**Employees' Retirement System
of the State of Hawaii**

ACTUARIAL EXPERIENCE STUDY
For the five-year period ending June 30, 2010

GRS

Gabriel Roeder Smith & Company

GRS

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December 20, 2010

Board of Trustees
Employees' Retirement System of
    The State of Hawaii
City Financial Tower
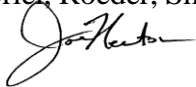201 Merchant St., Ste. 1400
Honolulu, HI 96813-2980

Subject: Results of 2010 Experience Study

We are pleased to present our report on the results of the 2010 Experience Study for the Employees' Retirement System of the State of Hawaii (ERS). It includes our recommendations for new actuarial assumptions to be effective for the June 30, 2011 actuarial valuation, and it describes the actuarial impact produced by these recommendations as though they had been effective for the June 30, 2010 actuarial valuation.
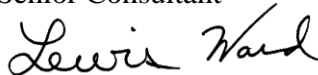
With the Board's approval of the recommendations in this report, we believe the actuarial condition of the System will be more accurately portrayed. The Board's decisions should be based on the appropriateness of each recommendation individually, not on their collective effect on the funding period or the unfunded liability.

We wish to thank the ERS staff for their assistance in providing data for this study.

Sincerely,
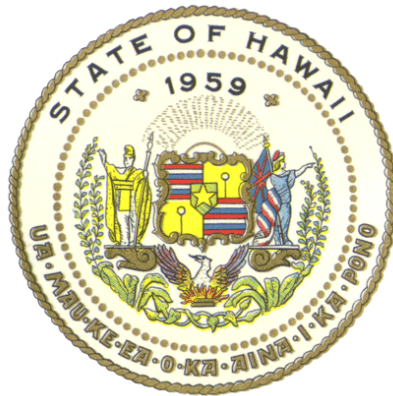Gabriel, Roeder, Smith & Company

Joseph P. Newton, FSA
Senior Consultant

Lewis Ward
Consultant

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Gabriel Roeder Smith & Company

SECTION I

EXECUTIVE SUMMARY

Executive Summary

- *Summary of recommendations:*
  - Recommend no changes to the following economic assumptions:
    - 3.00% inflation
    - 3.50% payroll growth assumption
  - Recommend decreasing 5.00% net real rate of investment return to 4.75%
    - (7.75% nominal investment return net of expenses)
    - Would require statutory change
  - Recommend modifying the smoothing method used to determine the actuarial value of assets
- *General Employees:*
  - Recommend small increases to step salary increase rates
  - Recommend improving the post-retirement mortality assumption
  - Recommend improving the post-disability mortality assumption
  - Recommend increasing the rates of pre-retirement mortality
  - Recommend decreases in the age based rates of termination
  - Recommend decreases in rates of retirement
  - Recommend small changes to the disability rates
- *Teachers:*
  - Recommend small increases to step salary increase rates
  - Recommend improving the post-retirement mortality assumption for male Teachers
  - Recommend increasing the rates of pre-retirement mortality
  - Recommend increases in the service based rates of termination
  - Recommend decreases in the age based rates of termination
  - Recommend decreases in rates of retirement
  - Recommend small changes to the disability rates
- *Police and Fire:*
  - Recommend increase to both step rates and general wage increase
  - Recommend improving the post-disability mortality assumption
  - Recommend increases in the service based rates of termination
  - Recommend decreases in rates of retirement

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- ***Impact of all recommended changes:***

Item	2010 Valuation	Recommended Assumptions – 8% Investment Return	Recommended Assumptions – 7.75% Investment Return
(1)	(2)	(3)	(4)
Total System			
Unfunded Actuarial Accrued Liability ($ in Millions)	$7,138.1	$7,137.3	$7,659.5
Funded Ratio	61.4%	61.4%	59.6%
Police and Fire Employees Only			
Total Normal Cost %	18.80%	19.03%	20.15%
30 Year ARC	22.33%	22.07%	24.14%
Funding Period (years)	47.2	45.2	83.8
All Other Employees			
Total Normal Cost %	11.84%	11.90%	12.53%
30 Year ARC	16.23%	16.34%	17.39%
Funding Period (years)	40.0	41.1	56.7

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- *Summary of all recommended changes:*

Assumption (years of experience used in analysis)	Impact on Valuation	Actual	Expected based on current assumptions	A/E Ratio (current assumptions)	A/E Ratio (proposed assumptions)	Range of Reasonableness	Ideal Target Measure	Recommendation	Comments
Inflation (20 years)	Building Block	2.62%	3.00%	N/A	N/A	2.50%-3.50%	N/A	No change	Based on national averages and economic expectations
Investment Return (10 years)	Major	2.74%	8.00%	N/A	N/A	25%-75% percentile of expected returns based on target asset allocation	35%-50% percentile	Recommended decreasing assumption to 7.75%	Based on inflation plus expected net real rate of return, analysis includes target asset allocation and capital market assumptions
Salary Scale - Ultimate compared to Inflation (10 years)	Medium to Major	2.27% (G) 2.62% (T) 4.34% (P&F)	1.00% (G) 1.50% (T) 1.75% (P&F)	N/A	N/A	Typically from 1.00% below to 2.00% above inflation	Based on national averages, client experience, expectations	Increase ultimate salary scale for P&F to 2.00%	added to the 3.00% inflation assumption to produce an Ultimate Rate
Salary Scale - Select above Ultimate Rate (10 years)	Medium to Major	1.20% (G) 1.28% (T) 17.71% (P&F)	0.89% (G) 1.33% (T) 12.00% (P&F)	N/A	N/A	N/A	N/A	Small increase for all groups to reflect recent experience	Increase in the normal cost, expect to be primarily driven by actual demographic experience over an extended period
Payroll Growth (10 years)	Medium	3.90%	3.50%	N/A	N/A	Based on national averages, client experience, best estimates	Inflation to Inflation plus 1.00%	No Change, retirements over the short term will dampen growth	

Assumption (years of experience used in analysis)	Impact on Valuation	Actual	Expected	A/E Ratio (current assumptions)	A/E Ratio (proposed assumptions)	Range of Reasonableness	Ideal Target Measure	Recommendation	Comments
Healthy Post-retirement mortality (5 years)	Major	M: 1,910 F: 1,270 (G) M: 316 F: 562 (T) M: 265 (P&F)	M: 1,765 F: 1,208 (G) M: 339 F: 474 (T) M: 238 (P&F)	M: 108% F: 105% (G) M: 93% F: 119% (T) M: 111% (P&F)	M: 110% F: 107% (G) M: 108% F: 115% (T) M: 111% (P&F)	Above 100%	110%-120%	Weaken mortality to assume slightly longer life expectancy.	Expected amount of time benefits will be payable once a member retires.
Active-mortality (5 years)	Minor	M: 232 F: 146 (G) M: 52 F: 52 (T) M: 21 (P&F)	M: 128 F: 125 (G) M: 29 F: 42 (T) M: 16 (P&F)	M: 181% F: 117% (G) M: 177% F: 124% (T) M: 133% (P&F)	M: 115% F: 98% (G) M: 118% F: 110% (T) M: 133% (P&F)	60%-130%	85%-120%	Increase expectation.	Not a significant assumption.
Disabled Post-retirement mortality (5 years)	Minor	M: 173 F: 130 (G) M: 8 F: 18 (T) M: 27 (P&F)	M: 194 F: 134 (G) M: 5 F: 17 (T) M: 33 (P&F)	M: 89% F: 97% (G) M: 147% F: 103% (T) M: 81% (P&F)	M: 97% F: 117% (G) M: 132% F: 103% (T) M: 97% (P&F)	100%-120%	105%-115%	Weaken mortality to assume longer life expectancy.	Minor impact due to small population size, updated assumption to recognize continued improvement in mortality.

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Employees' Retirement System of the State of Hawaii

Assumption (years of experience used in analysis)	Impact on Valuation	Actual	Expected	A/E Ratio (current assumptions)	A/E Ratio (proposed assumptions)	Range of Reasonableness	Ideal Target Measure	Recommendation	Comments
Rates of Unreduced Retirement (5 years) General Employees	Medium	M: 2,285 F: 3,145 (G-C) M: 1,192 F: 1,453 (G-NC) M: 17 (25&Out)	M: 3,101 F: 3,887 (G-C) M: 1,778 F: 1,810 (G-NC) M: 19 (25&Out)	M: 74% F: 81% (G-C) M: 67% F: 80% (G-NC) M: 92% (25&Out)	M: 90% F: 93% (G-C) M: 75% F: 86% (G-NC) M: 93% (25&Out)	85%-105%	90%-98%	Recommend modifications to most ages, lower expectations at the older retirement ages.	
Rates of Unreduced Retirement (5 years) Teachers and P&F	Medium	M: 242 F: 724 (T-C) M: 296 F: 621 (T-NC) M&F: 616 (P&F)	M: 449 F: 1,063 (T-C) M: 366 F: 682 (T-NC) M&F: 824 (P&F)	M: 54% F: 68% (G-C) M: 81% F: 91% (T-NC) M&F: 75% (P&F)	M: 65% F: 76% (G-C) M: 81% F: 90% (T-NC) M&F: 89% (P&F)	85%-105%	90%-98%	Recommend small modifications to some rates.	
Rates of Reduced Retirement (5 years) General Employees	Medium	M: 27 F: 26 (G-C) M: 70 F: 86 (G-NC)	M: 37 F: 27 (G-C) M: 299 F: 374 (G-NC)	M: 72% F: 96% (G-C) M: 23% F: 23% (G-NC)	M: 84% F: 100% (G-C) M: 90% F: 94% (G-NC)	85%-105%	90%-98%	Recommend lower expectations at all ages.	
Rates of Reduced Retirement (5 years) Teachers	Medium	M: 4 F: 10 (T-C) M: 27 F: 47 (T-NC)	M: 6 F: 12 (T-C) M: 73 F: 211 (T-NC)	M: 66% F: 84% (T-C) M: 37% F: 22% (T-NC)	M: 126% F: 79% (T-C) M: 96% F: 95% (T-NC)	85%-105%	90%-98%	Recommend lower expectations for noncontributory plan at all ages.	

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Employees' Retirement System of the State of Hawaii

Assumption (years of experience used in analysis)	Impact on Valuation	Actual	Expected	A/E Ratio (current assumptions)	A/E Ratio (proposed assumptions)	Range of Reasonableness	Ideal Target Measure	Recommendation	Comments
Rates of Ordinary Disability (5 years)	Minor	M: 118 F: 89 (G) M: 13 F: 18 (T) M&F: 5 (P&F)	M: 137 F: 114 (G) M: 9 F: 18 (T) M&F: 5 (P&F)	M: 86% F: 78% (G) M: 152% F: 100% (T) M&F: 100% (P&F)	M: 96% F: 87% (G) M: 117% F: 95% (T) M&F: 100% (P&F)	80%-110%	85%-95%	Recommend lowering expectations, particularly at the later career ages.	Not a significant assumption. Members often opt to commence their retirement benefit in lieu of applying for a disability benefit.
Rates of Duty Disability (5 years)	Minor	M: 37 F: 7 (G) M&F: 2 (P&F)	M: 19 F: 6 (G) M&F: 3 (P&F)	M: 195% F: 117% (G) M&F: 67% (P&F)	M: 142% F: 100% (G) M&F: 67% (P&F)	80%-110%	85%-95%	Recommend lowering expectations, particularly at the later career ages.	Not a significant assumption. Small portion of all disabilities are duty related.
Rates of Withdrawal - (6 year select period)	Medium	M: 5,641 F: 8,171 (G) M: 2,919 F: 5,880 (T) M&F: 652 (P&F)	M: 5,386 F: 8,130 (G) M: 2,688 F: 5,387 (T) M&F: 580 (P&F)	M: 105% F: 101% (G) M: 109% F: 109% (T) M&F: 112% (P&F)	M: 105% F: 101% (G) M: 103% F: 105% (T) M&F: 105% (P&F)	90%-120%	102%-108%	Recommend small increases in expectations for Teachers and Police & Fire based on experience.	Impacts the probability of reaching retirement age.
Rates of Withdrawal - (age based after select period)	Medium	M: 3,037 F: 3,483 (G) M: 720 F: 1,985 (T) M&F: 517 (P&F)	M: 3,048 F: 3,544 (G) M: 767 F: 2,037 (T) M&F: 483 (P&F)	M: 100% F: 98% (G) M: 94% F: 97% (T) M&F: 107% (P&F)	M: 106% F: 110% (G) M: 107% F: 110% (T) M&F: 107% (P&F)	90%-120%	102%-108%	Recommend decreases in expectations for General Employees and Teachers based on experience.	Impacts the probability of reaching retirement age.

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Asset Valuation Method: We are recommending a minor change to the asset valuation method. The recommendation is to continue using an asset method with a 4-year smoothing period but in a modified form. The current method recognizes1/4th of each of the 4 individual bases each year. The proposed method would recognize 1/4th of the aggregate deferred gains or losses each year. The proposed method offsets deferred gains and losses against each other which will produce an actuarial asset value that is similar to the current method during periods of extreme investment performance, but has an additional advantage of an actuarial value that moves more consistent with the market value during periods of ordinary investment returns. In turn, this will result in a less volatile contribution rate and funded status.

Actuarial Funding Method: The recommendation is to keep the current use of the Entry Age Normal cost method.

SECTION II

INTRODUCTION

Introduction

In determining liabilities, contribution rates, and funding periods for retirement plans, actuaries must make assumptions about the future. Among the assumptions that must be made are:

- Retirement rates
- Mortality rates
- Turnover rates
- Disability rates
- Investment return rate
- Salary increase rates
- Inflation rate

For some of these assumptions, such as the mortality rates, recent past experience provides important evidence about the future. For other assumptions, such as the investment return rate, the link between past and future results is much weaker. In either case, though, actuaries should review their assumptions periodically and determine whether these assumptions are consistent with actual past experience and with anticipated future experience.

For this purpose we have reviewed and analyzed ERS's data for the five-year period from June 30, 2005 through June 30, 2010. (In examining certain assumptions, however, we used a longer period, ten years, in order to smooth some of the year-to-year fluctuations and in order to increase the soundness of our conclusions.) In our view, a period this long is reasonable. Sufficient data can usually be gathered so that the results have statistical significance. Legislation, such as plan improvements or changes in statewide salary schedules, can sometimes affect the results. Using a 3-5 year period prevents giving too much weight to such short-term effects. Finally, using a much longer period would water down real changes that may be occurring, such as mortality improvement or a change in the ages at which members retire.

In an experience study, we first determine the number of deaths, retirements, etc. that occurred during the period. Then we determine the number expected to occur, based on the current actuarial assumptions. Finally we calculate the A/E ratio, where "A" is the <u>actual</u> number (of retirements, for example) and "E" is the <u>expected</u> number. If the current assumptions were "perfect", the A/E ratio would be 100.0%. When it varies much from this figure, it is a sign that new assumptions may be needed. Of course we not only look at the assumptions as a whole, but we also review how well they fit the actual results by sex, by age, and by service.

Finally, if the data leads the actuary to conclude that new tables are needed, the actuary "graduates" or smoothes the results, since the raw results can be quite uneven from age to age or from service to service.

SECTION III

ANALYSIS OF EXPERIENCE
AND RECOMMENDATIONS

Analysis of Experience and Recommendations

We will begin by discussing the economic assumptions: inflation, the investment return rate, the salary increase assumption, and the payroll growth rate. Then we will discuss the demographic assumptions: mortality, disability, termination and retirement. Finally we will discuss the actuarial methods used.

Inflation rate

By "inflation," we mean price inflation, as measured by increases in the Consumer Price Index (CPI). The inflation assumption underlies all the other economic assumptions. It impacts both investment return and salary increases. The current inflation assumption is 3.00%.

However, because Hawaii's economy is separated from the Mainland and may not trend at the same rate, there could be a need for separate inflation assumptions: one underlying the investment return and one underlying the salary increases. We compared the CPI-U over the last fifty years for Honolulu to All-US. The data showed that while for given periods of time of the economic cycle the two rates may differ, over the long term, the two trend very closely. The following graph shows the annual rates of inflation for both sets of data.
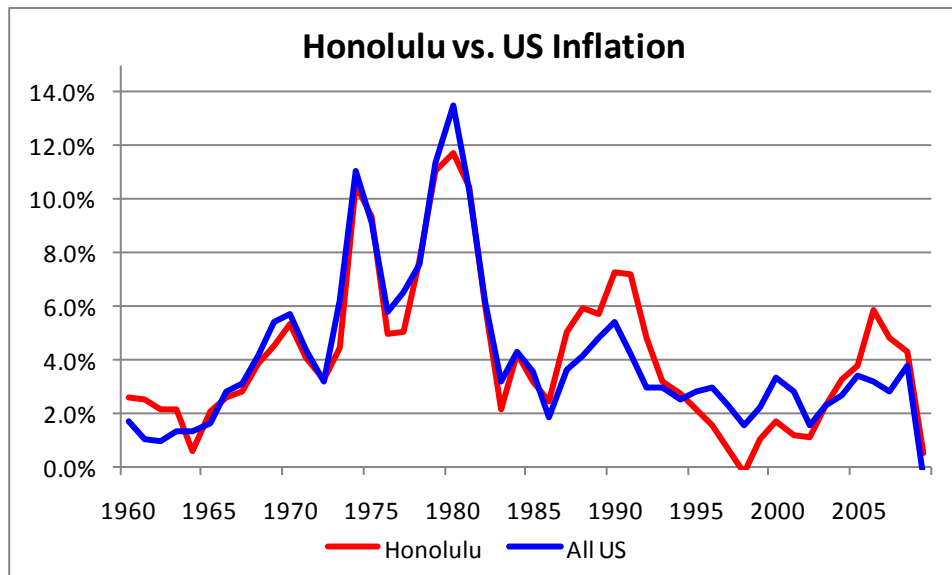
Over the long term, when the state economy booms relative to the Mainland, Hawaii's inflation is usually higher and when it is depressed relative to the Mainland, the inflation is usually lower. However, the average Hawaii inflation over the past fifty years has been 4.12%, and the average all-US inflation has been 4.07%. We believe the two inflation measurements will track closely over time and we have developed and recommend one inflation assumption.

Over the five-year period from June 2005 through June 2010, the CPI-U has increased at an average rate of 2.30%, and over the last ten years it has averaged 2.37% per year. The average over longer periods is shown in the table below.

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Periods Ending June 2010	Average Increase in CPI-U
Last five (5) years	2.30%
Last ten (10) years	2.37%
Last fifteen (15) years	2.41%
Last twenty (20) years	2.62%
Last twenty-five (25) years	2.86%
Last fifty (50) years	4.07%

The chart on the following page shows the average annual inflation in each of the ten consecutive five-year periods over the last fifty years:

Average Annual Inflation
CPI-U, Five Fiscal Year Averages
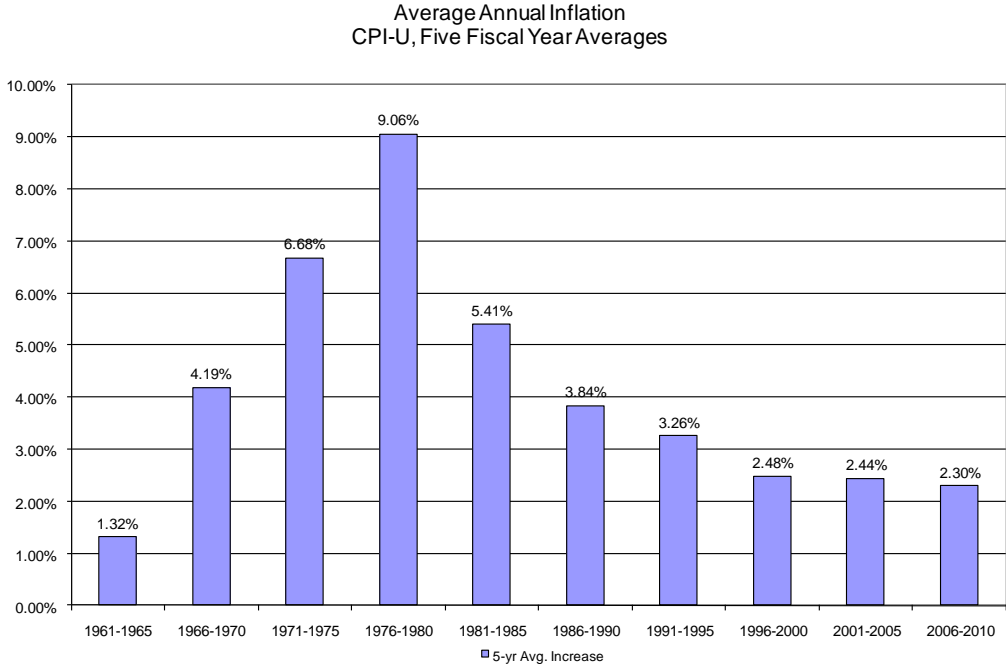
While inflation has been lower than 3.00% over the last 25 years, if we look back over periods of more than 30 years, inflation has averaged more than 3.00% per year. Most observers expect inflation to be low or non-existent for the next 1-3 years, as the US economy works out of the current recession. In fact, over the year ending June 2010, the CPI-U increased only 1.05% and for the two-year period ending June 2010 inflation was actually negative. After that, some observers expect inflation to increase as a consequence of the large amount of government borrowing.

One source of information about future inflation is the market for US Treasury bonds and TIPs (Treasury Inflation Protection bonds). For example, the June 30, 2010 yield for a 20-year inflation indexed Treasury bond was 1.67% plus actual inflation. The yield for a 20-year non-

indexed US Treasury bond was 3.76%. Simplistically, this means that on that day the bond market was predicting that inflation over the next twenty years would average 2.09% (3.76% – 1.67%) per year. As of December 1, 2010, the spread between the 20-year inflation protected and constant maturity bonds was marginally higher, with a difference of 2.38%. However, this measurement is subject to fluctuation. During calendar year 2010, the spread between the TIPs and US Treasury bonds has ranged from 1.75% to 2.67%.

However, this analysis is known to be imperfect. It ignores the inflation risk premium that buyers of US Treasury bonds should ask for, and it ignores the differences in liquidity between US Treasury bonds and TIPs. For a number of years, the Cleveland Fed published on its website an adjusted inflation expectation, using formulas to adjust the raw results for these two factors. However, because of the unprecedented rush to safety and liquidity following the market meltdown, demand for US Treasury bonds soared, and the spreads between treasuries and TIPs shrank.

We also reviewed the inflation assumptions used by several investment consulting firms. In our sample of eight firms (including PCA, ERS' investment consultant), these ranged from 2.00% to 3.25%, with an average of 2.66%.

In the Social Security Administration's 2010 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.8% under the intermediate cost assumption. (The inflation assumption is 1.8% and 3.8% respectively in the low cost and high cost projection scenarios.) These inflation assumptions were unchanged from their prior year's report.

The Philadelphia Federal Reserve conducts a quarterly survey of the Society of Professional Forecasters. Their most recent forecast (fourth quarter of 2010) was for inflation over the next ten years to average 2.20%. This estimate is slight decrease in expectations compared to surveys conducted in the first three quarters of 2010.

Another source of information about this assumption is the Public Funds Survey that is prepared on behalf of the National Association of State Retirement Administrators (NASRA) and the National Council on Teacher Retirement (NCTR). This report surveys about 125 plans, including all of the largest public funds covering state employees or teachers. The current survey shows that the median inflation rate assumed for large public retirement systems in the U.S. is 3.50%. Our current 3.00% assumption is used by about 30% of the surveyed systems, with almost all of the rest using higher assumptions.

Therefore, we believe a reasonable long-term inflation assumption will likely fall in the range of 2.25% to 3.25%. We believe that inflation may continue to be less than 3.00% annually over the next few years, but we believe a 3.00% rate of inflation is reasonable over the long term. This is in line with the average for the last 25 years, and a little below the long-term historical average. Therefore, we are recommending retaining the 3.00% inflation assumption.

INVESTMENT AND ADMINISTRATIVE EXPENSES

Since the trust fund pays investment and administrative expenses from plan assets, it is appropriate to make an assumption about expected expense. Plan expenses may be explicitly assumed as a direct increase to the annual normal cost or implicitly assumed by developing an investment return assumption as a net return after payment of plan expenses. We believe the development of an implicit expense assumption to net against investment returns is an appropriate method for the valuation of the Plan.

The chart below shows the administrative and investment expenses for the last six years expressed as a percentage of the assets, adjusted for cash flow, each year.

Annual Expenses Expressed as a Percentage Assets			
Fiscal Year	Administrative	Investment	Total
2005	0.08%	0.32%	0.40%
2006	0.09%	0.43%	0.52%
2007	0.09%	0.35%	0.44%
2008	0.10%	0.28%	0.38%
2009	0.13%	0.13%	0.25%
2010	0.13%	0.38%	0.51%
Average	0.10%	0.32%	0.42%

Based on this information, we recommend continuing the use of the current assumption that investment and administrative expenses will consume 0.40% (40 basis points) of each year's investment return in the future. This assumption is then used in setting the investment return assumption.

INVESTMENT RETURN

Currently, ERS assumes an investment return rate of 8.00%, net of investment and administrative expenses. This is the rate used in discounting future payments in calculating the actuarial present value of those payments. Even a small change to this assumption can produce significant changes to the liabilities and contribution rates. The 8.00% assumption is composed of a 3.00% assumed inflation rate plus a 5.40% assumed real return, for a gross expected return of 8.40%. This is offset by 0.40% for expected investment and administrative expenses.

The chart on the following page shows a ten-year history of ERS' market returns through FY 2010.

Historical Returns on a Market Value Basis

8.00%
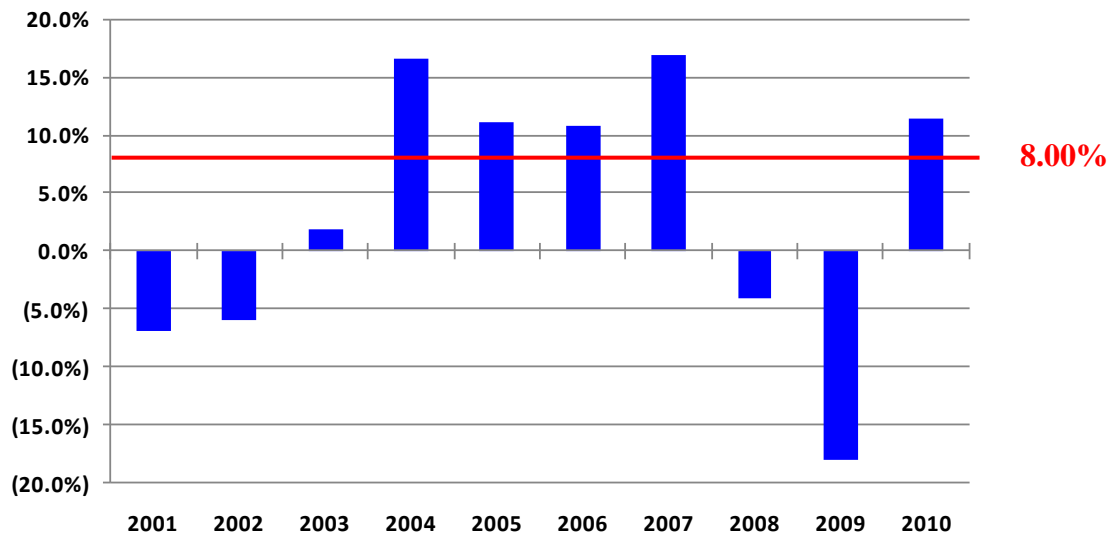
The returns in the chart above are market returns, net of investment and administrative expenses, as reported in the actuarial valuations. While ERS did exceed the expected 8.00% return assumption in five of the last ten years, the average market return during this period was only 2.74%, which is significantly less than the 8.00% assumption.

Because of this, past performance, even averaged over a twenty-year period, is not a reliable indicator of future performance for this assumption. The actual asset allocation of the trust fund will significantly impact the overall performance, so returns achieved under a different allocation are not meaningful. More importantly, the real rates of return for many asset classes, especially equities, vary so dramatically from year to year that even a twenty-year period is not long enough to provide reasonable guidance. There are strong reasons to believe the next twenty years will be different than the last twenty, in part because we are starting from higher price-earnings ratios on equities, and in part because the current bond returns are so low.

The table on the following page provides the distribution of the different investment return assumptions used by other large public retirement systems.

Public Fund Survey
Investment Return Assumption
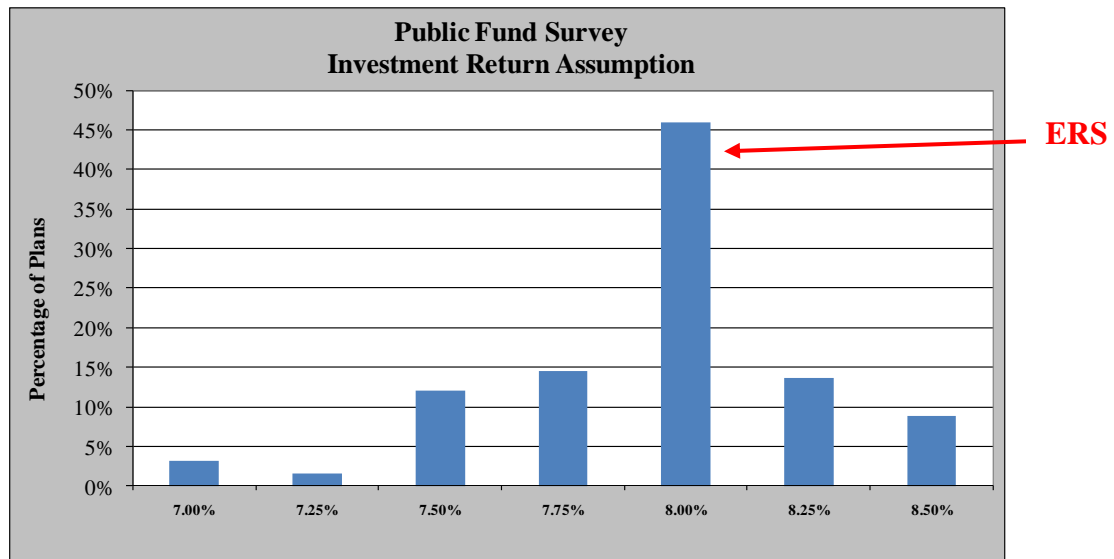
Source: Public Funds Survey (n=124) Median investment return assumption: 8.00% nominal return

While we do not recommend the Board select an assumption based on this information, it is still informative to see ERS' assumption in relation to its peers. While the table shows that the 8.00% assumption is right at the median, you should be aware that several large plans have recently reduced their assumption, and several others are in the middle of a review of this assumption.

We view the investment return assumption as having three components: the assumed rate of (price) inflation, the real return net of inflation, and an offset for expected investment and administrative expenses. This "building block" approach is one explicitly permitted under ASOP 27. The inflation assumption and expense assumption have already been discussed, so we will proceed with the analysis of the real rate of return.

To do this, we like to examine the results of applying a set of capital market assumptions to the plan's target asset allocation. Since we are not investment professionals, we looked at the results using the capital market assumptions for eight investment consulting firms, including ERS' investment consultant:

- Callan Associates
- JP Morgan
- Morgan Stanley Smith Barney
- NEPC

- PCA (ERS's Inv. Consultant)
- Strategic Investment Solutions
- Sunguard
- Towers Watson

Here is a table with the plan's long-term target asset allocation and the development of the plan's expected nominal investment returns using ERS's investment consultant, PCA.

Asset Class	Long-Term Target Asset Allocation	Expected Total Return	Expected Portfolio Return (2) x (3)
(1)	(2)	(3)	(4)
Domestic Equities	41%	9.25%	3.79%
International Equities	17%	9.75%	1.66%
Fixed Income	28%	4.00%	1.12%
Real Estate	9%	7.25%	0.65%
Alternative Investments	5%	10.85%*	0.55%
Gross Return			7.77%
Investment Consultant's Inflation Assumption:			(3.00%)
Gross Real Return			4.77%
Actuary's Inflation Assumption:			3.00%
Actuary's Plan Expense Assumption:			(0.40%)
Net Expected Nominal Investment Return			**7.37%**

*The expected return for is a weighted average of the expected return assumption of sub-classes within this asset class.

As you can see, the 2010 capital market assumptions developed by PCA would result in a one-year expected return of 7.37%, which is 0.63% lower than the current 8.00% return assumption. We also looked at the results using the capital market assumptions of the seven other firms named above. These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility, and correlations between asset classes. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term expectations. The estimates for core investments (i.e. fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds, and do include an assumption for possible alpha generated returns.

Given the plan's target asset allocation and the capital market assumptions made available by the investment consultants listed above, the development of the average nominal return, net of administrative and investment expenses, is provided in the table on the next page:

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Expected Nominal Return Net of Expenses (6)-(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	7.77%	3.00%	4.77%	3.00%	7.77%	0.40%	7.37%
2	8.04%	3.25%	4.79%	3.00%	7.79%	0.40%	7.39%
3	8.15%	3.00%	5.15%	3.00%	8.15%	0.40%	7.75%
4	7.24%	2.00%	5.24%	3.00%	8.24%	0.40%	7.84%
5	7.77%	2.50%	5.27%	3.00%	8.27%	0.40%	7.87%
6	7.91%	2.50%	5.41%	3.00%	8.41%	0.40%	8.01%
7	8.39%	2.75%	5.64%	3.00%	8.64%	0.40%	8.24%
8	9.34%	2.30%	7.04%	3.00%	10.04%	0.40%	9.64%
Average	**8.08%**	**2.66%**	**5.41%**	**3.00%**	**8.41%**	**0.40%**	**8.01%**

Note: Expected returns are based on an arithmetic average.

We have determined for each firm the expected nominal return rate, then subtracted that firm's expected inflation to arrive at their expected real return in col. (4). Then we have added back our 3.00% inflation assumption and subtracted 0.40% for expenses to obtain a net nominal return. As the table shows, the average one-year return of the eight firms (including PCA) is 8.01%, which is almost exactly equal to the current assumption of 8.00%. Three of the eight investment firms have an expected real return above the current assumption. The other five firms produced expected returns below the current 8.00% assumption.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the table on the next page provides the 25th, 50th, and 75th percentiles of the 30-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 8.00% assumption.

Investment Consultant	Distribution of 30-Year Average Geometric Net Nominal Return			Probability of exceeding 8.00% *
	25th	50th	75th	
(1)	(2)	(3)	(4)	(5)
1	5.33%	6.73%	8.15%	27.4%
2	5.43%	6.79%	8.17%	27.7%
3	5.66%	7.09%	8.54%	33.6%
4	6.03%	7.31%	8.62%	36.1%
5	6.06%	7.34%	8.64%	36.6%
6	5.76%	7.28%	8.81%	37.5%
7	6.00%	7.51%	9.05%	41.5%
8	7.94%	9.16%	10.40%	73.9%
Average	**6.03%**	**7.40%**	**8.80%**	**39.3%**

*Plan's current return assumption net of expenses.

As the analysis shows, there is a 50% likelihood that the 30-year average net real return will be between 6.03% and 8.80%. This becomes the best-estimate range under ASOP 27. However, the average results of the eight firms indicate there is only a 39% chance that the plan will produce an average return that exceeds 8.00% over the next 30 years.

We believe it is also important for the Retirement Board to bear in mind the risk involved. You can see from the chart of annual returns shown earlier in this section that year-by-year returns can swing wildly. Only in three of the last ten years was the return within 5.00% (500 basis points) of the 8.00% assumption. The standard deviation of the investment returns is around 13%, depending on the particular set of capital market assumptions used. This means that even over a ten or twenty year period, there is a significant possibility that the average return will be less than 6.5% or greater than 9.5%.

While we find the current investment assumption of 8.00% to be within the range for a reasonable assumption, we recommend that the Board consider decreasing the investment return assumption 25 basis points to 7.75%. Reducing the investment return assumption would increase the plan liabilities and required contributions. This would, however, also increase the probability that the actual investment return will exceed the assumed rate of return, and it would decrease the size of the investment losses that are incurred when the actual investment returns are less than assumed. The probability of exceeding a 7.75% return assumption over the next 30 years is 44%.

The investment return assumption is currently set in State statute. Therefore, in order for the Board to change the assumption the Board will either need to propose legislation to change the assumption or propose legislation to give the Board the authority to set the assumption, much like the change with the salary increase assumption following the last experience study.

If the assumption is not lowered, but the plan experiences lower returns, then over time the contribution rates will increase anyway, due to the necessity of amortizing the actuarial investment losses.

Salary increase rates

In order to project future benefits, the actuary must project future salary increases. Salaries may increase for a variety of reasons:

- Across-the-board increases for all employees;
- Across-the-board increases for a given group of employees;
- Increases to a minimum salary schedule;
- Additional pay for additional duties;
- Step or service-related increases;
- Increases for acquisition of advanced degrees or specialized training;
- Promotions;
- Overtime;
- Bonuses, if available; or
- Merit increases, if available.

Our salary increase assumption is meant to reflect all of these kinds of increases.

The actuary should not look at the overall increases in payroll in setting this assumption, because payroll can grow at a rate different from the average pay increase for individual members. There are two reasons for this. First, when older, longer-service employees terminate, retire or die, they are generally replaced with new employees who have a lower salary. Because of this, in most populations that are not growing in size, the growth in total payroll is smaller than the average pay increase for members. Second, payroll can change due to an increase or decrease in the size of the group. Therefore, to analyze salary increases, we examine the actual increase in salary for each member who is active in two consecutive fiscal years.

Salary increases for employees of state government tend to vary significantly from year to year. In particular, when the state's tax revenues stall or increase slowly, salary increases often are small or nonexistent. Also, increases may be granted through biennial legislative sessions or through labor negotiations that do not occur every year. Therefore, a longer period for measuring salary increase rates usually provides a more accurate picture, by allowing us to smooth out short-term effects.

For this assumption, we looked at the salaries provided for all members who were active in the start and the end of an experience year, for the nine year study period, beginning July 1, 2000 and ending June 30, 2009. It should be noted that due to the furlough days that occurred in fiscal year 2010, the data for fiscal year 2010 is not suitable for inclusion in the study. The furloughs are expected to be only temporary in nature and therefore are not expected to impact the long-term salary increases experienced by the employees. For these reasons we have excluded fiscal year 2010 from our analysis. Therefore, we have used the combined period from the prior

experience study and this year's experience study (excluding fiscal year 2010) to produce our analysis.

The ERS data shows that salary increases appear to be granted sporadically, with no increases for one year followed by a larger than expected increase the next. Over the nine year study period (for the period July 1, 2000 through June 30, 2009) there have been three years of very low salary increases and five years of very high increases. The following table shows the average increase for Teachers over the last 9 years.

Average Salary Increase for Teachers			
Year Ending June 30,	Average Increase	Year Ending June 30,	Average Increase
2001	1.89%	2006	0.94%
2002	9.85%	2007	7.86%
2003	9.37%	2008	8.26%
2004	0.52%	2009	5.92%
2005	8.38%		

Most actuaries recommend salary increase assumptions that include an element that depends on the member's age or service, especially for large, state-wide retirement systems. They assume larger pay increases for younger or shorter-service employees. This is done in order to reflect pay increases that accompany changes in job responsibility, promotions, demonstrated merit, etc. The experience shows salaries continue to be more closely correlated to service (rather than age), as promotions and productivity increases tend to be greater in the first few years of a career, even if the new employee is older than the average new hire. For this reason, we will continue to use salary scales based on service.

The data also shows differences in salary increases for Teachers, Police & Fire, and General Employees. Therefore, the salary scales have been derived separately for these three groups.

The current salary increase assumption varies based on years of service, with an ultimate salary increase assumption used for all employees who have attained a specified amount of service (4% for General Employees with 15 or more years of service, 4.5% for Teachers with 16 or more years of service, and 4.75% for Police and Fire employees with 3 or more years of service). Over the nine-year period, average pay increases were well above these figures. Teachers received an average long-service increase of 5.26%, Police & Fire employees received an average long-service increase of 7.02%, and General Employees received an average long-service increase of 4.94%. (The long-service increase is the average increase over the nine-year period for Teachers and General Employees with at least 15 years of service, or Police and Fire employees with at least 3 years of service). The table below shows the actual average long-service increases for each year of the study. Note that these actual average rates of increase include average actual inflation of 2.67% (arithmetic average), not our recommended 3% inflation assumption.

Average "Long-Service" Increase				
Current Assumptions vs Experience				
Year Ending	Inflation	Police & Fire	Teachers	General Employees
2001	3.43%	8.98%	1.37%	2.75%
2002	1.77%	6.26%	8.95%	7.52%
2003	2.20%	6.35%	8.91%	6.02%
2004	2.19%	8.45%	(0.28)%	1.57%
2005	3.01%	6.49%	8.07%	6.14%
2006	3.81%	1.35%	0.51%	2.81%
2007	2.59%	7.69%	7.06%	6.19%
2008	3.71%	8.76%	7.76%	6.26%
2009	1.40%	9.05%	5.58%	5.39%
Average	2.67%	7.05%	5.26%	4.94%

The following describes the building block methodology used to construct the current and proposed salary assumptions for Teachers. The same methodology was used to construct the current and proposed salary assumptions for Police & Fire as well as General Employees.

Salary increases are typically larger for shorter-service employees than longer-service employees, as productivity increases faster and promotions occur more frequently earlier in an employee's career. ERS's experience shows this trend. The following table shows the average increase over the nine-year period parsed out in five-year service groups for Teachers:

Teacher Experience	
Service	Average Pay Increase
1 to 5 Years	7.96%
6 to 10 Years	6.13%
11 to 15 Years	5.69%
16 to 20 Years	5.46%
21 to 25 Years	5.36%
More than 25 Years	5.30%
All Years of Service	5.98%

The table shows that members with less than 6 years of service had an average increase of 7.96%, which is 2.50% higher than that of members with 16 to 20 years of service and 2.66% higher than

that of members with more than 25 years of service. Therefore, we continue to recommend the adoption of assumed salary increase rates which vary by service.

The salary scale is composed of three pieces: inflation, general productivity, and a service based step-rate or promotional piece. Our recommended inflation assumption is 3.00%, as discussed earlier. The general productivity component is the expected salary increase of the longer-service employees that is above inflation. The service-based or step-rate/promotional component is the expected salary increase of the shorter-service members that is above the general productivity component. All three pieces are determined independently and then added together to develop the ultimate salary schedule.

To determine the new salary scale, we first calculated the average increase over the nine-year period for members grouped by service. Members with 15 or more years of service were selected to be the longer-service employees to be used in determining the ultimate productivity component. They were grouped together because their salary increase did not vary significantly with additional service.

Using this group, we backed out actual inflation during the study period (2.67%) to get the real rates of increase. The average increase for the longer-service employees over the nine-year period was 5.26%; therefore, the actual productivity component for the period was 2.59% (5.26% less the actual inflation rate of 2.67%). Consequently, we could recommend a productivity component as high as 2.00%. However, we believe the salary increases granted from 2000-2009 will historically show to be abnormally high in comparison to the general growth of the economy. We know the increases over the next 3-5 years will be much lower than recent experience and believe it is likely that the longer term salary increases will be closer to historical averages.

Therefore, we are recommending no change in our productivity component for Teachers of 1.50%.

The salary increase assumption for longer-service employees is the sum of the inflation (3.00%) and the productivity component (1.50%), which is 4.50%. This creates the salary increase assumption of 4.50% for longer-service Teachers.

Next, we developed the step-rate/promotional component. The table on the following page shows the actual increases for members with less than 16 years of service and how we calculated the actual step-rates from the experience. Notice how the step rates decrease as the service increases.

Teachers Step-rate/Promotional Experience			
Years of Service	Average Pay Increase	Less Actual Inflation and Productivity Components	Actual Step-Rate/Promotional Component
1	9.44%	- 5.26%	4.17%
2	8.36%	- 5.26%	3.09%
3	7.86%	- 5.26%	2.59%
4	7.53%	- 5.26%	2.26%
5	6.64%	- 5.26%	1.37%
6	6.49%	- 5.26%	1.22%
7	5.88%	- 5.26%	0.62%
8	6.10%	- 5.26%	0.83%
9	6.40%	- 5.26%	1.13%
10	5.76%	- 5.26%	0.50%
11	6.00%	- 5.26%	0.73%
12	5.70%	- 5.26%	0.44%
13	5.73%	- 5.26%	0.46%
14	5.42%	- 5.26%	0.15%
15	5.58%	- 5.26%	0.32%
16+	5.26%	- 5.26%	0.00%

The next step is to smooth these actual step-rates in order to develop a schedule that will produce a salary history consistent with the experience. The following graph shows two hypothetical salary histories of a teacher with a starting salary of $20,000. One salary history will be based on the actual step-rate/promotional increases from the experience, while the other is based on the proposed step-rate/promotional increase assumption. Our current step rates actually produce results which match very closely and therefore we are not recommending a change in the step-rates. Notice on the following graph that the proposed step-rate/promotional assumption (which is the current assumption) tracks the nine-year experience very closely, yet achieves the desired smoothing pattern.

Salary Growth of $20,000 New Entrant, Promotional Increases Only
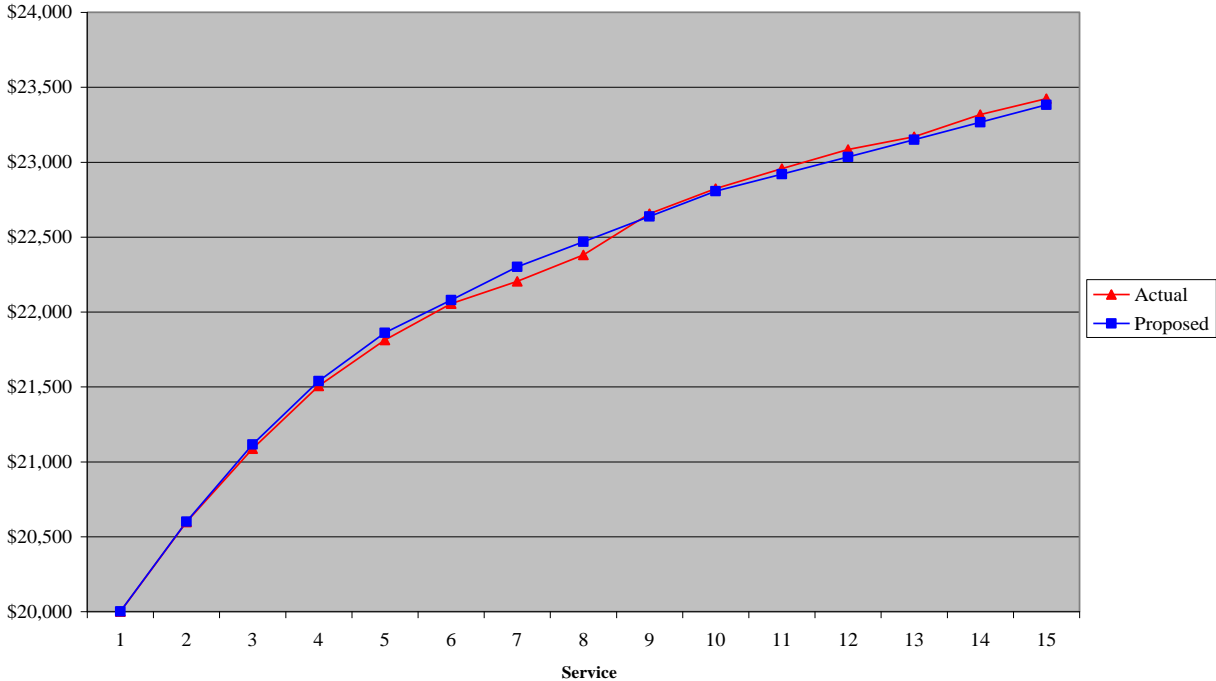
To obtain the recommended rates, we add the smoothed step-rate/promotional component, the 3.00% inflation component, and the 1.50% productivity component. These rates include an increase of 8.50% for new members after their first year of service and grade down to an annual 4.50% increase for teachers with 16 or more years of service. The average salary increase under the schedule is 5.24%. The full schedule is shown in Section VI of this report. Note that for the Teachers we did not recommend a change in any of the component pieces of the salary increase assumption, therefore the overall assumption remains unchanged.

Similar methodologies produced a productivity component of 2.00% for Police & Fire employees (which is an increase of 0.25% over the current assumption) and 1.00% for General Employees (same as current assumption). The average salary increase under the proposed schedule of Police & Fire employees is 5.54% and for General Employees 4.55%. Section VII of this report shows more detail on the experience.

Payroll growth rate

The salary increase rates discussed above are assumptions applied to individuals and are used in projecting future benefits. We use a separate payroll growth assumption (currently 3.50%) in determining the annual payment needed to amortize the unfunded actuarial accrued liability. The amortization payments are calculated to be a level percentage of payroll. Therefore, as payroll increases over time, these amortization charges do, as well.

Payroll can grow at a rate different from the average pay increase for individual members. There are two reasons for this. First, when older, longer-service members terminate, retire or die, they

are generally replaced with new members who have a lower salary. Because of this, in most populations that are not growing in size, the growth in total payroll will be smaller than the average pay increase for members. Second, payroll can grow due to an increase in the size of the group. However, Governmental Accounting Standards Board Statements No. 25 and 27 (GASB 25 and GASB 27) prohibit actuaries from using anticipated membership growth in setting the payroll growth assumption.

As was the case with the salary increase assumption we have excluded fiscal year 2010 from this analysis due to the temporary nature of the furloughs. Over the nine year period ending June 30, 2009, the payroll for ERS has grown from $2.3 billion to $3.8 billion, an average increase of 5.98% per year. In setting the payroll growth assumption, we only take into account anticipated increases in members' salary, not growth in the number of active members. Adjusting the 5.98% average increase to remove the effect of membership growth reduces the average payroll increase to 4.44%, an amount more than the current 3.50% assumption.

This result would seem to justify an increase in the assumption. However, both covered payroll and the active membership declined in fiscal year 2010. With even more furlough days in fiscal year 2011, we could see another decline in payroll during this fiscal year. With the current uncertainty in the economy and the budget issues faced by the state, we have decided to recommend no change in the assumption, as we believe it is very likely that payroll will remain flat in the next several years which could dampen the long-term annual growth in payroll.

Therefore, we are recommending no change in the current payroll growth rate of 3.50%. This assumption is higher than the assumed 3.00% inflation and lower than the salary increase assumption for longer-service employees.

Post-retirement mortality rates

ERS's liability depends in part on how long retirees live. If members live longer, benefits will be paid for a longer period of time, and the liability will increase.

The mortality tables currently being used for non-disabled retirees and for beneficiaries receiving benefits are distinct for each employee group and for males and females. The table used for General Employees was constructed at the last experience study from actual membership experience. The table used for the Teachers is a table constructed for Teachers of another state and the Fire and Police use standard published tables. These tables are then adjusted by a scalar factor to provide a better fit to the data and to add some room for future mortality improvement.

To analyze the data, we begin by determining the expected number of deaths in each year at each age for males and females. Then we compare the actual number to the expected number. The ratio of the actual deaths to the expected deaths—the A/E ratio—then tells us whether the assumptions are reasonable. We generally want to keep the ratio for this assumption around 110% (i.e., 10% more actual deaths than expected) to introduce some conservatism, since we expect life expectancies to continue to increase in the future. The results of this analysis are shown below:

Employee Group	General Employees		Teachers		Police & Fire	
Non-disabled Retirees	Males	Females	Males	Females	Males	Females
Number of actual deaths	1,910	1,270	316	562	265	2
Number of expected deaths (current assumptions)	1,765	1,208	339	474	238	2
A/E ratio	108%	105%	93%	119%	111%	96%

As you can see, the A/E ratios are lower than the 110% that we aim at for the General Employees and the male Teachers. This shows that the current mortality assumptions are too aggressive and are underestimating how long benefits will be paid. For the General Employees and the male Teachers we are recommending adjusting the scalar multipliers used on these groups to produce A/E ratios closer to our targeted 110%. Therefore, we recommend that the mortality rates for non-disabled retirees and beneficiaries be changed to the recommended rates. Section VII shows more detail of the experience.

Disabled mortality rates

This is a minor assumption, and it has only a minor impact on the liabilities of ERS. Although this assumption impacts only a small portion of the membership, the experience indicates that some of the groups could use more conservatism added to the assumption. Therefore, we are recommending some modification to the current rates for several of the groups. The table below shows the A/E ratio of both the current and proposed assumptions for each employee group by gender

A/E Ratio for Disabled Mortality Rates						
.Employee Group	General Employees		Teachers		Police & Fire	
Assumption Set	Current	Proposed	Current	Proposed	Current	Proposed
Males	89%	97%	147%	132%	81%	97%
Females	97%	117%	103%	103%	N/A	N/A

Active mortality rates

Currently, we use the RP-2000 mortality tab les for active employees as the basis of our assumptions for the mortality rates of active members, with different percentages of the tables used for the different employee groups. This is a minor assumption. However, for both the General Employees and the Teachers there were significantly more deaths than expected. Therefore, we are recommending changes to the percentages of tables used for each of these groups so that more deaths are expected.

Disability rates

Disability is also a minor assumption, with little effect on the liabilities. However, the experience did not match the current assumptions as well as we would have liked for the General Employees. Therefore, we are recommending changing the percentages of the client table to match the experience of the group.

Retirement rates

For this assumption, an A/E ratio between 90% and 100% is desirable for conservatism. We currently use retirement rates that vary by group, age, and sex. The retirement tables also vary by contributory vs. noncontributory. The analysis studied all of the groups separately. Data from the prior experience study was taken into consideration when changes were recommended to the assumptions.

There was one overall trend, members are extending their careers and deferring their retirement to later ages. The following sections give a brief description of the findings for unreduced retirement for each group for the "core ages" of 55-69. Section VII has more detail on the experience.

		NonContributory			
		Old Assumptions		New Assumptions	
Group	Actual Retirements	Expected Retirements	Actual/ Expected	Expected Retirements	Actual/ Expected
General Male	1,079	1,434	75.2%	1,240	87.0%
General Female	1,334	1,492	89.4%	1,404	95.0%
Teacher Male	264	259	101.7%	261	101.3%
Teacher Female	593	618	96.0%	626	94.7%

		Contributory (including Hybrid)			
		Old Assumptions		New Assumptions	
Group	Actual Retirements	Expected Retirements	Actual/ Expected	Expected Retirements	Actual/ Expected
General Male	848	1,164	72.9%	987	85.9%
General Female	1,149	1,523	75.4%	1,316	87.3%
Teacher Male	215	289	74.4%	256	83.9%
Teacher Female	671	779	86.2%	710	94.5%

GRS

Police & Fire Employees:

The data showed moderately fewer retirements than expected. The retirement rates were modified to give a closer match to experience, as shown below. The maximum retirement age was extended to age 65 (from age 62). The following table gives more detail.

Police & Fire Employees – Males and Females Unreduced					
		Old Assumptions		New Assumptions	
Age Range	Actual Retirements	Expected Retirements	Actual/ Expected	Expected Retirements	Actual/ Expected
45-49	65	123	52.8%	88	74.0%
50-54	196	266	73.7%	210	93.3%
55-59	263	307	85.7%	268	98.2%
60-61	52	58	89.8%	58	89.8%
Sub-Total	576	754	76.4%	624	92.4%
62-64	27	30	89.1%	30	89.1%
Total (including ages 62-64)	603	784	76.9%	654	92.3%

Termination rates

Termination rates reflect members who leave for any reason other than death, disability or service retirement. They apply whether the termination is voluntary or involuntary, whether the member is vested or non-vested, and whether the member takes a refund or keeps his/her account balance on deposit and takes a deferred benefit.

The current tables have different rates for members within their first three years of service than the rest of the population. This is a typical pattern as termination and turnover are higher earlier in a member's career than once the member is established. The period based on the first few years of a member's career is called the select period, and the period after the select period is called the ultimate period. The rates during the ultimate period are age based and unrelated to service.

We found that in general the current assumptions do a reasonable job of estimating the number of terminations for General Employees and we have made only very minor changes to these rates. For Teachers the current assumptions appear to be predicting too many terminations and hence we are making modifications to these rates to reduce the number of expected terminations.

In setting this assumption credibility was given to data from the prior experience study. The following tables show selected information. The first table only includes data from employees with six years of service or less, while the second table uses data from employees with more than six years of service. Section VII gives more detail on the data.

		Old Assumptions		New Assumptions	
Members with Six Years of Service or Less					
	Actual Terminations	Expected Terminations	A/E	Expected Terminations	A/E
Male Teachers	2,919	2,688	109%	2,832	103%
Female Teachers	5,880	5,387	109%	5,600	105%
Male General Employees	5,641	5,386	105%	5,349	105%
Female General Employees	8,171	8,130	101%	8,130	101%
Police & Fire	652	580	112%	621	105%

		Old Assumptions		New Assumptions	
Members with More than Six Years of Service					
	Actual Terminations	Expected Terminations	A/E	Expected Terminations	A/E
Male Teachers	720	767	94%	676	107%
Female Teachers	1,985	2,037	97%	1,807	110%
Male General Employees	3,037	3,048	100%	2,859	106%
Female General Employees	3,483	3,544	98%	3,159	110%
Police & Fire	517	483	107%	483	107%

GRS

COLA Delay

Our valuation model assumes all teachers retire at the beginning of the year (July) and all other employees retire at the middle of the year. Currently, members receive their first COLA in the first July after the calendar year they retire. For example, a member who retirees in October of 2010 will receive their first COLA in July of 2011 (9 months), but a member who retires in February of 2011 will not receive their first COLA until July of 2012 (17 months later). The valuation currently assumes a member will receive the first COLA nine months after retirement.

We are recommending no change in the COLA delay assumption of 9 months for all groups but Teachers. Teachers are assumed to retire at the beginning of the year. To be consistent with this assumption we are recommending that for Teachers the COLA delay be extended to 12 months.

Sick Leave

We currently assume that each member has their service increased at retirement for unused sick leave. The assumption varies the percentage increase by employee group. Data shows the amount of sick leave is proportional to the amount of service at retirement. Data also shows the amount differs by General Employees, Teachers, and Police and Fire. We are recommending no changes to the assumptions at this time.

Other assumptions

There are other assumptions made in the course of a valuation, such as the percentage of members who are married, the age difference between husbands and wives, the likelihood that a terminating employee will take a refund, timing of decrements, etc. We reviewed these, and decided to recommend no changes to these other assumptions.

Actuarial methods

We have reviewed the actuarial cost method being used—the Entry Age Normal cost method (EAN)—and we continue to believe that this is the method of choice for this plan, since this method usually does the best job of keeping costs level as a percentage of payroll.

Actuarial Value of Assets

Actuaries generally recommend using a smoothed actuarial value of assets (AVA), rather than market value (MVA), in order to dampen the fluctuations in measurements such as the required contribution amount and the funded status of the Plan.

The current method smoothes the differences between the expected returns on the market value of assets (based on the 8.00% annual investment return assumption) and actual returns, net of expenses, over a four-year period. For example, if the actual return is 13% in one year, then 8% is reflected immediately in the AVA, and the other 5% is recognized in 25% increments over four years.

While we believe this method is reasonable, we are recommending a minor change to the asset valuation method. The recommendation is to continue using an asset method with a 4-year smoothing period but in a modified form. The current method recognizes1/4th of each of the 5 individual bases each year. The proposed method would recognize 1/4th of the aggregate deferred gains or losses each year. The proposed method offsets deferred gains and losses against each other which will produce an actuarial asset value that is similar to the current method during periods of extreme investment performance, but has an additional advantage of an actuarial value that moves more consistent with the market value during periods of ordinary investment returns. In turn, this will result in a less volatile contribution rate and funded status.

Section IV

Actuarial Impact of Recommendations

Estimated Impact of All Recommendations (with 8.00% Investment Return)
As of June 30, 2010

	Police & Firefighters			Other Employees			All Employees		
Item	Actuarial Valuation	New Assumptions	Change	Actuarial Valuation	New Assumptions	Change	Actuarial Valuation	New Assumptions	Change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Normal cost	18.8%	19.0%	0.2%	11.8%	11.9%	0.1%	12.6%	12.7%	0.1%
2. Unfunded actuarial accrued liability (millions)	$1,074.5	$1,044.0	-$30.5	$6,063.5	$6,093.2	$29.7	$7,138.1	$7,137.3	-$0.8
3 a. Funded ratio (AVA)	65.7%	66.4%	0.7%	60.5%	60.4%	-0.1%	61.4%	61.4%	0.0%
b. Funded ratio (MVA)	56.8%	57.4%	0.6%	52.4%	52.3%	-0.1%	53.1%	53.1%	0.0%
4. Funding period (in years, AVA)	47.2	45.2	-2	40.0	41.1	1.1	41.3	41.9	0.6
5 a. GASB Annual Required Contribution (30-year)	22.33%	22.07%	-0.26%	16.23%	16.34%	0.11%	16.90%	16.96%	0.06%
b. Annual Required Contribution based on market value of assets	28.43%	28.10%	-0.33%	19.65%	19.75%	0.10%	20.60%	20.65%	0.05%

Note: Funding period calculations do not reflect any active membership growth and are based on the current statutory rates of 19.70% for Police & Fire and 15.00% for all other employees.

Shown above is a table that compares key statistics from the June 30, 2010 actuarial valuation before and after taking into account the recommended new assumptions. The net result of making all the recommended changes makes a significant change in the picture of ERS's actuarial status.

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The normal cost is the average expected cost for a typical new member. The figures shown include both the expected contribution paid by members and the balance to be paid by the employers. The difference between the total contribution paid by the employers, and the portion devoted to the normal cost, is used to amortize the unfunded actuarial accrued liability (UAAL). The UAAL is the portion of the total present value of future benefits that is assigned to past years and is in excess of the actuarial value of assets. The funding period is the number of years that will be required to amortize the UAAL, assuming that the employer contribution rate is unchanged at 19.70% for Police & Firefighters and 15.00% for All Other Employees. The amortization calculations are made assuming payments increase annually at the payroll growth rate.

As you can see, the changes are very significant. The change in the assumed rate of return has the largest effect on the actuarial status.

The Board's decisions should be based on the appropriateness of each recommendation individually, not on their collective effect on the funding period or the unfunded liability.

Estimated Impact of All Recommendations (with 7.75% Investment Return)
As of June 30, 2010

Item	Police & Firefighters			Other Employees			All Employees		
	Actuarial Valuation	New Assumptions	Change	Actuarial Valuation	New Assumptions	Change	Actuarial Valuation	New Assumptions	Change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Normal cost	18.8%	20.2%	1.4%	11.84%	12.5%	0.7%	12.6%	13.4%	0.8%
2. Unfunded actuarial accrued liability (millions)	$1,074.5	$1,139.8	$ 65.3	$6,063.5	$6,519.7	$ 456.2	$7,138.1	$7,659.5	$ 521.4
3 a. Funded ratio (AVA)	65.7%	64.4%	-1.3%	60.5%	58.8%	-1.7%	61.4%	59.7%	-1.7%
b. Funded ratio (MVA)	56.8%	55.6%	-1.2%	52.4%	50.9%	-1.5%	53.1%	51.7%	-1.4%
4. Funding period (in years, AVA)	47.2	83.8	36.6	40.0	56.7	16.7	41.3	59.8	18.5
5 a. GASB Annual Required Contribution (30-year)	22.33%	24.14%	1.8%	16.23%	17.39%	1.2%	16.90%	18.13%	1.2%
b. Annual Required Contribution based on market value of assets	28.43%	30.22%	1.8%	19.65%	20.84%	1.2%	20.60%	21.86%	1.3%

Note: Funding period calculations do not reflect any active membership growth and are based on the current statutory rates of 19.70% for Police & Fire and 15.00% for all other employees.

Shown above is a table that compares key statistics from the June 30, 2010 actuarial valuation before and after taking into account all of the recommended new assumptions except for the investment return assumption change. This assumption set will be used to calculate the liabilities stated in the 2011 actuarial valuation and future valuations until the statutory language is changed to allow for the investment return assumption to be set by the Board based on the recommendation of the Actuary.

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SECTION V

SUMMARY OF RECOMMENDATIONS

Summary of Recommendations

Our recommendations may be summarized as follows:

1. Make no change to the assumed inflation rate of 3.00%.

2. Decrease the assumed real return on investments (net of expenses)--the return in excess of inflation--from 5.00% to 4.75%. (The first two recommendations, taken together, result in a decrease to the nominal investment return rate assumption from 8.00% to 7.75%). [Note: this will require a statutory change.]

3. Change the salary increase rates to reflect a larger productivity component for Police & Fire. Small changes also made to service-based components for all groups. The overall impact is to increase assumed salary increase rates for all employees.

4. No change to the assumed payroll growth assumption from of 3.50%.

5. Decrease the rates of mortality for healthy retirees and beneficiaries for most employee groups. Recommend retaining current mortality tables, but modifying the percentages applied to reflect experience and allow for future mortality improvements.

6. Modify the rates of mortality for disabled retirees.

7. Increase the rates of mortality for active employees.

8. Modify the rates of disability for active employees.

9. Modify the rates of retirement for most employees. Lower rates at most ages.

10. Modify the rates of termination for both males and females for each of the groups.

11. Change COLA delay from 9 months to 1 year for Teachers.

12. Recommend a modification to the asset valuation method from the current individual base amortization to an aggregate base amortization.

13. No changes are being made to any other actuarial assumption or method.

14. Change ERS statutes to provide that the investment return assumption is set by the Board based on the recommendation of the Actuary.

SECTION VI

**SUMMARY OF ASSUMPTIONS
AND METHODS INCORPORATING
THE RECOMMENDED ASSUMPTIONS**

Summary of Assumptions and Methods
Incorporating the Recommended Assumptions

I.   *Valuation Date*

The valuation date is June 30th of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II.   *Actuarial Cost Method*

The funding period required to amortize the unfunded actuarial accrued liability (UAAL) is determined using the Entry Age Actuarial Cost Method. This method assigns the plan's total unfunded liabilities (the actuarial present value of future benefits less the actuarial value of assets) to various periods. The unfunded actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years.

The normal cost is the level percentage of payroll contribution required to accumulate the needed funds to pay all expected benefits. This percentage of payroll is then applied to the total compensation for the prior year for all active members, and is then adjusted for the payroll growth assumption.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

Since the State statutes governing the System establish the current employee and Employer contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL on a level percentage of payroll basis, taking into account the payroll growth assumption and the normal cost expressed as a percent of pay.

Because of this amortization procedure, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period.

III.   *Funding of Unfunded Actuarial Accrued Liability*

All of the following concepts will be discussed on an aggregate basis with regards to the contributory and noncontributory plans. The total normal cost for benefits provided by ERS is 7.77% of payroll, which is 8.03% of payroll less than the total contributions required by Law (13.95% from employers plus 1.78% from employees). Since only 5.99% of the employer's 13.95% contribution is required to meet the normal cost (1.78% comes from the employee contribution), it is intended that the remaining 8.03% of payroll will be used to amortize any unfunded actuarial accrued liabilities over a period of years in the future, assuming that total payroll increases by 3.50% per year.

IV.   *Actuarial Value of Assets*

The actuarial value of assets is equal to the market value, adjusted for a four-year phase in of actual investment return in excess of expected investment return. The actual return is calculated net of investment and administrative expenses, and the expected investment return is equal to the assumed investment return rate multiplied by the prior year's market value of assets, adjusted for contributions, benefits paid, and refunds.

V.   *Actuarial Assumptions*

A.   Economic Assumptions

1.   Investment return: 8% per year, compounded annually, composed of an assumed 3.00% inflation rate and a 5.00% net real rate of return. (Set by legislative action.)

2.   Payroll growth rate: 3.50% per annum.

3. Salary increase rates: As shown below

Years of Service	General Employees		Teachers	
	Service-related Component	Total Annual Rate of Increase Including 3.00% Inflation Component and 1.00% General Increase Rate	Service-related Component	Total Annual Rate of Increase Including 3.00% Inflation Component and 1. 50% General Increase Rate
(1)	(2)	(3)	(2)	(3)
1	4.00%	8.00%	4.00%	8.50%
2	3.00%	7.00%	3.25%	7.75%
3	2.00%	6.00%	2.50%	7.00%
4	1.25%	5.25%	2.00%	6.50%
5	1.00%	5.00%	1.50%	6.00%
6	0.75%	4.75%	1.00%	5.50%
7	0.50%	4.50%	1.00%	5.50%
8	0.50%	4.50%	0.75%	5.25%
9	0.50%	4.50%	0.75%	5.25%
10	0.25%	4.25%	0.75%	5.25%
11	0.25%	4.25%	0.50%	5.00%
12	0.25%	4.25%	0.50%	5.00%
13	0.25%	4.25%	0.50%	5.00%
14	0.25%	4.25%	0.50%	5.00%
15 or more	0.00%	4.00%	0.00%	5.00%

Years of Service	Police & Firefighters	
	Service-related Component	Total Annual Rate of Increase Including 3.00% Inflation Component and 2.00% General Increase Rate
(1)	(2)	(3)
0	14.00%	19.00%
1	12.00%	17.00%
2 or more	0.00%	5.00%

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3.   Salary increase rates (continued):

Salary increases are assumed to occur once a year, on July 1. Therefore the pay used for the period between the valuation date and the first anniversary of the valuation date is equal to the reported pay for the prior year, annualized if necessary, and then increased by the salary increase assumption.

B.   Demographic Assumptions

1.   Mortality rates

General Employees

a.   Healthy males – Client Specific Table for males, 89% multiplier.
b.   Healthy females - Client Specific Table for females, 89% multiplier.
c.   Disabled males - 1994 US Group Annuity Mortality Static Table for males set forward nine years.
d.   Disabled females - 1994 US Group Annuity Mortality Static Table for females set forward nine years.

Teachers

a.   Healthy males – Client Specific Table for male teachers, 65% multiplier.
b.   Healthy females - Client Specific Table for female teachers, 67% multiplier.
c.   Disabled males - 1994 US Group Annuity Mortality Static Table for males set forward five years.
d.   Disabled females - 1994 US Group Annuity Mortality Static Table for females set forward six years.

Police and Fire

a.   Healthy males – 1994 US Group Annuity Mortality Static Table for males, 85% multiplier.
b.   Healthy females - 1994 US Group Annuity Mortality Static Table for females, 85% multiplier.
c.   Disabled males - 1994 US Group Annuity Mortality Static Table for males set forward three years.
d.   Disabled females - 1994 US Group Annuity Mortality Static Table for females set forward three years.

2.   Disability rates – The assumed total disability rates for employees covered by the contributory plan and the noncontributory plan at select ages are multiples of the client specific table that follows:

Age	Male & Female
25	0.000%
30	0.001%
35	0.008%
40	0.026%
45	0.064%
50	0.146%
55	0.198%
60	0.217%

Note: The disability rates project the percentage of employees at each age that is assumed to become disabled before retiring. Multiples of the rates above are assumed to be ordinary disability or accidental disability, and varies by employee group as follows:

Type	General Employees		Teachers		Police and Fire
	Male	Female	Male	Female	Male & Female
Ordinary	135%	85%	50%	50%	70%
Accidental	30%	7%	5%	5%	35%

3. Termination Rates - Separate male and female rates, based on both age and service, developed from 2010 Experience Study. Rates reflect terminations for causes other than death, disability or retirement. Employees eligible for retirement are assumed to have no probability of termination. Sample rates are shown below:

For first 6 years of service

	Expected Terminations per 100 Lives (Male Members)					
	Years of Service					
Group	0	1	2	3	4	5
General Employees	15.5	12.5	10.5	9.0	7.0	6.0
Teachers	33.0	23.0	15.0	13.0	11.0	9.0
Police & Fire	12.0	9.0	4.0	4.0	4.0	4.0

	Expected Terminations per 100 Lives (Female Members)					
	Years of Service					
Group	0	1	2	3	4	5
General Employees	18.5	16.5	12.5	10.0	8.0	7.0
Teachers	28.0	23.0	16.0	14.0	12.0	8.0
Police & Fire	11.0	7.5	4.0	4.0	4.0	4.0

After first 6 years of service

	Expected Terminations per 100 Lives				
	Years of Service				
Age	General Employees Males	General Employees Females	Teachers Males	Teachers Females	Police & Fire
(1)	(2)	(3)	(4)	(5)	(6)
20	7.15	8.12	6.22	7.12	2.03
25	6.50	7.83	4.98	6.72	1.91
30	5.46	5.84	4.12	6.15	2.53
35	4.40	4.04	3.95	4.99	2.75
40	3.60	3.30	3.60	3.70	2.01
45	3.02	2.65	2.88	2.88	1.18
50	2.54	2.41	2.34	2.36	0.79
55	2.52	2.41	2.34	2.36	0.24
60	2.52	2.41	2.34	2.36	0.00

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4. Retirement rates - Separate male and female rates, based on age, developed from the 2010 Experience Study. Sample rates are shown below:

Contributory Plan and Hybrid Plan

	Expected Retirements per 100 Lives				
	General Employees		Teachers		Police and Fire
Age	Male	Female	Male	Female	Male & Female
45	2	1	0	0	13
46	2	1	0	0	13
47	2	1	0	0	13
48	2	1	0	0	13
49	2	1	0	0	13
50	2	1	1	0	15
51	2	1	1	1	15
52	2	1	1	1	15
53	2	2	2	2	15
54	3	3	3	3	15
55	16	13	20	18	20
56	14	13	15	16	20
57	14	13	15	16	20
58	14	13	15	16	20
59	14	13	15	16	20
60	14	15	14	18	30
61	15	15	14	18	30
62	25	25	14	25	30
63	20	25	14	20	30
64	20	20	14	15	30
65	25	25	20	25	100
66	25	25	15	25	100
67	20	20	15	20	100
68	20	20	15	20	100
69	20	20	15	20	100
70	20	20	15	20	100
71	20	20	15	20	100
72	20	20	15	20	100
73	20	20	15	20	100
74	20	20	15	20	100
75	100	100	100	100	100

Note: Retirement rates for the 25&out group age 50-54 are 10% for both male and female.

Noncontributory Plan

Expected Retirements per 100 Lives

	General Employees				Teachers			
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	13	12	2	2	10	13	2	3
56	13	12	2	2	10	13	2	3
57	13	12	2	2	10	14	2	3
58	13	12	2	2	10	15	2	3
59	13	12	3	3	10	16	3	3
60	14	15	4	4	10	17	5	5
61	14	18	5	5	10	18	10	5
62	25	25			16	25		
63	25	25			12	20		
64	20	20			10	18		
65	25	22			20	30		
66	25	22			15	25		
67	25	22			15	25		
68	25	22			15	25		
69	25	22			15	25		
70	20	20			15	25		
71	20	20			15	25		
72	20	20			15	25		
73	20	20			15	25		
74	20	20			15	25		
75	100	100			100	100		

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C.   Other Assumptions

1.   Percent married: 77% of male employees and 57.6% of female employees are assumed to be married.

2.   Age difference: Male members are assumed to be four years older than their spouses, and female members are assumed to be four years younger than their spouses.

3.   Percent electing annuity on death for contributory participants (when eligible): All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity or a refund, whichever is more valuable at time of participant's death.

4.   Percent electing deferred termination benefit: vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

5.   Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt when eligible for early retirement.

6.   Administrative expenses: The assumed investment return rate represents the anticipated net return after payment of all investment and administrative expenses.

7.   Reemployment, purchase of service, transfers: No recognition is made of (i) future member reimbursements upon reemployment, (ii) future purchase of additional service, or (iii) special transfer provisions.

8.   Sick Leave: It is assumed that all members will have their benefit service increased by sick leave and the following loads will be applied by group:

General Employees	3.75%
Teachers	4.25%
Police and Fire	5.00%

9.   COLA delay: It is assumed that the first COLA will be received 9 months after retirement. Teachers are assumed to receive COLA 12 months after retirement,

10.   There will be no recoveries once disabled.

11.   No surviving spouse will remarry and there will be no children's benefit.

12. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

13. Decrement timing: Retirements and terminations of Teachers are assumed to occur at the beginning of the year. All other decrements are assumed to occur mid-year.

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

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

16. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

17. Benefit Service: All members are assumed to accrue 1 year of service each year. Exact fractional service is used to determine the amount of benefit payable.

VI. Participant Data

Participant data was supplied on CD-ROM for (i) active members, (ii) inactive vested members, who are entitled to a future deferred benefit, (iii) members and beneficiaries receiving benefits.

Salary supplied for the current year was based on the earnings for the March preceding the valuation date. This salary was compared to March base pay plus a twelve-month average of overtime, with the greater of the two being used for valuation pay.

VII.   Dates of Adoption of Assumptions and Methods

Generally, actuarial assumptions and methods were adopted by the Board of Trustees in 2000 as recommended by the Segal Company, the prior actuary, with respect to the assumptions, and by Gabriel, Roeder, Smith & Company with respect to the methods. These assumptions and methods were first reflected in the 2001 actuarial valuation. The legislature sets the investment return assumption and the salary scale assumption in the statutes governing the ERS.

Section VII
Summary of Data and Experience

Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

GENERAL EMPLOYEES - CONTRIBUTORY
MALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	83	520	0.160	0.200	0.160	104	83	80%	100%
56	74	473	0.156	0.150	0.140	71	66	104%	112%
57	53	456	0.116	0.150	0.140	68	64	77%	83%
58	46	416	0.111	0.150	0.140	62	58	74%	79%
59	51	395	0.129	0.150	0.140	59	55	86%	92%
60	47	378	0.124	0.150	0.140	57	53	83%	89%
61	54	371	0.146	0.180	0.150	67	56	81%	97%
62	119	668	0.178	0.350	0.250	234	167	51%	71%
63	114	507	0.225	0.200	0.200	101	101	112%	112%
64	56	370	0.151	0.200	0.200	74	74	76%	76%
65	49	303	0.162	0.350	0.250	106	76	46%	65%
66	46	237	0.194	0.250	0.250	59	59	78%	78%
67	24	166	0.145	0.300	0.200	50	33	48%	72%
68	21	122	0.172	0.250	0.200	31	24	69%	86%
69	11	83	0.133	0.250	0.200	21	17	53%	66%
Subtotal	848	5,465	0.155			1,164	987	73%	86%
70-74	43	238	0.181	25.000	0.200	60	48	72%	90%
Subtotal	891	5,703	0.156			1,224	1,035	73%	86%
75 & Over	23	122	0.189	1.000	1.000	122	122	19%	19%
Total	914	5,825	0.157			1,346	1,157	68%	79%

Note: The proposed retirement rates of the 25& out group from age 50 to 54 are 10%.

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Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

GENERAL EMPLOYEES - CONTRIBUTORY
FEMALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	76	685	0.111	0.200	0.130	137	89	55%	85%
56	104	686	0.152	0.100	0.130	69	89	152%	117%
57	84	637	0.132	0.100	0.130	64	83	132%	101%
58	62	606	0.102	0.100	0.130	61	79	102%	79%
59	74	604	0.123	0.120	0.130	72	79	102%	94%
60	78	538	0.145	0.120	0.150	65	81	121%	97%
61	80	465	0.172	0.150	0.150	70	70	115%	115%
62	161	906	0.178	0.350	0.250	317	227	51%	71%
63	166	675	0.246	0.250	0.250	169	169	98%	98%
64	73	468	0.156	0.200	0.200	94	94	78%	78%
65	69	382	0.181	0.450	0.250	172	96	40%	72%
66	59	282	0.209	0.250	0.250	71	71	84%	84%
67	21	205	0.102	0.300	0.200	62	41	34%	51%
68	24	150	0.160	0.400	0.200	60	30	40%	80%
69	18	107	0.168	0.400	0.200	43	21	42%	84%
Subtotal	1,149	7,402	0.155			1,523	1,316	75%	87%
70-74	54	263	0.205	25.000	0.200	66	53	82%	103%
Subtotal	1,203	7,665	0.157			1,589	1,369	76%	88%
75 & Over	15	96	0.156	1.000	1.000	96	96	16%	16%
Total	1,218	7,761	0.157			1,685	1,465	72%	83%

Note: The proposed retirement rates of the 25& out group from age 50 to 54 are 10%.

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GENERAL EMPLOYEES - CONTRIBUTORY
MALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 45	-	-	N\A	0.000	0.000	-	-	N\A	N\A
45	1	32	0.031	0.010	0.020	0	1	313%	156%
46	-	51	0.000	0.010	0.020	1	1	0%	0%
47	3	66	0.045	0.010	0.020	1	1	455%	227%
48	2	82	0.024	0.010	0.020	1	2	244%	122%
49	2	107	0.019	0.010	0.020	1	2	187%	93%
50	2	139	0.014	0.020	0.020	3	3	72%	72%
51	1	186	0.005	0.020	0.020	4	4	27%	27%
52	2	232	0.009	0.020	0.020	5	5	43%	43%
53	6	260	0.023	0.020	0.020	5	5	115%	115%
54	8	296	0.027	0.060	0.030	18	9	45%	90%

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GENERAL EMPLOYEES - CONTRIBUTORY
FEMALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 45	-	-	N\A	0.000	0.000	-	-	N\A	N\A
45	-	12	0.000	0.000	0.010	0	0	0%	0%
46	1	25	0.040	0.000	0.010	0	0	4000000%	400%
47	-	56	0.000	0.000	0.010	0	1	0%	0%
48	2	86	0.023	0.000	0.010	0	1	2325581%	233%
49	2	111	0.018	0.000	0.010	0	1	1801802%	180%
50	-	152	0.000	0.010	0.010	2	2	0%	0%
51	1	208	0.005	0.010	0.010	2	2	48%	48%
52	2	260	0.008	0.010	0.010	3	3	77%	77%
53	8	304	0.026	0.010	0.020	3	6	263%	132%
54	10	359	0.028	0.050	0.030	18	11	56%	93%

GRS

GENERAL EMPLOYEES - NONCONTRIBUTORY
MALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	40	324	0.123	0.100	0.130	32	42	123%	95%
56	59	341	0.173	0.090	0.130	31	44	192%	133%
57	35	324	0.108	0.090	0.130	29	42	120%	83%
58	45	351	0.128	0.090	0.130	32	46	142%	99%
59	38	348	0.109	0.090	0.130	31	45	121%	84%
60	50	320	0.156	0.100	0.140	32	45	156%	112%
61	38	281	0.135	0.180	0.140	51	39	75%	97%
62	214	983	0.218	0.300	0.250	295	246	73%	87%
63	190	775	0.245	0.300	0.250	233	194	82%	98%
64	81	555	0.146	0.250	0.200	139	111	58%	73%
65	68	479	0.142	0.400	0.250	192	120	35%	57%
66	89	390	0.228	0.350	0.250	137	98	65%	91%
67	54	299	0.181	0.300	0.250	90	75	60%	72%
68	52	219	0.237	0.300	0.250	66	55	79%	95%
69	26	157	0.166	0.300	0.250	47	39	55%	66%
Subtotal	1,079	6,146	0.176			1,434	1,240	75%	87%
70-74	62	454	0.137	0.200	0.200	91	91	68%	68%
Subtotal	1,141	6,600	0.173			1,525	1,331	75%	86%
75 & Over	51	253	0.202	1.000	1.000	253	253	20%	20%
Total	1,192	6,853	0.174			1,778	1,584	67%	75%

GRS

GENERAL EMPLOYEES - NONCONTRIBUTORY
FEMALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	36	331	0.109	0.100	0.120	33	40	109%	91%
56	47	384	0.122	0.100	0.120	38	46	122%	102%
57	46	396	0.116	0.100	0.120	40	48	116%	97%
58	41	388	0.106	0.100	0.120	39	47	106%	88%
59	50	369	0.136	0.100	0.120	37	44	136%	113%
60	59	334	0.177	0.150	0.150	50	50	118%	118%
61	52	283	0.184	0.150	0.180	42	51	122%	102%
62	262	1,274	0.206	0.250	0.250	319	319	82%	82%
63	281	1,003	0.280	0.250	0.250	251	251	112%	112%
64	122	693	0.176	0.250	0.200	173	139	70%	88%
65	86	538	0.160	0.300	0.220	161	118	53%	73%
66	118	430	0.274	0.300	0.220	129	95	91%	125%
67	52	291	0.179	0.250	0.220	73	64	71%	81%
68	43	230	0.187	0.250	0.220	58	51	75%	85%
69	39	198	0.197	0.250	0.220	50	44	79%	90%
Subtotal	1,334	7,142	0.187			1,492	1,404	89%	95%
70-74	80	466	0.172	0.250	0.200	117	93	69%	86%
Subtotal	1,414	7,608	0.186			1,609	1,497	88%	94%
75 & Over	39	201	0.194	1.000	1.000	201	201	19%	19%
Total	1,453	7,809	0.186			1,810	1,698	80%	86%

GRS

GENERAL EMPLOYEES - NONCONTRIBUTORY
MALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 55	-	-	N\A	0.000	0.000	-	-	N\A	N\A
55	9	583	0.015	0.100	0.020	58	12	15%	77%
56	7	521	0.013	0.090	0.020	47	10	15%	67%
57	6	444	0.014	0.090	0.020	40	9	15%	68%
58	11	394	0.028	0.090	0.020	35	8	31%	140%
59	14	380	0.037	0.090	0.030	34	11	41%	123%
60	16	332	0.048	0.100	0.040	33	13	48%	120%
61	7	284	0.025	0.180	0.050	51	14	14%	49%

GENERAL EMPLOYEES - NONCONTRIBUTORY
FEMALE EARLY RETIREMENT EXPERIENCE - AGE BASED

				Assumed Rate		Expected Retirement		Actual/Expected	
	Actual	Total	Actual			Current	Proposed	Current	Proposed
Age	Retirement	Count	Rate	Current	Proposed	(3) * (5)	(3) * (6)	(2) / (7)	(2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 55	-	-	N\A	N\A	0.000	-	-	N\A	N\A
55	7	588	0.012	0.100	0.020	59	12	12%	60%
56	16	521	0.031	0.100	0.020	52	10	31%	154%
57	7	496	0.014	0.100	0.020	50	10	14%	71%
58	11	482	0.023	0.100	0.020	48	10	23%	114%
59	8	442	0.018	0.100	0.030	44	13	18%	60%
60	12	413	0.029	0.150	0.040	62	17	19%	73%
61	25	392	0.064	0.150	0.050	59	20	43%	128%

GRS

TEACHERS - CONTRIBUTORY
MALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	27	101	0.267	0.200	0.200	20	20	134%	134%
56	13	93	0.140	0.150	0.150	14	14	93%	93%
57	7	100	0.070	0.150	0.150	15	15	47%	47%
58	13	120	0.108	0.150	0.150	18	18	72%	72%
59	22	124	0.177	0.150	0.150	19	19	118%	118%
60	15	125	0.120	0.140	0.140	18	18	86%	86%
61	18	120	0.150	0.140	0.140	17	17	107%	107%
62	36	213	0.169	0.140	0.140	30	30	121%	121%
63	17	160	0.106	0.140	0.140	22	22	76%	76%
64	14	142	0.099	0.140	0.140	20	20	70%	70%
65	6	121	0.050	0.250	0.200	30	24	20%	25%
66	12	100	0.120	0.250	0.150	25	15	48%	80%
67	7	68	0.103	0.250	0.150	17	10	41%	69%
68	6	59	0.102	0.250	0.150	15	9	41%	68%
69	2	40	0.050	0.250	0.150	10	6	20%	33%
Subtotal	215	1,686	0.128			289	256	74%	84%
70-74	13	119	0.109	25.000	0.150	30	18	44%	73%
Subtotal	228	1,805	0.126			319	274	71%	83%
75 & Over	10	63	0.159	1.000	1.000	63	63	16%	16%
Total	238	1,868	0.127			382	337	62%	71%

GRS

TEACHERS - CONTRIBUTORY
FEMALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	64	363	0.176	0.220	0.180	80	65	80%	98%
56	41	354	0.116	0.180	0.160	64	57	64%	72%
57	47	360	0.131	0.180	0.160	65	58	73%	82%
58	64	361	0.177	0.180	0.160	65	58	98%	111%
59	48	342	0.140	0.180	0.160	62	55	78%	88%
60	63	340	0.185	0.180	0.180	61	61	103%	103%
61	59	280	0.211	0.180	0.180	50	50	117%	117%
62	105	437	0.240	0.250	0.250	109	109	96%	96%
63	53	291	0.182	0.180	0.200	52	58	101%	91%
64	33	232	0.142	0.180	0.150	42	35	79%	95%
65	31	173	0.179	0.250	0.250	43	43	72%	72%
66	34	119	0.286	0.250	0.250	30	30	114%	114%
67	14	68	0.206	0.300	0.200	20	14	69%	103%
68	10	48	0.208	0.400	0.200	19	10	52%	104%
69	5	40	0.125	0.400	0.200	16	8	31%	63%
Subtotal	671	3,808	0.176			779	710	86%	94%
70-74	13	114	0.114	25.000	0.200	29	23	46%	57%
Subtotal	684	3,922	0.174			807	733	85%	93%
75 & Over	5	30	0.167	1.000	1.000	30	30	17%	17%
Total	689	3,952	0.174			837	763	82%	90%

GRS

TEACHERS - CONTRIBUTORY
MALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 45	-	-	N\A	0.000	0.000	-	-	N\A	N\A
45	-	-	N\A	N\A	0.000	-	-	N\A	N\A
46	-	-	N\A	N\A	0.000	-	-	N\A	N\A
47	-	1	0.000	0.000	0.000	0	-	0%	N\A
48	-	7	0.000	0.000	0.000	0	-	0%	N\A
49	-	18	0.000	0.000	0.000	0	-	0%	N\A
50	-	25	0.000	0.010	0.010	0	0	0%	0%
51	1	25	0.040	0.010	0.010	0	0	400%	400%
52	1	32	0.031	0.010	0.010	0	0	313%	313%
53	1	41	0.024	0.040	0.020	2	1	61%	122%
54	1	51	0.020	0.070	0.030	4	2	28%	65%

GRS

TEACHERS - CONTRIBUTORY
FEMALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 45	-	-	N\A	0.000	0.000	-	-	N\A	N\A
45	-	-	N\A	N\A	0.000	-	-	N\A	N\A
46	-	-	N\A	N\A	0.000	-	-	N\A	N\A
47	-	5	0.000	0.000	0.000	0	-	0%	N\A
48	-	26	0.000	0.000	0.000	0	-	0%	N\A
49	-	56	0.000	0.000	0.000	0	-	0%	N\A
50	2	80	0.025	0.000	0.000	0	-	2500000%	N\A
51	-	100	0.000	0.000	0.010	0	1	0%	0%
52	1	141	0.007	0.010	0.010	1	1	71%	71%
53	1	189	0.005	0.010	0.020	2	4	53%	26%
54	6	216	0.028	0.040	0.030	9	6	69%	93%

GRS

Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

TEACHERS - NONCONTRIBUTORY
MALE NORMAL RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	11	58	0.190	0.100	0.100	6	6	190%	190%
56	8	79	0.101	0.090	0.100	7	8	113%	101%
57	10	98	0.102	0.090	0.100	9	10	113%	102%
58	20	127	0.157	0.090	0.100	11	13	175%	157%
59	15	135	0.111	0.090	0.100	12	14	123%	111%
60	15	119	0.126	0.100	0.100	12	12	126%	126%
61	15	113	0.133	0.100	0.100	11	11	133%	133%
62	46	280	0.164	0.150	0.160	42	45	110%	103%
63	31	245	0.127	0.100	0.120	25	29	127%	105%
64	16	194	0.082	0.100	0.100	19	19	82%	82%
65	27	172	0.157	0.240	0.200	41	34	65%	78%
66	21	138	0.152	0.180	0.150	25	21	85%	101%
67	14	110	0.127	0.150	0.150	17	17	85%	85%
68	9	82	0.110	0.150	0.150	12	12	73%	73%
69	6	68	0.088	0.150	0.150	10	10	59%	59%
Subtotal	264	2,018	0.131			260	261	102%	101%
70-74	23	170	0.135	15.000	0.150	26	26	90%	90%
Subtotal	287	2,188	0.131			285	286	101%	100%
75 & Over	9	81	0.111	1.000	1.000	81	81	11%	11%
Total	296	2,269	0.130			366	367	81%	81%

GRS

TEACHERS - NONCONTRIBUTORY
FEMALE RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55	23	151	0.152	0.130	0.130	20	20	117%	117%
56	24	202	0.119	0.120	0.130	24	26	99%	91%
57	35	237	0.148	0.120	0.140	28	33	123%	105%
58	37	285	0.130	0.150	0.150	43	43	87%	87%
59	45	287	0.157	0.180	0.160	52	46	87%	98%
60	45	242	0.186	0.180	0.170	44	41	103%	109%
61	32	212	0.151	0.180	0.180	38	38	84%	84%
62	132	508	0.260	0.300	0.250	152	127	87%	104%
63	67	330	0.203	0.160	0.200	53	66	127%	102%
64	29	239	0.121	0.160	0.180	38	43	76%	67%
65	30	187	0.160	0.300	0.300	56	56	53%	53%
66	42	140	0.300	0.200	0.250	28	35	150%	120%
67	22	91	0.242	0.200	0.250	18	23	121%	97%
68	15	69	0.217	0.200	0.250	14	17	109%	87%
69	15	48	0.313	0.200	0.250	10	12	156%	125%
Subtotal	593	3,228	0.184			618	626	96%	95%
70-74	18	92	0.196	25.000	0.250	23	23	78%	78%
Subtotal	611	3,320	0.184			641	649	95%	94%
75 & Over	10	41	0.244	1.000	1.000	41	41	24%	24%
Total	621	3,361	0.185			682	690	91%	90%

GRS

GENERAL EMPLOYEES - NONCONTRIBUTORY
MALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 55	-	-	N\A	N\A	0.000	-	-	N\A	N\A
55	5	122	0.041	0.100	0.020	12	2	41%	205%
56	1	110	0.009	0.090	0.020	10	2	10%	45%
57	3	103	0.029	0.090	0.020	9	2	32%	146%
58	-	110	0.000	0.090	0.020	10	2	0%	0%
59	3	119	0.025	0.090	0.030	11	4	28%	84%
60	5	109	0.046	0.100	0.050	11	5	46%	92%
61	10	102	0.098	0.100	0.100	10	10	98%	98%

GENERAL EMPLOYEES - NONCONTRIBUTORY
FEMALE EARLY RETIREMENT EXPERIENCE - AGE BASED

Age	Actual Retirement	Total Count	Actual Rate	Assumed Rate		Expected Retirement		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 55	-	-	N\A	N\A	0.000	-	-	N\A	N\A
55	10	258	0.039	0.130	0.030	34	8	30%	129%
56	9	246	0.037	0.120	0.030	30	7	30%	122%
57	4	213	0.019	0.120	0.030	26	6	16%	63%
58	3	191	0.016	0.150	0.030	29	6	10%	52%
59	5	182	0.027	0.180	0.030	33	5	15%	92%
60	9	173	0.052	0.180	0.050	31	9	29%	104%
61	7	166	0.042	0.180	0.050	30	8	23%	84%

GRS

POLICE & FIRE EMPLOYEES
RETIREMENT EXPERIENCE - AGE BASED

				Assumed Rate		Expected Retirement		Actual/Expected	
	Actual	Total	Actual			Current	Proposed	Current	Proposed
Age	Retirement	Count	Rate	Current	Proposed	(3) * (5)	(3) * (6)	(2) / (7)	(2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
45	6	52	0.115	0.175	0.125	9	7	66%	86%
46	10	93	0.108	0.175	0.125	16	12	61%	76%
47	13	136	0.096	0.175	0.125	24	17	55%	87%
48	20	183	0.109	0.175	0.125	32	23	62%	54%
49	16	239	0.067	0.175	0.125	42	30	38%	99%
50	41	275	0.149	0.175	0.150	48	41	85%	65%
51	26	268	0.097	0.175	0.150	47	40	55%	98%
52	42	285	0.147	0.175	0.150	50	43	84%	109%
53	48	294	0.163	0.175	0.150	51	44	93%	94%
54	39	278	0.140	0.250	0.150	70	42	56%	91%
55	75	410	0.183	0.250	0.200	103	82	73%	111%
56	72	324	0.222	0.220	0.200	71	65	101%	88%
57	45	255	0.176	0.220	0.200	56	51	80%	87%
58	35	202	0.173	0.220	0.200	44	40	79%	122%
59	36	148	0.243	0.220	0.200	33	30	111%	80%
60	27	112	0.241	0.300	0.300	34	34	80%	103%
61	25	81	0.309	0.300	0.300	24	24	103%	113%
Subtotal	576	3,635	0.158			754	624	76%	92%
62-64	27	101	0.267	0.300	0.300	30	30	89%	89%
Subtotal	603	3,736	0.161			784	654	77%	92%
65 & Over	13	40	0.325	1.000	1.000	40	40	33%	33%
Total	616	3,776	0.163			824	694	75%	89%

GRS

SALARY SCALE ASSUMPTION
GENERAL EMPLOYEES

Year	Average Long Service Increase	CPI	Productivity
2001	2.75%	3.43%	-0.68%
2002	7.52%	1.77%	5.74%
2003	6.02%	2.20%	3.83%
2004	1.57%	2.19%	-0.62%
2005	6.14%	3.01%	3.13%
2006	2.81%	3.81%	-1.00%
2007	6.19%	2.59%	3.60%
2008	6.26%	3.71%	2.56%
2009	5.39%	1.40%	4.00%
Average	4.94%	2.67%	2.27%
Proposed	4.00%	3.00%	1.00%

Years of Service	Average Pay Increase	Less Actual Inflation and Productivity Components	Actual Step-Rate/Promotional Component	Proposed Step-Rate/Promotional Component
1	9.76%	-4.94%	4.81%	4.00%
2	8.35%	-4.94%	3.40%	3.00%
3	7.09%	-4.94%	2.15%	2.00%
4	6.25%	-4.94%	1.30%	1.25%
5	6.27%	-4.94%	1.32%	1.00%
6	5.79%	-4.94%	0.85%	0.75%
7	5.56%	-4.94%	0.62%	0.50%
8	5.64%	-4.94%	0.69%	0.50%
9	5.02%	-4.94%	0.08%	0.50%
10	5.34%	-4.94%	0.40%	0.25%
11	5.53%	-4.94%	0.58%	0.25%
12	5.04%	-4.94%	0.10%	0.25%
13	5.43%	-4.94%	0.48%	0.25%
14	5.01%	-4.94%	0.06%	0.25%
15	4.94%	-4.94%	0.00%	0.00%

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SALARY SCALE ASSUMPTION
TEACHERS

Year	Average Long Service Increase	CPI	Productivity
2001	1.37%	3.43%	-2.06%
2002	8.95%	1.77%	7.18%
2003	8.91%	2.20%	6.71%
2004	-0.28%	2.19%	-2.47%
2005	8.07%	3.01%	5.06%
2006	0.51%	3.81%	-3.30%
2007	7.06%	2.59%	4.47%
2008	7.76%	3.71%	4.05%
2009	5.58%	1.40%	4.18%
Average	5.26%	2.67%	2.59%
Proposed	4.50%	3.00%	1.50%

Years of Service	Average Pay Increase	Less Actual Inflation and Productivity Components	Actual Step-Rate/Promotional Component	Proposed Step-Rate/Promotional Component
1	9.44%	-5.58%	4.17%	4.00%
2	8.36%	-5.58%	3.09%	3.25%
3	7.86%	-5.58%	2.59%	2.50%
4	7.53%	-5.58%	2.26%	2.00%
5	6.64%	-5.58%	1.37%	1.50%
6	6.49%	-5.58%	1.22%	1.00%
7	5.88%	-5.58%	0.62%	1.00%
8	6.10%	-5.58%	0.83%	0.75%
9	6.40%	-5.58%	1.13%	0.75%
10	5.76%	-5.58%	0.50%	0.75%
11	6.00%	-5.58%	0.73%	0.50%
12	5.70%	-5.58%	0.44%	0.50%
13	5.73%	-5.58%	0.46%	0.50%

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14	5.42%	-5.58%	0.15%	0.50%
15	5.58%	-5.58%	0.32%	0.50%
16	5.26%	-5.58%	0.00%	0.00%

SALARY SCALE ASSUMPTION
POLICE & FIRE EMPLOYEES

Year	Average Long Service Increase	CPI	Productivity
2001	8.98%	3.43%	5.55%
2002	6.26%	1.77%	4.49%
2003	6.35%	2.20%	4.15%
2004	8.45%	2.19%	6.26%
2005	6.49%	3.01%	3.48%
2006	1.35%	3.81%	-2.46%
2007	7.69%	2.59%	5.11%
2008	8.76%	3.71%	5.06%
2009	9.05%	1.40%	7.65%
Average	7.02%	2.67%	4.34%
Proposed	5.00%	3.00%	2.00%

Years of Service	Average Pay Increase	Less Actual Inflation and Productivity Components	Actual Step-Rate/Promotional Component	Proposed Step-Rate/Promotional Component
1	27.29%	-7.02%	20.28%	14.00%
2	22.16%	-7.02%	15.14%	12.00%
3	7.02%	-7.02%	0.00%	0.00%

GENERAL EMPLOYEES
POST-RETIREMENT MORTALITY - MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	5	158	0.0316	0.0071	0.0070	1	1	420%	424%
55-59	37	2,155	0.0172	0.0111	0.0109	25	24	150%	152%
60-64	66	5,766	0.0114	0.0143	0.0142	83	82	80%	81%
65-69	135	8,238	0.0164	0.0160	0.0158	134	132	101%	102%
70-74	188	8,381	0.0224	0.0228	0.0225	193	191	97%	99%
75-79	274	8,194	0.0334	0.0350	0.0346	287	283	96%	97%
80-84	390	6,683	0.0584	0.0534	0.0528	362	357	108%	109%
85-89	437	4,079	0.1071	0.0950	0.0940	376	371	116%	118%
90-94	276	1,533	0.1800	0.1541	0.1523	227	225	121%	123%
95-99	86	328	0.2622	0.2057	0.2035	66	65	131%	133%
100-104	15	34	0.4412	0.3345	0.3308	11	11	139%	139%
105-109	1	2	0.5000	0.3600	0.3560	1	1	139%	141%
Other	0	0	N\A	0.0000	0.0000	0	0	0%	0%
Totals	1,910	45,551				1,765	1,743	108%	110%

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GENERAL EMPLOYEES
POST-RETIREMENT MORTALITY - FEMALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	1	73	0.0137	0.0028	0.0028	0	0	400%	417%
55-59	14	2,408	0.0058	0.0063	0.0062	16	16	86%	86%
60-64	57	7,312	0.0078	0.0086	0.0086	62	62	91%	92%
65-69	116	10,084	0.0115	0.0082	0.0081	83	82	139%	141%
70-74	114	9,710	0.0117	0.0098	0.0097	99	97	116%	117%
75-79	176	9,582	0.0184	0.0178	0.0176	171	168	103%	105%
80-84	243	7,843	0.0310	0.0303	0.0300	239	236	102%	103%
85-89	257	4,352	0.0591	0.0627	0.0620	270	266	95%	96%
90-94	207	1,639	0.1263	0.1327	0.1312	203	200	102%	103%
95-99	78	324	0.2407	0.1888	0.1867	59	58	132%	134%
100-104	7	22	0.3182	0.2290	0.2265	5	5	146%	149%
105-109	0	0	0.0000	0.0000	0.0000	0	0	0%	0%
Other	0	0	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	1,270	53,349				1,208	1,191	105%	107%

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GENERAL EMPLOYEES
POST-RETIREMENT MORTALITY - DISABLED MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	15	357	0.0420	0.0101	0.0090	4	3	400%	452%
55-59	29	588	0.0493	0.0180	0.0162	11	10	268%	297%
60-64	30	614	0.0489	0.0285	0.0260	18	16	171%	187%
65-69	19	476	0.0399	0.0452	0.0409	21	19	89%	98%
70-74	13	257	0.0506	0.0755	0.0686	19	17	69%	75%
75-79	12	212	0.0566	0.1157	0.1058	25	23	49%	53%
80-84	20	195	0.1026	0.1823	0.1673	36	33	56%	61%
85-89	16	131	0.1221	0.2688	0.2515	35	32	46%	49%
90-94	5	50	0.1000	0.3503	0.3335	17	17	29%	30%
95-99	8	17	0.4706	0.4419	0.4256	7	7	110%	115%
Other	6	249	0.0241	0.0000	0.0000	2	2	300%	300%
Totals	173	3,146				194	179	89%	97%

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GENERAL EMPLOYEES
POST-RETIREMENT MORTALITY - DISABLED FEMALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	12	209	0.0574	0.0067	0.0051	1	1	805%	1053%
55-59	27	408	0.0662	0.0118	0.0097	5	4	553%	667%
60-64	26	541	0.0481	0.0183	0.0150	10	8	255%	312%
65-69	14	421	0.0333	0.0317	0.0253	13	10	108%	134%
70-74	11	248	0.0444	0.0549	0.0440	13	11	82%	102%
75-79	10	193	0.0518	0.0938	0.0753	19	15	54%	67%
80-84	8	170	0.0471	0.1559	0.1288	26	21	31%	38%
85-89	9	120	0.0750	0.2377	0.2025	29	24	32%	37%
90-94	10	49	0.2041	0.3385	0.2966	16	14	63%	72%
95-99	1	5	0.2000	0.4444	0.4052	2	2	48%	53%
Other	2	81	0.0247	0.0000	0.0000	0	0	741%	952%
Totals	130	2,445				134	111	97%	117%

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Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

GENERAL EMPLOYEES
ACTIVE MORTALITY - MALE (ORDINARY AND DUTY COMBINED)

				Assumed Rate		Expected Deaths		Actual/Expected	
Age	Actual Deaths	Total Count	Actual Rate	Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	1	0.0000	0.0002	0.0002	0	0	N/A	N/A
20-24	1	653	0.0015	0.0002	0.0003	0	0	N/A	N/A
25-29	3	3,798	0.0008	0.0002	0.0003	1	1	300%	300%
30-34	5	6,833	0.0007	0.0003	0.0004	2	3	250%	167%
35-39	4	11,716	0.0003	0.0005	0.0007	5	8	80%	50%
40-44	12	12,224	0.0010	0.0006	0.0010	8	12	150%	100%
45-49	26	15,142	0.0017	0.0009	0.0014	13	21	200%	124%
50-54	46	16,573	0.0028	0.0012	0.0020	20	33	230%	139%
55-59	52	15,180	0.0034	0.0018	0.0029	28	44	186%	118%
60-64	43	9,590	0.0045	0.0030	0.0047	28	44	154%	98%
65-69	23	3,076	0.0075	0.0043	0.0069	13	20	177%	115%
70-74	12	895	0.0134	0.0136	0.0218	10	16	120%	75%
75 and over	5	0	N\A	0.0235	0.0375	0	0	N/A	N/A
Totals	232	95,681				128	202	181%	115%

GENERAL EMPLOYEES
ACTIVE MORTALITY - FEMALE (ORDINARY AND DUTY COMBINED)

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	3	0.0000	0.0001	0.0001	0	0	N/A	N/A
20-24	0	833	0.0000	0.0001	0.0001	0	0	N/A	N/A
25-29	0	5,386	0.0000	0.0001	0.0001	1	1	0%	0%
30-34	1	8,618	0.0001	0.0002	0.0002	2	2	50%	50%
35-39	6	11,944	0.0005	0.0003	0.0003	3	4	200%	150%
40-44	9	15,220	0.0006	0.0004	0.0005	7	8	129%	113%
45-49	16	18,809	0.0009	0.0007	0.0008	13	15	123%	107%
50-54	21	22,241	0.0009	0.0010	0.0012	22	27	95%	78%
55-59	38	20,649	0.0018	0.0015	0.0018	31	37	123%	103%
60-64	27	12,298	0.0022	0.0023	0.0028	28	33	96%	82%
65-69	12	3,482	0.0034	0.0033	0.0039	11	13	109%	92%
70-74	8	874	0.0092	0.0103	0.0124	7	9	114%	89%
75 and over	8	0	N\A	0.0171	0.0205	0	0	N/A	N/A
Totals	146	120,357	0.0012	0.0010	0.0012	125	149	117%	98%

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TEACHERS
POST-RETIREMENT MORTALITY - MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	0	8	0.0000	0.0026	0.0022	0	0	0%	0%
55-59	0	604	0.0000	0.0037	0.0032	2	2	0%	0%
60-64	11	2,055	0.0054	0.0039	0.0033	8	7	140%	161%
65-69	22	2,637	0.0083	0.0057	0.0049	16	14	133%	155%
70-74	30	2,944	0.0102	0.0151	0.0131	44	38	69%	80%
75-79	55	2,663	0.0207	0.0230	0.0200	63	54	88%	102%
80-84	67	1,574	0.0426	0.0499	0.0433	78	67	86%	99%
85-89	71	772	0.0920	0.0926	0.0803	68	59	104%	120%
90-94	32	219	0.1461	0.1544	0.1338	33	28	98%	113%
95-99	21	95	0.2211	0.2245	0.1946	21	18	101%	116%
100-104	6	16	0.3750	0.2825	0.2449	4	4	137%	159%
105-109	1	5	0.2000	0.3564	0.3089	2	1	58%	68%
Other	0	0	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	316	13,592				339	293	93%	108%

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TEACHERS
POST-RETIREMENT MORTALITY - FEMALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	0	14	0.0000	0.0015	0.0015	0	0	0%	0%
55-59	10	1,927	0.0052	0.0031	0.0032	6	6	162%	157%
60-64	35	7,064	0.0050	0.0027	0.0027	19	20	180%	176%
65-69	38	7,438	0.0051	0.0036	0.0037	28	28	138%	134%
70-74	54	5,831	0.0093	0.0074	0.0076	42	43	128%	124%
75-79	57	4,498	0.0127	0.0119	0.0123	55	57	103%	100%
80-84	64	2,548	0.0251	0.0296	0.0305	74	76	86%	84%
85-89	95	1,342	0.0708	0.0633	0.0652	83	86	115%	111%
90-94	93	753	0.1235	0.1086	0.1119	80	82	117%	113%
95-99	87	409	0.2127	0.1610	0.1659	65	67	134%	130%
100-104	27	103	0.2621	0.2216	0.2284	21	22	126%	122%
105-109	2	2	1.0000	0.2969	0.3061	1	1	364%	357%
Other	0	0	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	562	31,929				474	488	119%	115%

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TEACHERS
POST-RETIREMENT MORTALITY - DISABLED MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	2	11	0.1818	0.0049	0.0056	0	0	3333%	2857%
55-59	3	56	0.0536	0.0090	0.0101	1	1	566%	500%
60-64	2	63	0.0317	0.0162	0.0180	1	1	202%	182%
65-69	0	26	0.0000	0.0260	0.0285	1	1	0%	0%
70-74	0	7	0.0000	0.0409	0.0452	0	0	0%	0%
75-79	0	8	0.0000	0.0686	0.0755	1	1	0%	0%
80-84	1	9	0.1111	0.1058	0.1157	1	1	104%	94%
85-89	0	6	0.0000	0.1673	0.1823	1	1	0%	0%
90-94	0	2	0.0000	0.2515	0.2688	0	0	0%	0%
95-99	0	0	N\A	0.3335	0.3503	0	0	N/A	N/A
100-104	0	0	N\A	0.4256	0.4419	0	0	N/A	N/A
105-109	0	0	N\A	0.4964	0.5000	0	0	N/A	N/A
Other	0	7	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	8	195				5	6	147%	132%

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TEACHERS
POST-RETIREMENT MORTALITY - DISABLED FEMALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	2	29	0.0690	0.0034	0.0034	0	0	1818%	1818%
55-59	6	82	0.0732	0.0067	0.0067	1	1	1034%	1034%
60-64	3	124	0.0242	0.0118	0.0118	1	1	204%	207%
65-69	0	82	0.0000	0.0183	0.0183	1	1	0%	0%
70-74	3	25	0.1200	0.0317	0.0317	1	1	400%	400%
75-79	0	45	0.0000	0.0549	0.0549	3	3	0%	0%
80-84	1	20	0.0500	0.0938	0.0938	2	2	56%	56%
85-89	1	14	0.0714	0.1559	0.1559	2	2	47%	47%
90-94	0	4	0.0000	0.2377	0.2377	1	1	0%	0%
95-99	0	10	0.0000	0.3385	0.3385	3	3	0%	0%
100-104	1	4	0.2500	0.4444	0.4444	2	2	56%	56%
105-109	1	1	1.0000	0.5000	0.5000	1	1	200%	200%
Other	0	9	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	18	449				17	17	103%	103%

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TEACHERS
ACTIVE MORTALITY - MALE (ORDINARY AND DUTY COMBINED)

				Assumed Rate		Expected Deaths		Actual/Expected	
Age	Actual Deaths	Total Count	Actual Rate	Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	1	0.0000	0.0001	0.0002	0	0	N/A	N/A
20-24	0	129	0.0000	0.0001	0.0002	0	0	0%	0%
25-29	0	1,779	0.0000	0.0002	0.0002	0	0	0%	0%
30-34	1	3,128	0.0003	0.0002	0.0003	1	1	139%	93%
35-39	0	3,896	0.0000	0.0004	0.0005	1	2	0%	0%
40-44	3	3,102	0.0010	0.0005	0.0007	2	2	197%	132%
45-49	7	3,283	0.0021	0.0007	0.0010	2	3	306%	204%
50-54	6	3,262	0.0018	0.0010	0.0015	3	5	186%	124%
55-59	10	3,693	0.0027	0.0015	0.0022	5	8	183%	122%
60-64	9	2,965	0.0030	0.0024	0.0036	7	10	131%	87%
65-69	8	1,227	0.0065	0.0034	0.0052	4	6	195%	130%
70-74	3	364	0.0082	0.0109	0.0164	3	5	93%	62%
75 and over	5	20	0.2500	0.0188	0.0281	0	0	1667%	1111%
Totals	52	26,849				29	44	177%	118%

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TEACHERS
ACTIVE MORTALITY - FEMALE (ORDINARY AND DUTY COMBINED)

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0001	0.0001	0	0	N/A	N/A
20-24	0	755	0.0000	0.0001	0.0001	0	0	0%	0%
25-29	1	5,848	0.0002	0.0001	0.0001	1	1	189%	167%
30-34	0	6,743	0.0000	0.0001	0.0002	1	1	0%	0%
35-39	4	7,627	0.0005	0.0002	0.0002	2	2	235%	209%
40-44	8	7,119	0.0011	0.0003	0.0004	2	3	328%	291%
45-49	3	6,694	0.0004	0.0005	0.0006	4	4	85%	75%
50-54	5	7,535	0.0007	0.0008	0.0009	6	7	83%	74%
55-59	10	9,354	0.0011	0.0012	0.0014	11	13	88%	78%
60-64	11	5,612	0.0020	0.0019	0.0021	10	11	109%	97%
65-69	6	1,343	0.0045	0.0026	0.0030	3	4	177%	157%
70-74	1	263	0.0038	0.0083	0.0093	2	2	56%	50%
75 and over	3	9	0.3333	0.0136	0.0153	0	0	3000%	2727%
Totals	52	58,902	0.0009	0.0007	0.0008	42	47	124%	110%

GRS

POLICE & FIRE EMPLOYEES
POST-RETIREMENT MORTALITY - MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate Current	Assumed Rate Proposed	Expected Deaths Current (3) * (5)	Expected Deaths Proposed (3) * (6)	Actual/Expected Current (2) / (7)	Actual/Expected Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	5	888	0.0056	0.0027	0.0027	3	3	192%	193%
55-59	24	2,837	0.0085	0.0047	0.0047	14	14	169%	169%
60-64	29	3,488	0.0083	0.0086	0.0086	30	30	96%	96%
65-69	45	2,508	0.0179	0.0153	0.0153	38	38	119%	119%
70-74	33	1,446	0.0228	0.0242	0.0242	34	34	96%	96%
75-79	31	752	0.0412	0.0384	0.0384	29	29	107%	107%
80-84	48	637	0.0754	0.0642	0.0642	41	41	118%	118%
85-89	30	345	0.0870	0.0983	0.0983	33	33	90%	90%
90-94	15	92	0.1630	0.1549	0.1549	13	13	112%	112%
95-99	5	12	0.4167	0.2285	0.2285	3	3	192%	192%
Totals	265	13,005				238	238	111%	111%

GRS

POLICE & FIRE EMPLOYEES
POST-RETIREMENT MORTALITY - FEMALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	0	47	0.0000	0.0015	0.0015	0	0	0%	0%
55-59	0	54	0.0000	0.0025	0.0025	0	0	0%	0%
60-64	0	48	0.0000	0.0050	0.0050	0	0	0%	0%
65-69	1	25	0.0400	0.0091	0.0091	0	0	435%	417%
70-74	1	24	0.0417	0.0140	0.0140	0	0	278%	270%
75-79	0	27	0.0000	0.0241	0.0241	1	1	0%	0%
80-84	0	7	0.0000	0.0418	0.0418	0	0	0%	0%
85-89	0	2	0.0000	0.0714	0.0714	0	0	0%	0%
90-94	0	0	N\A	0.1207	0.1207	0	0	N/A	N/A
95-99	0	0	N\A	0.1867	0.1867	0	0	N/A	N/A
Totals	2	234				2	2	96%	91%

GRS

POLICE & FIRE EMPLOYEES
POST-RETIREMENT MORTALITY - DISABLED MALE

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	2	76	0.0263	0.0056	0.0044	0	0	444%	571%
55-59	2	134	0.0149	0.0101	0.0080	1	1	144%	183%
60-64	6	177	0.0339	0.0180	0.0145	3	3	184%	228%
65-69	2	117	0.0171	0.0285	0.0237	3	3	61%	73%
70-74	2	75	0.0267	0.0452	0.0372	3	3	59%	72%
75-79	2	57	0.0351	0.0755	0.0620	4	3	48%	58%
80-84	3	42	0.0714	0.1157	0.0972	5	4	57%	68%
85-89	6	58	0.1034	0.1823	0.1529	10	8	59%	71%
90-94	1	7	0.1429	0.2688	0.2336	2	2	55%	63%
95-99	0	0	N\A	0.3503	0.3172	0	0	N/A	N/A
100-104	0	0	N\A	0.4419	0.4072	0	0	N/A	N/A
105-109	0	0	N\A	0.5000	0.4867	0	0	N/A	N/A
Other	1	74	0.0135	0.0000	0.0000	0	0	526%	256%
Totals	27	817				33	28	81%	97%

GRS

POLICE & FIRE EMPLOYEES
POST-RETIREMENT MORTALITY - DISABLED FEMALE

				Assumed Rate		Expected Deaths		Actual/Expected	
Age	Actual Deaths	Total Count	Actual Rate	Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50-54	0	4	0.0000	0.0029	0.0023	0	0	0%	0%
55-59	0	4	0.0000	0.0058	0.0044	0	0	0%	0%
60-64	0	4	0.0000	0.0108	0.0086	0	0	0%	0%
65-69	0	0	N\A	0.0165	0.0137	0	0	N/A	N/A
70-74	0	0	N\A	0.0284	0.0227	0	0	N/A	N/A
75-79	0	0	N\A	0.0492	0.0394	0	0	N/A	N/A
80-84	0	0	N\A	0.0840	0.0677	0	0	N/A	N/A
85-89	0	0	N\A	0.1420	0.1163	0	0	N/A	N/A
90-94	0	0	N\A	0.2197	0.1862	0	0	N/A	N/A
95-99	0	0	N\A	0.3171	0.2764	0	0	N/A	N/A
100-104	0	0	N\A	0.4248	0.3836	0	0	N/A	N/A
105-109	0	0	N\A	0.5000	0.4823	0	0	N/A	N/A
Other	0	11	0.0000	0.0000	0.0000	0	0	0%	0%
Totals	0	23				0	0	0%	0%

GRS

POLICE & FIRE EMPLOYEES
ACTIVE MORTALITY - MALE (ORDINARY AND DUTY COMBINED)

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0002	0.0002	0	0	N/A	N/A
20-24	0	224	0.0000	0.0002	0.0002	0	0	0%	0%
25-29	0	1,689	0.0000	0.0002	0.0002	0	0	0%	0%
30-34	4	3,411	0.0012	0.0003	0.0003	1	1	404%	404%
35-39	3	4,986	0.0006	0.0005	0.0005	2	2	133%	133%
40-44	2	4,350	0.0005	0.0006	0.0006	3	3	75%	75%
45-49	1	3,666	0.0003	0.0009	0.0009	3	3	31%	31%
50-54	7	2,673	0.0026	0.0012	0.0012	3	3	215%	215%
55-59	3	1,313	0.0023	0.0018	0.0018	2	2	130%	130%
60-64	1	288	0.0035	0.0030	0.0030	1	1	125%	125%
Totals	21	22,600				16	16	133%	133%

POLICE & FIRE EMPLOYEES
ACTIVE MORTALITY - FEMALE (ORDINARY AND DUTY COMBINED)

Age	Actual Deaths	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0001	0.0001	0	0	N/A	N/A
20-24	0	19	0.0000	0.0001	0.0001	0	0	N/A	N/A
25-29	0	190	0.0000	0.0001	0.0001	0	0	0%	0%
30-34	0	226	0.0000	0.0002	0.0002	0	0	0%	0%
35-39	0	290	0.0000	0.0003	0.0003	0	0	0%	0%
40-44	1	346	0.0029	0.0004	0.0004	0	0	667%	667%
45-49	0	275	0.0000	0.0007	0.0007	0	0	0%	0%
50-54	0	164	0.0000	0.0010	0.0010	0	0	0%	0%
55-59	0	60	0.0000	0.0015	0.0015	0	0	0%	0%
60-64	0	9	0.0000	0.0023	0.0023	0	0	0%	0%
Totals	1	1,579	0.0006	0.0005	0.0005	1	1	135%	135%

GRS

GENERAL EMPLOYEES
SERVICE BASED WITHDRAWAL EXPERIENCE - MALE

Service	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	865	4,749	0.1821	0.1550	0.1550	736	736	118%	118%
2	1,794	12,894	0.1391	0.1250	0.1250	1,612	1,612	111%	111%
3	1,127	10,899	0.1034	0.1050	0.1050	1,144	1,144	99%	98%
4	849	9,473	0.0896	0.0900	0.0900	853	853	100%	100%
5	557	8,139	0.0684	0.0700	0.0700	570	570	98%	98%
6	449	7,247	0.0620	0.0650	0.0600	471	435	95%	103%
Totals	5,641	53,401				5,386	5,349	105%	105%

SERVICE BASED WITHDRAWAL EXPERIENCE - FEMALE

Service	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	889	4,453	0.1996	0.1850	0.1850	824	824	108%	108%
2	2,777	16,232	0.1711	0.1650	0.1650	2,678	2,678	104%	104%
3	1,831	14,768	0.1240	0.1250	0.1250	1,846	1,846	99%	99%
4	1,228	12,510	0.0982	0.1000	0.1000	1,251	1,251	98%	98%
5	804	10,792	0.0745	0.0800	0.0800	863	863	93%	93%
6	642	9,536	0.0673	0.0701	0.0700	668	668	96%	96%
Totals	8,171	68,291				8,130	8,130	101%	101%

GRS

GENERAL EMPLOYEES
AGE BASED WITHDRAWAL EXPERIENCE (SERVICE >= 7) - MALE

Age	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
25-29	25	395	0.0633	0.0608	0.0608	23	23	109%	109%
30-34	206	3,917	0.0526	0.0503	0.0503	192	192	107%	107%
35-39	449	11,348	0.0396	0.0403	0.0403	454	454	99%	99%
40-44	620	18,540	0.0334	0.0336	0.0336	621	621	100%	100%
45-49	683	23,078	0.0296	0.0281	0.0281	648	648	105%	105%
50-54	594	24,007	0.0247	0.0258	0.0252	638	606	93%	98%
55-59	345	9,132	0.0378	0.0367	0.0252	332	230	104%	150%
60-64	115	3,374	0.0341	0.0400	0.0252	140	85	82%	135%
Totals	3,037	93,791				3,048	2,859	100%	106%

AGE BASED WITHDRAWAL EXPERIENCE (SERVICE >= 7) - FEMALE

Age	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
25-29	19	308	0.0617	0.0738	0.0738	21	21	90%	90%
30-34	239	4,526	0.0528	0.0482	0.0482	211	211	113%	113%
35-39	494	12,388	0.0399	0.0375	0.0375	460	460	107%	107%
40-44	602	19,601	0.0307	0.0302	0.0302	589	589	102%	102%
45-49	707	27,353	0.0258	0.0249	0.0249	684	684	103%	103%
50-54	747	31,168	0.0240	0.0262	0.0241	836	750	89%	100%
55-59	494	13,848	0.0357	0.0392	0.0240	537	333	92%	148%
60-64	181	4,620	0.0392	0.0424	0.0240	206	111	88%	163%
Totals	3,483	113,812				3,544	3,159	98%	110%

GRS

GENERAL EMPLOYEES
SERVICE BASED WITHDRAWAL EXPERIENCE - MALE

Service	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	478	1,428	0.3347	0.3200	0.3300	457	471	105%	101%
2	1,071	4,510	0.2375	0.2200	0.2300	992	1,037	108%	103%
3	536	3,306	0.1621	0.1400	0.1500	463	496	116%	108%
4	376	2,813	0.1337	0.1200	0.1300	338	366	111%	103%
5	272	2,421	0.1124	0.1000	0.1100	242	266	112%	102%
6	186	2,176	0.0855	0.0900	0.0900	196	196	95%	95%
Totals	2,919	16,654				2,688	2,832	109%	103%

GENERAL EMPLOYEES
SERVICE BASED WITHDRAWAL EXPERIENCE - FEMALE

Service	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	591	2,024	0.2920	0.2800	0.2800	567	567	104%	104%
2	2,119	9,009	0.2352	0.2200	0.2300	1,982	2,072	107%	102%
3	1,288	7,190	0.1791	0.1500	0.1600	1,078	1,150	119%	112%
4	879	5,983	0.1469	0.1400	0.1400	838	838	105%	105%
5	596	5,048	0.1181	0.1100	0.1200	555	606	107%	98%
6	407	4,592	0.0886	0.0800	0.0800	367	367	111%	111%
Totals	5,880	33,846				5,387	5,600	109%	105%

GRS

Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

GENERAL EMPLOYEES
AGE BASED WITHDRAWAL EXPERIENCE (SERVICE >= 7) - MALE

Age	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate Current	Assumed Rate Proposed	Expected Withdrawal Current (3) * (5)	Expected Withdrawal Proposed (3) * (6)	Actual/Expected Current (2) / (7)	Actual/Expected Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
25-29	1	19	0.0526	0.0526	0.0435	1	1	100%	100%
30-34	62	1,738	0.0357	0.0409	0.0412	71	71	87%	87%
35-39	123	3,548	0.0347	0.0380	0.0380	135	135	91%	91%
40-44	132	4,265	0.0309	0.0335	0.0338	143	143	92%	92%
45-49	131	4,834	0.0271	0.0259	0.0257	125	125	105%	105%
50-54	144	5,578	0.0258	0.0269	0.0235	150	131	96%	110%
55-59	100	2,262	0.0442	0.0447	0.0234	101	53	99%	189%
60-64	27	710	0.0380	0.0577	0.0239	41	17	66%	159%
Totals	720	22,954				767	676	94%	107%

AGE BASED WITHDRAWAL EXPERIENCE (SERVICE >= 7) - FEMALE

Age	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate Current	Assumed Rate Proposed	Expected Withdrawal Current (3) * (5)	Expected Withdrawal Proposed (3) * (6)	Actual/Expected Current (2) / (7)	Actual/Expected Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
25-29	11	121	0.0909	0.0661	0.0650	8	8	138%	138%
30-34	323	5,525	0.0585	0.0565	0.0580	312	312	104%	104%
35-39	426	9,410	0.0453	0.0442	0.0441	416	416	102%	102%
40-44	306	9,475	0.0323	0.0334	0.0331	316	316	97%	97%
45-49	290	10,552	0.0275	0.0263	0.0265	278	278	104%	104%
50-54	330	13,366	0.0247	0.0280	0.0236	374	315	88%	105%
55-59	236	5,459	0.0432	0.0476	0.0236	260	129	91%	183%
60-64	63	1,416	0.0445	0.0516	0.0233	73	33	86%	191%
Totals	1,985	55,324				2,037	1,807	97%	110%

GRS

POLICE & FIRE EMPLOYEES
SERVICE BASED WITHDRAWAL EXPERIENCE

Service	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	96	686	0.1399	0.1100	0.1200	75	82	128%	117%
2	239	2,282	0.1047	0.0750	0.0900	171	205	140%	117%
3	83	2,184	0.0380	0.0400	0.0400	87	87	95%	95%
4	89	2,147	0.0415	0.0400	0.0400	86	86	103%	103%
5	73	2,040	0.0358	0.0400	0.0400	82	82	89%	89%
6	72	1,979	0.0364	0.0400	0.0400	79	79	91%	91%
Totals	652	11,318				580	621	112%	105%

AGE BASED WITHDRAWAL EXPERIENCE (SERVICE >= 7)

Age	Actual Withdrawal	Total Count	Actual Rate	Assumed Rate		Expected Withdrawal		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
25-29	7	125	0.0560	0.0200	0.0200	3	3	233%	233%
30-34	90	3,133	0.0287	0.0282	0.0282	88	88	102%	102%
35-39	170	7,375	0.0231	0.0250	0.0250	182	182	93%	93%
40-44	145	8,006	0.0181	0.0166	0.0166	134	134	108%	108%
45-49	76	5,846	0.0130	0.0094	0.0094	58	58	131%	131%
50-54	29	2,715	0.0107	0.0066	0.0066	18	18	161%	161%
Totals	517	27,200				483	483	107%	107%

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GENERAL EMPLOYEES
MALE ORDINARY DISABILITY

	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
Age									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	1	0.0000	0.0000	0.0000	0	0	N/A	N/A
20-24	0	653	0.0000	0.0000	0.0000	0	0	N/A	N/A
25-29	0	3,798	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	6,833	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	1	11,716	0.0001	0.0002	0.0002	2	2	50%	50%
40-44	5	12,224	0.0004	0.0006	0.0005	7	6	71%	83%
45-49	16	15,124	0.0011	0.0014	0.0012	21	19	76%	84%
50-54	26	16,505	0.0016	0.0027	0.0024	43	39	60%	67%
55-59	34	12,044	0.0028	0.0031	0.0028	37	33	92%	103%
60-64	32	5,276	0.0061	0.0037	0.0033	19	17	168%	188%
65-69	3	964	0.0031	0.0063	0.0056	6	5	50%	60%
70-74	1	315	0.0032	0.0070	0.0063	2	2	50%	50%
75 and over	0	0	N\A	0.0075	0.0067	0	0	N/A	N/A
Totals	118	85,453	0.0000	0.0000	0.0000	137	123	86%	96%

GRS

GENERAL EMPLOYEES
FEMALE ORDINARY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	3	0.0000	0.0000	0.0000	0	0	N/A	N/A
20-24	0	833	0.0000	0.0000	0.0000	0	0	N/A	N/A
25-29	0	5,386	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	8,618	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	0	11,944	0.0000	0.0001	0.0001	2	2	0%	0%
40-44	3	15,220	0.0002	0.0004	0.0003	6	5	50%	60%
45-49	9	18,807	0.0005	0.0009	0.0008	17	15	53%	60%
50-54	18	22,237	0.0008	0.0017	0.0015	37	33	49%	55%
55-59	30	16,630	0.0018	0.0019	0.0017	32	29	94%	103%
60-64	29	6,728	0.0043	0.0023	0.0021	15	13	193%	223%
65-69	0	1,104	0.0000	0.0040	0.0036	4	4	0%	0%
70-74	0	255	0.0000	0.0044	0.0040	1	1	0%	0%
75 and over	0	0	N\A	0.0047	0.0042	0	0	N/A	N/A
Totals	89	107,765	0.0000	0.0000	0.0000	114	102	78%	87%

GRS

GENERAL EMPLOYEES
MALE DUTY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	1,923	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	6,833	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	0	11,716	0.0000	0.0000	0.0000	0	0	N/A	N/A
40-44	1	12,224	0.0001	0.0001	0.0001	1	1	100%	100%
45-49	3	15,124	0.0002	0.0002	0.0003	3	4	100%	75%
50-54	7	16,505	0.0004	0.0004	0.0005	6	9	117%	78%
55-59	15	12,048	0.0012	0.0004	0.0006	5	7	300%	214%
60-64	11	5,282	0.0021	0.0005	0.0007	3	4	367%	275%
65-69	0	965	0.0000	0.0008	0.0013	1	1	0%	0%
70-74	0	318	0.0000	0.0009	0.0014	0	0	N/A	N/A
75 and over	0	0	N\A	0.0010	0.0015	0	0	N/A	N/A
Totals	37	82,938	0.0004	0.0002	0.0003	19	26	195%	142%

GRS

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Section VII
Employees' Retirement System of the State of Hawaii
Summary of Data and Experience

GENERAL EMPLOYEES
FEMALE DUTY DISABILITY

				Assumed Rate		Expected Deaths		Actual/Expected	
Age	Actual Disabilities	Total Count	Actual Rate	Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
30-34	0	7,098	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	0	11,944	0.0000	0.0000	0.0000	0	0	N/A	N/A
40-44	0	15,220	0.0000	0.0000	0.0000	0	0	N/A	N/A
45-49	0	18,807	0.0000	0.0000	0.0001	1	1	0%	0%
50-54	5	22,237	0.0002	0.0001	0.0001	2	3	250%	167%
55-59	0	16,635	0.0000	0.0001	0.0001	2	2	0%	0%
60-64	1	6,729	0.0001	0.0001	0.0002	1	1	100%	100%
65-69	1	1,105	0.0009	0.0002	0.0003	0	0	N/A	N/A
70-74	0	256	0.0000	0.0002	0.0003	0	0	N/A	N/A
75 and over	0	0	N\A	0.0002	0.0003	0	0	N/A	N/A
Totals	7	100,031	0.0001	0.0001	0.0001	6	7	117%	100%

GRS

TEACHERS
MALE ORDINARY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	1,294	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	3,128	0.0000	0.0000	0.0000	0	0	0%	0%
35-39	0	3,896	0.0000	0.0001	0.0001	0	0	0%	0%
40-44	1	3,102	0.0003	0.0001	0.0002	0	1	213%	169%
45-49	0	3,283	0.0000	0.0004	0.0005	1	2	0%	0%
50-54	4	3,262	0.0012	0.0007	0.0009	2	3	179%	140%
55-59	5	3,057	0.0016	0.0008	0.0010	2	3	212%	161%
60-64	3	1,589	0.0019	0.0010	0.0012	1	2	210%	157%
65-69	0	316	0.0000	0.0017	0.0021	0	1	0%	0%
70-74	0	78	0.0000	0.0019	0.0023	0	0	0%	0%
75 and over	0	6	0.0000	0.0020	0.0025	0	0	0%	0%
Totals	13	23,011	0.0006	0.0004	0.0005	9	11	152%	117%

GRS

TEACHERS
FEMALE ORDINARY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	3,902	0.0000	0.0000	0.0000	0	0	0%	N/A
30-34	0	6,743	0.0000	0.0000	0.0000	0	0	0%	0%
35-39	0	7,627	0.0000	0.0001	0.0001	0	0	0%	0%
40-44	0	7,119	0.0000	0.0001	0.0001	1	1	0%	0%
45-49	1	6,694	0.0001	0.0004	0.0004	2	2	41%	40%
50-54	8	7,535	0.0011	0.0007	0.0007	5	5	154%	151%
55-59	4	7,451	0.0005	0.0008	0.0008	6	6	71%	66%
60-64	5	2,978	0.0017	0.0010	0.0010	3	3	198%	179%
65-69	0	322	0.0000	0.0017	0.0017	0	1	0%	0%
70-74	0	70	0.0000	0.0019	0.0019	0	0	0%	0%
75 and over	0	1	0.0000	0.0020	0.0020	0	0	N/A	N/A
Totals	18	50,442	0.0004	0.0004	0.0004	18	19	100%	95%

GRS

TEACHERS
MALE DUTY DISABILITY

				Assumed Rate		Expected Deaths		Actual/Expected	
	Actual	Total	Actual			Current	Proposed	Current	Proposed
Age	Disabilities	Count	Rate	Current	Proposed	(3) * (5)	(3) * (6)	(2) / (7)	(2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
30-34	0	2,560	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	0	3,896	0.0000	0.0000	0.0000	0	0	N/A	N/A
40-44	0	3,102	0.0000	0.0000	0.0000	0	0	N/A	N/A
45-49	0	3,283	0.0000	0.0000	0.0000	0	0	N/A	N/A
50-54	0	3,262	0.0000	0.0001	0.0001	0	0	N/A	N/A
55-59	0	3,057	0.0000	0.0001	0.0001	0	0	N/A	N/A
60-64	0	1,590	0.0000	0.0001	0.0001	0	0	N/A	N/A
65-69	0	316	0.0000	0.0002	0.0002	0	0	N/A	N/A
70-74	0	78	0.0000	0.0002	0.0002	0	0	N/A	N/A
75 and over	0	6	0.0000	0.0002	0.0002	0	0	N/A	N/A
Totals	0	21,150	0.0000	0.0000	0.0000	0	0	N/A	N/A

TEACHERS
FEMALE DUTY DISABILITY

				Assumed Rate		Expected Deaths		Actual/Expected	
Age	Actual Disabilities	Total Count	Actual Rate	Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
30-34	0	5,395	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	0	7,627	0.0000	0.0000	0.0000	0	0	N/A	N/A
40-44	0	7,119	0.0000	0.0000	0.0000	0	0	N/A	N/A
45-49	0	6,694	0.0000	0.0000	0.0000	0	0	N/A	N/A
50-54	0	7,535	0.0000	0.0001	0.0001	1	1	0%	0%
55-59	1	7,451	0.0001	0.0001	0.0001	1	1	100%	100%
60-64	0	2,978	0.0000	0.0001	0.0001	0	0	N/A	N/A
65-69	0	322	0.0000	0.0002	0.0002	0	0	N/A	N/A
70-74	0	70	0.0000	0.0002	0.0002	0	0	N/A	N/A
75 and over	0	1	0.0000	0.0002	0.0002	0	0	N/A	N/A
Totals	1	45,192	0.0000	0.0000	0.0000	2	2	50%	50%

GRS

POLICE & FIRE EMPLOYEES
MALE & FEMALE ORDINARY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	1	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	444	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	1	2,741	0.0004	0.0001	0.0001	0	0	N/A	N/A
40-44	0	3,857	0.0000	0.0003	0.0003	1	1	0%	0%
45-49	3	3,126	0.0010	0.0006	0.0006	2	2	150%	150%
50-54	1	1,608	0.0006	0.0012	0.0012	2	2	50%	50%
55-59	0	240	0.0000	0.0014	0.0014	0	0	N/A	N/A
60-64	0	45	0.0000	0.0017	0.0017	0	0	N/A	N/A
65-69	0	0	N\A	0.0029	0.0029	0	0	N/A	N/A
70-74	0	0	N\A	0.0033	0.0033	0	0	N/A	N/A
75 and over	0	0	N\A	0.0035	0.0035	0	0	N/A	N/A
Totals	5	12,062	0.0000	0.0000	0.0000	5	5	100%	100%

GRS

POLICE & FIRE EMPLOYEES
MALE & FEMALE DUTY DISABILITY

Age	Actual Disabilities	Total Count	Actual Rate	Assumed Rate		Expected Deaths		Actual/Expected	
				Current	Proposed	Current (3) * (5)	Proposed (3) * (6)	Current (2) / (7)	Proposed (2) / (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under 20	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
20-24	0	0	N\A	0.0000	0.0000	0	0	N/A	N/A
25-29	0	1,396	0.0000	0.0000	0.0000	0	0	N/A	N/A
30-34	0	3,637	0.0000	0.0000	0.0000	0	0	N/A	N/A
35-39	1	5,276	0.0002	0.0000	0.0000	0	0	N/A	N/A
40-44	1	4,696	0.0002	0.0001	0.0001	1	1	100%	100%
45-49	0	3,386	0.0000	0.0003	0.0003	1	1	0%	0%
50-54	0	1,705	0.0000	0.0006	0.0006	1	1	0%	0%
55-59	0	274	0.0000	0.0007	0.0007	0	0	N/A	N/A
60-64	0	50	0.0000	0.0009	0.0009	0	0	N/A	N/A
65-69	0	0	N\A	0.0015	0.0015	0	0	N/A	N/A
70-74	0	0	N\A	0.0016	0.0016	0	0	N/A	N/A
75 and over	0	0	N\A	0.0017	0.0017	0	0	N/A	N/A
Totals	2	20,420	0.0000	0.0000	0.0000	3	3	67%	67%

GRS