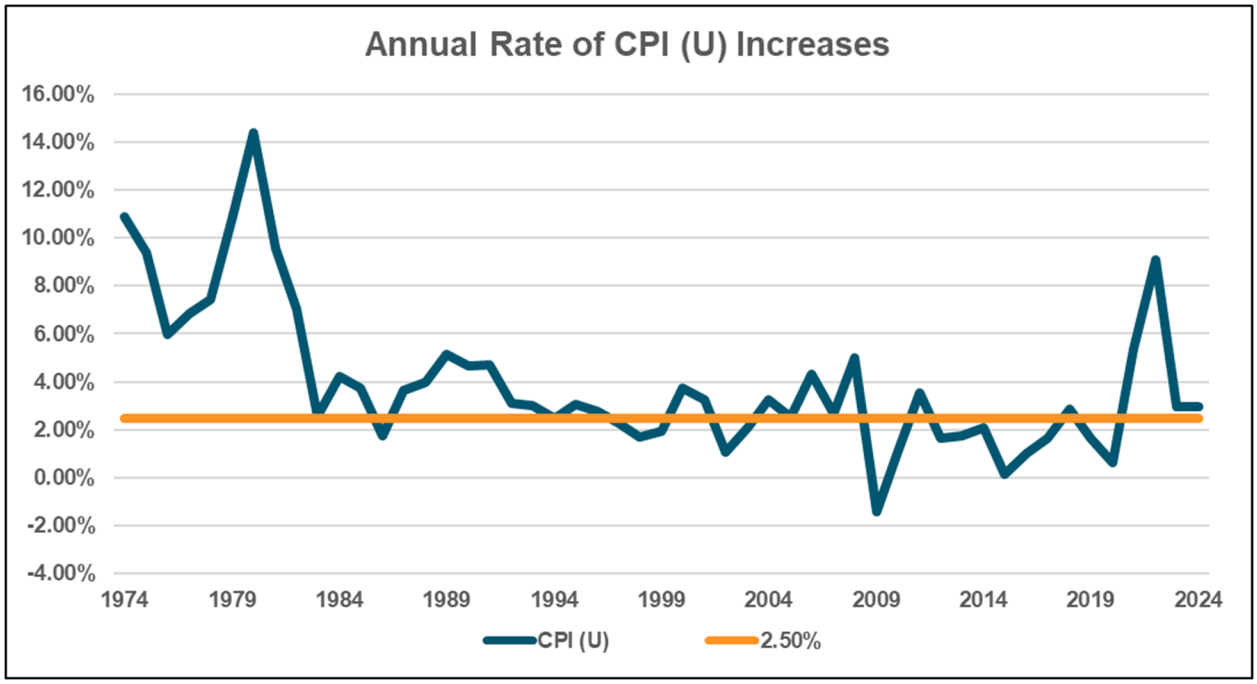
Past Experience: The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The level of that index in June of each of the last 50 years is provided in Appendix A.

In analyzing this data, annual rates of inflation have been determined by measuring the compound growth rate of the CPI (U) over various time periods. The results are as follows:

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1934 – 2024	90	3.59%	3.39%
1974 – 2024	50	3.79%	2.94%
1984 – 2024	40	2.81%	1.75%
1994 – 2024	30	2.54%	1.86%
2004 – 2024	20	2.55%	2.23%
2014 – 2024	10	2.80%	2.66%

The graph below shows the annual increases in the CPI (U) over the 50-year period (1974-2024) compared to the 2.50% currently assumed.

SECTION III – ECONOMIC ASSUMPTIONS



As can be seen from the table on the previous page, over the last 30 years, the average annual rate of increase in the CPI-U has been just over 2.50%. The higher annual rates from 2021 and 2022 have increased this average.

Forecasts

Based upon information contained in the "Survey of Professional Forecasters" for the third quarter of 2025 as published by the Philadelphia Federal Reserve Bank, the median expected annual rate of inflation for the next ten years is 2.31%. Although 10 years of future expectation is too short of a period for the basis of our inflation assumption, the information does provide some evidence that the consensus expectations of these experts are for rates of inflation very close to our current assumption of 2.50% for the near-term future.

The latest forecast from the National Association for Business Economics (NABE) released in August 2025 shows its members largely agree that the Personal Consumption Expenditures Price Index (PCE) will not hit the 2.00% target before 2027.

The spread between the yield on treasury securities (bonds) and the inflation indexed yield on Treasury Inflation Protected Securities (TIPS) of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity.

The table below provides the breakeven rates of inflation as of the beginning of October 2025.

Years to Maturity	Breakeven Rate of Inflation
10	2.35%
20	2.42%
30	2.23%

The bond market's expectation for the rate of inflation over the 30-year period is 2.23% which is lower than 30-year historical annualized rates and the current 2.50% assumed rate of inflation.

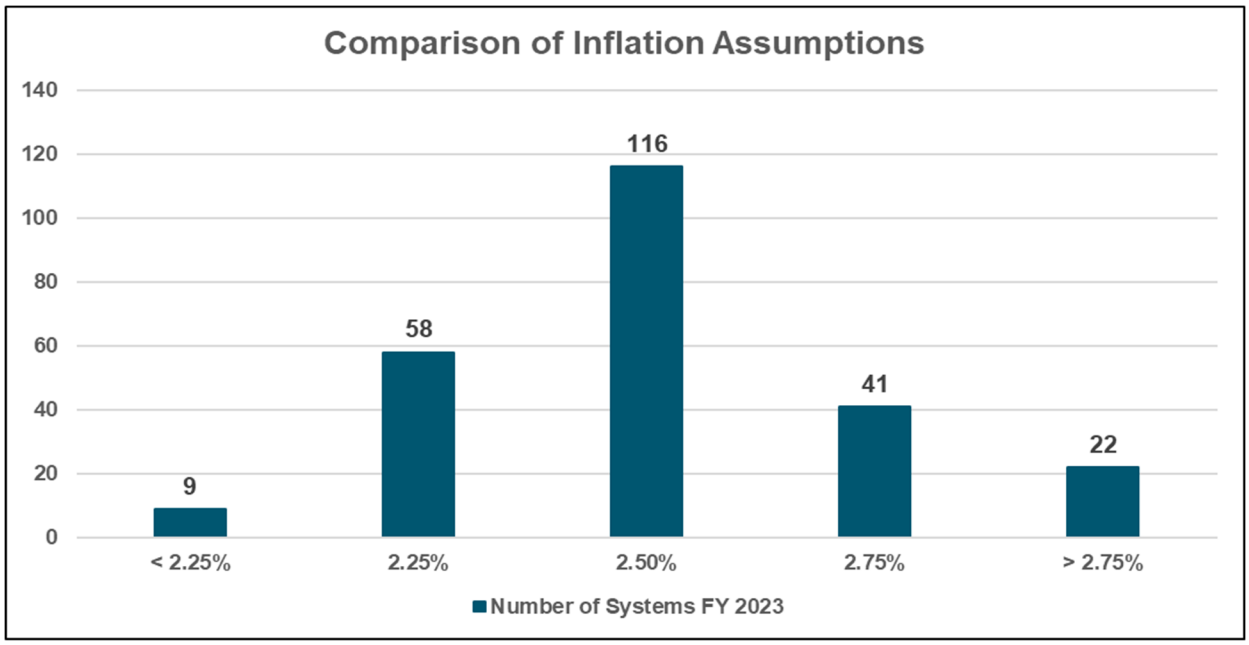
Social Security Administration

Although many economists forecast lower inflation than the assumption used by most retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2025 annual report, the projected ultimate average annual increase in the CPI over the next 75 years was estimated to be 2.40%, under the intermediate (best estimate) cost assumption. The range of inflation assumptions used in the Social Security 75-year modeling, which includes a low and high-cost scenario, in addition to the intermediate cost projection, was 1.80% to 3.00%. These rates remained unchanged from their 2024 annual report.

Peer Comparison

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. The following chart shows the inflation rate assumptions of 246 plans in the Public Plan Database of the Center for Retirement Research. Based on the current data, the average inflation assumption is 2.52%. The assumptions are from actuarial valuations reported in FYE 2023. Although inflation has spiked recently, we have not seen a reversal of this trend and expect most systems to take a wait-and-see approach.

SECTION III – ECONOMIC ASSUMPTIONS



Recommendation

It is difficult to predict inflation accurately. Inflation's short-term volatility is illustrated by comparing its average rate over the last 10 and 50 years. Although the 10-year average of 2.80% is closer to the System's assumed rate of 2.50%, the longer 50-year average of 3.79% is much higher and it includes the very high rates of inflation from the late 1970s and early 1980s.

Although we have experienced rather high inflation in 2021 and 2022 due to the recovery from the COVID-19 pandemic, current economic forecasts suggest annual inflation rates closer to 2.50% over the short-term and long-term. We concur with these forecasts and recommend maintaining the inflation assumption for the System at 2.50%.

Price Inflation Assumption	
Current	2.50%
Recommended	2.50%

SECTION III – ECONOMIC ASSUMPTIONS

Investment Rate of Return

Background: The assumed investment return is one of the most significant assumptions in the annual actuarial valuation process as it is used to discount the expected benefit payments for all active, inactive and retired members of the System. Minor changes in this assumption can have a major impact on valuation results. The investment return assumption should reflect the asset allocation target for the funds set by the Board of Trustees.

The current assumption is 7.00%, consisting of a price inflation assumption of 2.50% and a real rate of return assumption of 4.50%. The return is net of investment expenses.

Long Term Perspective: Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon in order to make prudent choices regarding how to invest the trust funds. For actuarial calculations, we typically consider very long periods of time. For example, a newly hired employee who is 25 years old may work for 35 years, to age 60, and live another 30 years, to age 90 (or longer). The retirement system would receive contributions for the first 35 years and then pay out benefits for the next 30 years. During the entire 65-year period, the system is investing assets related to the member. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open, ongoing system like this Plan, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in the time horizon used by actuaries and investment consultants is frequently a source of debate and confusion when setting economic assumptions.

Past Experience: The assets for the System are valued using a widely accepted asset-smoothing methodology (5-year smoothing) that fully recognizes the expected investment income and also recognizes 20% of each year's investment gain or loss (the difference between actual and expected investment income). The recent experience over the last five years is shown in the table below.

Year Ending 6/30	Actuarial Value	Market Value
2020	6.98%	5.41%
2021	12.35%	29.46%
2022	7.90%	-11.64%
2023	6.85%	11.16%
2024	8.43%	13.82%
Average	8.50%	9.64%

The impact of the asset smoothing method can be observed in the table. Although the average returns over the five-year period are very close, the return on actuarial value is, as expected, less variable. We also note, as provided by the guidance of the Actuarial Standards of Practice (ASOP), that historical returns over a short time period are not credible for the purpose of setting the long-term assumed future rate of return.

We next include in our analysis information concerning future expectations for the investment return assumption. We prefer to base our investment return assumption largely on the capital market assumptions utilized by the Board in setting investment policy and the System's asset allocation. The investment rate of return assumption has two component parts: the rate of price inflation and the real rate of investment return. This component approach is referred to as the building block method in ASOP No. 27. The price inflation component was discussed previously in this report; therefore, this section will focus on the real rate of investment return component.

Analysis: The current capital market assumptions and asset allocation as provided by the System investment staff, the Division of Investment Services (DIS), are shown in Appendix B. We further assumed that investment returns approximately follow a lognormal distribution with no correlation between years. The results below provide an expected range of real rates of return over up to a 50-year time horizon. Looking at one-year results produces an expected real return of 7.5% but also has a high standard deviation or measurement of volatility. By expanding the time horizon, the compound average return approaches the expected median of future real returns, and the volatility declines significantly. The following table provides a summary of results. The geometric real rates of return are net of investment expenses.

Time Span In Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	7.5%	14.1%	-14.0%	-2.4%	6.6%	16.4%	32.1%
5	6.8%	6.2%	-3.2%	2.5%	6.6%	10.8%	17.3%
10	6.7%	4.4%	-0.4%	3.6%	6.6%	9.6%	14.0%
20	6.6%	3.1%	1.6%	4.5%	6.6%	8.7%	11.8%
30	6.6%	2.5%	2.5%	4.9%	6.6%	8.3%	10.8%
50	6.6%	2.0%	3.4%	5.2%	6.6%	7.9%	9.8%

Based on this analysis the median (50th percentile) real rate of return over a 50-year period is 6.6%. It can also be anticipated that for the 10-year time span, 50% of the expected compound average real rates of return were between 3.6% and 9.6%. As the time span increases, this spread begins to narrow. Over a 50-year time span, the analysis indicates there is a 25% likelihood that real returns will average below 5.2% and a 25% likelihood they will be above 7.9%. In other words, 50% of the distribution of expected compound average real returns will be between 5.2% and 7.9%.

SECTION III – ECONOMIC ASSUMPTIONS

Using the building block approach of ASOP No. 27 and the projection results outlined above, we have determined a range for the investment return assumption of the 25th to 75th percentile real returns over the 50-year time span plus the recommended inflation assumption. The following table details the range.

Item	25th Percentile	50th Percentile	75th Percentile
Real Rate of Return*	5.2%	6.6%	7.9%
Inflation	2.5%	2.5%	2.5%
Net Investment Return	7.7%	9.1%	10.4%

* net of investment expenses

Based on the capital market assumptions provided by the System's investment experts, the median expected compound average return is 9.1% over a 50-year period. The current 7.00% assumed rate of return is approximately the 15th percentile of the distribution of expected average rate of returns over a 50-year period. Although not in the center of the recommended range, in our opinion a return of 7.00% is a reasonable expectation with a sufficient margin to account for adverse experience. It should be noted that the capital market assumptions of investment professionals will vary from year to year and can differ substantially from investment professional to investment professional. Different market expectations could impact the development of a recommended assumption.

For a broader view of expected returns, we also reviewed the 2025 Survey of Capital Market Assumptions produced by Horizon Actuarial Services, LLC to see what other investment professionals are currently using for capital market assumptions. The Horizon survey includes both 10-year horizon and 20-year horizon capital market assumptions of several investment consultants. Using the Board's current target asset allocation, we applied the same statistical analysis to these survey results as we did the capital market assumption of the investment staff with the following results for the 20-year horizon:

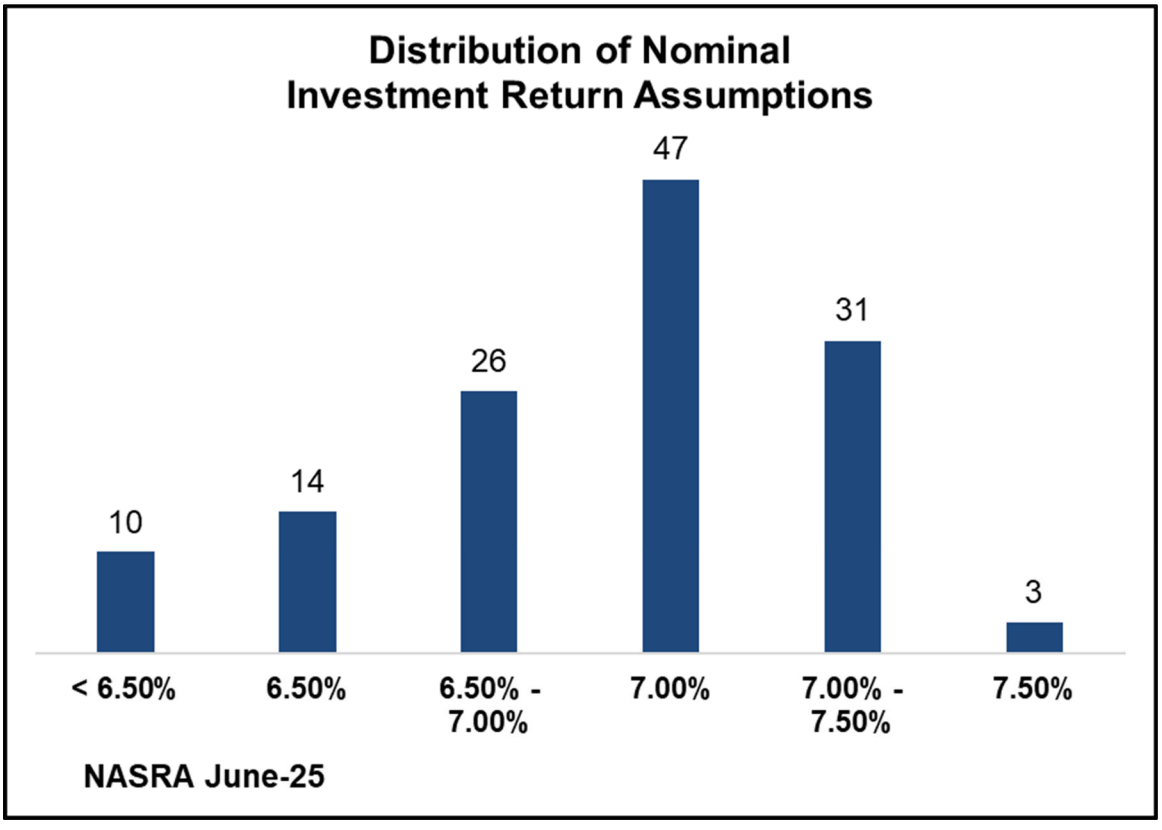
Time Span In Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	5.4%	12.4%	-13.7%	-3.3%	4.7%	13.3%	27.0%
5	4.8%	5.5%	-4.0%	1.0%	4.7%	8.5%	14.1%
10	4.8%	3.9%	-1.5%	2.1%	4.7%	7.4%	11.3%
20	4.7%	2.7%	0.3%	2.8%	4.7%	6.6%	9.3%
30	4.7%	2.2%	1.1%	3.2%	4.7%	6.2%	8.4%
50	4.7%	1.7%	1.9%	3.5%	4.7%	5.9%	7.6%

Again, using the building block approach and the Horizon projection results, the following shows the range for the investment return assumptions.

Item	25th Percentile	50th Percentile	75th Percentile
Real Rate of Return	3.5%	4.7%	5.9%
Inflation	2.5%	2.5%	2.5%
Net Investment Return	6.0%	7.2%	8.4%

Using this basis, the 7.00% is slightly below the median expected return over a 50-year period. We prefer the use of the capital market assumptions of the Board's investment professional, DIS, over the assumptions from a survey of several consultants which do not serve the Board since the survey assumptions were not the basis for the asset allocation decisions of the Board. By the guidance of the actuarial standards, we maintain a long-term perspective in setting all assumptions, especially the investment return assumption.

Peer Comparison: The following chart shows the nominal investment return assumptions of 131 plans in the National Association of State Retirement Administrators (NASRA). The assumptions shown below are as of June 2025 and are updated frequently by the NASRA staff.



SECTION III – ECONOMIC ASSUMPTIONS

Recommendation: By actuarial standards, we are required to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe actuaries must be careful not to let recent experience or short-term expectations excessively impact our judgment regarding the appropriateness of the current assumption over the long term.

There has been a significant trend in lowering the investment return assumption for pension plans across the country. According to the March 2025 NASRA Issue Brief, the median return assumption has decreased from 8.00% in 2010 to 7.00% in 2024. In addition, the capital market assumptions for investment consultants have bounced around quite a bit lately and have been historically lower than what they are today. We continue to favor an assumption which is less than the median rate of return based on current capital market assumptions for the longer timeframes and recommend no change to the current 7.00% annual rate of investment return assumption.

Below is a breakdown of the building block approach as recommended under ASOP No. 27.

Investment Return Assumption		
	Current	**Recommended**
Real Rate of Return*	4.50%	4.50%
Inflation	2.50%	2.50%
Net Investment Return	7.00%	7.00%

* net of investment expenses

Wage Inflation

Background

The wage inflation assumption is composed of the price inflation assumption and an assumption for the real rate of wage increases. The salary increase assumption combines the wage inflation assumption with an assumption for promotion and longevity, often called merit increases. Merit assumptions are generally age and/or service related and will be dealt with in the demographic assumption section of the report. The excess of wage growth over price inflation is also considered the increase in productivity that labor provides.

The current wage inflation assumption is 3.00%, which is made up of the price inflation of 2.50% and the real wage growth assumption of 0.50%.

Past Experience

The Social Security Administration publishes data on wage growth in the United States (see Appendix C). While this is the most comprehensive data available, it is based on all wage earners in the country so it can be influenced by the mix of jobs as well as by changes in certain sectors of the workforce that may not be seen by all segments.

As with our analysis of inflation, we provide below wage inflation and a comparison with price inflation over various time periods. Currently, this wage data is only available through calendar year 2023. We remove the rate of price inflation for each year from the data to result in the historical real rate of wage inflation.

Period	Wage Inflation	Price Inflation	Real Wage Growth
2013-2023	4.03%	2.79%	1.24%
2003-2023	3.41%	2.58%	0.83%
1993-2023	3.59%	2.51%	1.08%
1983-2023	3.76%	2.81%	0.95%
1973-2023	4.44%	3.86%	0.58%

Thus, over the last 50 years, annual real wage growth has averaged 0.58%.

Social Security Administration

The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In April of 2025, the annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.53%, 1.13% higher than the Social Security intermediate inflation assumption of 2.40% per year. The range of the assumed real wage inflation in the 2025 Trustees report was 0.53% to 1.73% per year.

Public Sector Compensation and Wages

The Bureau of Labor Statistics publishes the Employment Cost Index, including detail for real (net of inflation) total compensation and wages and salaries. Further, this index is also broken down for state and local government workers. From December 2005 through June 2025, total compensation grew at an annualized rate of 2.88%, while wages and salaries grew at a rate of 2.50% (inflation was 2.56% over the same period). This difference is a reflection that state and local government workers have had much of their compensation increase delivered through benefits rather than wages. While it is reasonable to anticipate that total compensation will continue to increase faster than wages, it is also reasonable to anticipate that the difference between the two will moderate over time.

Determination

The data the Social Security Administration collects is nationwide and predominantly from the private sector which includes many collectively bargained employees. It is questionable whether public sector employees can match the productivity rates of the private sector. As mentioned above, the wage growth assumption is used in combination with the merit increase assumption to create the salary increase assumption which is applied to individual pay increase. The merit increase assumption is outside the scope of this review. **Therefore, we have determined that the real wage growth inflation assumption should be maintained at 0.50% as a more conservative assumption and will be reviewed again in the next study.**

Wage Inflation Assumption		
	Current	**Proposed**
Price Inflation	2.50%	2.50%
Real Wage Growth	0.50%	0.50%
Wage Inflation	3.00%	3.00%

Cost-of-Living Adjustment (COLA) Assumption

In recent years, the JRS Board has based its COLA recommendation for JRS retirees on the same formula that is utilized and outlined in the ERS Funding Policy. It is our understanding that this methodology shall continue in the future. Therefore, beginning July 1, 2026 and each July 1 thereafter, a COLA increase will be determined as described in the Appendix of the new Board Funding Policy. There is no current COLA assumption for JRS.

For this study, we have analyzed this assumption based on the funding status of the System as of June 30, 2024 but including actual June 30, 2025 assets and the following parameters:

- For the actual fair value of asset returns, 1,000 30-year scenarios were simulated where annual returns were randomly sampled for each year of the projection period from a lognormal distribution of returns with a geometric mean return of 7.0% and an annual standard deviation of 12.4%.

- For the SSA OASDI COLA rate, 1,000 30-year scenarios were simulated where annual rates of change were randomly generated for each year of the projection period from a lognormal distribution with a geometric mean of 2.5% and an annual standard deviation of 1.0%.

- Simulated actuarial value of asset returns and System funded ratios were determined for each of the 1,000 annual scenarios for each year of the projection

- Simulated COLA rates were then developed following the procedure outlined in the Appendix of the Board Funding Policy and analyzed by calculating the average COLA rate over each 30-year scenario and then calculating the median average COLA rate over the 1,000 scenarios.

Based on the results of our analysis, we recommend that the COLA assumption be set at 1.20% annually.

SECTION IV – ACTUARIAL METHODS

Actuarial Cost Method

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. However, Governmental Accounting Standard Board (GASB) Statement Numbers 67 and 68 require that the Entry Age Normal cost method be used for financial reporting. Most systems do not want to use a different actuarial cost method for funding and financial reporting. In addition, the Entry Age Normal method has been the most common funding method for public systems for many years. This is the cost method currently used by the plan.

The rationale of the Entry Age Normal (EAN) cost method is that the cost of each member's benefit is determined to be a level percentage of their salary from date of hire to the end of their employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit that is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The Entry Age Normal accrued liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded accrued liability, the value of plan assets is subtracted from the Entry Age Normal accrued liability. The current year's cost to amortize the unfunded accrued liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as anticipated by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded accrued liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

Considering that the Entry Age Normal cost method is the most commonly used cost method by public plans, that it develops a normal cost rate that tends to be less volatile and is the required cost method under calculations required by GASB disclosures, **we recommend use of the Entry Age Normal actuarial cost method be continued.**

SECTION IV – ACTUARIAL METHODS

Actuarial Value of Assets

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value is often used to smooth out the volatility that is reflected in the market value of assets. This is because most employers would rather have annual costs remain relatively smooth, as a percentage of payroll or in actual dollars, as opposed to a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. The Actuarial Standards Board also has basic principles regarding the calculation of a smoothed asset value, Actuarial Standard of Practice No. 44 (ASOP 44), *Selection and Use of Asset Valuation Methods for Pension Valuations.*

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value, AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value, OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to manipulate annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

The 5-year phase-in methodology that JRS currently uses meets these rules and is, in fact, the most commonly used methodology for plans similar to JRS.

Currently, the actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value. **We recommend no change in this methodology.**

Amortization of the Unfunded Accrued Liability

The accrued liability is the portion of the actuarial present value of future benefits that is not included in future normal costs. Thus, it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded accrued liability (UAL) exists when the accrued liability exceeds the actuarial value of plan assets. These deficiencies can result from:

(i) plan improvements,
(ii) experience that is less favorable than expected, or
(iii) assumption changes that increase liabilities.

There are a variety of different methods that can be used to amortize the UAL. Each method results in a different payment stream and, therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization payment increases, and
- The number of components of UAL (separate amortization bases).

Amortization Period: The amortization period can be either closed or open. If it is a closed amortization period, the number of years remaining in the amortization period declines by one in each future year. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but is reset to the same number each year. This approach essentially "refinances" the System's debt (UAL) every year.

Amortization Payment: The level dollar amortization method is similar to the method in which a homeowner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on the amortization period until the liability is extinguished. This results in the liability steadily decreasing while the payments, though remaining level in dollar terms, in all probability decrease as a percentage of payroll. Even if a plan sponsor's population is not growing, inflationary salary increases will usually be sufficient to increase the aggregate covered payroll.

The rationale behind the level percentage of payroll amortization method is that since normal costs are calculated to be a constant percentage of pay, the unfunded accrued liability should be paid off in the same manner. When this method of amortizing the unfunded accrued liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method, but the payments increase at a fixed rate each year so that ultimately the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase at the same rate so that the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded accrued liability meaning that even if there are no experience losses, the dollar amount of the unfunded accrued liability will grow (called negative amortization). This is particularly true if the plan sponsor is paying off the unfunded accrued liability over a long period, such as 20 or more years.

SECTION IV – ACTUARIAL METHODS

Amortization Bases: The UAL can be amortized either as one single amount or as components or "layers", each with a separate amortization base, payment and period. If the UAL is amortized as one amount, the UAL is recalculated each year in the valuation and experience gains/losses or other changes in the UAL are folded into the single UAL amortization base. The amortization payment is then the total UAL divided by an amortization factor for the applicable amortization period.

If separate amortization bases are maintained, the UAL is composed of multiple amortization bases, each with its own payment schedule and remaining amortization period. In each valuation, the unexpected change in the UAL is established as a new amortization base over the appropriate amortization period beginning on that valuation date. The UAL is then the sum of all of the outstanding amortization bases on the valuation date and the UAL payment is the sum of all of the amortization payments on the existing amortization bases. This approach provides transparency in that the current UAL is paid off over a fixed period of time and the remaining components of the UAL are clearly identified. Adjustments to the UAL are also separately identified in each future year.

Currently, the amortization methodology is based on the level percentage of payroll amortization method for the System. In addition, we are amortizing the UAL as of June 30, 2013 (Transitional UAL) over a closed period equal to an amortization period of 20 years (it is 9 years as of June 30, 2024). In each subsequent valuation all benefit changes, assumption and method changes and experience gains and/or losses that have occurred since the previous valuation will determine a New Incremental UAL. Each New Incremental UAL will be amortized over a closed 20-year period from the date it is established. Any new incremental UAL attributable to the granting of any post-retirement benefit adjustment (PRBA) will be amortized over a closed 15-year period. The UAL will be amortized as a level dollar amount if the Funded Ratio is less than 100% or as a level percentage of payroll if the Funded Ratio is greater than 100%, over a period not to exceed 20 years.

We recommend continuation of these methodologies and assumptions.

SECTION V – DEMOGRAPHIC ASSUMPTIONS

There are several demographic assumptions used in the actuarial valuations performed for the Georgia Judicial Retirement System. They are:

- Rates of Withdrawal
- Rates of Disability Retirement
- Rates of Retirement
- Rates of Mortality
- Rates of Salary Increase

The Actuarial Standards Board has issued a revised Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Assumptions for Measuring Pension Obligations"* as of January 2025, which provides guidance to actuaries in selecting demographic assumptions for measuring obligations under defined benefit plans. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 27.

The purpose of a study of demographic experience is to compare what actually happened to the membership during the study period (July 1, 2019 through June 30, 2024) with what was expected to happen based on the assumptions used in the last five actuarial valuations.

Detailed tabulations by age, service and/or gender are performed over the entire study period. These tabulations look at all active and retired members during the period as well as separately annotating those who experience a demographic event, also referred to as a decrement. In addition, the tabulation of all members together with the current assumptions permits the calculation of the number of expected decrements during the study period.

Instead of relying entirely on the counts of actual and expected decrements, we utilized a weighted experience approach which better reflects the impact demographic experience has on liability measures. We weight decrements from active service with the monthly salary of the individual members and we weight the post-retirement mortality experience with the annual retirement benefits of the individuals. We still review the actual counts of actual and expected decrements, but it is used for informational purposes only.

If the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, gender, or service does not follow the expected pattern, new assumptions are recommended. Recommended changes usually do not follow the exact actual experience during the observation period. Judgment is required to extrapolate future experience from past trends and current member behavior.

SECTION V – DEMOGRAPHIC ASSUMPTIONS

The following table outlines the demographic (gain) or loss that the plan has experienced over the past five years. The impacts below show the increase/loss or decrease/gain in the unfunded accrued liability in each of the valuation years. We use this analysis to assist us when developing our proposed assumptions. If the Plan experiences certain (gains) or losses in every year of the study, that means there is a good indication that the assumptions need to be adjusted.

For example, the System has experienced gains for salary increases in each of the last five years. Therefore, we need to analyze and possibly adjust these decrements to diminish this trend.

$ in Millions	2020	2021	2022	2023	2024
Pensioners' Mortality	1.1	1.9	2.8	(2.1)	3.4
Turnover and Retirements	(1.4)	4.8	0.6	2.1	(4.2)
Salary Increases	(4.2)	(4.7)	(4.1)	(0.2)	(4.1)

The remainder of this section presents the results of the demographic study. We have prepared tables that show a comparison of the actual and expected decrements and the overall ratio of actual to expected results (A/E Ratios) under the current assumptions. If a change is being proposed, the revised A/E Ratios are shown as well. Salary adjustments, other than the economic assumption for wage inflation discussed in the previous section, are treated as demographic assumptions.

RATES OF WITHDRAWAL

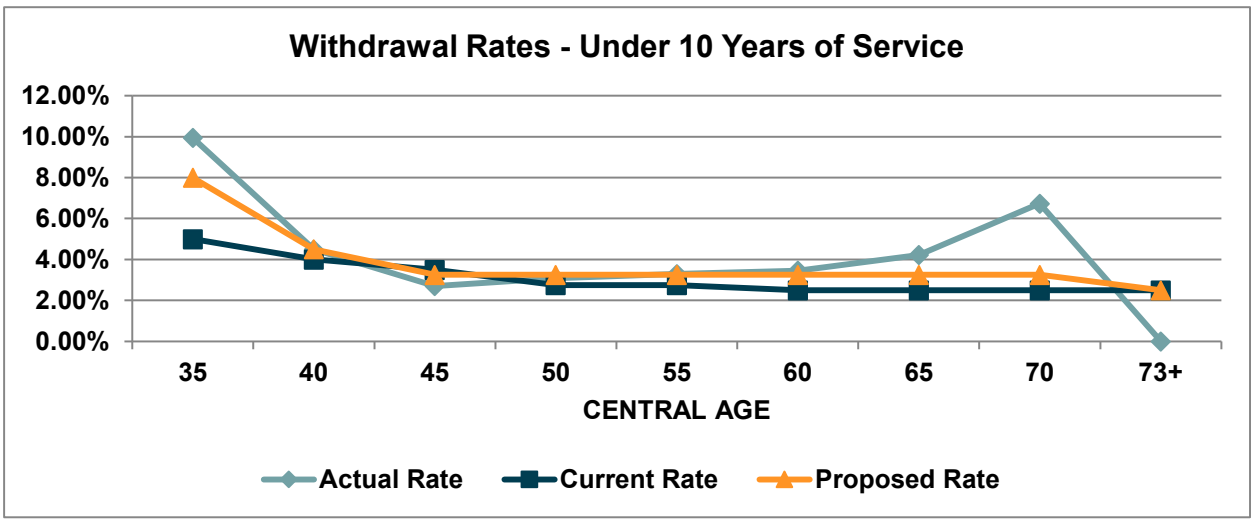
The rates of withdrawal are used to determine the expected number of separations from active service which will occur prior to eligibility for retirement for reasons other than death and disability (e.g., termination of employment). The current assumption is one set of rates based on age.

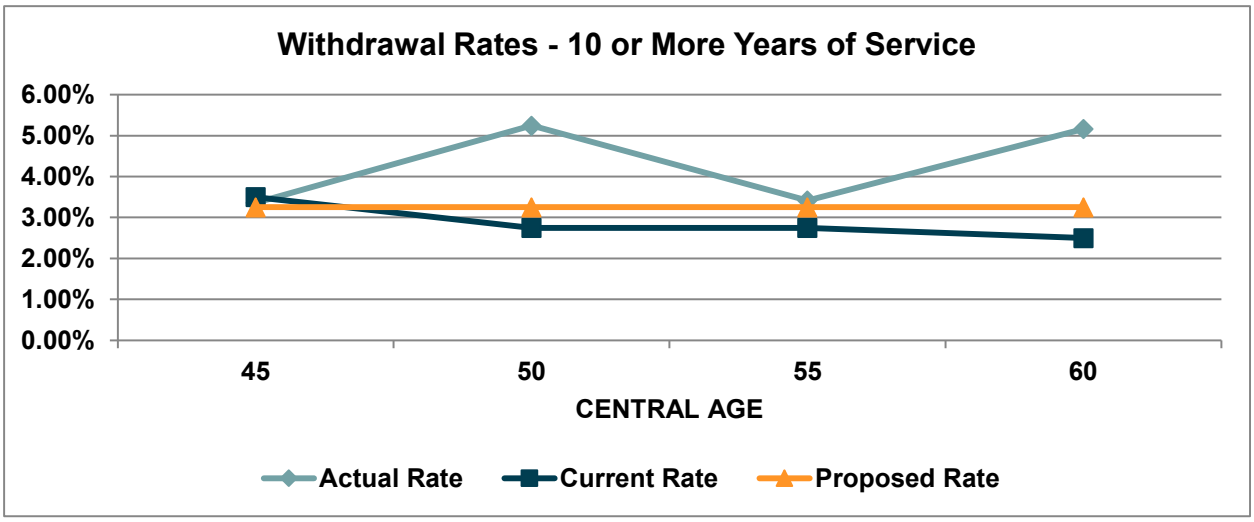
The following table presents the actual to expected analysis of withdrawal experience for the 5-year study period from July 1, 2019 through June 30, 2024. In this study we have analyzed recent withdrawal experience on a salary-weighted basis where the exposures and withdrawals are weighted by annual member salary amounts.

COMPARISON OF ACTUAL AND EXPECTED WITHDRAWALS FROM ACTIVE SERVICE

Central Age of Group	Weighted Experience - Current Rates		
	Actual	Expected	A/E Ratio
37 & Under	$767,061	$380,088	201.8%
40	851,420	652,130	130.6%
45	1,206,514	1,485,028	81.2%
50	2,277,184	1,547,640	147.1%
55	1,812,935	1,484,818	122.1%
58 & Over	2,320,290	1,328,709	174.6%
Total	$9,235,403	$6,878,413	134.3%

The following sample graphs show a comparison of the current expected, actual, and proposed rates of withdrawal for actives at certain service levels.





The preceding results indicate that during the study period more liabilities were released from the System than expected in most age categories. Typically, more withdrawals than expected create gains to the System since less members remain in service to accrue additional benefits. We recommend that the rates of withdrawal be revised at this time to include an age-service combination table that we believe will more closely reflect the experience of the System.

COMPARATIVE RATES OF WITHDRAWAL FROM ACTIVE SERVICE

Central Age	Annual Rates of Withdrawal		
	Current	Proposed	
		Under 10 Years	10+ Years
35	5.00%	8.00%	6.00%
40	4.00%	4.50%	4.00%
45	3.50%	3.25%	3.25%
50	2.75%	3.25%	3.25%
55	2.75%	3.25%	3.25%
60	2.50%	3.25%	3.25%
65	2.50%	3.25%	3.25%

COMPARISON OF ACTUAL AND EXPECTED WITHDRAWALS BASED ON PROPOSED RATES

Central Age of Group	Weighted Experience - Proposed Rates		
	Actual	Expected	A/E Ratio
37 & Under	$767,061	$591,877	129.6%
40	851,420	726,623	117.2%
45	1,206,514	1,378,955	87.5%
50	2,277,184	1,829,029	124.5%
55	1,812,935	1,754,785	103.3%
58 & Over	2,320,290	1,711,892	135.5%
Total	$9,235,403	$7,993,160	115.5%

RATES OF DISABILITY RETIREMENT

The rates of disability are used to anticipate the expected number of separations due to disabilities of eligible active members. As rates of disability are very small, the number of disabilities incurred and expected is small relative to other decrements. When a disability does occur, it will result in an increase in the plan liability to reflect the immediate annuity payable to eligible disabled members at typically earlier ages.

During the period under investigation, there were no disability retirements. In the last experience study period, there were also no disability retirements. Therefore, we recommend the rates of disability retirement be further decreased to partially reflect the experience of the System.

The following tables show a comparison between the present disability retirement rates and the proposed rates.

COMPARATIVE RATES OF DISABILITY RETIREMENTS

Central Age	Annual Rates of Disability	
	Current	Proposed
35	0.0375%	0.0188%
40	0.0500%	0.0250%
45	0.0875%	0.0438%
50	0.1250%	0.0625%
55	0.2250%	0.1125%
60	0.3625%	0.1813%
65	0.5875%	0.2938%

RATES OF RETIREMENT

The rates of retirement are used to determine the expected number of separations from active service due to election of retirement under the applicable retirement provisions. The current assumption is one set of rates based on age.

The following table presents the actual to expected analysis of retirement experience for the 5-year study period from July 1, 2019 through June 30, 2024. In this study, we have analyzed recent retirement experience on a salary-weighted basis where the exposures and retirements are weighted by annual member salary amounts.

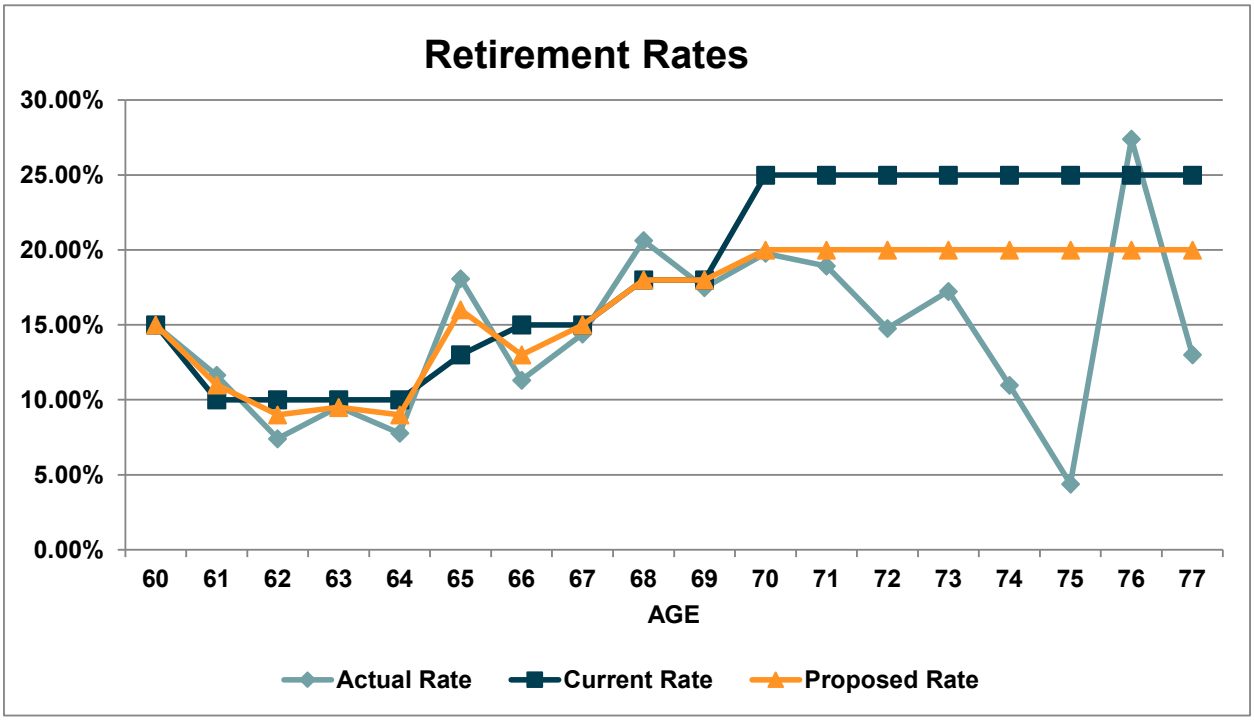
COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS

Weighted Experience - Current Rates			
Age	Actual	Expected	A/E Ratio
60	$1,212,545	$1,214,029	99.9%
61	909,235	781,323	116.4%
62	502,076	677,706	74.1%
63	681,661	716,007	95.2%
64	524,702	675,071	77.7%
65	1,242,946	894,063	139.0%
66	811,972	1,076,825	75.4%
67	1,144,152	1,191,883	96.0%
68	1,656,787	1,446,199	114.6%
69	1,164,844	1,199,286	97.1%
70	1,143,537	1,445,319	79.1%
71	826,294	1,091,242	75.7%
72	423,860	717,575	59.1%
73	420,407	609,644	69.0%
74	195,597	445,805	43.9%
75	61,003	347,903	17.5%
76	419,017	382,223	109.6%
77	142,758	274,308	52.0%
78	0	600,750	0.0%
79	32,000	663,432	4.8%
80 and over	487,388	768,940	63.4%
Total	$14,002,780	$17,219,533	81.3%

SECTION V – DEMOGRAPHIC ASSUMPTIONS

The analysis of the experience reflects that, in aggregate, the current assumed rates of retirement slightly over-anticipate retirements for most members. Fewer retirements than expected create gains to the System, while more than expected create losses, particularly for unreduced retirement at younger ages.

We recommend adjustment to the rates to reflect the experience as well as maintain a reasonable degree of margin. The following graph shows a sample of comparisons of the present, actual, and proposed rates of retirements.



The following table shows a comparison of the present and proposed rates of service retirement.

COMPARATIVE RATES OF RETIREMENT

Age	Annual Rates of Retirement	
	Current	Proposed
60	15.0%	15.0%
61	10.0%	11.0%
62	10.0%	9.0%
63	10.0%	9.5%
64	10.0%	9.0%
65	13.0%	16.0%
66	15.0%	13.0%
67	15.0%	15.0%
68 – 69	18.0%	18.0%
70 – 77	25.0%	20.0%
78 - 79	100.0%	20.0%
80	100.0%	100.0%

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS
BASED ON PROPOSED RATES OF RETIREMENT

Weighted Experience - Proposed Rates			
Age	Actual	Expected	A/E Ratio
60	$1,212,545	$1,214,029	99.9%
61	909,235	859,455	105.8%
62	502,076	609,935	82.3%
63	681,661	680,207	100.2%
64	524,702	607,564	86.4%
65	1,242,946	1,100,386	113.0%
66	811,972	933,248	87.0%
67	1,144,152	1,191,883	96.0%
68	1,656,787	1,446,199	114.6%
69	1,164,844	1,199,286	97.1%
70	1,143,537	1,156,255	98.9%
71	826,294	872,993	94.7%
72	423,860	574,060	73.8%
73	420,407	487,715	86.2%
74	195,597	356,644	54.8%
75	61,003	278,322	21.9%
76	419,017	305,778	137.0%
77	142,758	219,447	65.1%
78	0	120,150	0.0%
79	32,000	132,686	24.1%
80 and over	487,388	768,940	63.4%
Total	$14,002,780	$15,115,183	92.6%

RATES OF MORTALITY

One of the most important demographic assumptions in the valuation is mortality because it defines the expectation for how long benefit payments will be made. The longer members live, the greater the true cost of future benefit obligations will be.

For many years, rates of mortality have been declining, meaning people, in general, are living longer. Consequently, we anticipate that mortality tables will need to be updated periodically. Because of potential differences in mortality, we break down our study by gender (males and females) and by status (healthy retirees, beneficiaries, disabled retirees, and active members).

Because of the substantial amount of data required to construct a mortality table, actuaries usually rely on standard tables published by the Society of Actuaries (SOA). Actuaries often use various adjustments to these published mortality tables to better match the observed mortality rates of a specific group. The first of these adjustments can be an age adjustment that is either a "set back" or a "set forward". A one-year age set back treats all members as if they were one year younger than they truly are when applying the rates in the mortality table. So, a one-year age set back would treat a 61-year-old retiree as if she will exhibit the mortality of a 60-year-old in the standard mortality table. The second adjustment that can be used is to "scale" a mortality table by multiplying the probabilities of death by factors less than 100% (to reflect better mortality) or factors greater than 100% (to reflect poorer mortality). Scaling factors can be applied to an entire table or a portion of the table. Of course, if needed, actuaries may use both methods to develop an appropriate table to model the mortality of the specific plan population.

In 2019, the SOA released a family of mortality tables named the Pub-2010 tables. While prior pension mortality tables had been based solely on private corporate and union retirement plans, these new tables were based entirely on public sector plan data. These tables were split by three membership types: Public Safety, Teachers, and General Employees to reflect the observed differences in mortality patterns related to the three groups. Tables were further split for healthy retirees, disabled retirees, contingent beneficiaries, and employees. There were also versions of these tables for above and below median annuity values. In May of 2025, the SOA released an updated set of mortality tables named the Pub-2016 tables which are organized in a similar fashion as the Pub-2010 tables. We anticipate that this new family of tables will be a good starting point in developing a recommendation for mortality assumptions.

The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying and monitoring. This has resulted in changes to the relevant Actuarial Standard of Practice, ASOP 27, *Selection of Assumptions for Measuring Pension Obligations*. This ASOP requires the pension actuary to make and disclose a specific recommendation with respect to future improvements in mortality after the valuation date, although it does not require that an actuary assume there will be future improvements. There have been significant improvements in longevity in the past, although there are different opinions about future expectations, and thus there is a subjective component in the estimation of future mortality improvement. We believe it is prudent to anticipate that the trend will continue to some degree in the future and that it is appropriate to reflect some future mortality improvement as part of the mortality assumption.

There are two, widely used ways to reflect future improvements in mortality:

(1) Static table with "margin"
(2) Generational mortality

The first approach of reflecting mortality improvements is through the use of a static mortality table with "margin." Under this approach, the Actual to Expected Ratio is intentionally targeted to be over 100% so that mortality can improve without creating actuarial losses over the period prior to the next experience study. This was the approach used historically by many retirement systems. In this manner, it could be expected that as mortality improves, each successive experience study will require mortality assumption changes which will have an increase to the measured liabilities.

Another approach, referred to as generational mortality, directly anticipates future improvements in mortality by using a different set of mortality rates based on each year of birth, with the rates for later years of birth assuming lower mortality than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2045 has a longer life expectancy than a member who turns age 65 in 2025. When using generational mortality, the Actual to Expected Ratios for the observed experience are set near 100% as future mortality improvements will be considered directly in the actuarial valuation process. The generational approach is the current approach used by the System and is the preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with established trends in improved longevity. In this manner, with future mortality improvements already considered, the adjustments to the mortality assumptions in each experience study will be expected to be minor and not significantly impact the measured liabilities.

Finally, it is common in demographic studies to weight the exposures and decrements by an approximation of the associated liability. In this study, we have analyzed recent experience on a benefit-weighted basis where the exposures and deaths are multiplied by the monthly retirement benefit amount. Because a valuation is designed to measure the amount and timing of future benefit payments (liability) rather than simply the number of retirees leaving pay status, this benefit-weighted approach is an important factor in valuing plan obligations. Most modern mortality tables used by actuaries are developed on a weighted basis. This also helps to reflect any differences that arise from better mortality experience among those with larger benefits.

SECTION V – DEMOGRAPHIC ASSUMPTIONS

The current mortality assumptions are based on the Pub-2010 family of tables projected generationally with MP-2019 with further adjustments as follows:

Current Tables

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Service Retirees	General Healthy Annuitant	Male: +1; Female: +1	Male: 105%; Female: 108%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Beneficiaries	General Contingent Survivors	Male: +2; Female: +2	Male: 106%; Female: 105%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Disabled Retirees	General Disabled	Male: -3; Female: 0	Male: 103%; Female: 106%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Active Employees	General Employee	Male: 0; Female: 0	Male: 100%; Female: 100%

Since the System has minimal mortality experience, we recommend that the rates of mortality be revised to the same mortality tables used for the Employees' Retirement System of Georgia. We also recommend the most recent mortality improvement scale, MP-2021, be used to anticipate future mortality improvements in the valuation process through at least the next experience study.

SECTION V – DEMOGRAPHIC ASSUMPTIONS

We recommend that the rates of mortality be revised to the Pub-2016 family of tables projected generationally with MP-2021 with further adjustments as follows:

Proposed Tables

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Service Retirees	General Retiree	Male: +1; Female: +1	Male: 105%; Female: 107%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Beneficiaries	Contingent Survivor	Male: +1; Female: +2	Male: 107%; Female: 100%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Disabled Retirees	Non-Safety Disabled Retiree	Male: +2; Female: +3	Male: 101%; Female: 109%

Participant Type	Membership Table	Set Forward (+)/ Setback (-)	Adjustment to Rates
Active Employees	General Employee	Male: -3; Female: -2	Male: 100%; Female: 100%

RATES OF SALARY INCREASE

Over the past five years, the System has experienced rates of salary increase below expectations in all service categories. As shown in the table below, net gains due to salary increases over the past five years have decreased the unfunded accrued liability by just over $17 million.

$ in Millions	2020	2021	2022	2023	2024	Total
Amount of Increase due to Salary Increases	(4.2)	(4.7)	(4.1)	(0.2)	(4.1)	(17.3)

Many retirement systems from across the country have seen opposite experience as the public sector members have seen significant salary increases to match the post-pandemic inflation. The following table shows the actual versus expected values for the System.

COMPARISON OF ACTUAL AND EXPECTED RATES OF SALARY INCREASE OF ACTIVE MEMBERS

SERVICE	SALARIES AT END OF YEAR ($1,000s)		
	Actual	Expected	Ratio of Actual to Expected
Less than 5	93,089	93,877	99.2%
5-9	68,251	69,540	98.1%
10-14	53,253	54,243	98.2%
15-19	45,919	46,817	98.1%
20-24	28,251	28,848	97.9%
25 & Over	20,392	20,731	98.4%
TOTAL	**309,155**	**314,056**	**98.4%**

As you can see from the table above, although less than 1.0, the A/E ratios shown in the last column are somewhat consistent across all service levels indicating that the merit salary scale is fairly reasonable. In conclusion, we believe that salary increases during the study period may not be necessarily indicative of the expected long-term future rate of salary increase and would recommend to the Board that no change to the current salary increase rates of 3.75% annually, for all years of service, be proposed at this time.

SECTION VI – OTHER ASSUMPTIONS AND METHODS

ADMINISTRATIVE EXPENSES: This assumption is currently 1.35% of payroll (included in normal contribution). The actual administrative expenses over the experience study period have averaged approximately 1.45% of payroll, with the 2024 valuation equaling 1.60% of payroll. **We recommend increasing this assumption at this time from 1.35% of payroll to 1.50% of payroll.**

OPTION FACTORS: The option factors currently used by the Retirement System are based on the mortality tables and investment rate of return (discount rate) used in the valuation. **We recommend that the factors be revised to be based on the mortality table recommended for the valuation.**

PERCENT MARRIED: This assumption is used to determine who will receive death in active service benefits. The beneficiaries of unmarried members are assumed to receive a refund of member contributions. **We recommend keeping this assumption for death in active service benefits as 100% married for both males and females. We also recommend keeping the three year age difference between spouses.**

APPENDIX A – HISTORICAL JUNE CPI (U) INDEX

Fiscal Year Ending 6/30	CPI (U)	Fiscal Year Ending 6/30	CPI (U)
1964	31.0	1995	152.5
1965	31.6	1996	156.7
1966	32.4	1997	160.3
1967	33.3	1998	163.0
1968	34.7	1999	166.2
1969	36.6	2000	172.4
1970	38.8	2001	178.0
1971	40.6	2002	179.9
1972	41.7	2003	183.7
1973	44.2	2004	189.7
1974	49.0	2005	194.5
1975	53.6	2006	202.9
1976	56.8	2007	208.352
1977	60.7	2008	218.815
1978	65.2	2009	215.693
1979	72.3	2010	217.965
1980	82.7	2011	225.722
1981	90.6	2012	229.478
1982	97.0	2013	233.504
1983	99.5	2014	238.343
1984	103.7	2015	238.638
1985	107.6	2016	241.018
1986	109.5	2017	244.955
1987	113.5	2018	251.989
1988	118.0	2019	256.143
1989	124.1	2020	257.797
1990	129.9	2021	271.696
1991	136.0	2022	296.311
1992	140.2	2023	305.109
1993	144.4	2024	314.175
1994	148.0		

Appendix B – Capital Market Assumptions and Asset Allocation

Capital Market Assumptions and Asset Allocation
As Provided by the System

Arithmetic Rates of Return and Standard Deviations by Asset Class

Asset Class	Expected Real Rate of Return*	Standard Deviation
Fixed Income	5.0%	9.0%
US Large Stocks	12.3%	19.7%
US Small Stocks	16.0%	30.9%
Int'l Developed Mkt Stocks	12.3%	21.5%
Int'l Emerging Mkt Stocks	14.3%	29.1%
Alternatives	14.4%	21.9%

** Net of 3.00% assumed inflation*

Asset Class Correlation Coefficients

Asset Class	Fixed Income	US Large Stocks	US Small Stocks	Int'l Dev Mkt Stocks	Int'l EM Mkt Stocks	Alts
Fixed Income	1.00					
US Large Stocks	0.21	1.00				
US Small Stocks	0.19	0.84	1.00			
Int'l Developed Mkt Stocks	0.20	0.69	0.61	1.00		
Int'l Emerging Mkt Stocks	0.11	0.66	0.64	0.72	1.00	
Alternatives	(0.01)	0.42	0.29	0.36	0.34	1.00

Asset Allocation Targets

Asset Class	Asset Allocation
Fixed Income	30.0%
US Large Stocks	43.2%
US Small Stocks	4.3%
Int'l Developed Mkt Stocks	12.3%
Int'l Emerging Mkt Stocks	5.2%
Alternatives	5.0%

APPENDIX C – SOCIAL SECURITY ADMINISTRATION WAGE INDEX

Social Security Administration Calendar Year Wage Index

Calendar Year	Wage Index	Annual Increase	Calendar Year	Wage Index	Annual Increase
1963	$4,396.64	2.45%	1994	$23,753.53	2.68%
1964	4,576.32	4.09	1995	24,705.66	4.01
1965	4,658.72	1.80	1996	25,913.90	4.89
1966	4,938.36	6.00	1997	27,426.00	5.84
1967	5,213.44	5.57	1998	28,861.44	5.23
1968	5,571.76	6.87	1999	30,469.84	5.57
1969	5,893.76	5.78	2000	32,154.82	5.53
1970	6,186.24	4.96	2001	32,921.92	2.39
1971	6,497.08	5.02	2002	33,252.09	1.00
1972	7,133.80	9.80	2003	34,064.95	2.44
1973	7,580.16	6.26	2004	35,648.55	4.65
1974	8,030.76	5.94	2005	36,952.94	3.66
1975	8,630.92	7.47	2006	38,651.41	4.60
1976	9,226.48	6.90	2007	40,405.48	4.54
1977	9,779.44	5.99	2008	41,334.97	2.30
1978	10,556.03	7.94	2009	40,711.61	(1.50)
1979	11,479.46	8.75	2010	41,673.83	2.36
1980	12,513.46	9.01	2011	42,979.61	3.13
1981	13,773.10	10.07	2012	44,321.67	3.12
1982	14,531.34	5.51	2013	44,888.16	1.28
1983	15,239.24	4.87	2014	46,481.52	3.55
1984	16,135.07	5.88	2015	48,098.63	3.48
1985	16,822.51	4.26	2016	48,642.15	1.13
1986	17,321.82	2.97	2017	50,321.89	3.45
1987	18,426.51	6.38	2018	52,145.80	3.62
1988	19,334.04	4.93	2019	54,099.99	3.75
1989	20,099.55	3.96	2020	55,628.60	2.83
1990	21,027.98	4.62	2021	60,575.07	8.89
1991	21,811.60	3.73	2022	63,795.13	5.32
1992	22,935.42	5.15	2023	66,621.80	4.43
1993	23,132.67	0.86			

APPENDIX D – RECOMMENDED DEMOGRAPHIC RATES

TABLE 1

RATES OF SEPARATION FROM ACTIVE SERVICE

Age	Rates of Withdrawal Years of Service 0 – 9	Rates of Withdrawal Years of Service 10+	Rates of Disability	Rates of Death* Males	Rates of Death* Females
25	0.0800	0.0600	0.000063	0.000340	0.000110
26	0.0800	0.0600	0.000125	0.000370	0.000120
27	0.0800	0.0600	0.000125	0.000400	0.000130
28	0.0800	0.0600	0.000125	0.000420	0.000140
29	0.0800	0.0600	0.000125	0.000440	0.000150
30	0.0800	0.0600	0.000125	0.000450	0.000160
31	0.0800	0.0600	0.000125	0.000460	0.000170
32	0.0800	0.0600	0.000125	0.000470	0.000190
33	0.0800	0.0600	0.000125	0.000480	0.000200
34	0.0800	0.0600	0.000188	0.000490	0.000220
35	0.0800	0.0600	0.000188	0.000490	0.000240
36	0.0800	0.0600	0.000188	0.000490	0.000260
37	0.0800	0.0600	0.000188	0.000500	0.000280
38	0.0450	0.0400	0.000250	0.000520	0.000300
39	0.0450	0.0400	0.000250	0.000540	0.000330
40	0.0450	0.0400	0.000250	0.000570	0.000350
41	0.0450	0.0400	0.000250	0.000600	0.000380
42	0.0450	0.0400	0.000313	0.000640	0.000410
43	0.0325	0.0325	0.000375	0.000690	0.000450
44	0.0325	0.0325	0.000375	0.000740	0.000480
45	0.0325	0.0325	0.000438	0.000790	0.000520
46	0.0325	0.0325	0.000438	0.000850	0.000570
47	0.0325	0.0325	0.000500	0.000920	0.000610
48	0.0325	0.0325	0.000563	0.000990	0.000660
49	0.0325	0.0325	0.000625	0.001070	0.000720
50	0.0325	0.0325	0.000625	0.001150	0.000780
51	0.0325	0.0325	0.000688	0.001250	0.000840
52	0.0325	0.0325	0.000750	0.001350	0.000920
53	0.0325	0.0325	0.000875	0.001470	0.000990
54	0.0325	0.0325	0.001000	0.001600	0.001080
55	0.0325	0.0325	0.001125	0.001740	0.001170
56	0.0325	0.0325	0.001250	0.001900	0.001270
57	0.0325	0.0325	0.001375	0.002070	0.001370
58	0.0325	0.0325	0.001500	0.002260	0.001490
59	0.0325	0.0325	0.001625	0.002460	0.001620
60	0.0325	0.0325	0.001813	0.002680	0.001750
61	0.0325	0.0325	0.002000	0.002910	0.001900
62	0.0325	0.0325	0.002188	0.003160	0.002070
63	0.0325	0.0325	0.002438	0.003410	0.002250
64	0.0325	0.0325	0.002688	0.003690	0.002440
65	0.0325	0.0325	0.002938	0.003970	0.002650
66	0.0325	0.0325	0.003188	0.004270	0.002880
67	0.0325	0.0325	0.003438	0.004590	0.003130
68	0.0325	0.0325	0.003688	0.004930	0.003410
69	0.0325	0.0325	0.004000	0.005300	0.003700
70	0.0325	0.0325	0.004000	0.005710	0.004030
71	0.0325	0.0325	0.004000	0.006170	0.004380
72	0.0325	0.0325	0.004000	0.006700	0.004760
73	0.0250	0.0325	0.004000	0.007290	0.005180
74	0.0250	0.0325	0.004000	0.007960	0.005630
75	0.0250	0.0325	0.004000	0.008710	0.006120

* Base mortality rates as of 2016 before application of the improvement scale

TABLE 2

RATES OF SEPARATION FROM ACTIVE SERVICE
(CONTINUED)

Age	Rates of Service Retirement
60	0.150000
61	0.110000
62	0.090000
63	0.095000
64	0.090000
65	0.160000
66	0.130000
67	0.150000
68	0.180000
69	0.180000
70	0.200000
71	0.200000
72	0.200000
73	0.200000
74	0.200000
75	0.200000
76	0.200000
77	0.200000
78	0.200000
79	0.200000
80	1.000000

APPENDIX D – RECOMMENDED DEMOGRAPHIC RATES

TABLE 3

RATES OF ANTICIPATED SALARY INCREASES

Assumed 3.75% annual increases at all ages.

TABLE 4

RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF SERVICE*

Age	Male	Female	Age	Male	Female
50	0.00321	0.00284	86	0.11066	0.08803
51	0.00348	0.00292	87	0.12479	0.09904
52	0.00377	0.00303	88	0.14049	0.11119
53	0.00408	0.00312	89	0.15778	0.12463
54	0.00443	0.00324	90	0.17619	0.13909
55	0.00481	0.00336	91	0.19538	0.15439
56	0.00521	0.00348	92	0.21520	0.17047
57	0.00564	0.00365	93	0.23556	0.18735
58	0.00609	0.00386	94	0.25644	0.20507
59	0.00656	0.00411	95	0.27789	0.22369
60	0.00704	0.00437	96	0.29992	0.24331
61	0.00754	0.00467	97	0.32250	0.26389
62	0.00806	0.00500	98	0.34556	0.28542
63	0.00865	0.00539	99	0.36888	0.30773
64	0.00930	0.00587	100	0.39212	0.33056
65	0.01006	0.00646	101	0.41477	0.35345
66	0.01092	0.00717	102	0.43663	0.37623
67	0.01194	0.00801	103	0.45753	0.39867
68	0.01312	0.00901	104	0.47731	0.42059
69	0.01449	0.01015	105	0.49587	0.44178
70	0.01611	0.01147	106	0.51317	0.46211
71	0.01800	0.01298	107	0.52500	0.48145
72	0.02018	0.01470	108	0.52500	0.49970
73	0.02272	0.01666	109	0.52500	0.51680
74	0.02563	0.01889	110	0.52500	0.53271
75	0.02896	0.02142	111	0.52500	0.53500
76	0.03275	0.02432	112	0.52500	0.53500
77	0.03707	0.02762	113	0.52500	0.53500
78	0.04194	0.03142	114	0.52500	0.53500
79	0.04742	0.03578	115	0.52500	0.53500
80	0.05357	0.04083	116	0.52500	0.53500
81	0.06047	0.04663	117	0.52500	0.53500
82	0.06822	0.05322	118	0.52500	0.53500
83	0.07697	0.06066	119	1.00000	1.00000
84	0.08685	0.06892	120	1.00000	1.00000
85	0.09804	0.07802			

* Base mortality rates as of 2016 before application of the improvement scale

TABLE 5

RATES OF MORTALITY FOR BENEFICIARIES OF DECEASED MEMBERS*

Age	Male	Female	Age	Male	Female
50	0.00834	0.00329	86	0.12804	0.09158
51	0.00859	0.00353	87	0.14291	0.10277
52	0.00887	0.00378	88	0.15945	0.11522
53	0.00915	0.00405	89	0.17786	0.12870
54	0.00945	0.00434	90	0.19688	0.14305
55	0.00976	0.00465	91	0.21584	0.15821
56	0.01009	0.00499	92	0.23448	0.17417
57	0.01044	0.00535	93	0.25286	0.19094
58	0.01083	0.00575	94	0.27128	0.20858
59	0.01125	0.00618	95	0.29011	0.22710
60	0.01170	0.00665	96	0.30978	0.24650
61	0.01220	0.00717	97	0.33061	0.26671
62	0.01275	0.00775	98	0.35270	0.28760
63	0.01339	0.00840	99	0.37590	0.30893
64	0.01411	0.00911	100	0.39959	0.33033
65	0.01496	0.00991	101	0.42267	0.35162
66	0.01593	0.01080	102	0.44495	0.37259
67	0.01708	0.01180	103	0.46624	0.39307
68	0.01842	0.01290	104	0.48640	0.41288
69	0.02001	0.01412	105	0.50532	0.43188
70	0.02191	0.01549	106	0.52294	0.44995
71	0.02415	0.01702	107	0.53500	0.46701
72	0.02676	0.01874	108	0.53500	0.48299
73	0.02979	0.02071	109	0.53500	0.49786
74	0.03327	0.02295	110	0.53500	0.50000
75	0.03725	0.02550	111	0.53500	0.50000
76	0.04176	0.02843	112	0.53500	0.50000
77	0.04686	0.03178	113	0.53500	0.50000
78	0.05258	0.03562	114	0.53500	0.50000
79	0.05895	0.04002	115	0.53500	0.50000
80	0.06600	0.04505	116	0.53500	0.50000
81	0.07380	0.05075	117	0.53500	0.50000
82	0.08244	0.05720	118	0.53500	1.00000
83	0.09204	0.06444	119	1.00000	1.00000
84	0.10275	0.07252	120	1.00000	1.00000
85	0.11469	0.08154			

* Base mortality rates as of 2016 before application of the improvement scale

TABLE 6

RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF DISABILITY*

Age	Male	Female	Age	Male	Female
50	0.01034	0.01028	86	0.13531	0.13293
51	0.01126	0.01117	87	0.15003	0.14385
52	0.01225	0.01215	88	0.16593	0.15549
53	0.01334	0.01322	89	0.18249	0.16801
54	0.01451	0.01438	90	0.19942	0.18158
55	0.01580	0.01564	91	0.21664	0.19634
56	0.01719	0.01702	92	0.23420	0.21242
57	0.01872	0.01851	93	0.25226	0.22993
58	0.02036	0.01889	94	0.27101	0.24888
59	0.02138	0.01925	95	0.29063	0.26924
60	0.02226	0.01962	96	0.31119	0.29086
61	0.02302	0.02000	97	0.33266	0.31348
62	0.02368	0.02043	98	0.35482	0.33673
63	0.02430	0.02093	99	0.37719	0.36006
64	0.02491	0.02154	100	0.39897	0.38327
65	0.02556	0.02231	101	0.42000	0.40612
66	0.02634	0.02330	102	0.44010	0.42845
67	0.02732	0.02459	103	0.45913	0.45004
68	0.02859	0.02625	104	0.47698	0.47075
69	0.03025	0.02832	105	0.49362	0.49045
70	0.03233	0.03083	106	0.50500	0.50904
71	0.03485	0.03383	107	0.50500	0.52646
72	0.03780	0.03738	108	0.50500	0.54267
73	0.04125	0.04150	109	0.50500	0.54500
74	0.04517	0.04617	110	0.50500	0.54500
75	0.04955	0.05133	111	0.50500	0.54500
76	0.05439	0.05687	112	0.50500	0.54500
77	0.05960	0.06259	113	0.50500	0.54500
78	0.06511	0.06831	114	0.50500	0.54500
79	0.07082	0.07412	115	0.50500	0.54500
80	0.07684	0.08027	116	0.50500	0.54500
81	0.08335	0.08705	117	0.50500	1.00000
82	0.09058	0.09492	118	1.00000	1.00000
83	0.09887	0.10357	119	1.00000	1.00000
84	0.10956	0.11283	120	1.00000	1.00000
85	0.12183	0.12260			

* Base mortality rates as of 2016 before application of the improvement scale