Seattle City Employees' Retirement System

Investigation of Experience

January 1, 2010 through December 31, 2013

May 8, 2014

By

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May 8, 2014

Retirement Board
Seattle City Employees' Retirement System
720 Third Avenue, Suite 1000
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Dear Members of the Board:

It is a pleasure to submit this report of our investigation of the experience of the Seattle City Employees' Retirement System for the period January 1, 2010 through December 31, 2013. The results of this investigation are the basis for recommended changes in actuarial assumptions for the actuarial valuation to be performed as of January 1, 2014. Note that this report covers both the assumptions for active members and retired members.

The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions to be used in the completion of the upcoming valuation. Several of our recommendations represent changes from the prior methods or assumptions and are designed to better anticipate the emerging experience of the System.

We have provided financial information showing the estimated impact of the recommended assumptions, if they had been reflected in the January 1, 2013 actuarial valuation. We believe the recommended assumptions provide a reasonable estimate of anticipated experience affecting SCERS. Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following:

- Plan experience differing from the actuarial assumptions,
- Future changes in the actuarial assumptions,
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as potential additional contribution requirements due to changes in the plan's funded status), and
- Changes in the plan provisions or accounting standards.

Due to the scope of this assignment, we did not perform an analysis of the potential range of such measurements.

In preparing this report, we relied without audit on information (some oral and some in writing) supplied by SCERS staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We used SCERS benefit provisions as stated in our January 1, 2013 Actuarial

Valuation report. In our examination, after discussion with SCERS and certain adjustments, we have found the data to be reasonably consistent and comparable with data used for other purposes. Since the experience study results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our determinations might need to be revised.

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The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, 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.

We would like to acknowledge the help in the preparation of the data for this investigation given by the SCERS staff. We look forward to our discussions and the opportunity to respond to your questions and comments at your next meeting.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

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Section 1: Executive Summary and Recommendations

Overview

Actuarial valuations are based on certain underlying assumptions. Determining the adequacy of the contribution rate is dependent on these assumptions that the actuary uses to project the future benefit payments and then to discount the value of future benefits to determine the present values. Thus, the assumptions are critical in assisting the system in adequately pre-funding the benefits prior to retirement.

To assess the reasonableness of the assumptions used in the valuation, they should be studied regularly. This process is called an investigation of experience (or experience study).

Summary of Results

This section describes the key findings of this investigation of experience of the Seattle City Employees' Retirement System (SCERS) for the period January 1, 2010 through December 31, 2013. We are recommending several changes to the demographic assumptions. Additionally, we are recommending certain changes to the current economic assumptions; we have also shown alternative options for the economic assumptions, which we believe would also be reasonable.

It should be noted that this experience study covers a four-year period, with one year of overlap with the previous investigation of experience (the year January 1, 2010 through December 31, 2010). We take into account both the results of the current and prior study when making recommendations for changes to assumptions, in an attempt to identify short-term vs. long-term trends.

The following shows a summary of our recommendations.

Assumption	Proposed Change
Inflation	Reduce to 3.25% (or alternative 3.00%)
Investment Return	Reduce to 7.50% (or alternative 7.25%)
Wage Growth	Reduce to 3.75% (or alternative 3.50%)
Membership Growth	Reduce to 0.00% (or alternative 0.50%)
Admin. Expenses	Increase to 0.60%
Merit Salary Scale	No Change
Death while Active	Reduce Rates
Retirement	Various Adjustments
Disability	Reduce Rates
Retired Mortality	Reduce Rates for Healthy Males
Termination	Various Adjustments
Probability of Refund	No Change

Summary of Results (continued)	If adopted, the new assumptions would result in an increase in the total contribution rate required to pay off the Unfunded Actuarial Accrued Liability (UAAL) over a 30-year period as of the January 1, 2013 actuarial valuation and would result in a decrease in the Funded Ratio of the system as of that date. This is discussed further in the Financial Impact section at the end of the Executive Summary. Some additional scenarios were studied; the financial impact of those scenarios is also shown at the end of this section.
Economic Assumptions	Section 2 of this report discusses the economic assumptions: price inflation, general wage growth (includes price inflation and productivity), the variable interest rate credited to member contributions made on or after January 1, 2012, and the investment return assumption. We have proposed that the Board reduce each of these assumptions by 0.25% from the current economic assumptions.
	We have also shown, for the Board's consideration, the impact of reducing each of the above assumptions by 0.50% from the current economic assumptions. We have labeled this an "alternative" scenario, and believe that it would allow some provision for future adverse deviation, should the Board wish to include this in the economic assumptions. A fuller discussion of these assumptions and the concept of adverse deviation is included in Section 2 of this report.
	Note that, generally speaking, we make recommendations for changes to demographic assumptions based on tangible evidence to back up those recommendations. In contrast, the economic assumptions tend to be more subjective; we have proposed a recommended and an alternative set of assumptions, but there may be other combinations of assumptions which we would also consider reasonable for valuation purposes.
	We also reviewed the active membership growth assumption, which is currently 1.0%. Using an active membership growth assumption is uncommon in public sector valuations and recognizes in the current calculated contribution rate gains due to an increase in the total active membership which may or may not materialize in the future. We are recommending this assumption be reduced to 0.0% for valuation (funding) purposes. We have also shown the impact of reducing the assumption to 0.50%.
Administrative Expenses	Administrative expenses are calculated as a percentage of active payroll for SCERS, and are included as a component of the ongoing Normal Cost of benefits as a percentage of pay. As of the January 1, 2013 valuation, the total Normal Cost of benefits was 14.95% of payroll, which included an assumption of 0.40% of payroll for administrative expenses.

Administrative Expenses (continued)	Over the last several years, administrative expenses have been higher as a percentage of payroll (see Section 2). Therefore, we are recommending an increase in the administrative expense assumption from 0.40% of payroll to 0.60% of payroll.
	This increase will directly increase the Normal Cost and the Total Contribution Rate needed by 0.20%, all else being equal.
Individual Salary Increases Due to Promotion and Longevity (Merit)	Section 3 discusses the individual salary increases due to promotion and longevity – the merit component of salaries. Overall, the results of our salary study show increases have been reasonably consistent with the current rates. We are recommending no changes to the current merit salary increase assumptions.
Death While Active	Section 4 discusses the results of death from active status. Overall, the actual number of deaths from active status was smaller than the current assumptions predicted. This is indicated by an actual-to-expected ratio of 75%. That is, there were 25% fewer active deaths than the current assumptions would have predicted.
	Actuaries frequently use "setbacks" on mortality tables to reflect mortality experience better than the unadjusted table. For example, a one-year setback means that the assumed probability of mortality at each age uses the standard table rate for an age one year younger. We are recommending an additional setback to the current tables to better reflect experience. This would result in a change from a three-year setback to a six-year setback for both males and females. By increasing the setback, this reduces the probability of mortality.

Deaths While Active					
Gender	Actual	Expected	Act/Exp	Proposed	Act/Prop
Male	24	33	72%	27	91%
Female	18	23	78%	18	101%
Total	**42**	**56**	**75%**	**45**	**93%**

Retired Mortality	Section 5 discusses the rates of mortality among service retirees, disabled retirees, and beneficiaries.
	Overall, the number of actual deaths was very close to expected for total service and disabled retiree deaths during the study period. Note that beneficiary mortality is not explicitly studied. See Section 5 for details.

Total Retiree Deaths		
Actual	Expected	Actual / Expected
615	623	99%

Retired Mortality (continued)

However, when viewed separately by retirement type and gender, some groups had higher than expected mortality while others had lower than expected mortality.

The only change we are recommending to retired mortality at this time is an improvement in the mortality for service retired males, via an additional year of setback. We are recommending the setback be increased from one year to two years.

See Section 5 for further details and additional considerations in setting the retired mortality assumption.

Service Retirement

Section 6 discusses the rates of service retirement. In the actuarial valuation, the retirement assumptions are split into three segments: members eligible for reduced retirement benefits, members eligible for unreduced retirement benefits who have less than 30 years of service, and members eligible for unreduced retirement benefits who have 30 or more years of service.

Overall, the actual number of service retirements was close to what the assumptions predicted in aggregate, although experience at some ages was higher and at some ages was lower than expected. We are recommending various adjustments to better reflect the experience over the study period. The following graph shows the results for all members eligible for unreduced retirement in aggregate (regardless of service level).
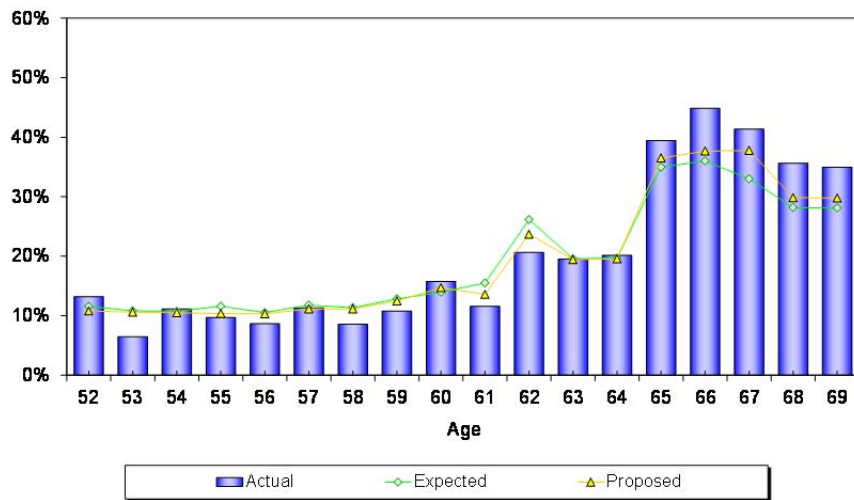
We are also recommending various adjustments to the rates of retirement with reduced benefits. See Section 6 of this report for further details.

Disability Retirement	Section 7 discusses rates of disability retirement. Over the four-year study period, there were three disability retirements compared to 9 expected. We are recommending lower rates of disability to bring the assumptions more in line with the actual experience. This is consistent with the previous study period, which also showed only three actual disability retirements during that period.
Termination	Section 8 discusses other terminations of employment. Overall, the actual number of terminations was lower than that predicted by the current assumptions. We are recommending revised rates to reflect this as shown in the following graph (males and females combined).
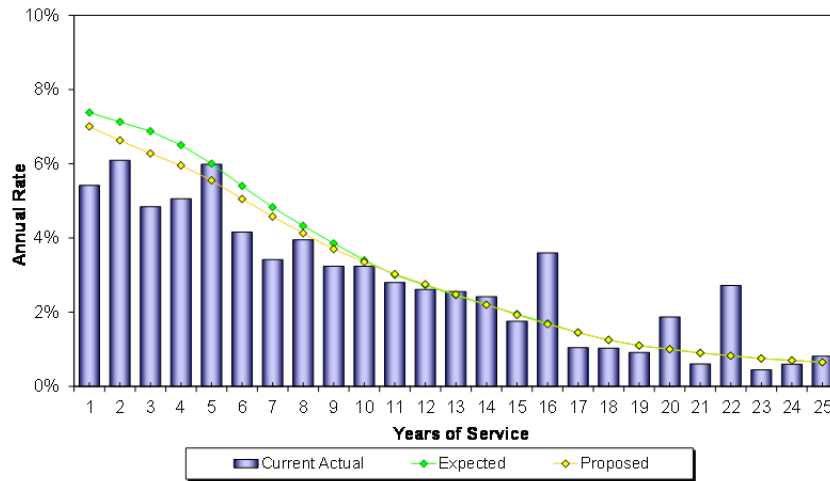
Probability of Refund upon Vested Termination	Section 9 discusses the probability of refund upon vested termination. The actual number of refunds for vested members at termination was very close to the number predicted by the current assumptions for members with less than 20 years of service.
	For the group with 20 years or more of service, there were four expected refunds, and 11 actual refunds. This is a small sample size, and we believe that it remains unlikely that in the future large numbers of members with 20 or more years of service will terminate and take a refund of contributions. Therefore, we are inclined to view the recent experience as less of an ongoing trend and more of an unusual event, likely influenced by the recession.
	We are recommending no changes to the rates of refund at termination based on the results of this study. We suggest careful monitoring of the experience for the group with 20 or more years of service in the next investigation of experience.

Miscellaneous Assumptions

There are other assumptions recommended that fall under the category of "miscellaneous" assumptions.

Probability of Marriage or Registered Domestic Partner: Currently, 60% of active members are assumed to have a spouse or eligible domestic partner for purposes of the SCERS death benefit. We recommend no change to this assumption. We do not receive information regarding actual death from active status with eligible beneficiary. This assumption has a very minor impact on the valuation, and we believe the continued use of 60% is reasonable and consistent with the assumptions used by other systems.

Mortality Tables used for Optional Factors: Currently, the factors for conversion at retirement between optional benefit forms are calculated based on mortality tables that reflect the 2013 valuation mortality assumption base tables, with static projection to 2025 and a 50%/50% male/female unisex blend. We recommend the mortality tables for optional factors be updated to reflect the proposed adjustment (increase in setback) to male service retiree mortality. We recommend the static projection to 2025 and the 50%/50% male/female blend continue to be used.

Financial Impact of Recommended Assumptions

The following exhibit is designed to give the reader an idea of how the proposed changes would affect SCERS as a whole. The proposed changes increase the Total Contribution Rate needed to amortize the UAAL over 30 years beginning January 1, 2013 and decrease the Funded Ratio as of that date.

The estimated financial impact was evaluated by performing additional valuations with the January 1, 2013 valuation data and reflecting the proposed assumption changes. This allows us to assess the relative financial impact of the various proposed changes. Note that the relative impact of the various assumption changes by component is somewhat dependent on the order in which they are evaluated.

Note that these are just estimates of the relative impact of specific changes. The actual January 1, 2014 valuation results will vary due to actuarial experience during the period such as the change in payroll and the actual investment return. Additionally, partial recognition of deferred asset gains as of the January 1, 2013 valuation, as well as the actuarial gain on assets for the 2013 year, will apply for the January 1, 2014 actuarial valuation, but are not reflected here.

Financial Impact of Recommended Assumptions (continued)

It should be noted that if the new retired mortality and/or a new investment return assumption are adopted by the Board, it will impact the factors used in the calculation of member benefits under optional forms of payment. Additionally, the mortality, investment return, and member crediting rate assumptions affect the calculation of the minimum SCERS benefit, which is equal to twice the member contributions with interest converted to a monthly annuity.

A decrease in the investment return assumption or interest crediting rate, or an improvement in the retired mortality assumption, would reduce the monthly annuities paid under this formula. We have reflected the expected impact of an immediate update of the new assumptions on the annuity factors used in the valuation. This has the impact of somewhat offsetting the cost impact of reducing the investment return assumption.

	Total Contribution To Amortize UAAL Over 30 Years	Funded Ratio
January 1, 2013 Valuation	**24.34%**	**63.5%**
Demographic Assumptions		
Termination Rates/Probability of Refund	0.04%	0.0%
Rates of Retirement	-0.07%	0.1%
Rates of Active Death/Disability	-0.01%	0.0%
Retired Mortality	0.35%	-0.6%
Administrative Expense	0.20%	0.0%
Subtotal Demographic Change	0.51%	-0.5%
January 1, 2013 Valuation with Demographic Changes	**24.85%**	**62.9%**
Economic Changes- Scenario #1		
Recommended Economic Assumptions* 7.50% Inv. Return, 3.75% Wage Growth, 3.25% CPI and 4.75% Member Crediting Rate	0.69%	-0.8%
Combined Change	**1.20%**	**-1.3%**
January 1, 2013 Valuation with Demo + Econ Changes	**25.54%**	**62.1%**
Economic Changes- Scenario #2		
Alternative Economic Assumptions* 7.25% Inv. Return, 3.50% Wage Growth, 3.00% CPI and 4.50% Member Crediting Rate	1.46%	-1.8%
Combined Change	**1.97%**	**-1.9%**
January 1, 2013 Valuation with Demo + Econ Changes	**26.31%**	**61.6%**
Additional Impact of Reducing Membership Growth Assumption		
Reduce to 0.00%	**1.36%**	**0.0%**
Reduce to 0.50%	**0.67%**	**0.0%**

Does not include the impact of the recommended reduction in membership growth assumption. Assumes annuity purchase rates for 2 times match benefit are immediately updated to reflect assumption changes.

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Section 2:   Economic Assumptions

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one "right answer," the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. 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.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27.

It should be noted that there are recent revisions to ASOP No. 27 that will be effective for the January 1, 2015 valuation and later. These revisions will impact how an actuary determines a reasonable assumption. In particular, the current assumption allows for the selection of an assumption that falls within a best-estimate range, whereas the new standard specifies that an assumption is reasonable only if it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic, although provision for adverse deviation is allowed). Ultimately, we believe that an assumption that was toward the higher end of the best-estimate range as defined by the current standard would not be considered reasonable under the new standard.

We are recommending a reduction of 0.25% in the investment return assumption, accompanied by corresponding reductions in the price inflation and wage growth assumptions. We are also recommending a reduction in active membership growth, from 1.00% to 0.00%. We believe this set of assumptions satisfies the current ASOP No. 27 and would also satisfy the new version of the standard, if it were effective immediately.

Economic Assumptions (continued)

In addition, we have shown an alternative set of economic assumptions, with a lower inflation assumption and corresponding reductions in the investment return, price inflation, and wage growth. Note that under this alternative, we have allowed for either a population growth assumption of 0.00% or 0.50%. We are recommending a population growth assumption of 0.00%; however, we believe an assumption of 0.50% would still meet the criteria for reasonableness. We believe the alternative set of economic assumptions shown would also satisfy both the current ASOP No. 27 and the new version of the standard.

The following table shows our recommendations, as well as the alternative set of assumptions:

Economic Assumption	Current Assumption	Recommended Assumptions	Alternative Assumptions
Investment Return Assumption[1]	7.75%	**7.50%**	7.25%
Consumer Price Inflation	3.50%	**3.25%**	3.00%
Real Wage Inflation	0.50%	**0.50%**	0.50%
Wage Growth (price inflation plus wage inflation)	4.00%	**3.75%**	3.50%
Active Membership Growth	1.00%	**0.00%**	0.00% or 0.50%
Payroll Growth (wage & membership growth)	5.04%	**3.75%**	3.50% or 4.02%

[1] *Net of investment expenses.*

1. Consumer Price Inflation and Member Contribution Crediting Rate

Use in the Valuation

When we refer to inflation in this report, we are generally referring to price inflation. The inflation assumption has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage increases, payroll increase assumptions, and the interest crediting assumption for member contributions made after December 31, 2011. It also has a direct impact on the valuation results as it will be used to determine the expected floor COLA payment.

The long-term relationship between inflation and investment return has long been recognized by economists. The basic principle is that the investors demand a "real return" – the excess of actual investment returns over inflation. If inflation rates are expected to be high, investors will demand expected investment returns that are also expected to be high enough to exceed inflation, while lower inflation rates will result in lower demanded expected investment returns, at least in the long run.

The current assumption for inflation is 3.50% per year.

Historical Perspective

The data for inflation shown below is based on the national Consumer Price Index, US City Average, All Urban Consumers (CPI-U) as published by the Bureau of Labor Statistics. The data for periods ending in December of each year is documented in Exhibit 1 at the end of this section.

Although economic activities in general, and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and-long term trends are a factor to be considered in developing the inflation assumption.

There are numerous ways to review historical data, with significantly differing results. The tables below show the compounded annual inflation rate for various 10-year periods, as well as for the 75-year period ended in December 2013.

Decade	CPI Increase
2004-2013	2.4%
1994-2003	2.4%
1984-1993	3.7%
1974-1983	8.2%
1964-1973	4.1%
Prior 75 Years	
1939-2013	3.8%

Historical Perspective (continued)

The following graph shows historical national CPI increases. Note that the actual CPI increase has been less than 3.50% for all but one of the last 20 years.

Historical CPI-U
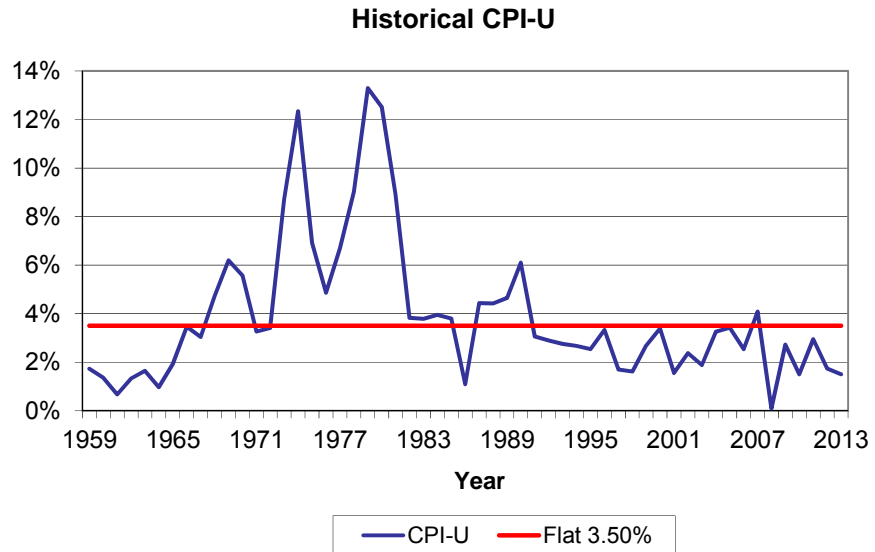
Peer System Comparison

According to the *Public Fund Survey* (a survey of approximately 100 statewide systems), the average inflation assumption for statewide systems has been steadily declining. As of the most recent study, the average inflation assumption is 3.17%, with the largest number of plans assuming 3.00%.

Looking at SCERS' peer systems (major cities in the western U.S.), the assumption of 3.00% is the most common, reflecting a shift downwards in assumptions over the last several years.

Comparison with Peer Systems
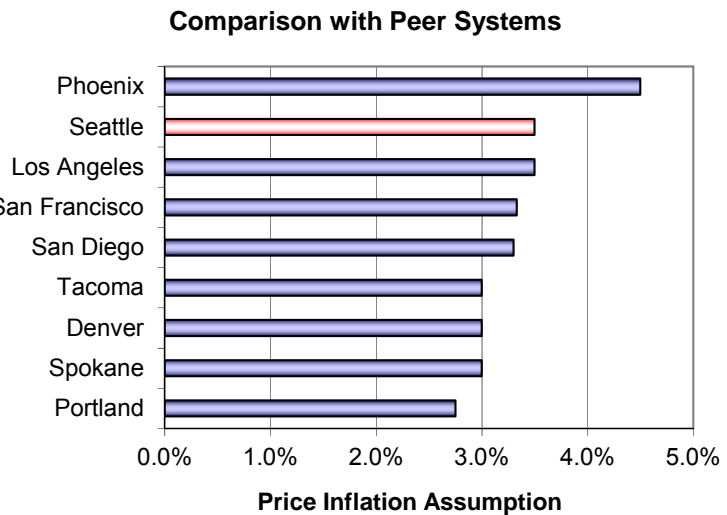
Forecasts of Inflation

Since the U.S. Treasury started issuing inflation indexed bonds, it is possible to determine the break-even rate of inflation anticipated by the financial markets by comparing the yields on inflation indexed bonds with traditional fixed government bonds. Current market prices as of April 2014 suggest investors expect inflation to be about 2.3% over the next 30 years and about 2.1% over the next 10 years.

We also considered other forecasts of inflation over a long-term time horizon. Although many economists have been forecasting inflation lower than the current assumption of 3.50%, these forecasts are generally over a shorter time period (10 years or less) than may be appropriate for a pension valuation. One economic forecast with a time frame long enough to suit our purposes is the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2013 Trustees Report, the projected average annual increase in the CPI over the next 75 years under the intermediate cost assumptions was 2.80% (with a stated reasonable range of 1.80% to 3.80%).

This long-term rate is generally consistent with the inflation being forecast by SCERS' investment consulting firm, New England Pension Consultants (NEPC), in their January 2014 capital market assumptions. NEPC is projecting 3.0% inflation over a shorter-term 5-7 year time horizon, and 3.25% inflation over a longer-term 30-year time horizon.

Recommendation

The consumer price inflation assumption impacts SCERS' funding as it is used to project the Floor COLA payments. It is also used to determine the investment return assumption and the wage growth assumption.

Given the future expectations of inflation, we recommend that the inflation assumption be reduced from 3.50% to 3.25% per year. We are also recommending a corresponding decrease in the general wage growth and investment return assumptions, as outlined in following sections. Note that lowering the inflation assumption without making a corresponding reduction to the investment return assumption effectively increases the real rate of return being assumed for funding purposes, which increases the future risk of not meeting the funding target.

We believe that there is a reasonable indication that inflation will be less than 3.25%. Therefore, we have shown an alternative assumption of 3.00%.

Recommendation (continued)	We believe that the recommended and alternative assumption satisfy both the current and the revised version of ASOP No. 27.

Consumer Price Inflation	
Current Assumption	3.50%
Proposed Assumption	3.25%
Alternative Assumption	3.00%

Crediting Rate on Member Contributions	For member contributions made on or after January 1, 2012, an annual interest credit is determined which may vary from year to year. This rate is based on the prior 12 months' average yield on 30-year U.S. Treasury Bonds, plus 0.25%, with a maximum credit interest rate equal to 5.75%. Note that, for member contributions made prior to this date, a flat 5.75% annual interest credit applies.

The current assumption for interest crediting for the post-2011 contributions is 5.00% per year. If the inflation assumption is reduced, we recommend reducing the interest credit assumption by the same amount, as the total yield on Treasuries will be influenced by inflation expectations and capital market assumptions. Thus, our recommendation for the assumed crediting rate on member contributions made on or after January 1, 2012 is 4.75% if inflation of 3.25% is adopted; or 4.50% if inflation of 3.00% is adopted. |

2. Wage Growth

Use in the Valuation

Estimates of future salaries are based on two types of assumptions: 1) general wage increase and 2) merit increase. Rates of increase in the general wage level of the membership are directly related to inflation, while individual salary increases due to promotion and longevity generally occur even in the absence of inflation. The promotion and longevity assumptions, referred to as the merit scale, will be reviewed with the other demographic assumptions.

The current assumption is for 0.50% wage growth above the inflation assumption.

Historical Perspective

We have used statistics from the Social Security Administration on the National Average Wage back to 1951. For years prior to 1951, we studied the Total Private Nonagricultural Wages as published in *Historical Statistics of the U.S., Colonial Times to 1970*.

There are numerous ways to review this data. For consistency with our observations of other indices, the table below shows the compounded annual rates of wage growth for various 10-year periods. The excess of wage growth over price inflation represents "productivity" or the increase in the standard of living (also called the real wage inflation rate).

Decade	Wage Growth	CPI Increase	Real Wage Inflation
2004-2013	2.9%	2.4%	0.5%
1994-2003	3.9%	2.4%	1.5%
1984-1993	4.3%	3.7%	0.6%
1974-1983	7.2%	8.2%	-1.0%
1964-1973	5.6%	4.1%	1.5%
Prior 75 Years			
1939-2013	5.2%	3.8%	1.4%

Peer System Comparison

The *Public Fund Survey* does not report the average wage growth assumption. Based on our experience with other systems, we believe the average for this group would be slightly lower than SCERS' assumption of 4.0%.

Looking at SCERS' peer systems (major cities in the western United States), the current wage growth assumption is in the mainstream, although somewhat toward the high end.

Comparison with Peer Systems
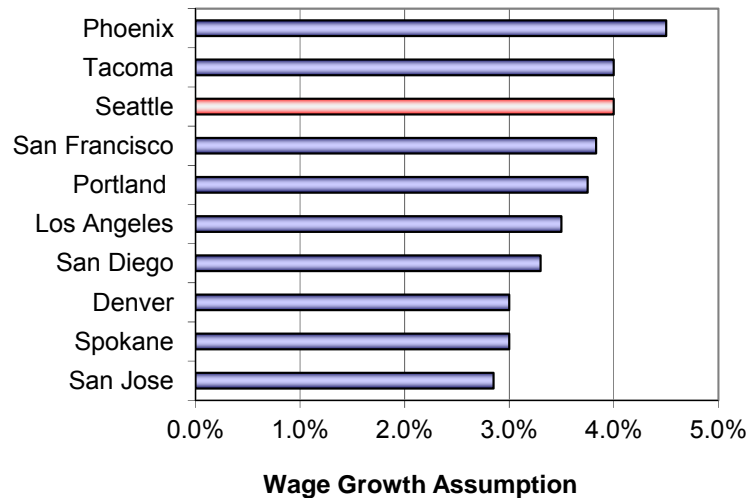
Forecasts of Future Wages

Wage inflation has been projected by the Office of the Chief Actuary of the Social Security Administration. In the 2013 Trustees Report, the long-term annual increase in the National Average Wage is estimated to be 1.1% higher than the Social Security intermediate inflation assumption of 2.8% per year. The range of the assumed real wage growth in the 2013 Trustees Report was from 0.5% to 1.7% per year.

Reasonable Range and Recommendation

We believe that a wage inflation assumption between 0.00% and 1.25% is reasonable for the actuarial valuation. Real wage inflation in recent years has been very low or negative; however, over the last 50 years it has been approximately equal to SCERS' current assumption of 0.50%. We believe future real wage inflation will remain around this level and are proposing no change in the assumption.

Real Wage Inflation Rate	
Current Assumption	0.50%
Proposed Assumption	0.50%

Reasonable Range and Recommendation (continued)

The wage growth assumption is the total of the consumer price inflation assumption and the real wage inflation rate. If the real wage inflation assumption remains 0.50% and the price inflation assumption remains at 3.50%, this would result in a total wage growth assumption of 4.00%. If the price inflation assumption is lowered to 3.25% as recommended, and the real wage inflation is held at 0.50%, the total wage growth assumption would be 3.75%. If the price inflation assumption was further lowered to 3.00% and the real wage inflation is held at 0.50%, the total wage growth assumption would be 3.50%.

3. Active Membership Growth and Payroll Increase Assumption

Use in the Valuation

The membership growth assumption does not impact the actuarial accrued liability, the UAAL, or the normal cost rate. However, it does impact the calculation of the required contribution rate to finance the UAAL. This is because it is treated as a component of the payroll increase assumption.

When a membership growth assumption is applied, the total aggregate payroll of the system is expected to increase by both the payroll growth assumption, and the membership growth assumption. This effectively reduces the calculated contribution rate as a percentage of payroll needed to finance the UAAL because payroll for anticipated future members is already being taken into account as of the valuation.

The current assumption in use by SCERS is that the active population will grow at a rate of 1.0% per year. This assumption was implemented beginning with the January 1, 2011 actuarial valuation. The only impact of this assumption on the valuation results is to reduce the calculated contribution rate needed since we assume greater future payroll on which to make UAAL contributions due to membership growth.

Financial Disclosure under GASB

The Government Accounting Standards Board (GASB) does not allow for a non-zero membership growth assumption in the calculation of the Annual Required Contribution (ARC) for plans that fund on a level percentage of pay basis for purposes of financial disclosure. Although this does not influence funding valuation calculations, we believe this has certainly contributed to the fact that very few public retirement systems use an active membership growth assumption.

Historical Perspective

Between 1948 and 2012, we estimate that active membership in SCERS has increased 1.0% per year on average. However, more recent annual patterns of growth have been much smaller. Over the last 20 years, average annual membership growth has been only 0.28% per year. In the period since 2000 only, the average annual growth in membership has been a decline of 0.18% per year.

Historical Perspective (continued)

This historical growth is illustrated in the chart below.

SCERS Active Membership Growth		
Valuation Year	**Contributing Members**	**Annual Growth***
1994	8,025	
1996	8,078	0.33%
1998	7,926	-0.95%
1999	7,779	-1.85%
2000	8,669	11.44%
2002	8,758	0.51%
2004	8,382	-2.17%
2006	8,521	0.83%
2007	8,587	0.39%
2008	8,842	2.97%
2010	9,071	1.29%
2011	8,599	-5.20%
2012	8,430	-1.97%
2013	8,465	0.42%

*Equivalent annual growth; for data spanning two-year periods, annual growth assumes even growth over both years.

Average Annual Growth Over Last 20 Years	**0.28%**

Comments

Very few public retirement systems have a non-zero active membership growth assumption. This has likely been influenced at least to some extent by the GASB reporting requirements.

If a positive growth in active membership is assumed and future growth is less than the assumption, this will push costs off in to the future (all other things being equal). Conversely, if no growth in active membership is assumed and there is future growth, this will push savings off into the future. An assumption of growth in active membership results in a lower calculated contribution rate as a level percentage of pay, all else being equal.

We recommend that SCERS adopt an active membership growth assumption of 0.00%. This way, if active membership growth does occur in the future, the gains on the contribution rate will be recognized as such growth occurs, rather than being pre-recognized gains in the valuation that may not actually occur. We have also shown the impact of an alternative active membership growth assumption of 0.50% per year. We believe that either of these assumptions would be reasonable and would satisfy the requirements of ASOP 27, although we believe a 0.00% active membership growth is a better assumption for funding SCERS.

Payroll Increase Assumption	The assumption for growth in the aggregate payroll of SCERS is a combination of the wage growth and active membership growth assumptions (currently 4.00% and 1.00%, respectively). The current payroll increase assumption is therefore equal to 5.04%. Note that the components are multiplicative, so the assumption is slightly greater than just adding the two together.
Reasonable Range and Recommendation for Payroll Growth Assumption	We recommend that the payroll increase assumption remain equal to the combined impact of the wage growth assumption and assumed changes in active membership. Since our recommendations for these two components are 3.75% and 0.00%, we recommend that the payroll growth assumption be set at 3.75%.

Real Wage Inflation Rate	
Current Assumption	0.50%
Proposed Assumption	3.75%
Alternative Assumptions	3.50% and 4.02%

4. Investment Return

Use in the Valuation

The investment return assumption is one of the primary determinants in the calculation of the expected cost of the System's benefits, providing a discount of the future benefit payments that reflects the time value of money. This assumption has a direct impact on the calculation of liabilities, normal costs, member contribution rates, and the factors for optional forms of benefits. The current investment return assumption for SCERS is 7.75% per year, net of investment-related expenses.

Method to Develop Recommended Investment Return

Per the guidance of ASOP No. 27, we have determined a recommendation for the long-term investment return assumption, as well as an alternative investment return assumption. We believe that either of these assumptions is reasonable for use in funding calculations for SCERS; however, it is important that the reasonableness of the investment return assumption be considered not only in isolation, but also in connection with the other economic assumptions being adopted.

Under the current version of ASOP No. 27, the typical practice in developing an economic assumption involves the determination of a best-estimate range into which the investment return is more likely than not to fall. We believe that certain assumptions that might fall into this best-estimate range would not be considered reasonable under the new version of ASOP No. 27, effective beginning with the next (2015) actuarial valuation. In other words, the new version of ASOP No. 27 has a somewhat narrower definition of what constitutes a reasonable assumption. Therefore, we have adhered to the guidance of the new ASOP No. 27 where this standard is narrower than the current standard, so that any recommendations made in this report satisfy the reasonableness criteria of both versions of the standard. Note that early implementation of revisions to the actuarial standards of practice is encouraged.

The revised version of ASOP No. 27 indicates that an assumption is reasonable only if it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic, although provision for adverse deviation is allowed).

Method to Develop Recommended Investment Return (continued)

The determination of the recommended investment return assumption uses information regarding SCERS' ultimate target asset allocation. This allocation, as provided to us by SCERS staff, is summarized in the following chart:

SCERS Target Asset Allocation

- Traditional US Equity
- Low Volatility Equity
- Non-US Equity
- Fixed Income
- Real Return
- Private Equity
- Real Estate
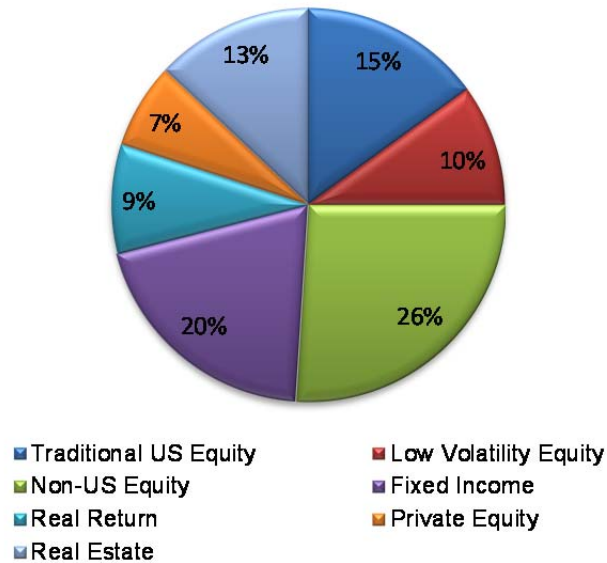
In our analysis of the long-term investment return assumption, we have used the forward-looking capital market assumptions developed by Milliman's investment practice, as well as the capital market assumptions and forecasting views of SCERS' independent investment consultant, New England Pension Consultants (NEPC).

We have used a model developed by Milliman's investment practice, which assumes the portfolio is re-balanced annually and that annual returns are lognormally distributed and independent from year-to-year, in order to develop expected percentiles for the long-term distribution of annualized returns. As inputs to this model, we have used the long-term (30-year time horizon) capital market assumptions developed by Milliman.

Method to Develop Recommended Investment Return (continued)

The capital market assumptions were combined with the target asset allocation policy to generate expected portfolio returns. These rates of return are subject to significant year-to-year volatility as measured by the standard deviation.

We have mapped SCERS' target asset allocation to asset classes for which Milliman has developed long-term capital market assumptions, based on our understanding of the nature of the various investments and additional information provided by NEPC. The mapped allocation, as well as Milliman's long-term capital market assumptions for real return by asset class and the overall long-term expected return on the portfolio, are shown in the chart below. The results shown below reflect the recommended 3.25% long-term inflation assumption using the building block method (see discussion below for details).

Milliman Capital Market Assumptions			
Asset Category	Percentage Allocation	Geometric Expected Return, Gross of Fees**	Standard Deviation
Core Bonds	20%	4.90%	6.60%
Broad US Equities	10%	7.60%	18.90%
Large Cap US Equities	13%	7.50%	17.80%
Small Cap US Equities	2%	7.75%	26.20%
Developed Foreign Equities	22%	7.50%	20.40%
Emerging Market Equities	4%	8.25%	31.15%
Private Equity	7%	8.75%	30.00%
Real Return	3%	6.00%	10.00%
Real Estate (Property)	13%	7.00%	13.00%
Commodities	6%	5.25%	19.55%
Portfolio- Gross of Investment Expenses*	100%	7.72%	11.52%
Reduction for Investment Expenses		-0.40%	
Portfolio- Net of Investment Expenses*		**7.32%**	**11.52%**

* As adjusted to reflect the recommended long-term inflation assumption of 3.25% via the building block method.

**Geometric expected return by asset class reflects a long-term assumed rate of inflation of 2.50%.

Milliman's expected portfolio return of 7.32% compares with a long-term expected return of 7.50% calculated by NEPC for SCERS' target asset allocation, after adjusting for assumed investment expenses of 0.40%. These numbers both assume 3.25% long-term future inflation. The difference in these numbers is due to some differences in capital market assumptions by asset class; capital market assumptions tend to vary between investment consultants, and overall, we consider Milliman's 7.32% versus NEPC's 7.50% to be reasonably consistent with one another. We have considered both Milliman's and NEPC's long-term expected rates of return in making our recommendations for the investment return assumption.

Method to Develop Recommended Investment Return (continued)

We have several comments regarding the above results:

■ As mentioned above, we have adjusted the results of Milliman's capital market return assumptions to reflect the recommended long-term assumed inflation assumption of 3.25% by using the building block method, since Milliman's investment consultants use an inflation assumption of 2.50% for these capital market assumptions. Under the building block method, the assumed rate of inflation is added onto the "real" portfolio rate of return (the expected portfolio return in excess of inflation). This method, while computationally transparent and widely used, is somewhat aggressive in that it implicitly assumes that the changing rate of inflation will not itself influence the real rates of return by asset class. In reality, a higher rate of inflation may itself cause changes in real rates of return (for instance, real bond yields may be depressed in a high inflationary environment).

■ We have calculated an investment expense ratio of 0.40%, based on the last three years of investment expenses reported in the SCERS Statement of Changes in Plan Net Assets. Given that SCERS at the start of 2014 changed investment consultants (from PCA to NEPC), the investment expenses going forward may differ. It is our understanding based on conversations with staff that the future investment expenses may be higher given a more active management style by NEPC; however, we cannot comment with any certainty regarding future levels of investment expense. It is important to keep in mind that an increase in investment expenses would further reduce the expected rates of return shown above.

■ The expected rate of return of 7.32% shown above represents the 50th percentile of portfolio returns using the methodology described above. The 50th percentile represents the rate of return that is approximately 50% likely to be met or exceeded in the future; that is to say, the model shows an equal likelihood that this assumption will not be met, as the likelihood that it will be met or exceeded. The new version of ASOP No. 27 makes explicit mention of the fact that it may be reasonable to reduce the long-term investment return assumption by a margin to provide for adverse deviation. By using an investment return assumption lower than the 50th percentile rate of 7.32% (such as the alternative assumption of 7.25%), SCERS would increase the likelihood that its assumption would be met or exceeded in the future.

Method to Develop Recommended Investment Return (continued)

Milliman's geometric mean portfolio return prior to any subsequent adjustments is 6.97%. This number is then adjusted upwards by 0.75% to account for the difference between the capital market inflation expectation of 2.50% and the recommended long-term inflation assumption of 3.25%, resulting in a long-term gross rate of expected return of 7.72%. This is then adjusted downwards by 0.40% assumed investment expenses to reflect the ultimate net expected rate of return of 7.32%.

Due to the volatility associated with the asset allocation, the range of probable outcomes is quite large. For example, over a 1-year period the model estimates a 5% chance the rate of return will be less than -9.91% and a 5% chance it will be greater than 27.86%. As the time horizon lengthens, the range of the cumulative average results narrows. The results of various key percentiles over several time horizons are summarized in the following chart.

Expected Investment Return based on Capital Market Assumptions, Net of Assumed Investment Expenses

Percentile Results for Annual Rate of Return using Milliman Capital Market Assumptions*		
1-year time horizon	**10-year time horizon**	**30-year time horizon**
5th percentile -9.91%	1.54%	3.95%
25th percentile -0.11%	4.91%	5.92%
50th percentile 7.32%	7.32%	7.32%
75th percentile 15.31%	9.79%	8.74%
95th percentile 27.86%	13.43%	10.81%

As adjusted via the building block method to reflect the recommended 3.25% inflation assumption; returns shown are net of assumed investment expenses of 0.40%.

Over a 30-year time horizon, we estimate there is a 25% chance the nominal rate of return will be less than 5.92% and a 25% chance the return will be greater than 8.74%.

The long-term (30-year) assumed annual rate of return on SCERS' target asset allocation according to the capital market assumptions and views of NEPC is 7.90%, gross of expenses, which equates to a 7.50% expected long-term total rate of return net of investment fees of 0.40%.

Investment-Related Expenses

The investment return assumption used for the valuation is assumed to be net of all investment-related expenses. The following table shows the ratio of investment expenses to the fair market value of SCERS assets over the last three fiscal years ending December 31. It is our understanding that, prior to 2011, some investment expenses were not being explicitly booked in the Statement of Changes in Plan Net Assets. Therefore we have only shown years since 2011 since these represent a more accurate picture of ongoing investment expenses. The expense ratio is calculated as the total expense divided by the average asset balance at fair market value.

($millions)			
Year	Market Assets*	Inv. Expense	Expense Ratio
2011	$ 1,783.2	$ 7.49	0.42%
2012	$ 1,852.5	$ 7.06	0.38%
2013	$ 2,082.7	$ 8.20	0.39%

Average of beginning of year and end of year values.

In line with recent experience, we are proposing the annual investment expense assumption be set at 0.40% of assets. It should be noted that this assumption may experience further fluctuation given that SCERS has engaged a new investment consultant (NEPC) beginning in 2014.

This assumption does not have a direct impact on the actuarial valuation results, but it does provide a measure of gross return on investments that will be needed to meet the actuarial assumption used for the valuation. For example, if the investment return assumption is set equal to 7.50%, then SCERS would need to earn a gross return on its assets of 7.90% in order to net the 7.50% for funding purposes.

Administrative Expenses

Future administrative expenses are recognized in the normal cost rate. The expected dollar amount is expressed as a percent of payroll. Based on the last 10 years, the administrative expenses have been:

($millions)			
Year	Covered Payroll	Admin. Expense	Expense Ratio
2003	$425	$1.84	0.43%
2004	457	1.76	0.39
2005	447	2.00	0.45
2006	473	1.84	0.39
2007	500	1.83	0.37
2008	572	2.04	0.36
2009	581	2.42	0.42
2010	563	3.30	0.59
2011	557	3.47	0.62
2012	568	3.34	0.59

Administrative Expenses (continued)

The ratio of administrative expenses to covered payroll has been somewhat higher over the most recent several years. Therefore, we are proposing an increase from 0.40% of payroll to 0.60% of payroll for this assumption.

Peer System Comparison

According to the *Public Fund Survey*, the average investment return assumption for statewide systems has been slowly declining. As of the most recent study, the average rate is 7.75%, although we believe this average has declined slightly since the time of the study.

Looking at SCERS' peer systems (major cities in the western United States), the current investment return assumption is also in the mainstream, although slightly on the high side.

Peer System Comparison

Investment Return Assumption
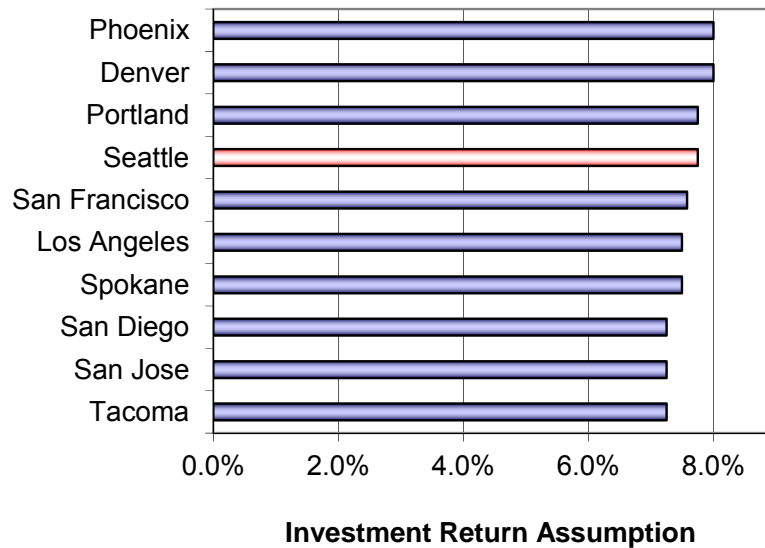
Other Factors for Board Consideration	The choice of assumptions depends on a system's risk tolerance. The final determination on whether or not a set of assumptions was either conservative or aggressive will only be borne out by future experience.
	It should also be noted that the investment return assumption is used in the calculation of option factors, service purchases, and the minimum benefit based on the value of twice the member contributions. If the investment return is changed and the change is reflected in these factors, this could either increase or decrease the member's (and consequently the City's) ultimate cost.
Conclusion	Based on SCERS' target asset allocation, we are recommending a reduction in the investment return assumption to 7.50%. We have also shown the impact of reducing the investment return assumption to 7.25%. This alternative assumption incorporates a small margin for adverse deviation, thereby increasing the probability that the long-term rate of return would be achieved.

Investment Return (net of investment expenses)	
Current Assumption	7.75%
Proposed Assumption	**7.50%**
Alternative Assumption	7.25%

Section 3:   Salary Increases Due to Promotion and Longevity (Merit)

Estimates of future salaries are based on assumptions for two types of increases:

1) Increases in each individual's salary due to promotion or longevity, which occur even in the absence of inflation (merit increases); and

2) Increases in the general wage level of the membership, which are directly related to inflation and increases in productivity.

In Section 2 we propose that the second of these rates, the general wage inflation, be reduced from 4.00% to 3.75%.

The purpose of this section is to examine the first source of these increases, due to promotion or longevity.

Results

Exhibit 3-1 shows the actual merit increases over the four-year study period. Also shown on this exhibit are the actual merit increases from the previous experience study. Increases were higher earlier in a member's career (lower service) and then decreased over time, consistent with the current assumptions; however, the actual increases were somewhat lower than the increases expected by the assumptions.

Recommendation

At the time of the previous investigation of experience study, per discussions with SCERS staff it was our understanding that some reductions in salary increases due to the recession had been delayed, and were likely to flow through the data in years subsequent to the previous study. Based on the current study results, we believe the slightly smaller than expected increases, particularly in the early years of service, are likely due to the influence of this short-term pattern.

Our goal is to not give undue weight to recent experience, as indicated by the guidelines of the actuarial standards of practice. Moreover, it has been our observation that there is significant variability in merit increases from one study to the next. We are recommending no changes to the rates of merit-based salary increase at this time. We recommend careful consideration be given to this assumption in the next investigation of experience study in order to determine whether the lower-than-expected salary increases at lower service levels are part of a longer-term pattern.

The recommended rates are shown on Exhibit 3-1.

Exhibit 3-1

**Total Annual Rates of Increase in Salary
Due to Merit and Longevity**

Males and Females
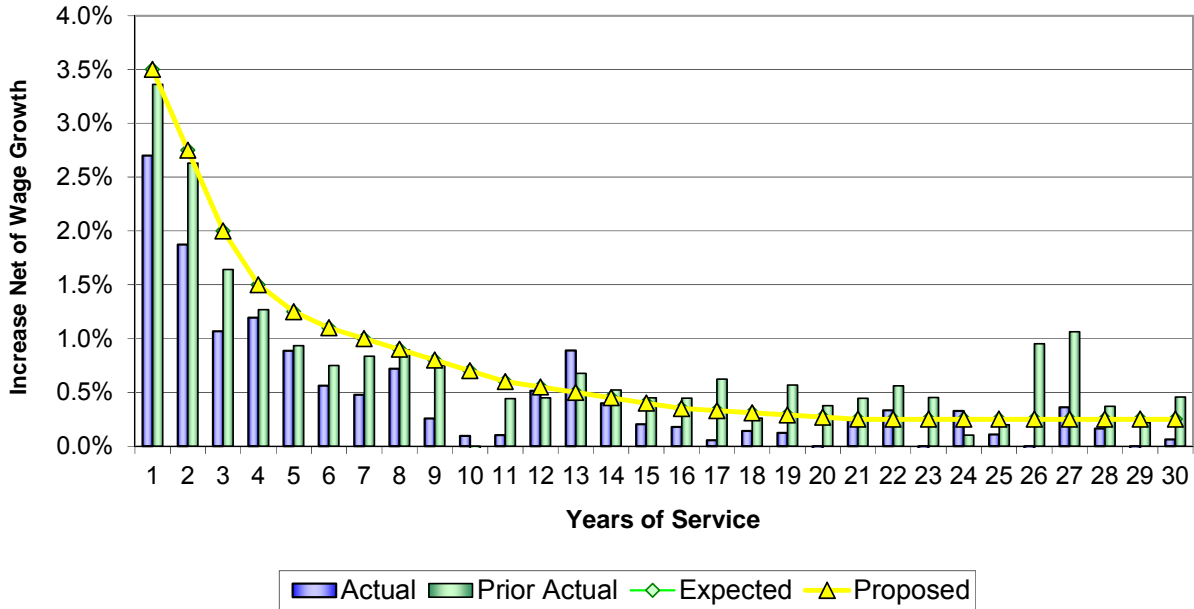
Section 4: Death while Active
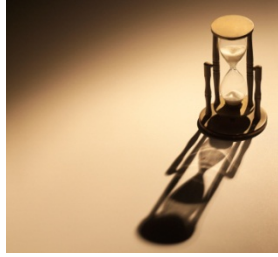
In this section, we discuss the analysis of actual and expected death rates of active members. Mortality among active members has only a very small financial impact on the system's liabilities.

For current and future retired members, mortality has a much more significant impact. This section only refers to the experience of active members. An analysis of mortality for retired and disabled members is found in Section 5 of this report.

Results

For both male and female active members, fewer deaths than expected occurred. Overall, there were 42 deaths from active status during the study period, while the assumptions predicted 56 deaths. The results are shown in the following table.

Deaths While Active			
Gender	Actual	Expected	Act/Exp
Male	24	33	72%
Female	18	23	78%
Total	**42**	**56**	**75%**

Recommendation

Although this is a small sample, the overall results are relatively consistent with the number of active deaths in the previous study. The current assumptions use the RP 2000 Employee Tables for Males and Females, with a three-year setback to account for slightly better mortality. Based on the results of this study, we are recommending a six-year setback be used instead.

Both the current and the proposed assumptions are projected for expected future improvements in mortality using Projection Scale AA on a fully generational basis.

The proposed rates result in an Actual-to-Proposed ratio of 93%, as shown in the following table.

Deaths While Active					
Gender	Actual	Expected	Act/Exp	Proposed	Act/Prop
Male	24	33	72%	27	91%
Female	18	23	78%	18	101%
Total	**42**	**56**	**75%**	**45**	**93%**

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Section 5:   Retired Mortality

In this section, we discuss the analysis of actual and expected rates of death among retired members. The assumption for retired mortality is an important one, as it is a key driver of actuarial liabilities. The assumption for retiree life expectancy directly determines the number of years over which we expect retirees will receive benefit payments.

Recent trends have seen ongoing increases in retiree life expectancy (decreases in rates of mortality). The current assumptions, based on the prior investigation of experience study, use generational projections of expected future improvements in mortality according to Projection Scale AA.

Exhibits 5-1 through 5-3 show the actual and expected rates of mortality among service and disability retirees as follows:

Exhibit 5-1:   Mortality Among Service Retirees – Males

Exhibit 5-2:   Mortality Among Service Retirees – Females

Exhibit 5-3:   Mortality Among Disabled Retirees – Males and Females

Results and Recommendations

The results of the current study show that the actual retired mortality experience during the study period was reasonably consistent with the rates of mortality predicted by the current assumptions.

Since an explicit assumption for expected future mortality improvement is made, we feel comfortable with the continued use of the current assumptions for each group considered in this section, with the exception of the Male Service Retiree group. For this group, we are recommending one year of additional setback in the mortality rates to better reflect experience during the study period.

Note that the actual/proposed ratio for each of the Service Retiree groups exceeds 100%. Generally speaking, all else being equal, we would prefer a ratio greater than or equal to 100%, as this indicates that more deaths occur (actual) than had been anticipated (proposed) by the assumption, so that enough money has been set aside to pay ongoing benefits. However, although the count basis actual/proposed ratio shown in this analysis is higher than 100%, there is generally known to be a well-established correlation between higher benefit level and lower rates of mortality. Therefore, for purposes of the actuarial valuation, an actual/proposed ratio higher than 100% does not necessarily mean we are explicitly assuming fewer deaths than expected on a liability-weighted basis. We believe the margins shown in the recommended assumptions are reasonable for valuation purposes, particularly in light of the fact that benefit-weighted mortality will reduce the margin shown in the actual/proposed ratio.

Results and Recommendations (continued)

In previous actuarial valuations, we have used the same mortality assumptions for beneficiaries as we used for service retirees. We recommend continuing this practice. It is impractical to study beneficiary mortality, because we can obtain reliable data only for beneficiaries who survive the related retiree, not for beneficiaries who predecease the related retiree. This results in an undercount of beneficiary deaths. A study using such incomplete data gives misleading results. Moreover, there is no reason to believe that the mortality of beneficiaries should be significantly different from that of service retirees of the same sex.

Exhibit 5-1

Mortality among Service Retirees – Males
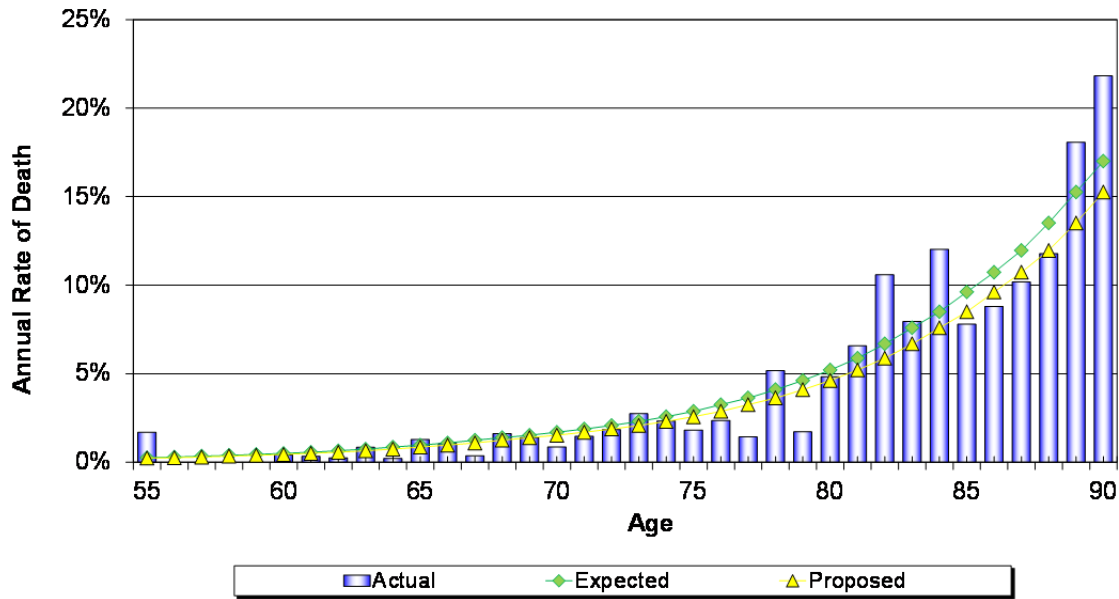
	Expected	Actual	Proposed
Total Count	416	398	372
Actual / Expected	96%		107%

Expected Mortality = RP2000 Combined Healthy Mortality Male set back one year.
Proposed Mortality = RP2000 Combined Healthy Mortality Male set back two years.

Generational projection with Scale AA assumed.

Exhibit 5-2

Mortality among Service Retirees – Females
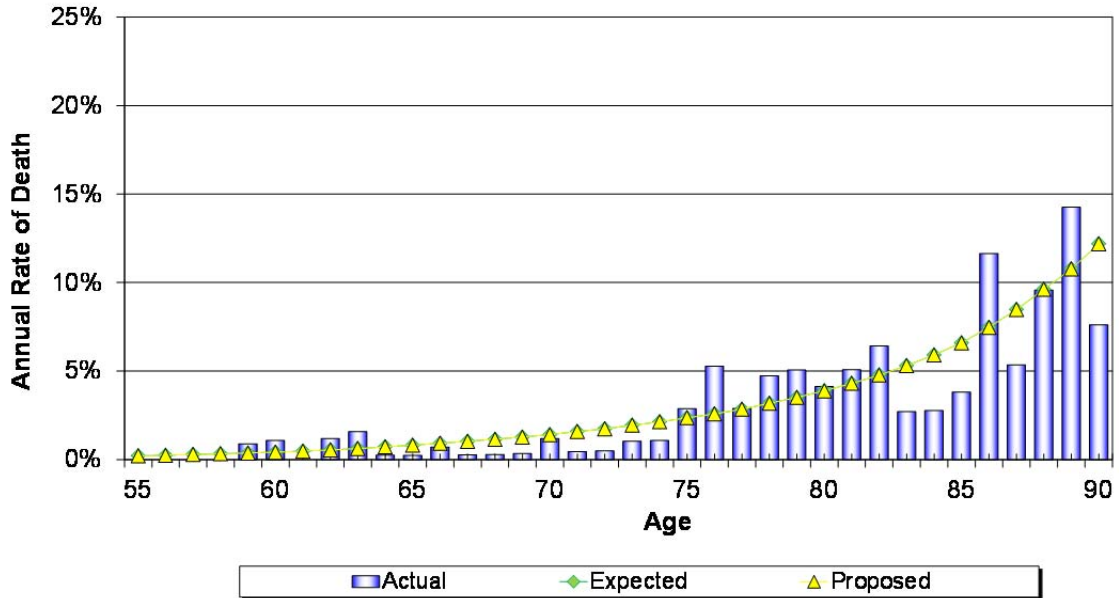
	Expected	Actual	Proposed
Total Count	197	206	No
Actual / Expected	105%		Change

Expected Mortality = RP2000 Combined Healthy Females set back one year.
Proposed Mortality = RP2000 Combined Healthy Females set back one year.

Generational projection with Scale AA assumed.

Exhibit 5-3

Mortality among Disabled Retirees – Males and Females
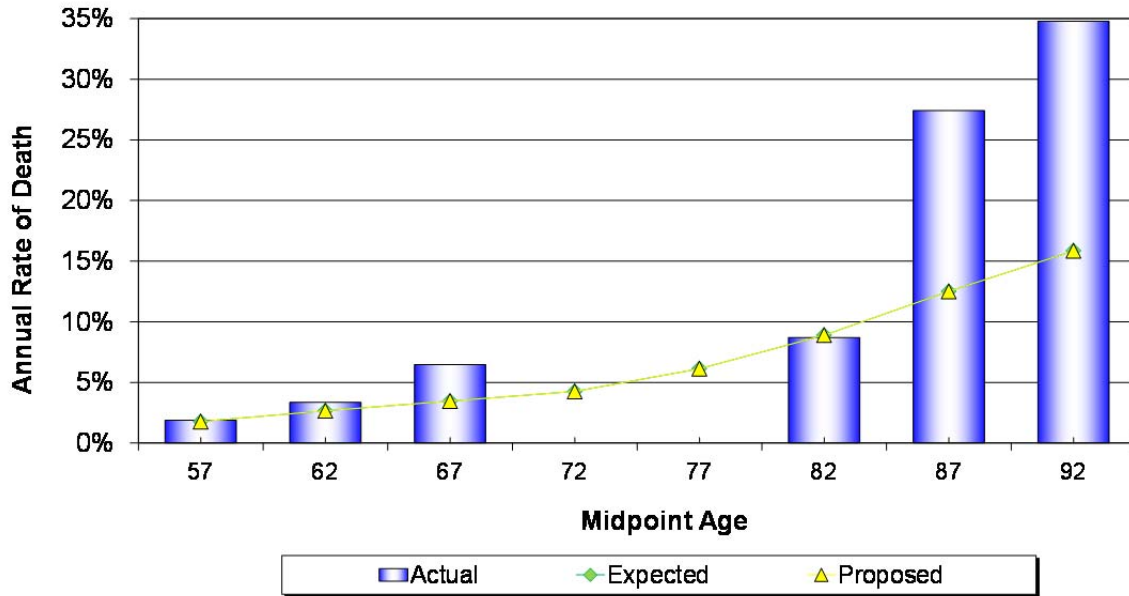
	Expected	Actual	Proposed
Total Count	10	11	No
Actual / Expected	110%		Change

Expected Mortality = RP2000 Disabled Mortality for Males and Females, set back 4 years.
Proposed Mortality = RP2000 Disabled Mortality for Males and Females, set back 4 years.

Generational projection with Scale AA assumed.

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Section 6:   Service Retirements

Exhibits 6-1 through 6-6 show the actual and expected rates of service retirement. Our analysis of rates of service retirement was by attained age. We study the retirement rates for members eligible to retire with a reduced benefit separately from the rates for members eligible to retire with a full 2% formula benefit. Additionally, we also study retirements for those with 30 or more years of service separately.

Exhibits 6-1 through 6-6 study retirements for the following eligibility groups:

Exhibit 6-1: Reduced Benefits – Male

Exhibit 6-2: Reduced Benefits – Female

Exhibit 6-3: Full Benefits (< 30 Years of Service) – Males

Exhibit 6-4: Full Benefits (< 30 Years of Service) – Females

Exhibit 6-5: Full Benefits (> 30 Years of Service) – Males

Exhibit 6-6: Full Benefits (> 30 Years of Service) – Females

Results – Reduced Benefits

The requirements for early retirement with a reduced benefit are age 52 with 20 years of service, age 57 with 10 years of service, or age 62 with five years of service. Exhibits 6-1 and 6-2 show the rates of retirement for members eligible to retire with a reduced benefit. The actual pattern and number of retirements was lower than expected over the study period, with the total number of reduced retirements equal to 80% of the expected amount.

Retirements with Reduced Benefits			
Gender	Actual	Expected	Act/Exp
Male	123	167	74%
Female	130	150	87%
Total	**253**	**317**	**80%**

Recommendation – Reduced Benefits

Based on the results of the study, we are recommending a reduction in the rates of reduced retirement. In making our recommendation, we considered the results of both the current and prior investigation of experience studies (as shown in the graphs below), as well as the recent economic uncertainty that may have influenced the lower rates of retirement. The proposed rates result in an Actual-to-Proposed ratio of 89%, as shown in the following table, and are shown in Exhibits 6-1 and 6-2.

Retirements with Reduced Benefits			
Gender	Actual	Proposed	Act/Prop
Male	123	145	85%
Female	130	138	94%
Total	**253**	**283**	**89%**

Exhibit 6-1

Retirement with Reduced Benefits – Males
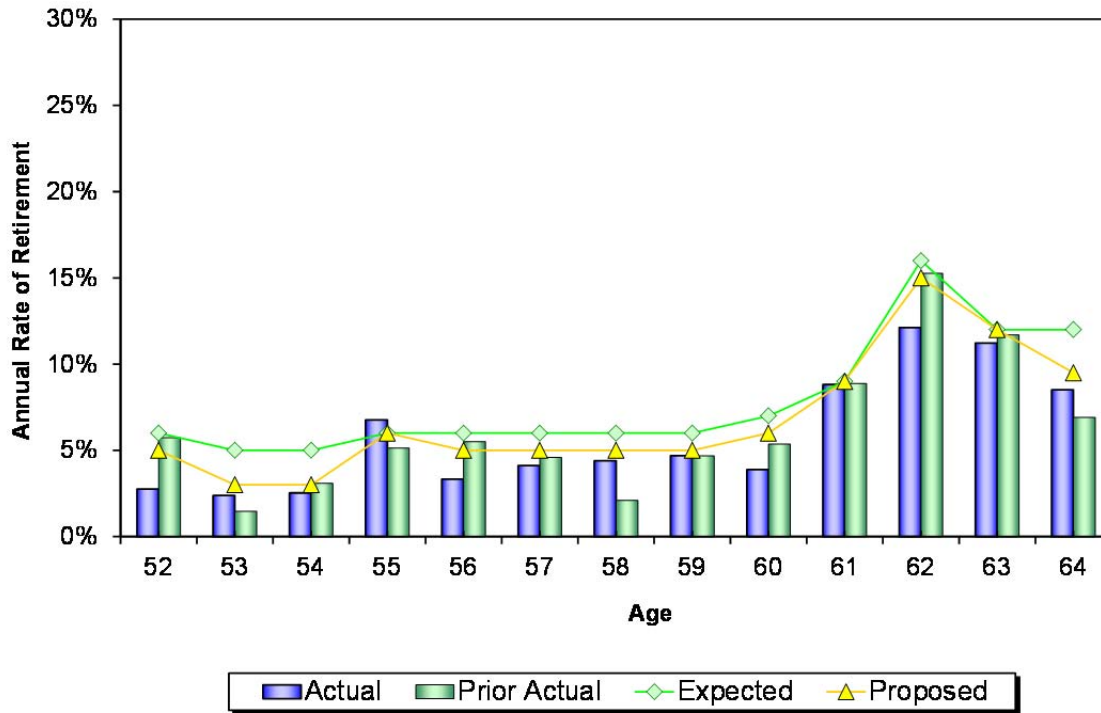
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	167	123	145
Actual / Expected	74%		85%

Exhibit 6-2

Retirement with Reduced Benefits – Females
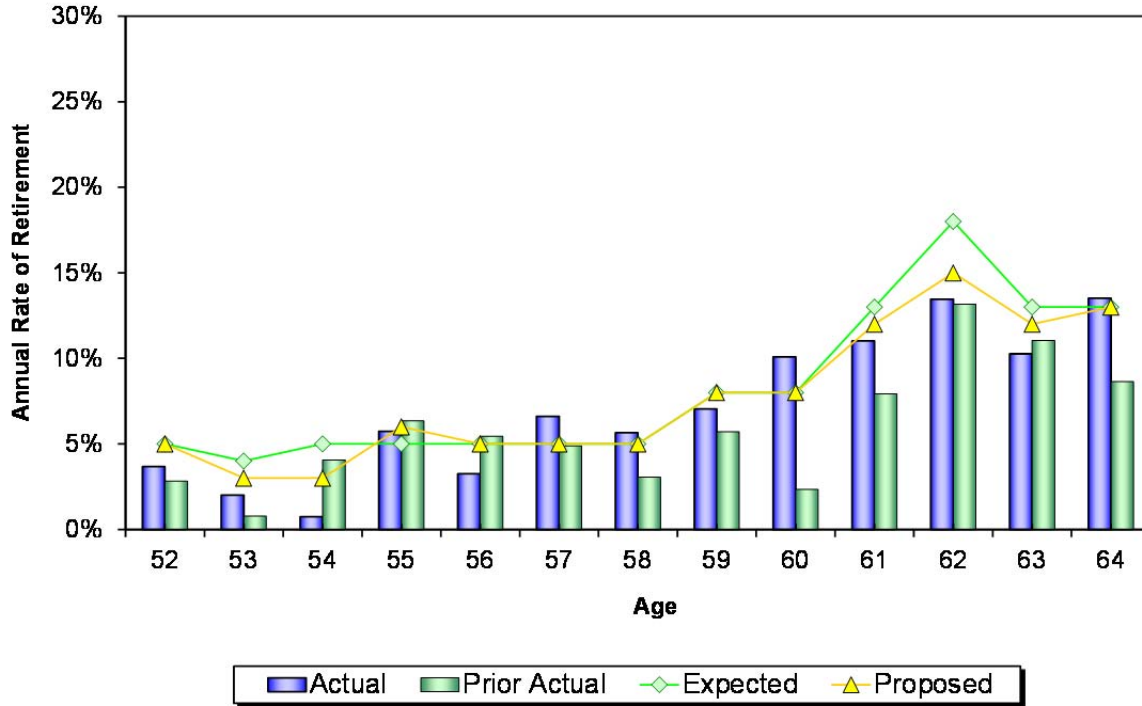
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	150	130	138
Actual / Expected	87%		94%

Results – Unreduced Benefits

Members who are eligible for the full 2% service benefit with no reduction have higher assumed retirement rates than those only eligible for reduced benefits. This is consistent with the results of this study as shown in Exhibits 6-3 and 6-4 (full benefits) when compared to Exhibits 6-1 and 6-2 (reduced benefits).

We split the group eligible for unreduced benefits into those with less than and those with more 30 years of service. As in the last experience study, we found that members with 30 years of service have a greater probability of retirement than those with less than 30 years of service. This is likely due to the fact that members who have 30 or more years of service are capped at 60% of pay under the basic benefit formula.

For most groups the actual number of retirements differed somewhat from the prediction of the current assumptions, with some ages having higher than expected retirement and other ages having lower than expected retirement. In total, the aggregate number of actual retirements with unreduced benefits was close to the number expected.

Retirements with Unreduced Benefits				
Gender	Service	Actual	Expected	Act/Exp
Male	< 30 yrs	241	256	94%
Female	< 30 yrs	313	277	113%
Male	>= 30 yrs	242	246	98%
Female	>= 30 yrs	200	221	90%
Total		**442**	**467**	**95%**

Recommendation – Unreduced Benefits

We are recommending the rates of unreduced retirement be adjusted for most groups to better reflect the experience. In most cases, we have recommended a partial reflection of recent experience to bring the assumptions more in line with the recently observed pattern. We are not recommending any change in rates for Males with 30 or more years of service.

A comparison of the actual and proposed retirements under the recommended assumptions is shown in the table below.

Retirements with Unreduced Benefits				
Gender	Service	Actual	Proposed	Act/Prop
Male	< 30 yrs	241	249	97%
Female	< 30 yrs	313	285	110%
Male	>= 30 yrs	242	246	98%
Female	>= 30 yrs	200	209	96%
Total		**442**	**455**	**97%**

Exhibit 6-3

Retirement with Unreduced Benefits
Males with Less than 30 Years of Service
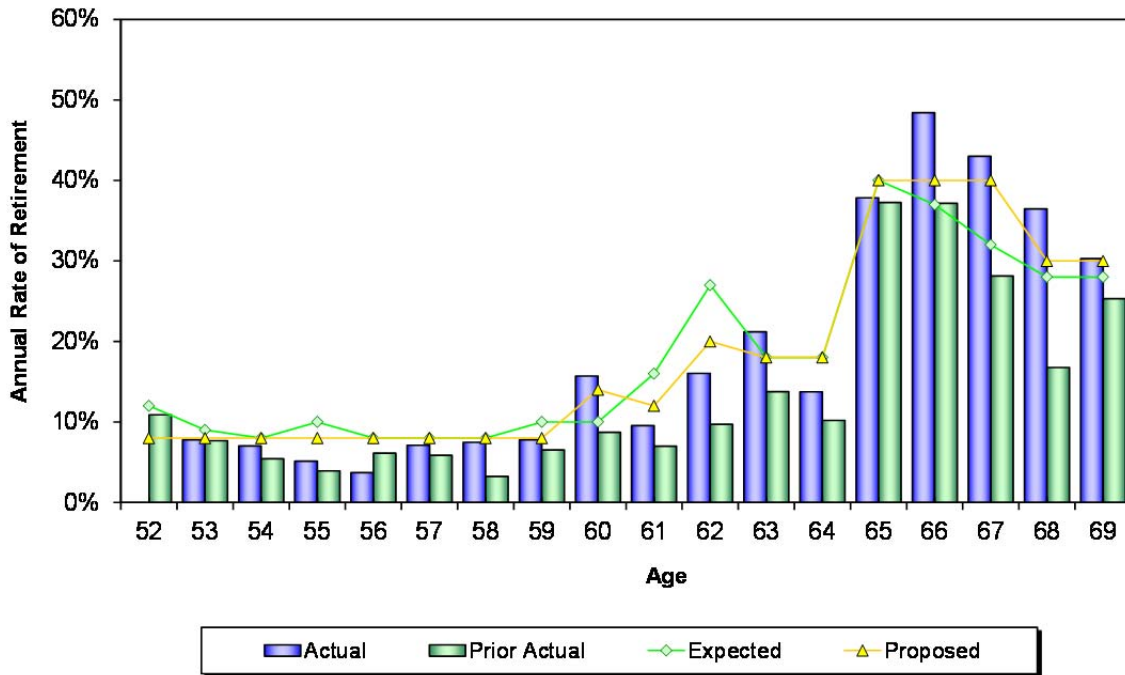
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	256	241	249
Actual / Expected	94%		97%

43

Exhibit 6-4

Retirement with Unreduced Benefits
Females with Less than 30 Years of Service
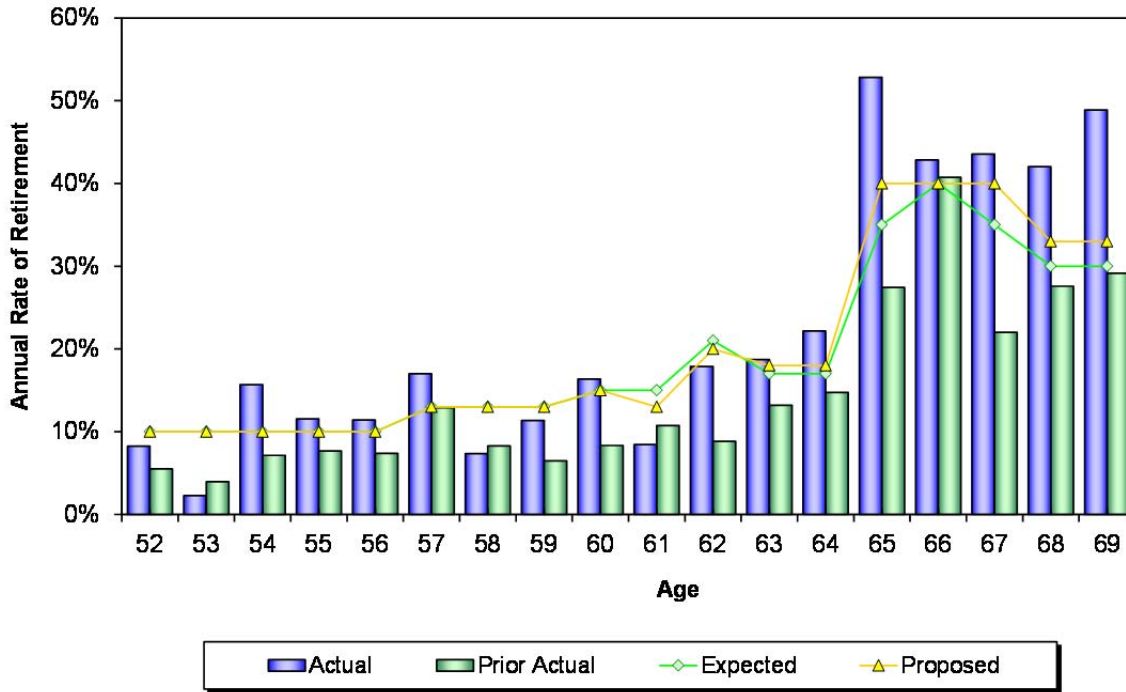
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	277	313	285
Actual / Expected	113%		110%

Exhibit 6-5

Retirement with Unreduced Benefits
Males with 30 Years of Service or More
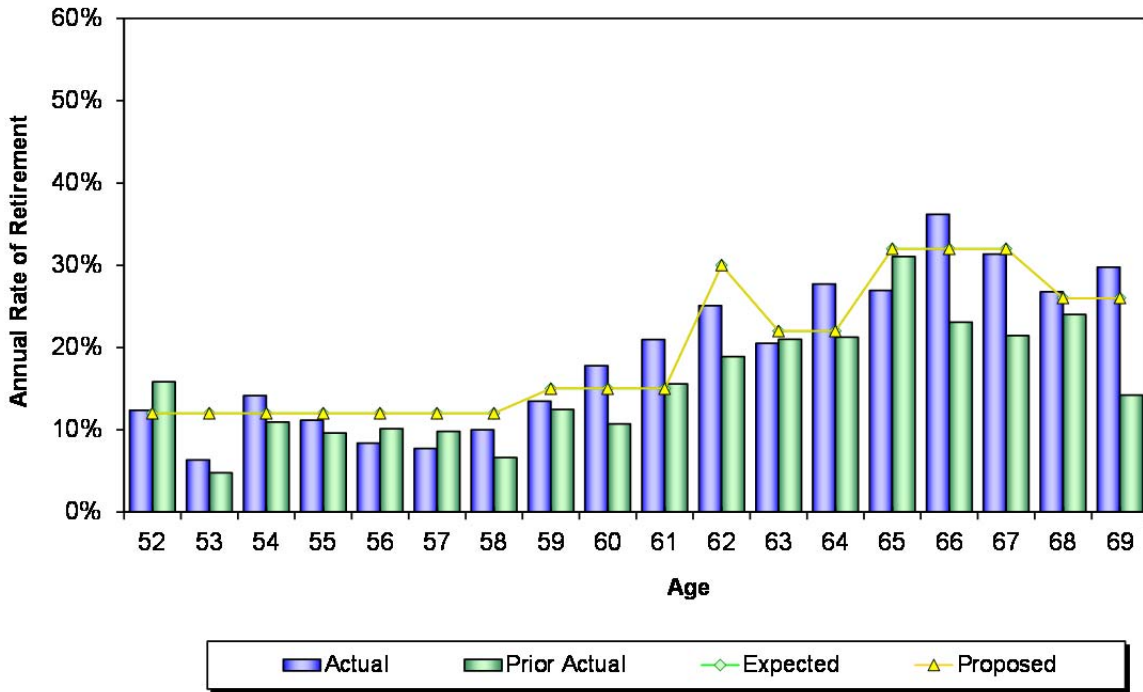
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	246	242	246
Actual / Expected	98%		98%

Exhibit 6-6

Retirement with Unreduced Benefits
Females with 30 Years of Service or More
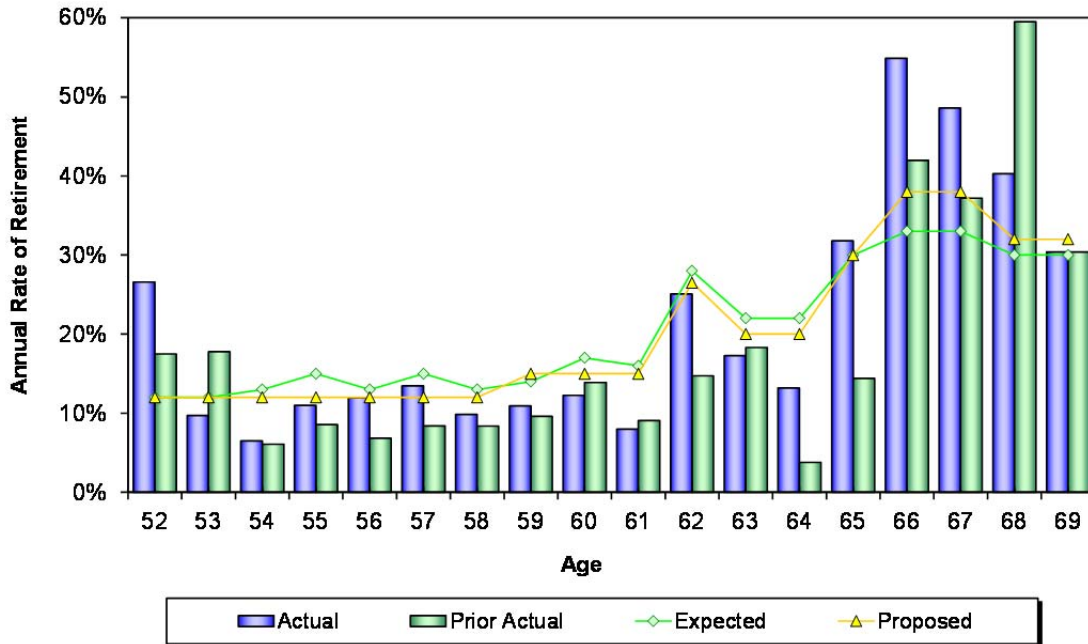
	2010-2013 Data		
	Expected	Actual	Proposed
Total Count	221	200	209
Actual / Expected	90%		96%

Section 7: Disability Retirement

The City's Long-Term Disability (LTD) Insurance benefits are reduced by any disability retirement benefits payable by the System. As a result, almost all disabled members elect to receive full 100% LTD benefits and delay receiving retirement benefits until normal service retirement age is reached. The result is very few disabilities occur within SCERS and the overall financial impact of this assumption on the System is very small.

Results

Over the four-year study period, there were three disability retirements compared to 9 expected. This very low number of actual disabilities is comparable to the number of actual disabilities in the prior investigation of experience study.

Disability Retirement			
Gender	Actual	Expected	Act/Exp
Male	2	5	41%
Female	1	4	23%
Total	**3**	**9**	**33%**

Recommendation

We are recommending reducing the disability assumption to better reflect experience. Since the disability experience is consistent with the results of our prior investigation of experience study, we are recommending a fuller reflection of the experience at this time. Because of the extremely small size of this group, it is possible that the actual rates of disability retirement may show greater variance from year to year than most assumptions. However, as discussed above, the impact of this assumption on the valuation is very small.

Disability Retirement			
Gender	Actual	Proposed	Act/Prop
Male	2	2	82%
Female	1	2	46%
Total	**3**	**4**	**75%**

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Section 8: Other Terminations of Employment

Results

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, service retirement, or disability. Rates of termination vary by years of service – the greater the years of service, the less likely a member is to terminate employment.

The current assumptions also vary by gender, with females having a slightly higher probability of terminating than males.

Overall, the actual number of terminations was somewhat lower than the number predicted by the current assumptions (86% of expected). We believe the recent economic environment was a factor in this decline.

Termination - All Years of Service*			
Gender	**Actual**	**Expected**	**Act/Exp**
Male	376	501	75%
Female	520	540	96%
Total	**896**	**1041**	**86%**

Experience for members with <1 year of service excluded.

However, among the group comprised of only those members with 10 or more years of service (the group to whom the bulk of the liabilities are attributable), the actual total number of terminations was slightly higher overall than the number predicted by the current assumption (106% of expected). Note that for males, there were fewer terminations than were predicted, while for females there were more terminations than predicted.

Termination - 10 or More Years of Service			
Gender	**Actual**	**Expected**	**Act/Exp**
Male	79	88	90%
Female	124	103	120%
Total	**203**	**191**	**106%**

Recommendation

We have recommended various adjustments to the rates of assumed termination, as shown in Exhibits 8-1 and 8-2, in order to better match recent experience. We have proposed changes to partially reflect recent experience, since the actual experience of terminations has likely been influenced by the recession.

A summary of the revised results under the recommended assumptions is shown in the following tables.

Termination - All Years of Service*			
Gender	**Actual**	**Proposed**	**Act/Prop**
Male	376	428	88%
Female	520	544	96%
Total	**896**	**972**	**92%**

Experience for members with <1 year of service excluded.

Termination - 10 or More Years of Service			
Gender	**Actual**	**Proposed**	**Act/Prop**
Male	79	83	95%
Female	124	108	115%
Total	**203**	**191**	**106%**

Exhibit 8-1

Termination by Years of Service – Males
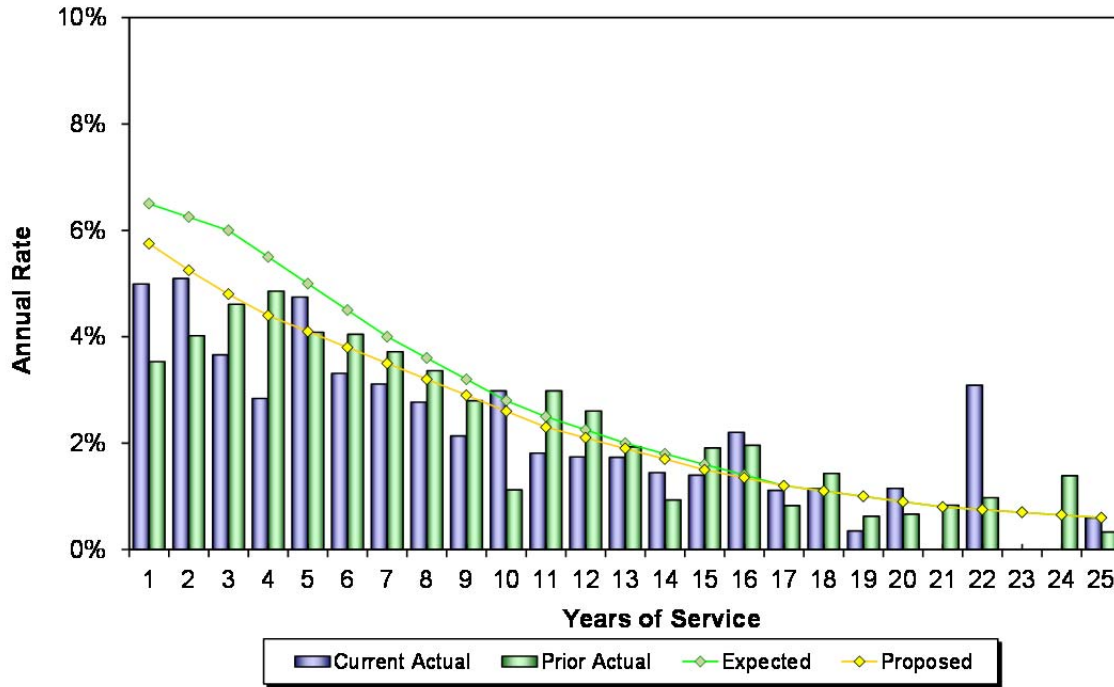
	All Years (Excludes First Year)		
	Expected	Actual	Proposed
Total Count	501	376	428
Actual / Expected	75%		88%

	Service of 10 Years or More		
	Expected	Actual	Proposed
Total Count	88	79	83
Actual / Expected	90%		95%

Exhibit 8-2

Termination by Years of Service – Females
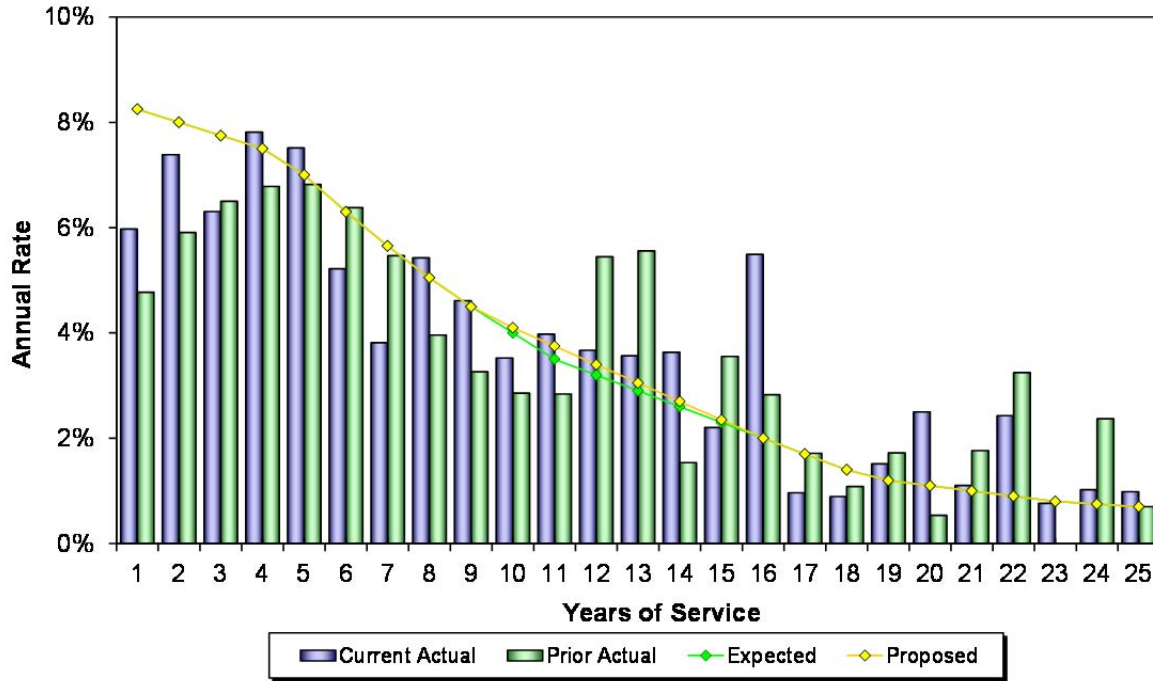
	All Years (Excludes First Year)		
	Expected	Actual	Proposed
Total Count	540	520	544
Actual / Expected	96%		96%

	Service of 10 Years or More		
	Expected	Actual	Proposed
Total Count	103	124	108
Actual / Expected	120%		115%

Section 9:   Probability of Refund upon Vested Termination

This section of the report deals with the rates at which employees elect a refund of their contributions upon termination of service. It only considers vested members who are not yet eligible for service retirement. Under the current assumptions, members who terminate at younger ages have a greater probability of electing to withdraw their contributions. All non-vested members are assumed to take a refund at termination.

Results

Exhibit 9-1 summarizes the results of our study. The results are consistent with our assumptions in that members have a higher likelihood of electing a refund at younger ages; however, the actual rates are a bit higher than expected at younger ages and a bit lower than expected at older ages. This is the reverse of the results seen in the previous study. Overall, the number of refunds for members with less than 20 years of service is 102% of what the assumptions predicted.

We use a separate assumption for the probability of refund among members who terminate with 20 or more years of service. Among this group, the actual number of refunds was 275% of the expected number (11 actual refunds, versus four expected).

Recommendation

Based on the experience from both the current and the prior experience studies, we are recommending no changes be made to the assumed rates at which members withdraw their contributions in the System.

Although the rate of refund for members with 20 or more years of service did not match the experience over the most recent study period, we have taken into account the fact that this is a very small group overall, and the higher than expected number of 11 refunds in this group may have been heavily influenced by the recent economic recession. We are recommending no change to the currently assumed 20% probability of refund at all ages for members with 20 or more years of service; however, we recommend examining this assumption closely again with the next investigation of experience to determine whether the trend upwards in refunds among this group is a temporary pattern or part of a more permanent shift.

Exhibit 9-1

Probability of Refund upon Vested Termination – Males and Females
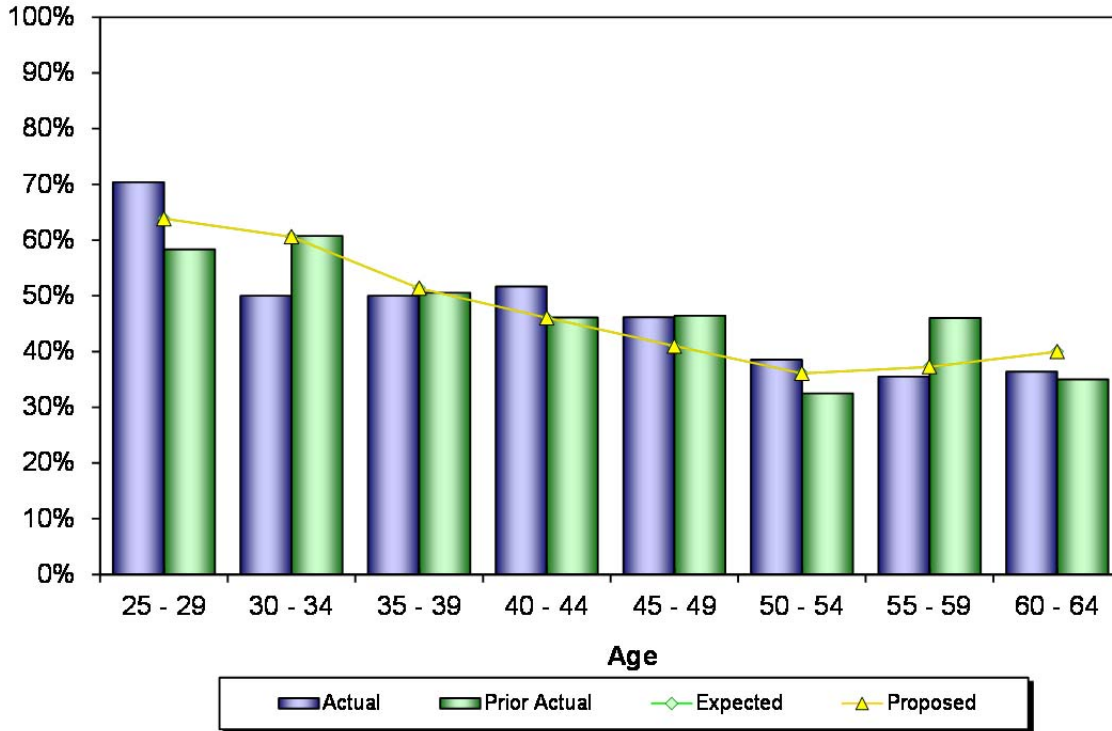
	Less than 20 Years of Service		
	Expected	Actual	Proposed
Total Count Actual / Expected	229 102%	233	229 102%

	20 Years or More of Service		
	Expected	Actual	Proposed
Total Count Actual / Expected	4 275%	11	4 275%

Section 10: Actuarial Methods

Actuarial Methods

In addition to the assumptions used in the valuation, we reviewed the actuarial methods. We are not recommending any changes to these assumptions.

- **Cost Method:** The actuarial valuation is prepared using the entry age actuarial cost method. We believe that this cost method is appropriate for SCERS' valuation. We recommend no change. For reference, approximately 70% of large public sector systems use this cost method (based on the current NASRA Public Fund Survey database which includes over 100 statewide systems).

- **Level Percent of Pay vs. Level Dollar:** A significant majority of public pension systems fund on a level percent of pay basis, as SCERS does. A minority use the level dollar approach. Using the level dollar method results in higher calculated contribution rates in the short term and ultimately a higher level of funding.

- **Valuation of Assets:** SCERS uses a five-year smoothing method to determine the actuarial value of assets used in the valuation. We believe this is an appropriate method for variable contribution rate plans.

  For reference, five-year asset smoothing is the most common asset smoothing period among public systems (based on the Public Fund Survey).

Appendix A: Summary of Proposed Assumptions

This section of the report describes the actuarial procedures and assumptions used in this valuation. <mark>The assumptions used in this valuation were adopted by the SCERS Board at their May 2014 meeting.</mark>

The actuarial assumptions used in the valuation are intended to estimate the future experience of the members of the System and of the System itself in areas that affect the projected benefit flow and anticipated investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in the estimated costs of the System's benefits. Table A-1 summarizes the actuarial assumptions.

Table A-2 presents expected annual salary increases for various years of service. Tables A-3 through A-6 show rates of decrement for service retirement, disablement, mortality, and other terminations of employment. Table A-7 shows probabilities of vesting upon termination.

Changes from Prior Assumptions

Where we have proposed changes from the prior assumptions, these changes are highlighted in <mark>yellow</mark>.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets, and (b) the actuarial present value of future normal costs is called the unfunded actuarial accrued liability or UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, and contribution rates and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.

Replacement of Terminated Members	The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.
Employer Contributions	For 2013, the total employer contribution rate for normal costs and amortization of the UAAL was 12.92% of members' salaries. The employer contribution rate is determined as of the prior year's valuation such that the combined member and employer contribution rate is sufficient to amortize the UAAL over a 30-year period. The amortization payment is based on a level percent of pay.
Administrative Expense	The annual contribution assumed to be necessary to meet general administrative expenses of the system, excluding investment expenses, is 0.60% of members' salaries. This figure is included in the calculation of the normal cost rate.
Valuation of Assets	The assets are valued using a five-year smoothing method based on the difference between the expected market value and the actual market value of the assets in each year. The expected market value is the prior year's market value increased with the net increase in the cash flow, all increased with interest during the past fiscal year at the expected investment return rate assumption.
Investment Earnings	The annual rate of investment earnings of the assets of the System is assumed to be 7.50%. This rate is compounded annually and is net of investment expenses.
Postretirement Benefit Increases	Postretirement benefit increases include:

- Automatic 1.5% Annual COLA – This benefit applies to all members.

- 65% Restoration of Purchasing Power (ROPP) – The member's benefit is the greater of 65% of the annual initial benefit adjusted for CPI or their applicable benefit. This minimum benefit is available to all retirees and beneficiaries. The financial impact of the ROPP benefit is valued assuming an annual price inflation rate of 3.75%.

Postretirement Benefit Increases (continued)	Additional contingent COLA increases that were adopted in 2001, but not effective until the System reaches at least a 100% funding ratio, are not included in the valuation results.
Future Salaries	Table A-2 illustrates the rates of future salary increases assumed for the purpose of the valuation. In addition to increases in salary due to promotions and longevity, this scale includes an assumed 3.75% per annum rate of increase in the general wage level of the membership.
Service Retirement	Table A-3 shows the annual assumed rates of retirement among members eligible for service retirement or reduced retirement. Separate rates are also used during the first year a member is eligible for service retirement.
Disablement	The rates of disablement used in this valuation are illustrated in Table A-4. It is assumed that one-third of all disabilities are duty related and two-thirds occur while off duty.
Mortality	The mortality rates used in this valuation are illustrated in Table A-5. A written description of each table used is included in Table A-1.
Other Terminations of Employment	The rates of assumed future withdrawal from active service for reasons other than death, disability, or retirement are shown for representative ages in Table A-6. Note that this assumption only applies to members who terminate and are not yet eligible for retirement.
Probability of Refund	Terminating members may forfeit a vested right to a deferred benefit if they elect a refund of their accumulated contributions. Table A-7 gives the assumed probability, at selected ages, that a terminating member will elect to receive a refund of his accumulated contributions instead of a deferred benefit.
	If a member terminates with more than 20 years of service, there is assumed to be a 20% probability that the member will elect a refund.
	Note that the probability of refund assumption only applies to members who terminate with a vested benefit and are not yet eligible for retirement.
Interest on Member Contributions	Interest on member contributions made prior to January 1, 2012 is assumed to accrue at a rate of 5.75% per annum, compounded annually. Interest on member contributions made on or after January 1, 2012 is assumed to accrue at 4.75%.

Portability

The cost of portability with other public retirement systems is not included in this valuation.

Probability of Marriage

We assumed 60% of the active members are married or have a registered domestic partner.

Commencement for Terminated Vested Members

Vested members who terminate but elect to leave their contributions in the System are assumed to commence receiving benefits at age 62.

Table A-1

Summary of Valuation Assumptions

January 1, 2013

I.   Economic assumptions

    A.   Price inflation   3.25%

    B.   General wage increases   3.75

    C.   Investment return   7.50

    D.   Increase in membership   0.00

    E.   Interest on member accounts   5.75/4.75

II. Demographic assumptions

    A.   Salary increases due to promotion and longevity   Table A-2

    B.   Retirement   Table A-3

    C.   Disablement   Table A-4

    D.   Mortality* among contributing members   Table A-5
        Men   RP 2000 Employees Table for Males, with ages
                set back six years.
        Women   RP 2000 Employees Table for Females, with ages
                set back six years.

    E.   Mortality* among service retired members and beneficiaries   Table A-5
        Men   RP2000 Combined Healthy Males, with ages set
                back two years.
        Women   RP2000 Combined Healthy Females, with ages set
                back one year.

    F.   Mortality* among disabled members   Table A-5
        Men   RP2000 Disabled Males, with ages set back four years.
        Women   RP2000 Disabled Females, with ages set back four years.

    G.   Other terminations of employment   Table A-6

    H.   Probabilities of vesting on termination   Table A-7

  All mortality tables are generational using Projection Scale AA.

Table A-2

Future Salaries

Annual Rate of Increase

Years of Service	Promotion and Longevity	Total*
0 to 1	4.50%	8.42%
1 to 2	3.50	7.38
2 to 3	2.75	6.60
3 to 4	2.00	5.83
4 to 5	1.50	5.31
9 to 10	0.80	4.58
14 to 15	0.45	4.22
19 to 20	0.29	4.05
24 to 25	0.25	4.01
29 to 30	0.25	4.01
35 or more	0.25	4.01

Total rate shown reflects compounded effect of merit increase and assumed wage growth of 3.75%.

Table A-3

Retirement

	Annual Probability					
	Men			Women		
		Eligible for Full Benefits			Eligible for Full Benefits	
Age	Eligible for Reduced Benefits	Less than 30 years of service	30 years or more of service	Eligible for Reduced Benefits	Less than 30 years of service	30 years or more of service
Less than 50	0.0%	8.0%	8.0%	0.0%	10.0%	10.0%
50	5.0	8.0	10.0	5.0	10.0	10.0
51	5.0	8.0	10.0	5.0	10.0	10.0
52	5.0	8.0	12.0	5.0	10.0	12.0
53	3.0	8.0	12.0	3.0	10.0	12.0
54	3.0	8.0	12.0	3.0	10.0	12.0
55	6.0	8.0	12.0	6.0	10.0	12.0
56	5.0	8.0	12.0	5.0	10.0	12.0
57	5.0	8.0	12.0	5.0	13.0	12.0
58	5.0	8.0	12.0	5.0	13.0	12.0
59	5.0	8.0	15.0	8.0	13.0	15.0
60	6.0	14.0	15.0	8.0	15.0	15.0
61	9.0	12.0	15.0	12.0	13.0	15.0
62	15.0	20.0	30.0	15.0	20.0	26.5
63	12.0	18.0	22.0	12.0	18.0	20.0
64	9.5	18.0	22.0	13.0	18.0	20.0
65		40.0	32.0		40.0	30.0
66		40.0	32.0		40.0	38.0
67		40.0	32.0		40.0	38.0
68		30.0	26.0		33.0	32.0
69		30.0	26.0		33.0	32.0
70		*	*		*	*

* *Immediate retirement is assumed for every person age 70 or over.*

Table A-4

Disability*

Age	Annual Rates	
	Men	**Women**
20	.00%	.00%
25	.00	.00
30	.02	.02
35	.02	.02
40	.03	.03
45	.03	.03
50	.04	.04
55	.04	.04
60	.04	.04
65	.00	.00

*It is assumed that one-third of all disabilities are duty related and two-thirds are non-duty related.

Table A-5

Mortality

	Annual Probability*					
	Contributing Members		Members Retired for Service and Beneficiaries of Members		Disabled Members	
Age	Men	Women	Men	Women	Men	Women
22	0.03 %	0.02 %	0.03 %	0.02 %	2.26 %	0.74
27	0.04	0.02	0.04	0.02	2.26	0.74
32	0.04	0.02	0.04	0.03	2.26	0.74
37	0.05	0.03	0.08	0.05	2.26	0.74
42	0.08	0.05	0.11	0.08	2.26	0.74
47	0.11	0.08	0.15	0.12	2.26	0.74
52	0.16	0.12	0.21	0.19	2.64	0.98
57	0.23	0.18	0.36	0.31	3.29	1.45
62	0.33	0.28	0.67	0.58	3.93	1.97
67	0.54	0.43	1.27	1.10	4.66	2.53
72	N/A	N/A	2.22	1.86	5.69	3.32
77	N/A	N/A	3.78	3.10	7.33	4.58
82	N/A	N/A	6.44	5.08	9.76	6.35
87	N/A	N/A	11.08	8.64	12.83	8.78
92	N/A	N/A	18.34	14.46	16.22	12.25

The mortality rates shown above are generationally projected on an individual basis using Projection Scale AA for the valuation.

Table A-6

Other Terminations of Employment Among Members Not Eligible to Retire

Years of Service	Annual Rates for Men	Annual Rates for Women
0 to 1	6.5%	8.5%
1 to 2	5.8	8.3
2 to 3	5.3	8.0
3 to 4	4.8	7.8
4 to 5	4.4	7.5
5 to 6	4.1	7.0
6 to 7	3.8	6.3
7 to 8	3.5	5.7
8 to 9	3.2	5.1
9 to 10	2.9	4.5
10 to 11	2.6	4.1
11 to 12	2.3	3.8
12 to 13	2.1	3.4
13 to 14	1.9	3.1
14 to 15	1.7	2.7
15 to 16	1.5	2.4
16 to 17	1.4	2.0
17 to 18	1.2	1.7
18 to 19	1.1	1.4
19 to 20	1.0	1.2
20 to 21	0.9	1.1
21 to 22	0.8	1.0
22 to 23	0.8	0.9
23 to 24	0.7	0.8
24 to 25	0.7	0.8
25 to 26	0.6	0.7
26 to 27	0.6	0.7
27 to 28	0.5	0.6
28 to 29	0.5	0.6
29 to 30	0.4	0.5
30 and up	0.5	0.5

Table A-7

Probability of Refund

Age	Probabilities of Refund upon Termination*
25	70.0%
30	65.0
35	55.0
40	48.0
45	43.0
50	38.0
55	36.0
60	40.0

If service is 20 or more years at termination, probability of refund is equal to 20%.