

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM
ANNUAL ACTUARIAL VALUATION
JUNE 30, 2015

September 14, 2015

Board of Trustees
Missouri State Employees'
Retirement System
907 Wildwood Drive
Jefferson City, Missouri 65102

Re: Annual Actuarial Valuation as of June 30, 2015

Dear Board Members:

The results of the June 30, 2015 **Annual Actuarial Valuation** of the Missouri State Employees' Retirement System are presented in this report. The purposes of the valuation were to measure the System's funding progress and to determine the level cost employer contribution rate for the fiscal year beginning July 1, 2016. Certain disclosures under the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 will be issued in separate reports.

Your attention is directed particularly to the Executive Summary and discussion in Section A.

The valuation was based upon data, furnished by the MOSERS' staff, concerning active, inactive and retired members along with pertinent financial information and plan provisions. The complete cooperation of the MOSERS' staff in furnishing materials requested is hereby acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by MOSERS.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. We believe that the assumptions and methods used in this report are reasonable and appropriate for the purpose for which they have been used. However, other assumptions and methods could also be reasonable and could result in materially different results. We have included sensitivity analysis for the assumed rate of investment return. Because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial.

To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the Missouri State Employees' Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, Governmental Accounting Standards and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety. This report should not be relied on for any purpose other than the purpose described. No adjustments have been made for events after June 30, 2015, except for recognition of a wage freeze during the fiscal year ending June 30, 2016.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. We did not perform an analysis of the potential range of such future measurements under the scope of this assignment.

The actuarial assumptions are adopted by the Board. The financial assumptions used in making the valuations are shown in Section C of this report. Assumptions concerning future experience are needed for computing employer contribution rates. As time passes and actual experience develops, assumed and actual experiences are compared. From time to time one or more of the assumptions about the future may be changed by the Board after consulting with the actuary and the investment consultant.

The actuaries submitting this report, Brad Lee Armstrong and David T. Kausch, are independent of the plan sponsor and are Members of the American Academy of Actuaries (M.A.A.A.) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brad Lee Armstrong, A.S.A., M.A.A.A.
Senior Consultant & Actuary



David T. Kausch, F.S.A, M.A.A.A.
Consultant & Actuary

BLA/DTK:bd

Table of Contents

	<u>Page</u>
Section A	Introduction
	Executive Summary/Board Summary..... 1
	Discussion 2
Section B	Funding Results
	Principle Valuation Results..... 6
	Employer Contribution Rate..... 7
	Sensitivity Analysis 8
	Actuarial Liabilities 9
	Unfunded Actuarial Accrued Liability 10
	Actuarial Balance Sheet..... 12
	Comparative Schedules 13
	Experience Gain/(Loss) 19
	Active Member Experience by Decrement..... 26
Section C	Fund Assets
	Development of Actuarial Value of Assets..... 33
	Asset Summary 34
	Comparative Graph..... 35
Section D	Projections
	Nature of Actuarial Projections..... 36
	Basic Cash Flow Projections 37
Section E	Participant Data
	Retirees Lives..... 41
	Active and Inactive members..... 44
Section F	Methods & Assumptions..... 48
Section G	Plan Provisions..... 58
Section H	Glossary 67
Section I	History of Results from the Investment Universe..... 69

SECTION A
INTRODUCTION

Executive Summary

(\$ in Millions)

Valuation Date	June 30, 2015	June 30, 2014
Contribution for Fiscal Year Ending	June 30, 2017	June 30, 2016
Required Employer Contributions		
• Annual Amount (Estimated)	\$ 322.9	\$ 322.0
• Percentage of Covered Payroll	16.34 %	15.95 %
Policy Minimum Employer Contribution		
• Annual Amount (Estimated)	\$ 335.3	\$ 342.6
• Percentage of Covered Payroll	16.97 %	16.97 %
Membership		
Number of		
• Active Members	49,980	50,621
• Retirees and Beneficiaries	42,964	41,000
• Terminated Vested Members	19,290	18,933
• Leave-of-Absence Members	195	199
• Long Term Disability Members	948	997
• Total	113,377	111,750
• Reported Payroll	\$ 1,918.5	\$ 1,902.7
Assets		
• Market Value	\$ 8,517	\$ 9,137
• Actuarial Value	8,792	8,638
• Return on Market Value	(2.65)%	18.99 %
• Return on Actuarial Value	6.37 %	11.15 %
• Ratio – Actuarial Value to Market Value	103.24 %	94.54 %
Actuarial Information		
• Actuarial Accrued Liability (AAL)	\$ 11,728	\$ 11,495
• Unfunded Actuarial Accrued Liability (UAAL)	2,935	2,857
• Funded Ratio [#]	75.0 %	75.1 %
• Employer Normal Cost %	6.67 %	6.89 %
• UAAL as % of Reported Payroll*	9.67 %	9.06 %
• Amortization Period	29 years	30 years
• Ratio of Assets to Payroll	4.6	4.5
• Ratio of Liability to Payroll	6.1	6.0

Highlights/Changes

- No changes to benefit provisions.
- Wage inflation was assumed to be 0% for the coming year and 3% thereafter.
- Losses on assets slightly offset by liability gains.
- The aggregate experience loss was \$107 million.

The executive summary provides an overview of the valuation report. It cannot be used as a substitute for a thorough reading of the full report.

* Based on the Required Employer Contribution

The Funded Ratio measure is appropriate for assessing the need for or the amount of future contributions above amounts needed to fund the normal cost and administrative expenses.

The Funded Ratio is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligation.

Discussion

Actuarial Valuation

This is the actuarial valuation of the Missouri State Employees' Retirement System, prepared as of June 30, 2015. Valuations are prepared annually as of June 30, the last day of the Missouri State Employees' Retirement System's plan and fiscal year.

The primary purposes of the valuation report are: to measure the plan's liabilities, to determine the required statutory employer contribution rate based upon the System's funding policy, and to analyze changes in the Missouri State Employees' Retirement System's actuarial position.

Financing Objectives

The Missouri State Employees' Retirement System is supported by member contributions, employer contributions, and net earnings on the investments of the fund. The member contribution rate is set by law at 4.0% of the member's compensation for members hired on or after January 1, 2011, while the employer contribution is determined by the actuarial valuation. The computed employer contribution rate is dependent upon timely receipt of both member and employer contributions.

The combined member and employer contributions are intended to be sufficient to pay the normal cost and to amortize the Unfunded Actuarial Accrued Liability (UAAL) as of June 30, 2014 over a period of 29 years. This will achieve progress towards 100% funded status under the provisions, assumptions and methods described in this report. The Board adopted a new policy which closes the amortization period beginning in fiscal year 2016 and ending fiscal year 2045. It is important to note that in the short term the UAAL is expected to increase in nominal (but not real) dollars until ultimately reading 0 at the end of 29 years if all assumptions are met. By Board Policy, the employer rate shall not fall below the rate set for fiscal 2015 until the plan is 80% funded.

Employer Contribution Requirement, Experience and Funded Ratio

The required employer contribution rate for the fiscal year ending June 30, 2017 is 16.34% of covered payroll, estimated to result in a contribution of \$322.9 million. This compares with an employer contribution rate for the fiscal year ending June 30, 2015 of 15.95% of covered payroll, estimated to result in a contribution of \$322.0 million. However, due to the Policy Minimum Employer Contribution of 16.97%, the resulting estimated dollar contribution is \$335.3 million. A rate reconciliation is shown below:

	Percent of Payroll
6/30/2014 Computed Rate	15.95%
Asset (Gain)/Loss	0.40%
Liability (Gain)/Loss	(0.10)%
Assumption & Method Changes	0.16%
Projected Payroll Lower than Expected	0.23%
Additional UAAL Contribution*	(0.06)%
Normal Cost	(0.24)%
6/30/2015 Computed Rate	16.34%
 Policy Minimum Contribution Rate	 16.97%

* The System is expected to contribute an additional 1.02% of payroll (16.97% - 15.95%) in FY 2016 as a result of the Minimum Funding Policy.

As already mentioned, the System experienced an experience loss this year. Areas contributing to the loss were investment losses, active retirement experience, and service purchases, offset by gains attributable to lower pay increases, lower COLAs, higher retiree mortality (by age and gender), and higher turnover. Experience impacts both the contribution requirement and the progress of the funded ratio. Section B has more analysis of the actuarial gains and losses.

The funded ratio and market value percent funded amounts are shown below:

Valuation Date	June 30, 2015	June 30, 2014
Actuarial Value of Assets (AVA)	\$8,792	\$8,638
Actuarial Accrued Liabilities (AAL)	\$11,728	\$11,495
AVA / AAL (Funded Ratio)	75.0%	75.1%
Market Value of Assets (MVA)	\$8,517	\$9,137
MVA / AAL	72.6%	79.5%

See Section B for a history of the funded ratios. The funded status is appropriate for assessing the need for or amount of future contributions (other than normal cost) if all assumptions are met. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling benefits.

Variability of Future Contribution Rates

The Actuarial Cost Method used to determine the contribution rate is intended to produce contribution rates which are generally level as a percent-of-payroll. Even so, when experience differs from the assumptions, as it often does, the employer's contribution rate can vary significantly from year-to-year.

One risk-metric for contribution rate volatility is the ratio of assets to payroll, which is currently 4.6. The impact of this metric on the variability of contribution rates is illustrated in the following table.

Sensitivity of Contribution Rate	50% Confidence Interval	90% Confidence Interval
a. Range of Rate of Return* (above or below 8.0%)	± 8.5 %	± 20.8 %
b. Ratio of Assets to Payroll	4.6	4.6
c. Range of Asset Gain/Loss as Percent of Pay (a x b)	± 39.1 %	± 95.8 %
d. Smoothed and Amortized as Percent of Pay	± 0.8 %	± 2.1 %

**Based on information as of June 30, 2013.*

Over time, if the year-to-year gains and losses offset each other, the unfunded contribution rate would be expected to remain level, but this does not often happen.

Relationship to Market Value

The Actuarial Value of Assets exceeds the Market Value of Assets by \$276 million as of the valuation date (see Section C). This difference will be gradually recognized in the absence of offsetting losses.

If Market Value had been the basis for the valuation, the contribution rate would have been 17.31% and the funded ratio would have been 72.6%. This is an indication that absent future gains, the unrecognized asset losses are expected to increase the contribution rate and decrease the funded ratio over the next few years.

Impact of the 2011 Plan

The employer normal cost for 2011 plan members is lower than for MSEP and MSEP 2000 members due to later retirement eligibility and 4% member contributions. As the 2011 plan members replace MSEP and MSEP 2000 members, the System's employer normal cost is expected to ultimately decline by approximately 3.4% of payroll relative to the June 30, 2015 valuation date.

Benefit Provisions

This valuation reflects benefits promised to members by statute as reported to us by the System's staff. There have been no changes since the prior valuation.

Actuarial Assumptions and Methods (Other than Asset Valuation Method)

In determining costs and liabilities, actuaries use assumptions about the future, such as rates of salary increase, probabilities of retirement, termination, death and disability, and an investment return assumption. The Board of Trustees sets the actuarial assumptions and methods taking into account recommendations made by the plan's actuary and other advisors. These assumptions and procedures were revised in 2012 following an analysis of plan experience for the 4-year period ending June 30, 2011.

Section F summarizes the current assumptions. The most significant assumptions are (i) the assumed investment return, currently set at 8.00%, and (ii) the assumption regarding future payroll increases of 3% per year. For the June 30, 2015 valuation, wage inflation is assumed to be 0% in the first year and 3% thereafter. This is a one-time change based on the pay freeze enacted for FY 2016.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of MOSERS. These actuarial assumptions and methods comply with current actuarial standards of practice.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated employer contribution rates, and amortization periods.

In addition to the actuarial assumptions, the actuary makes use of an Actuarial Cost Method to allocate costs to particular years. In accordance with Missouri statutes, MOSERS uses the Entry Age Normal method. Theoretically, this method produces a level contribution rate pattern of funding over time, and thereby provides equity between various generations of taxpayers. We continue to believe this method is appropriate for the Missouri State Employees' Retirement System and consistent with the statutory funding objective. The actuarial accrued liability determined by the Entry Age Normal method is compared to the Actuarial Value of Assets. Any difference is amortized as a level percentage of payroll over a period of 29 years as of the June 30, 2015 valuation determining contribution requirements for the fiscal year ending June 30, 2017.

Assets

System assets are held in trust. The Missouri State Employees' Retirement System staff have provided the asset information used in this valuation.

Section C contains several exhibits summarizing the plan's assets, presents a summary of the Market Value of Assets held by the fund, shows the allocation of assets held for investment and shows a reconciliation of the assets from the last valuation date to the current valuation date.

Section C also shows the development of the Actuarial Value of Assets on page 33. The Actuarial Value of Assets is a smoothed Market Value. A smoothed value is used in order to dampen some of the year-to-year fluctuations in valuation results that would occur if the Market Value were used instead. The method used phased-in differences between the actual and expected market returns over three years.

The expected return is determined using the 8.00% assumption and the plan's Actuarial Value of Assets, adjusted for contributions received and benefits and refunds paid. Both the actual and expected returns are computed net of investment expenses.

Market experience during the year ended June 30, 2015 was below expectations. The asset valuation method currently in use by MOSERS smoothes investment gains and losses over an open period of 3 years and, in addition, requires the smoothed value of assets to be within a certain corridor limit of the market value of assets. The corridor limit is currently 80% to 125%.

The Actuarial Value of Assets is currently 103% of the Market Value of Assets. Over any short time period, a disparity between Actuarial Value and Market Value may appear, but in the long-run, we would expect the Actuarial Value and the Market Value to continue to track each other fairly closely.

The investment return rate for fiscal year 2015 on Market Value was (2.65)% based on an approximation, while it was 6.37% on Actuarial Value. These figures differ because of the asset valuation procedure described above.

Active Member Data

The number of active members decreased from 50,621 last year to 49,980 this year. Total payroll increased 0.83% from \$1,902.7 million last year to \$1,918.5 million this year. Lower than expected payroll growth increased the contribution rate by 0.51% of covered payroll. The increase in the number of active members participating under MSEP 2011 decreased the Normal Cost contribution rate by 0.24% of covered payroll.

GASB Disclosures

The GASB 67/68 disclosures will be issued in separate reports due to the expressed intent of GASB to disconnect reporting requirements from funding requirements, and the timelines for meeting reporting requirements.

Conclusion

Based on the results of the June 30, 2015 regular annual actuarial valuation, it is our opinion that the Missouri State Employees' Retirement System continues to be funded in accordance with actuarial principles of level percent-of-payroll financing.

SECTION B
FUNDING RESULTS

**Principal Valuation Results
as of June 30
(\$ in Millions)**

Valuation Date:	2015	2014
A. Number of Participants		
Active Members	49,980	50,621
Retirees and Beneficiaries	42,964	41,000
Terminated Vested Members	19,290	18,933
Leave-of-Absence Members	195	199
Long Term Disability Members	948	997
Total	<u>113,377</u>	<u>111,750</u>
Covered Annual Payroll	\$ 1,919	\$ 1,903
 Development of Contribution Rate		
For Fiscal Year Ending	2017	2016
B. Normal Cost %		
Total	8.18 %	8.21 %
Member	1.51 %	1.32 %
Employer	6.67 %	6.89 %
C. Unfunded Actuarial Accrued Liabilities (UAAL)		
Actuarial Accrued Liability	\$ 11,728	\$ 11,495
Actuarial Value of Assets	8,792	8,638
UAAL	\$ 2,935	\$ 2,857
% of Payroll Required to Amortize UAAL*	9.67 %	9.06 %
D. Total Computed Employer Contribution Rate	16.34%	15.95%
E. Policy Minimum Employer Contribution Rate	16.97%	16.97%
F. Estimated Dollar Contribution#	\$ 335.3	\$ 342.6

* This corresponds to an amortization factor of 15.53151 applied to the unfunded actuarial accrued liability at the beginning of the applicable fiscal year assuming payroll growth of 3% per year.

Illustrative only. Estimated employer contribution amounts (shown in \$ millions) are based on the greater of the Total Computed Employer Contribution Rate and the Policy Minimum Contribution Rate shown and valuation payroll projected two years to the applicable fiscal year using the valuation assumptions of 0% for the first year and 3% for the second year.

**Computed Employer Contribution Rate
Expressed as Percents of Active Member Payroll
for the Fiscal Year Ending June 30, 2017
Actuarial Valuation Results as of June 30, 2015**

	Contribution Expressed as Percents of Payroll for the Fiscal Year		
	2016/17		
	Pre-2011 Hires	Post-2010 Hires	Weighted Average
A. Normal Cost			
(1) Service retirement benefits	5.73 %	3.86 %	5.03 %
(2) Vested termination benefits	1.69	0.77	1.34
(3) Disability benefits	0.72	0.74	0.73
(4) Survivor benefits	0.18	0.22	0.19
(5) Refunds	0.00	1.24	0.47
(6) Administrative expenses	0.42	0.42	0.42
(7) Total [(1) + (2) + (3) + (4) + (5) + (6)]	8.74	7.25	8.18
B. Less Member Contributions	0.00	4.00	1.51
C. Employer Normal Cost [A(7) - B]	8.74	3.25	6.67
D. Unfunded Actuarial Accrued Liabilities (UAAL) (29-year level percent-of-payroll amortization*)			9.67
E. TOTAL COMPUTED EMPLOYER CONTRIBUTION RATE [C. + D.]			16.34 %
F. POLICY MINIMUM EMPLOYER CONTRIBUTION RATE			16.97 %
G. ESTIMATED EMPLOYER CONTRIBUTION (\$Millions)#			\$335.3

The amortization period is a 30-year closed period beginning with the June 30, 2014 valuation as described in the Funding Policy adopted by the Board June 30, 2013. As of June 30, 2015, 29 years remain. At the September 18, 2014 meeting, the Board adopted a policy minimum contribution rate so that the employer rate shall not fall below the fiscal 2015 rate (16.97% of payroll) until the plan is 80% funded.

* This corresponds to an amortization factor of 15.53151 applied to the unfunded actuarial accrued liability at the beginning of the applicable fiscal year assuming payroll growth of 3% per year. See page 10.

Illustrative only. Estimated employer contribution amounts (shown in \$ millions) are based on the greater of the Total Computed Employer Contribution Rate and the Policy Minimum Contribution Rate shown and valuation payroll projected two years to the applicable fiscal year using the valuation assumptions of 0% for the first year and 3% for the second year. The comparable estimated employer contribution amount from last year's valuation is \$342.6 million.

Sensitivity Analysis

There are several actuarial assumptions used in the valuation. Differences between expected and actual experience result in gains and losses from year to year. The most significant assumption in regards to gains and losses is the rate of return assumption. This illustration shows sensitivity of the valuation results to the investment return assumption by reproducing the valuation at investment return assumptions 7%, 7.5%, 8.5% and 9.0%.

(All figures are in \$millions)

<u>Investment Return Assumption</u>	<u>7.0%</u>	<u>7.5%</u>	<u>8.0%</u>	<u>8.5%</u>	<u>9.0%</u>
Employer Normal Cost Rate	8.71 %	7.63 %	6.67 %	5.83 %	5.12 %
UAAL Rate	<u>12.72</u>	<u>10.98</u>	<u>9.67</u>	<u>7.81</u>	<u>6.47</u>
Employer Contribution Rate	21.43 %	18.61 %	16.34 %	13.64 %	11.59 %
Projected \$ Contribution (ER)	\$ 423.5	\$ 378.8	\$ 322.9	\$ 277.7	\$ 229.0
Actuarial Accrued Liability	\$ 13,042	\$ 12,358	\$ 11,728	\$ 11,149	\$ 10,624
Actuarial Value of Assets	\$ 8,792	\$ 8,792	\$ 8,792	\$ 8,792	\$ 8,792
Unfunded Actuarial Accrued Liability	\$ 4,249	\$ 3,566	\$ 2,935	\$ 2,357	\$ 1,831
Funded Ratio	67.4 %	71.1 %	75.0 %	78.9 %	82.8 %

Actuarial Liabilities June 30, 2015

Actuarial Present Value, June 30, for	(1) Actuarial Present Value	(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1) - (2)
Active Members			
Service retirement benefits based on service rendered before and likely to be rendered after valuation date	\$4,667,118,800	\$612,262,391	\$ 4,054,856,409
Disability benefits likely to be paid to present active members who become totally and permanently disabled	135,858,173	85,642,349	50,215,824
Survivor benefits likely to be paid to widows and children of present active members who die before retiring	94,514,730	22,245,790	72,268,940
Separation benefits likely to be paid to present active members	376,853,354	175,962,019	200,891,335
Refunds likely to be paid to present active members	<u>43,945,823</u>	<u>41,493,218</u>	<u>2,452,605</u>
Active Member Totals	\$5,318,290,880	\$937,605,767	\$ 4,380,685,113
Members on Leave of Absence & LTD			
Service retirement benefits based on service rendered before the valuation date			85,796,007
Terminated Vested Members			
Service retirement benefits based on service rendered before the valuation date			565,475,553
Retired Lives			6,694,962,539
BackDROP Installment Payments Incurred, but not yet paid			<u>699,198</u>
TOTAL ACTUARIAL ACCRUED LIABILITY			\$11,727,618,410
ACTUARIAL VALUE OF ASSETS			<u>8,792,485,658</u>
UNFUNDED ACTUARIAL ACCRUED LIABILITY			<u>\$ 2,935,132,752</u>
FUNDED RATIO			75.0%

**Determination of the
Unfunded Actuarial Accrued Liability (UAAL)
Amortization
(\$ in Millions)**

(1) Total Contribution Rate as a Percent-of-Payroll for the Year after the Valuation Date (as determined by the prior valuation)	
(a) Total Normal Cost Rate Beginning of Year	8.21%
(b) UAAL Beginning of Year	<u>10.08%</u>
(c) Total Contribution Rate Beginning of Year [@]	18.29%
(2) UAAL on Valuation Date	\$ 2,935.1
(3) Expected Interest on UAAL [(2) * 8.0%]	\$ 234.8
(4) Projected Payroll for the Year After the Valuation Date*	\$ 1,918.5
(5) Total Normal Cost [(1)(a) x (4)]	\$ 157.5
(6) 1/2 Year Interest on Normal Cost [(5) / 2 * 8.0%]	\$ 6.3
(7) Total Expected Contributions [(1)(c) x (4)]	\$ 350.9
(8) 1/2 Year Interest on Contributions [(7) / 2 * 8.0%]	\$ 14.0
(9) Projected UAAL [(2) + (3) + (5) + (6) - (7) - (8)]	\$ 2,968.8
(10) Amortization Factor (29 years)*	15.53151
(11) Projected Payroll for Second Year after Valuation Date	\$ 1,976.1
(12) UAAL Contribution Rate [(9) / (10) / (11)]	9.67%

* Assuming payroll growth of 0% for the first year.

@ The Total Contribution Rate was the adopted employer rate of 16.97% plus the weighted average member rate of 1.32% of payroll.

Financing Unfunded Actuarial Accrued Liabilities Calculated Using a Wage Inflation Assumption of 3.0% (0.0% for FYE 2016) and an Investment Return Assumption of 8.0% Compounded Annually

Level % of Payroll Amortization

Fiscal Year Ending June 30	Projected Active Member Payroll*	Unfunded Actuarial Accrued Liability (BOY)	UAAL Adjusted for Wage Inflation (BOY)	Amortization Years Remaining	Annual Contributions		UAAL as % of Payroll	BOY Funded Ratio [#]
					Dollars	% of Payroll		
-----\$ in millions-----								
2016	\$1,919	\$2,935	\$2,935	30	\$193	10.08 %	152.99 %	75.0 %
2017	1,976	2,969	2,882	29	191	9.67	150.24	75.4
2018	2,035	3,008	2,835	28	197	9.67	147.77	75.8
2019	2,096	3,044	2,785	27	203	9.67	145.18	76.1
2020	2,159	3,076	2,733	26	209	9.67	142.47	76.3
2021	2,224	3,105	2,679	25	215	9.67	139.62	76.6
2022	2,291	3,130	2,621	24	222	9.67	136.64	76.8
2023	2,360	3,150	2,561	23	228	9.67	133.51	77.0
2024	2,430	3,165	2,498	22	235	9.67	130.23	77.2
2025	2,503	3,174	2,432	21	242	9.67	126.79	77.4
2026	2,578	3,176	2,363	20	249	9.67	123.18	77.7
2027	2,656	3,171	2,291	19	257	9.67	119.40	77.9
2028	2,735	3,157	2,215	18	265	9.67	115.43	78.2
2029	2,817	3,135	2,135	17	273	9.67	111.27	78.5
2030	2,902	3,102	2,051	16	281	9.67	106.91	78.9
2031	2,989	3,059	1,963	15	289	9.67	102.34	79.3
2032	3,079	3,003	1,871	14	298	9.67	97.54	79.8
2033	3,171	2,934	1,775	13	307	9.67	92.51	80.3
2034	3,266	2,849	1,674	12	316	9.67	87.24	81.0
2035	3,364	2,749	1,568	11	325	9.67	81.72	81.7
2036	3,465	2,631	1,457	10	335	9.67	75.92	82.6
2037	3,569	2,493	1,340	9	345	9.67	69.84	83.6
2038	3,676	2,333	1,218	8	356	9.67	63.47	84.7
2039	3,786	2,150	1,090	7	366	9.67	56.79	86.0
2040	3,900	1,942	955	6	377	9.67	49.78	87.4
2041	4,017	1,705	814	5	389	9.67	42.44	89.0
2042	4,137	1,437	666	4	400	9.67	34.73	90.8
2043	4,262	1,136	511	3	412	9.67	26.66	92.8
2044	4,389	798	349	2	425	9.67	18.19	95.0
2045	4,521	421	179	1	437	9.67	9.31	97.4
2046	4,657	0	0	0	0	0.00	0.00	100.0

* Assuming payroll growth of 0% for the first year.

The Funded Ratio measure is appropriate for assessing the need for or the amount of future contributions above the amounts needed to fund the normal cost and administrative expenses. The Funded Ratio is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligation.

Actuarial Balance Sheet as of June 30, 2015

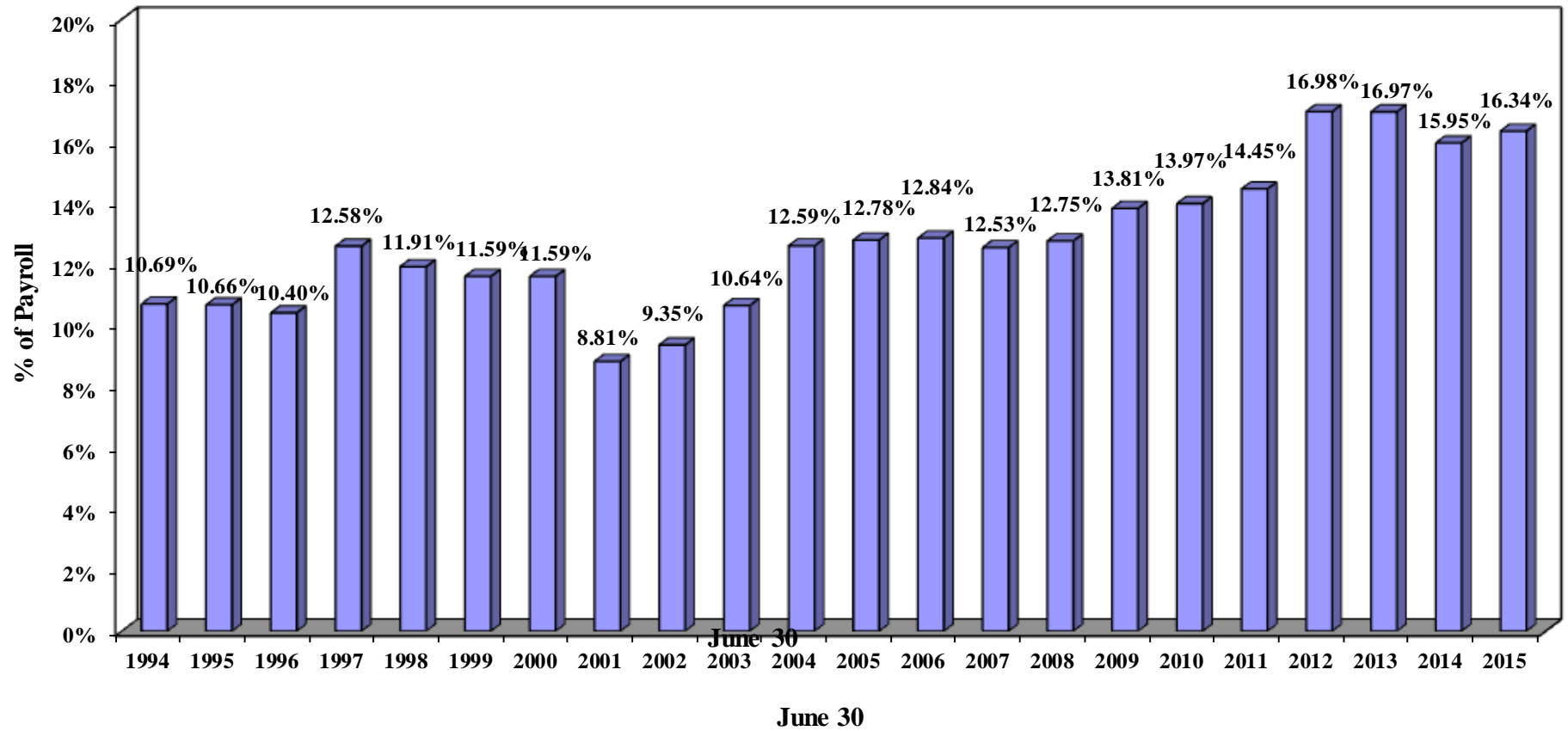
Assets and Present Value of Expected Future Contributions

A. Actuarial Value of Assets		
1. Net Assets from System Financial Statements	\$ 8,516,654,912	
2. Adjustment for Valuation Assets	275,830,746	
3. Actuarial Value of Assets		8,792,485,658
B. Actuarial Present Value of Expected Future Employer Contributions		
1. For Normal Costs	802,500,973	
2. For Unfunded Actuarial Accrued Liability	2,935,132,752	
3. Total		3,737,633,725
C. Actuarial Present Value of Expected Future Member Contributions		135,104,794
D. Total Present and Expected Future Resources		\$ 12,665,224,177

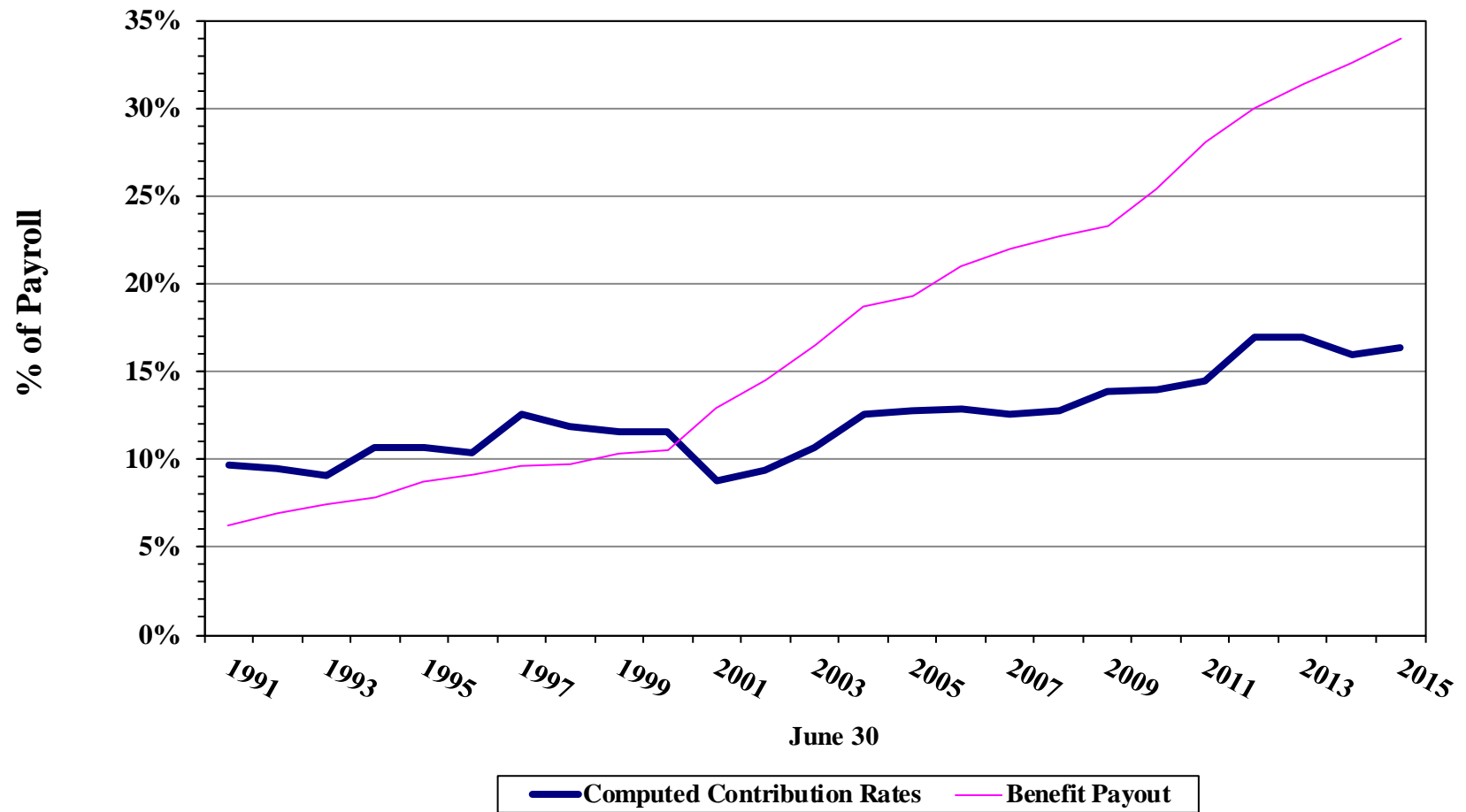
Present Value of Expected Future Benefit Payments

A. To Retirees and Beneficiaries		
1. Annual Pensions	\$ 6,694,962,539	
2. Members on Leave of Absence & LTD	85,796,007	
3. BackDROP Installment Payments Incurred, but not yet paid	699,198	
4. Total		6,781,457,744
B. To Vested Terminated Members		565,475,553
C. To Present Active Members		
1. Allocated to Service Rendered Prior to Valuation Date – Actuarial Accrued Liability	4,380,685,113	
2. Allocated to Service likely to be Rendered after Valuation Date	937,605,767	
3. Total		5,318,290,880
D. Total Actuarial Present Value of Expected Future Benefit Payments		\$ 12,665,224,177

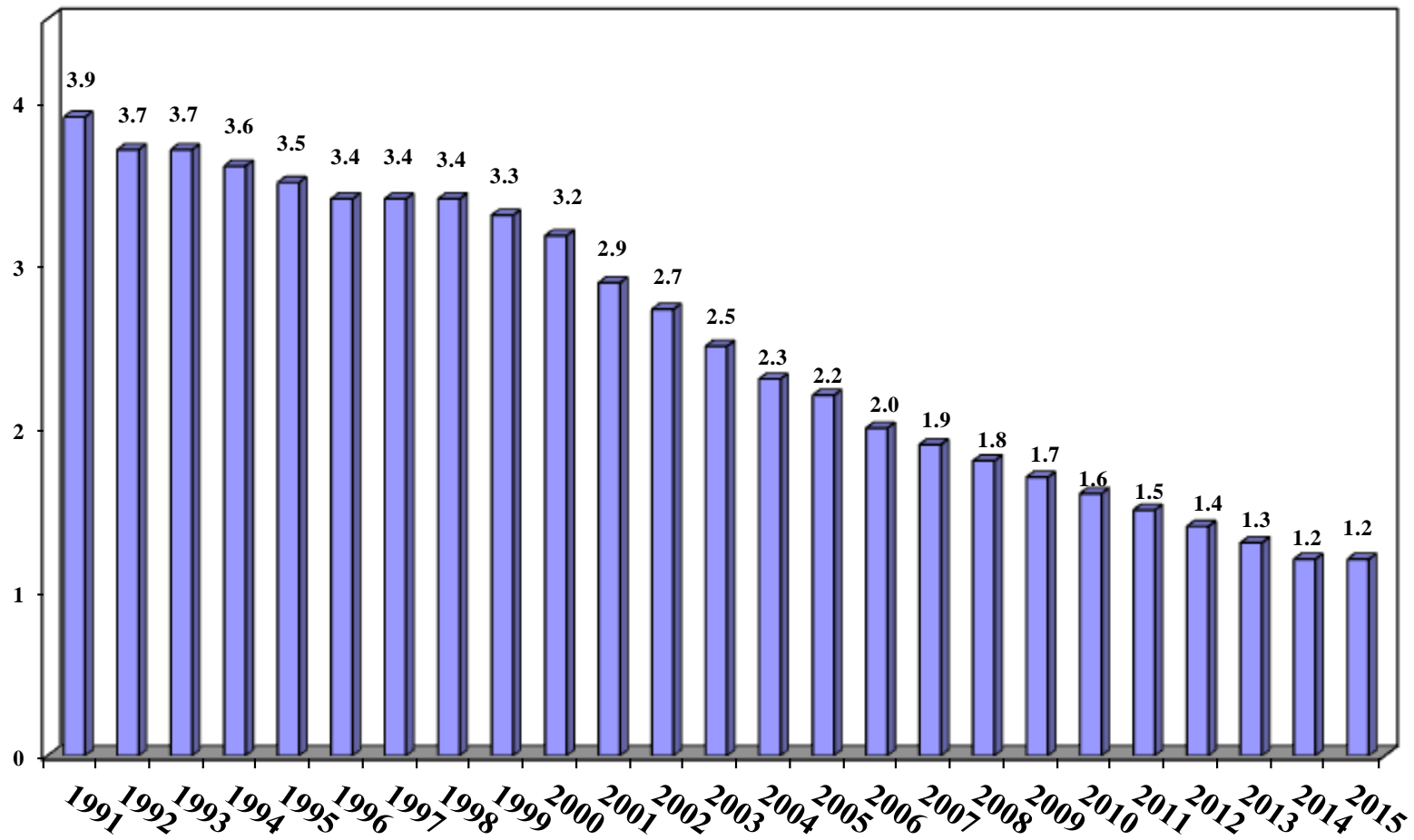
Computed Employer Contribution Rates



Contribution Rates vs. Benefit Payout

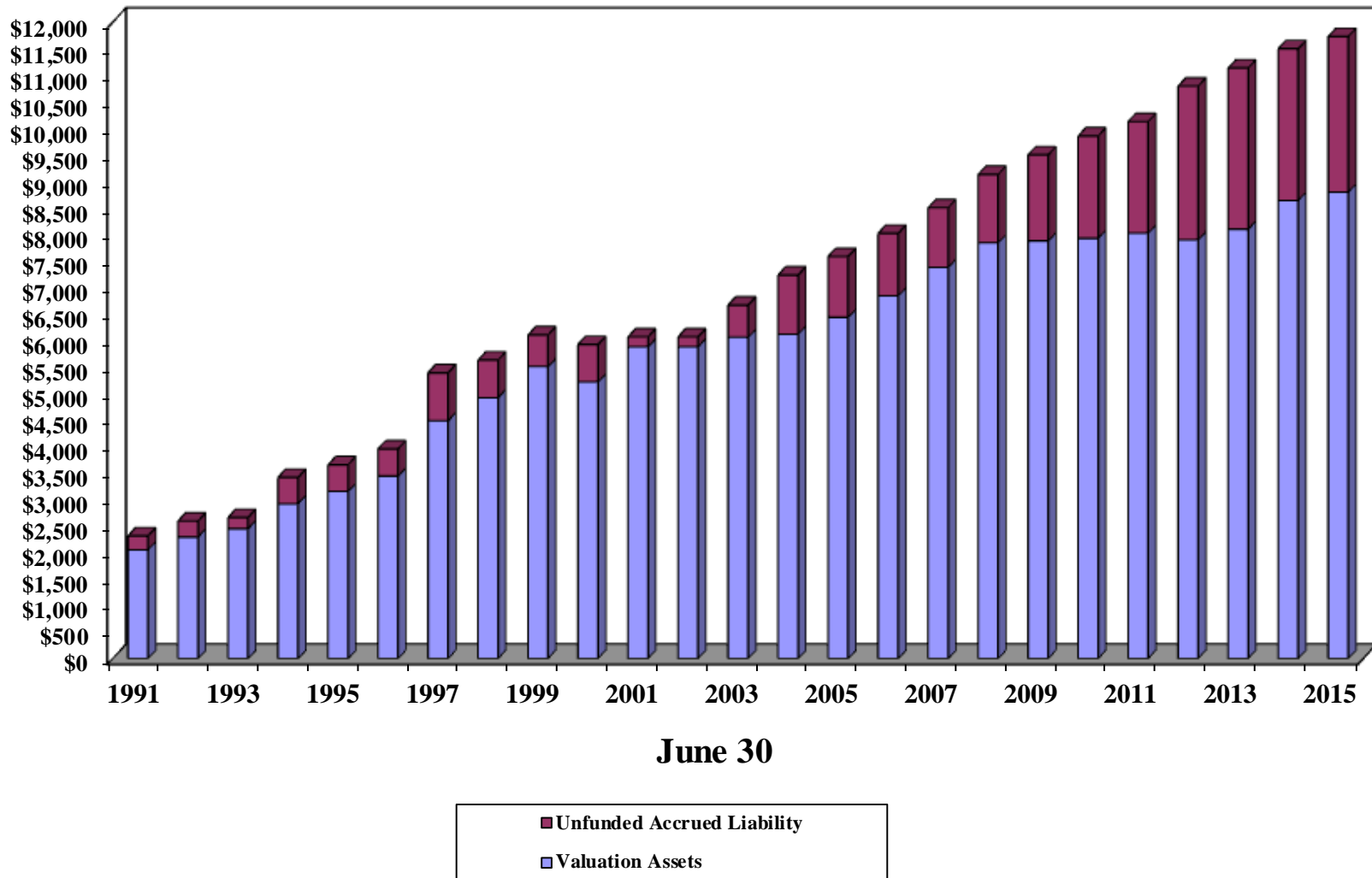


Number of Active Members Per Benefit Recipient

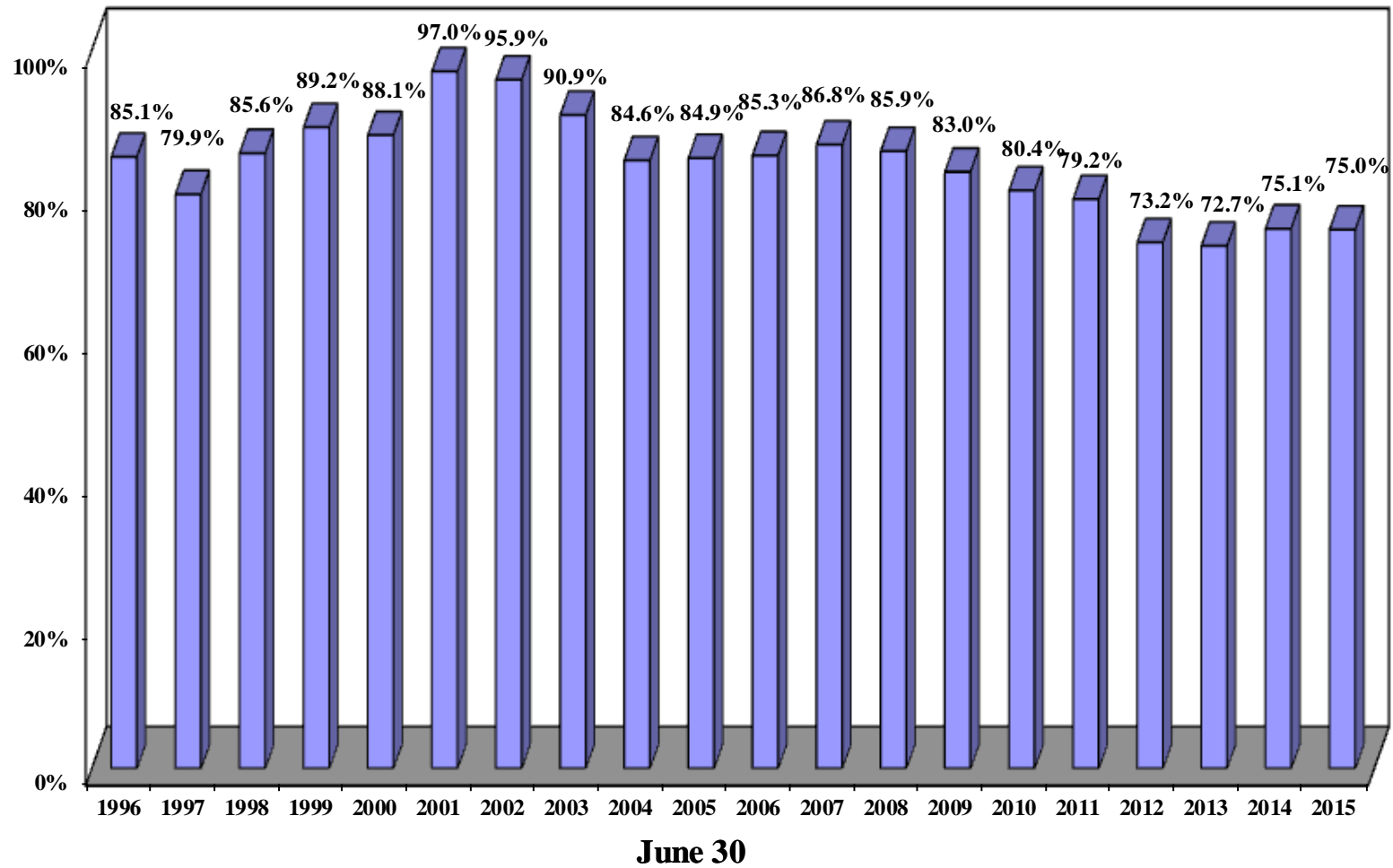


June 30

Actuarial Value of Assets and Actuarial Accrued Liabilities (\$ in millions)



Actuarial Value of Assets as Percents of Accrued Liabilities (Funded Ratio)



Gain/Loss Analysis of Experience During Last Year

Comments

Purpose of Gain/Loss Analysis. Regular actuarial valuations provide valuable information about the composite change in unfunded actuarial accrued liabilities – whether or not the liabilities are increasing or decreasing, and by how much. However, valuations do not show the portion of the change attributable to each risk area within the retirement system financial mechanism: the rate of investment income on plan assets; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of salary increases; and the assumed ages at actual retirement. In an actuarial valuation, assumptions are made as to what these rates will be for the next year and for decades in the future.

The objective of a gain and loss analysis is to determine the portion of the change in unfunded actuarial accrued liabilities attributable to each risk area.

The fact that actual experience differs from assumed experience is to be expected – the future cannot be predicted with precision. Changes in the valuation assumed experience for a risk area should be made when the differences between assumed and actual experience have been observed to be sizeable and persistent. One year's gain/loss analysis may or may not be indicative of ***long-term trends, which are the basis of financial assumptions.***

2014 and 2015 Data. For the 2014 and 2015 valuations, active and retired member data was reported as of May 31. It was brought forward to June 30 by adding one month of service for all active members, adding the June COLA for certain retirees, and otherwise making no other adjustments. It was assumed for valuation purposes that there was no turnover among members and no new entrants during the month of June. Financial information was reported as of June 30. It is believed that this procedure resulted in a slight overstatement of total liabilities as of June 30, 2014 and June 30, 2015.

The expected and actual numbers of retirements, deaths, and terminations found on pages 27 through 32 reflect experience over the 12-month period from May 31, 2014 through May 31, 2015.

Results from 2015 Plan Year. There was a net experience loss this year, with the largest single identifiable source being investment losses. The table below summarizes historical MOSERS economic experience:

Period	Inflation as Measured by		Market Interest Credited to MOSERS Funds	Real Rate of Return	
	CPI	Increase in Average Salary@		Relative to CPI	Relative to Salaries
July 1, 2000 - June 30, 2001	3.2 %	5.1 %	(2.0) %*	(5.2) %	(7.1) %
July 1, 2001 - June 30, 2002	1.1	(2.1)	(6.4) *	(7.5)	(4.3)
July 1, 2002 - June 30, 2003	2.1	0.6	6.8 *	4.7	6.2
July 1, 2003 - June 30, 2004	3.3	4.2	17.2 *	13.9	13.0
July 1, 2004 - June 30, 2005	2.5	5.2	12.6 *	10.1	7.4
July 1, 2005 - June 30, 2006	4.3	2.1	11.5 *	7.2	9.4
July 1, 2006 - June 30, 2007	2.7	5.7	18.6 *	15.9	12.9
July 1, 2007 - June 30, 2008	5.0	5.3	1.4 *	(3.6)	(3.9)
July 1, 2008 - June 30, 2009	(1.4)	5.1	(19.3) *	(17.9)	(24.5)
July 1, 2009 - June 30, 2010	1.1	0.7	14.3 *	13.2	13.6
July 1, 2010 - June 30, 2011	3.5	1.0	21.3 *	17.8	20.4
July 1, 2011 - June 30, 2012	1.7	1.8	2.1 *	0.4	0.3
July 1, 2012 - June 30, 2013	1.7	3.2	10.5 *	8.8	7.3
July 1, 2013 - June 30, 2014	2.1	3.0	19.0 *	16.9	16.0
July 1, 2014 - June 30, 2015	0.1	3.5	(2.7) *	(2.8)	(6.2)

* MOSERS' approximate rate of return based on market value.

@ For members active both at beginning and end of year.

The dollar amount of Unfunded Actuarial Accrued Liabilities (UAAL) is large in absolute dollars. However, the size should be viewed in the light of MOSERS' overall financial program. ***The ratio of unfunded actuarial accrued liabilities divided by active member payroll is significant.*** UAAL represents plan debt, while active member payroll is indicative of the state's capacity to amortize the UAAL – ***the ratio thus provides an index of relative condition.*** The smaller the ratio, the stronger the financial condition.

	<u>UAAL/Active Member Payroll</u>
June 30, 1998	.49
June 30, 1999 after MSEP 2000	.38
June 30, 2000 after changes in assumptions	.42
June 30, 2001 after changes in assumptions	.10
June 30, 2002 after changes in methods	.15
June 30, 2003 after changes in benefits, methods	.35
June 30, 2004 after changes in assumptions	.64
June 30, 2005 after changes in assumptions	.63
June 30, 2006	.66
June 30, 2007	.61
June 30, 2008	.67
June 30, 2009	.81
June 30, 2010	.99
June 30, 2011	1.12
June 30, 2012	1.55
June 30, 2013	1.62
June 30, 2014	1.50
June 30, 2015	1.53

Derivation of Experience Gain (Loss) Year Ended June 30, 2015

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

	\$ Millions
(1) UAAL* at start of year	\$2,856.8
(2) Normal cost from last valuation	157.5
(3) Actual contributions (Employer and Member)	349.7
(4) Interest accrual: $(1) \times .08 + [(2) - (3)] \times (.08 / 2)$	220.9
(5) Expected UAAL before changes: $(1) + (2) - (3) + (4)$	2,885.5
(6) Change from any changes in benefits, assumptions, or methods	(57.6)
(7) Expected UAAL after changes: $(5) + (6)$	2,827.9
(8) Actual UAAL at end of year	2,935.1
(9) Gain (loss): $(7) - (8)$	(107.2)
- Gains (losses) in economic experience	(56.5)
- Gains (losses) from decrement experience and other	(50.7)
(10) Gain (loss) as percent of actuarial accrued liabilities at start of year (\$11,495)	(0.9) %

* *Unfunded Actuarial Accrued Liabilities.*

Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
2006	(0.1) %
2007	1.0
2008	0.1
2009	(5.2)
2010	(4.0)
2011	(2.4)
2012	(4.7)
2013	(2.8)
2014	2.1
2015	(0.9)

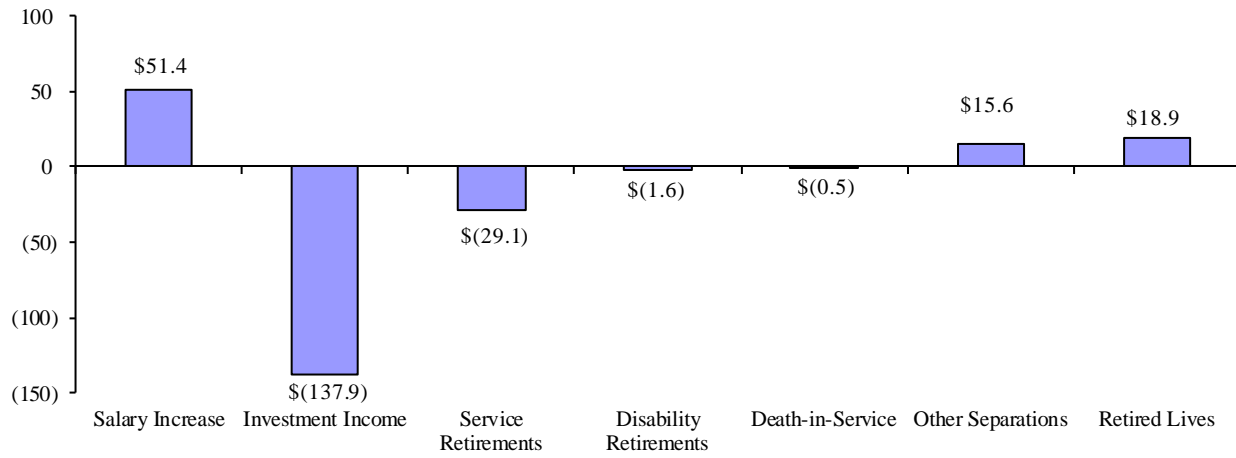
Gains & (Losses) in Actuarial Accrued Liabilities During Plan Year 2014 - 2015

Type of Activity	-- Gain (Loss) for Year --	
	\$ in Millions	% of Accr. Liabilities*
<u>Decrement Experience:</u>		
<i>Service Retirements.</i> If members retire at older ages than assumed, there is a gain. If at younger ages, a loss.	\$ (29.1)	(0.3) %
<i>Disability Retirements.</i> The occurrence of a gain or loss depends upon the age at disability and the incidence of disability.	(1.6)	0.0
<i>Death-in-Service.</i> If there are fewer survivor claims than assumed at younger ages, there is a gain. If there are fewer survivor claims than assumed at older ages, there can be a loss.	(0.5)	0.0
<i>Other Separations.</i> If more actuarial liabilities are released by other separations than assumed, there is a gain. If smaller releases, a loss.	15.6	0.1
<i>Retired Lives.</i> If more deaths than assumed, there is a gain. If fewer deaths, a loss.	18.9	0.2
<u>Economic Experience:</u>		
<i>Salary Increases.</i> If there are smaller salary increases than assumed, there is a gain. If greater increases, a loss. If long service members have greater salary increases than assumed, there can be a loss even if average salary increases are less than assumed.	51.4	0.4
<i>Investment Income.</i> If there is greater investment income than assumed, there is a gain. If less income, a loss.	(137.9)	(1.2)
<i>COLAs.</i>	30.0	0.3
<u>Other:</u>		
Service credit reinstatements, service transfers, service purchases, rehires, net of contributions.	(15.5)	(0.1)
Larger than expected average compensation for new retirees.	(11.5)	(0.1)
Change in group size, data adjustments, retroactive benefit payments, option elections, and miscellaneous unidentified changes in the UAAL.	(27.0)	(0.2)
<i>Experience Gain or (Loss) During Year</i>	\$ (107.2)	(0.9) %

* Beginning of year accrued liabilities totaled \$11,495 million.

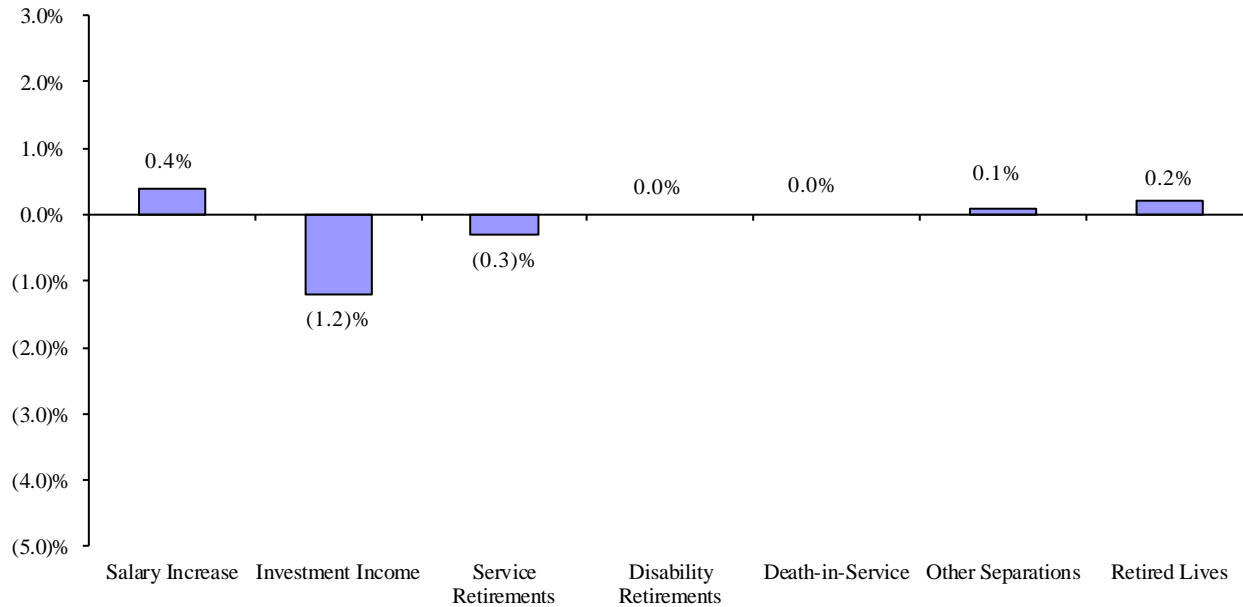
Gain (Loss) Analysis 2014-2015 Experience

Amount in \$ Millions



Type of Risk Area

% of Actuarial Accrued Liabilities



Type of Risk Area

Experience Gains & Losses by Risk Area

Comparative Statement

-----\$ in Millions-----

Year Ending June 30	Gain (Loss) By Risk Area									Total Exper. Gain (Loss)	Exper. Gain (Loss) as % of AAL	Accrued Liability Beginning of Year
	Salary Increases	Investments	Age & Service Retirement	Disability	Death- In- Service	Withdrawal	Retired Lives &	COLAs	Other			
1994	\$ 42.5	(\$18.1)	\$ (1.0)	\$0.7	\$ 2.3	\$ (7.0)	#		\$ 52.0	\$ 71.4	2.9	\$ 2,447
1995	16.7	12.0	(3.2)	0.5	2.5	(4.0)	#		(7.5)	17.0	0.6	2,919
1996	24.2	63.7	(2.1)	0.6	2.9	(10.2)	\$ 7.4		(74.3) ^	12.2	0.4	3,151
1997 *	(26.3)	260.3	(3.1)	0.5	2.6	(7.1)	14.5		(50.6)	190.8	5.5	3,440
1998	(56.9)	325.9	9.6	0.2	(0.3)	(1.7)	16.3		(48.3)	244.8	5.5	4,484
1999	(21.9)	299.8	(1.3)	(0.3)	(0.9)	1.7	10.5		(58.1)	229.5	4.7	4,919
2000 *	(6.4)	162.0	1.7	(0.5)	(0.7)	8.9	18.5		(34.7)	148.8	2.7	5,506
2001 *	(23.2)	(67.9)	(59.8)	(1.0)	(0.2)	(28.2)	(13.1)		(66.1)	(259.5)	(4.4)	5,921
2002	115.0	(284.6)	(14.4)	(0.5)	(1.3)	(21.4)	37.1		(62.6)	(232.8)	(3.8)	6,065
2003	7.7	(314.1)	(27.2)	(0.6)	(2.6)	(14.6)	9.6		(63.1)	(404.9)	(6.5)	6,294
2004 *	(40.0)	(240.1)	(51.5)	(1.4)	(1.3)	(6.7)	(4.3)		(53.8)	(399.1)	(6.0)	6,662
2005	(3.4)	(196.6)	3.1	(2.0)	(1.7)	(0.9)	(11.7)		(35.5)	(248.7)	(3.4)	7,230
2006	(29.5)	38.0	(1.7)	(2.3)	(2.4)	15.5	(21.1)		(3.6)	(7.1)	(0.1)	7,578
2007	(11.5)	179.4	(17.3)	(2.1)	(2.4)	3.8	(29.7)		(43.0)	77.2	1.0	8,013
2008 *	(10.5)	78.3	(22.9)	(2.0)	(3.4)	6.6	8.7		(49.8)	5.0	0.1	8,500
2009 *	(15.9)	(354.3)	8.8	(1.5)	0.0	(31.3)	(39.8)		(37.6)	(471.6)	(5.2)	9,128
2010	23.2	(313.6)	(19.0)	8.4	8.0	(30.6)	4.7		(56.9)	(375.8)	(3.9)	9,495
2011	49.6	(204.0)	(52.8)	10.8	7.5	(21.0)	32.7		(60.4)	(237.6)	(2.4)	9,853
2012 *	12.3	(447.2)	(24.3)	8.3	8.9	8.1	10.3		(53.6)	(477.2)	(4.7)	10,124
2013 **	60.4	(313.7)	6.7	11.1	7.4	2.0	(7.7)	(3.1)	(70.4)	(307.3)	(2.8)	10,794
2014	52.6	249.5	(6.9)	(4.2)	(2.5)	(12.7)	6.3	18.0	(68.3)	231.8	2.1	11,135
2015	51.4	(137.9)	(29.1)	(1.6)	(0.5)	15.6	18.9	30.0	(54.0)	(107.2)	(0.9)	11,495

* Revision in assumptions.

** Revision in asset valuation method.

Not identified as separate risk area. Included in "Other" category.

^ Includes \$(23.0) for legal settlement.

& Prior to the 2013 valuation, this amount included COLAs.

**Development of Gain (Loss)
from Investment Income
During Plan Year 2014 - 2015**

	Market Value	Actuarial Value
	----- \$ in millions -----	
1. Assets at June 30, 2014	\$9,136.8	\$ 8,637.8
2. Contributions and Transfers In	353.3	353.3
3. Investment Income	(237.1)	537.8
4. Benefit Payments	728.3	728.3
5. Administrative Expenses	8.1	8.1
6. Assets at June 30, 2015 = (1) + (2) + (3) - (4) - (5)	8,516.7	8,792.5
7. Actual Investment Increment/Mean Assets*	(2.65) %	6.37 %
8. Expected Investment Increment		8.0 %
9. Investment Gain (Loss):		
a. As a % of mean assets: (7) - (8)		(1.63) %
b. \$ in millions		<u>\$ (137.9)</u>

* Based on the approximation formula: $I/[.5 \times (A+B-I)]$, where

I = Investment increment
A = Beginning of year asset value
B = End of year asset value

**Salary Increases
to Members Active Both at Beginning & End of Year
During Plan Year 2014 - 2015**

Age Groups	Number	Salary Increases	
		Actual*	Expected
Below 20			
20-24	860	7.7%	6.3%
25-29	3,191	6.7%	5.6%
30-34	4,298	5.0%	4.9%
35-39	4,669	4.4%	4.4%
40-44	5,454	3.6%	4.1%
45-49	6,166	3.2%	3.8%
50-54	7,197	2.8%	3.6%
55-59	6,385	2.7%	3.5%
60-64	4,151	2.7%	3.4%
65 & Over	1,578	2.4%	3.3%
Total	43,949		
Average		3.5%	4.0%

* Excludes new entrants and terminations.

Assumed Payroll Growth	Actual Payroll Growth		
	2015	2014	2013
3.0%	0.8%	1.2%	0.9%

**Active Members Who Retired With
SERVICE OR REDUCED SERVICE RETIREMENT BENEFITS
During Plan Year 2014 - 2015**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 50	-	-	3	2.4	3	2.4
50	6	3.8	16	9.5	22	13.3
51	7	6.5	20	16.4	27	22.9
52	14	14.5	37	25.8	51	40.3
53	14	15.9	24	34.7	38	50.5
54	18	21.1	47	38.3	65	59.4
55	29	33.7	61	52.8	90	86.5
56	26	33.4	51	52.9	77	86.3
57	32	37.4	67	62.8	99	100.2
58	36	48.3	64	68.1	100	116.4
59	47	44.4	57	68.4	104	112.8
60	45	52.2	70	67.9	115	120.1
61	35	45.0	71	68.4	106	113.4
62	83	88.2	96	113.6	179	201.8
63	44	70.1	77	94.4	121	164.6
64	32	44.1	48	65.4	80	109.5
65	53	65.5	104	92.7	157	158.2
66	56	48.7	85	55.9	141	104.6
67	29	26.7	35	34.0	64	60.6
68	34	27.0	40	28.0	74	55.0
69	18	16.3	17	16.2	35	32.5
70 & Over	63	70.7	53	54.8	116	125.5
Totals	721	813.4	1,143	1,123.4	1,864	1,936.8

	Men	Women	Total
Average age at retirement	62.4 years	61.0 years	61.5 years
Average service at retirement	22.3 years	23.1 years	22.8 years

**Active Members Who Retired with DISABILITY BENEFITS
During Plan Year 2014 - 2015**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 25		0.9		2.2	-	3.0
25-29	2	3.0		7.1	2	10.0
30-34		3.9	3	9.0	3	12.9
35-39	4	4.6	8	9.7	12	14.3
40-44	1	6.6	11	13.0	12	19.6
45-49	13	9.8	19	19.1	32	28.9
50-54	14	17.3	25	28.8	39	46.1
55-59	17	24.2	34	34.4	51	58.5
60 & Over	6	12.1	7	17.0	13	29.1
Totals	57	82.4	107	140.1	164	222.6

	Men	Women	Total
Average age at disability	51.4 years	50.6 years	50.9 years
Average service at disability	12.2 years	10.7 years	11.3 years

Active Members Who Died During Plan Year 2014 - 2015

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 30	3	0.1	-	0.1	3	0.1
30-34	1	0.4	1	0.3	2	0.7
35-39	-	0.8	1	0.6	1	1.4
40-44	3	1.3	2	1.1	5	2.4
45-49	4	2.0	4	1.9	8	3.9
50-54	6	3.5	3	3.8	9	7.3
55-59	8	6.1	7	7.0	15	13.1
60-64	9	8.7	1	8.7	10	17.4
65 & Over	5	9.3	2	7.3	7	16.6
Totals	39	32.1	21	30.9	60	62.9

	Men	Women	Total
Average age at death	54.0 years	52.0 years	53.3 years
Average service at death	13.4 years	16.8 years	14.3 years

Of the 60 active members who died in service during plan year 2014-2015, 33 members had a benefit payable to a survivor.

**Active Members Who Left Active Status with a DEFERRED BENEFIT
(Retirement with Monthly Payments Beginning at Later Age)
During Plan Year 2014 - 2015**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 30	38	35.5	47	49.5	85	85.0
30-34	120	98.9	175	150.9	295	249.8
35-39	109	100.4	160	161.4	269	261.8
40-44	98	88.7	165	152.3	263	241.0
45-49	73	78.2	152	129.3	225	207.5
50-54	71	65.0	146	103.5	217	168.6
55-59	43	47.6	91	79.0	134	126.5
60 & Over	21	14.2	23	21.1	44	35.3
Totals	573	528.5	959	847.0	1,532	1,375.6

	Men	Women	Total
Average age at termination	41.9 years	42.8 years	42.5 years
Average service at termination	9.8 years	10.3 years	10.1 years

**Active Members Who Left Active Status with NO BENEFIT PAYABLE
(Other than Deaths)
During Plan Year 2014 - 2015**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 20						
20-24	147	95.9	224	147.5	371	243.4
25-29	393	248.3	477	351.2	870	599.4
30-34	205	169.7	327	247.0	532	416.8
35-39	128	106.3	210	174.3	338	280.7
40-44	82	85.1	177	150.2	259	235.3
45-49	76	69.2	133	134.9	209	204.1
50-54	55	69.4	101	126.7	156	196.2
55-59	59	58.3	89	96.8	148	155.1
60-64	47	41.0	65	52.3	112	93.3
65-69	17	12.9	28	12.0	45	24.9
70 & Over	6	4.2	6	3.0	12	7.2
Totals	1,215	960.4	1,837	1,495.9	3,052	2,456.3

	Men	Women	Total
Average age at termination	35.3 years	36.1 years	35.8 years
Average service at termination	2.8 years	2.9 years	2.9 years

Service at Termination	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
0	447	377.8	710	624.9	1,157	1,002.7
1	303	271.8	454	425.5	757	697.3
2	224	175.7	311	271.0	535	446.7
3	140	120.7	220	161.1	360	281.7
4	101	14.4	142	13.5	243	27.9
5 & Over	-	-	-	-	-	-
Totals	1,215	960.4	1,837	1,495.9	3,052	2,456.3

**Comparison of Actual to Expected Deaths
Among Retired Lives
(Service Retirement Only)
As of June 30, 2015**

Age	Male Deaths			Female Deaths			Total Deaths		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
45-49									
50-54	1		94	1		284	2		378
55-59	14	4	1,075	16	6	1,975	30	10	3,050
60-64	38	22	2,942	49	30	4,853	87	52	7,795
65-69	59	50	3,964	59	64	5,683	118	114	9,647
70-74	72	57	2,640	72	70	3,759	144	127	6,399
75-79	62	59	1,581	70	74	2,467	132	133	4,048
80-84	75	70	1,006	92	80	1,612	167	150	2,618
85-89	56	64	525	98	92	1,031	154	156	1,556
90-94	19	33	173	61	64	443	80	97	616
95-99	13	10	39	40	25	125	53	35	164
100 & Up		1	4	9	7	28	9	8	32
Totals	409	370	14,043	567	512	22,260	976	882	36,303
Average Ages	76.1	78.4	69.4	79.5	79.7	69.5	78.1	79.1	69.5

SECTION C
FUND ASSETS

Development of Actuarial Value of Assets

Valuation Date: June 30	2013	2014	2015
A. Actuarial value at beginning of year	\$ 7,897,167,203	\$ 8,096,436,929	\$ 8,637,758,955
B. Market value at end of year	7,993,837,570	9,136,781,826	8,516,654,912
C. Market value at beginning of year	7,581,882,309	7,993,837,570	9,136,781,826
D. Cash flow			
D1. Contributions	290,275,917	345,557,293	353,287,107
D2. Benefit payments	(649,242,314)	(680,436,106)	(728,265,800)
D3. Administrative expenses	(7,575,883)	(7,336,922)	(8,077,692)
D4. Net	(366,542,280)	(342,215,735)	(383,056,385)
E. Investment income			
E1. Market total (B-C-D4)	778,497,541	1,485,159,991	(237,070,529)
E2. Assumed rate	8.00%	8.00%	8.00%
E3. Amount for immediate recognition $(A + .5 * D4) * E2$	617,111,685	634,026,325	675,698,461
E4. Amount for phased-in recognition $(E1 - E3)$	161,385,856	851,133,666	(912,768,990)
F. Unrecognized gains/(losses) from prior years	(315,284,894)	(102,599,359)	499,022,871
G. Phased-in recognition of investment income $(E4 + F) / 3$	(51,299,679)	249,511,436	(137,915,373)
H. End of year adjustment	-	-	-
I. Actuarial value at end of year			
I1. Preliminary Value $(A + D4 + E3 + G + H)$	8,096,436,929	8,637,758,955	8,792,485,658
I2. Upper Corridor Limit: $125\% \times B$	9,992,296,963	11,420,977,283	10,645,818,640
I3. Lower Corridor Limit: $80\% \times B$	6,395,070,056	7,309,425,461	6,813,323,930
I4. Corridor Adjustment	-	-	-
I5. Funding Value End of Year: $I1 + I4$	8,096,436,929	8,637,758,955	8,792,485,658
J. Difference between market and actuarial values $(B - I5)$	(102,599,359)	499,022,871	(275,830,746)
K. Recognized rate of return	7.33%	11.15%	6.37%
L. Market value rate of return	10.52%	18.99%	(2.65)%
M. Actuarial value as a % of market value: $I5 / B$	101%	95%	103%

The actuarial value of assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over an open 3-year period. During periods when investment performance exceeds the assumed rate, the actuarial value of assets will tend to be less than market value. During periods when investment performance is less than assumed, the actuarial value will tend to be greater than market value.

Asset Summary

June 30, 2015

	Market Value	Actuarial Value
1. Assets at June 30, 2014	\$9,136,781,826	\$8,637,758,955
2. Contributions		
State Contributions	329,752,832	329,752,832
Employee Contributions	18,099,455	18,099,455
Member Purchases of Service Credit	1,859,005	1,859,005
Service Transfer Contributions	<u>3,575,815</u>	<u>3,575,815</u>
Total	353,287,107	353,287,107
3. Investment Increment*	(237,070,529)	537,783,088
4. Benefit Payments and Transfers Out	728,265,800	728,265,800
5. Administrative and Misc. Expenses	8,077,692	8,077,692
6. Assets at June 30, 2015		
(1) + (2) + (3) - (4) - (5)	\$8,516,654,912	8,792,485,658
7. Investment Increment/Mean Assets**	(2.65)%	6.37%

* *Net of investment expenses.*

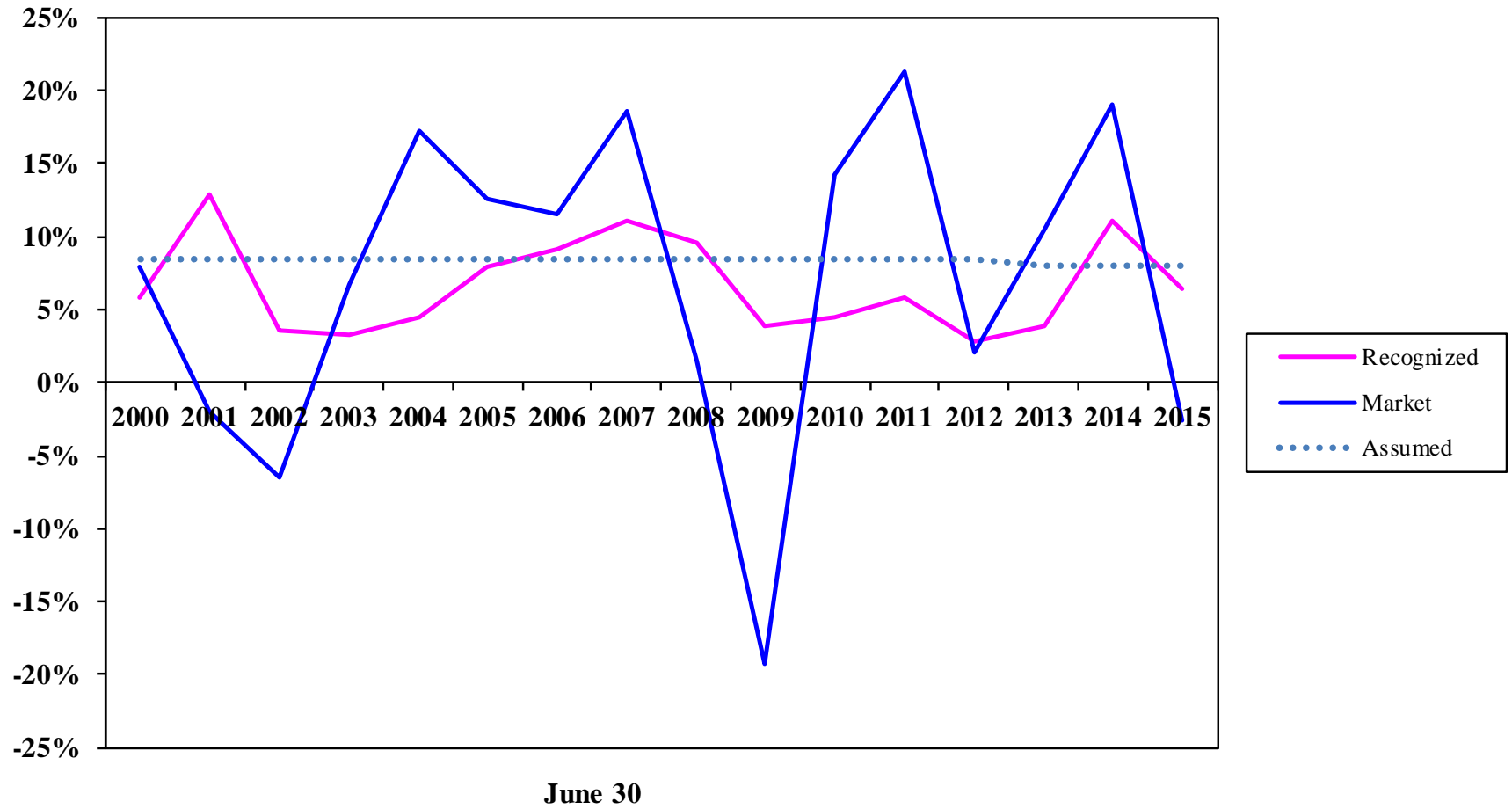
** *Based on the approximation formula: $I / [.5 \times (A+B-I)]$, where*

I = Investment Increment

A = Beginning of year asset value

B = End of year asset value

Recognized vs. Market Returns



The period of asset smoothing was changed from 3 to 5 years effective June 30, 2001.
 The asset smoothing method was changed from 5-year smoothing to 3-year rolling smoothing effective June 30, 2013.

SECTION D
PROJECTIONS

The Nature of Actuarial Projections

Regular actuarial valuations measure the Retirement System's present financial position and contributions adequacy by calculating and financing the liabilities created by the present benefit program. This process involves discounting to present values the future benefit payments on behalf of present active and retired members and their survivors. However, valuations do not produce information regarding future changes in the makeup of the covered group or the amounts of benefits to be paid or investment income to be received-actuarial projections do.

Whereas valuations provide a snapshot of the Retirement System as of a given date, projections provide a moving picture. Projected active and retired groups are developed from year to year by the application of assumptions regarding pre-retirement withdrawal from service, retirements, deaths, disabilities, and the addition of new members. Projected information regarding the retired life group leads to assumed future benefit payout. Combining future benefit payments with assumed contributions and expected investment earnings produces the net cash flow of the System each year, and thus end of year asset levels.

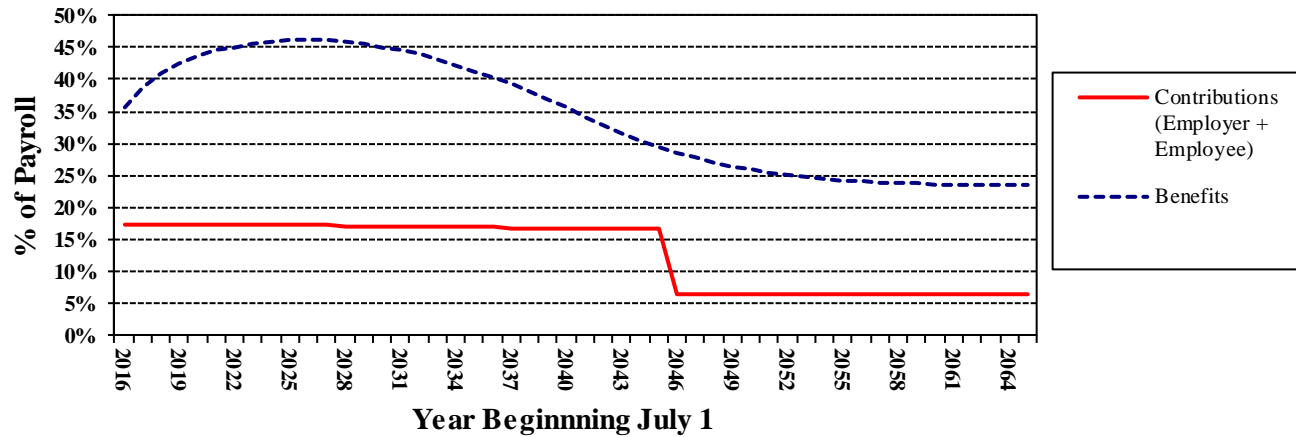
Projections are used for many purposes. Among them are (i) developing cash flow patterns for investment policy and asset mix consideration, (ii) exploring the effect of alternative assumptions about future experience, (iii) analyzing the impact on System funding progress of changes in the workforce, and (iv) examining the potential effect of changes in benefits on system financial activity.

Projection results are useful in demonstrating changing relationships among key elements affecting system financial activity. For example: how benefits payable and System assets will grow in future decades. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. For instance, cash flow projected to occur 10 years in the future will not be exact (except by coincidence), but understanding the changed relationships between future benefit payout and future investment income can be very useful.

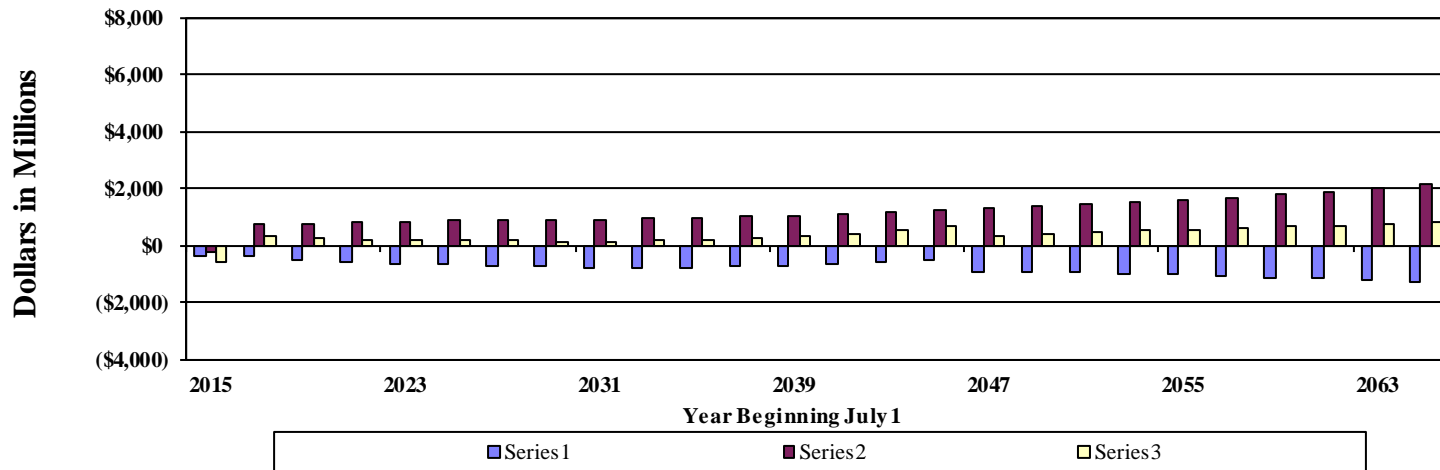
It is important to note that a projection is different than an amortization schedule and therefore the projected dollar contributions may differ from those shown on page 11.

50-Year Cash Flow Projection Based on Valuation Assumptions

Projected Contributions* and Benefits Expressed as Percents of Active Member Payroll



Net Change in Asset Values



* Does not include contributions for administrative expenses. Includes member contributions.

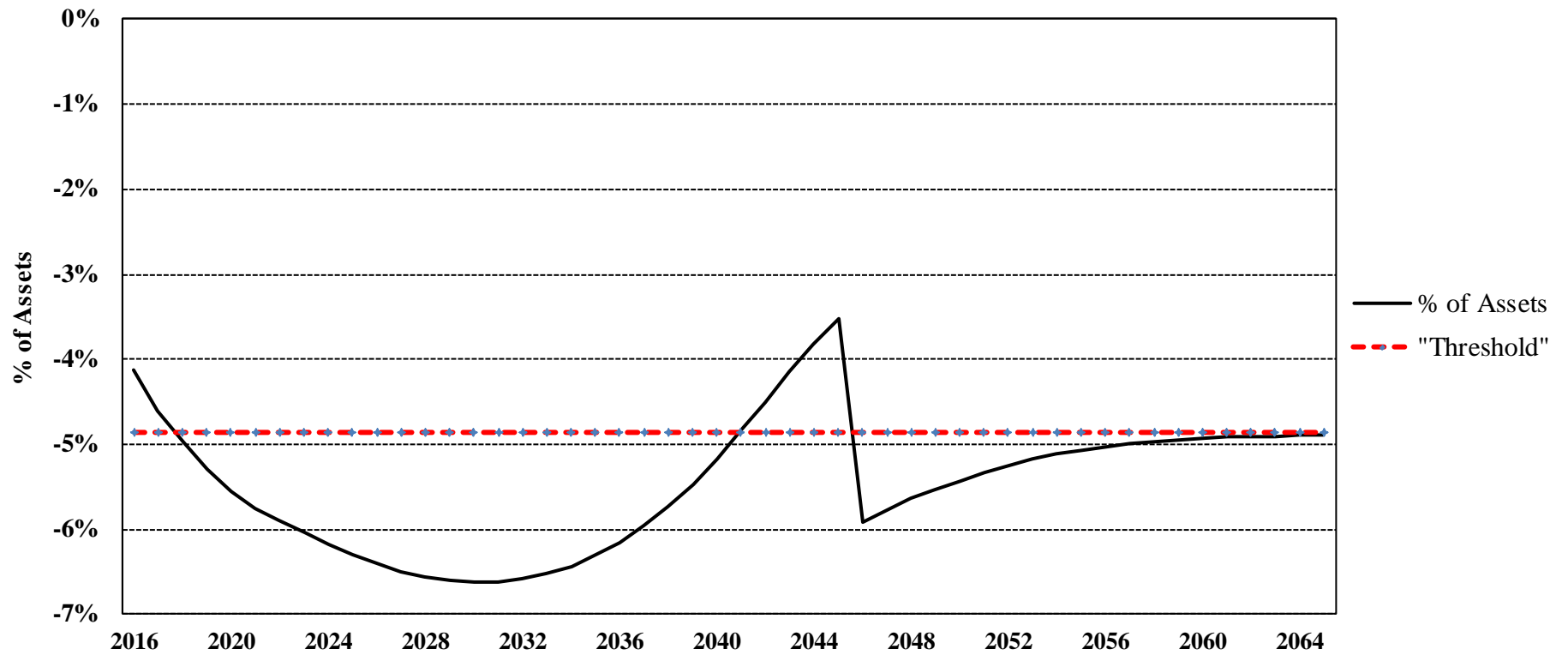
50-Year Cash Flow Projection (in Thousands)

Year Ended June 30	Assets BOY	Contributions*			Benefits	Investment Income	Assets EOY	
		Normal	UAAL	Total			Inflated	2016 \$
2016	\$ 8,792,486	\$ 150,413	\$ 193,388	\$ 343,801	\$ 707,102	\$ 689,052	\$ 9,118,237	\$9,118,237
2017	9,118,237	151,950	189,351	341,301	760,934	712,888	9,411,492	9,137,371
2018	9,411,492	152,989	195,386	348,375	816,838	734,422	9,677,451	9,121,925
2019	9,677,451	154,397	201,431	355,828	868,508	753,952	9,918,723	9,077,036
2020	9,918,723	156,177	207,887	364,064	914,525	771,761	10,140,023	9,009,279
2021	10,140,023	158,290	214,270	372,560	956,476	788,145	10,344,252	8,923,043
2022	10,344,252	160,513	220,761	381,274	991,070	803,461	10,537,917	8,825,340
2023	10,537,917	163,098	227,615	390,713	1,026,320	817,935	10,720,245	8,716,540
2024	10,720,245	165,818	234,369	400,187	1,062,092	831,483	10,889,823	8,596,527
2025	10,889,823	168,899	241,692	410,591	1,096,647	844,096	11,047,863	8,467,267
2026	11,047,863	172,371	248,899	421,270	1,128,986	855,883	11,196,030	8,330,898
2027	11,196,030	175,730	256,430	432,160	1,158,564	866,998	11,336,624	8,189,818
2028	11,336,624	179,747	264,318	444,065	1,186,919	877,596	11,471,366	8,045,785
2029	11,471,366	183,646	272,276	455,922	1,212,567	887,832	11,602,553	7,900,774
2030	11,602,553	187,966	280,304	468,270	1,236,295	897,877	11,732,405	7,756,502
2031	11,732,405	192,715	288,649	481,364	1,257,200	907,957	11,864,526	7,615,388
2032	11,864,526	197,344	297,323	494,667	1,275,717	918,321	12,001,797	7,479,123
2033	12,001,797	202,414	306,315	508,729	1,291,374	929,239	12,148,391	7,349,976
2034	12,148,391	207,650	315,331	522,981	1,304,047	941,030	12,308,355	7,229,861
2035	12,308,355	213,369	324,664	538,033	1,313,940	954,030	12,486,478	7,120,864
2036	12,486,478	218,935	334,302	553,237	1,320,865	968,608	12,687,458	7,024,738
2037	12,687,458	225,027	344,298	569,325	1,325,517	985,136	12,916,402	6,943,202
2038	12,916,402	231,661	354,284	585,945	1,326,003	1,004,089	13,180,433	6,878,769
2039	13,180,433	238,179	364,993	603,172	1,323,294	1,026,000	13,486,311	6,833,403
2040	13,486,311	245,268	375,682	620,950	1,317,389	1,051,405	13,841,277	6,808,991
2041	13,841,277	252,201	386,709	638,910	1,308,467	1,080,863	14,252,583	6,807,113
2042	14,252,583	259,729	397,673	657,402	1,298,355	1,114,898	14,726,528	6,828,614
2043	14,726,528	267,466	409,328	676,794	1,288,494	1,153,968	15,268,796	6,873,845
2044	15,268,796	275,398	420,852	696,250	1,279,866	1,198,460	15,883,640	6,942,370
2045	15,883,640	283,942	432,180	716,122	1,274,562	1,248,641	16,573,841	7,033,049
2046	16,573,841	292,232	0	292,232	1,273,055	1,287,178	16,880,196	6,954,417
2047	16,880,196	301,149	0	301,149	1,275,167	1,311,954	17,218,132	6,887,032
2048	17,218,132	309,805	0	309,805	1,281,163	1,339,094	17,585,868	6,829,244
2049	17,585,868	319,143	0	319,143	1,290,733	1,368,505	17,982,783	6,779,981
2050	17,982,783	328,718	0	328,718	1,303,756	1,400,120	18,407,865	6,738,105
2051	18,407,865	338,537	0	338,537	1,319,885	1,433,880	18,860,397	6,702,672
2052	18,860,397	348,629	0	348,629	1,338,873	1,469,730	19,339,883	6,672,887
2053	19,339,883	359,010	0	359,010	1,360,779	1,507,633	19,845,747	6,647,987
2054	19,845,747	369,693	0	369,693	1,385,638	1,547,543	20,377,345	6,627,246
2055	20,377,345	380,693	0	380,693	1,413,440	1,589,407	20,934,005	6,609,986
2056	20,934,005	392,021	0	392,021	1,444,119	1,633,176	21,515,083	6,595,596
2057	21,515,083	403,689	0	403,689	1,477,635	1,678,800	22,119,937	6,583,513
2058	22,119,937	416,345	0	416,345	1,513,962	1,726,253	22,748,573	6,573,410
2059	22,748,573	428,750	0	428,750	1,552,798	1,775,501	23,400,026	6,564,712
2060	23,400,026	441,532	0	441,532	1,594,040	1,826,493	24,074,011	6,557,081
2061	24,074,011	454,705	0	454,705	1,637,684	1,879,208	24,770,240	6,550,208
2062	24,770,240	468,279	0	468,279	1,683,513	1,933,633	25,488,639	6,543,865
2063	25,488,639	482,268	0	482,268	1,731,384	1,989,769	26,229,292	6,537,881
2064	26,229,292	496,686	0	496,686	1,781,173	2,047,622	26,992,427	6,532,135
2065	26,992,427	511,545	0	511,545	1,832,836	2,107,221	27,778,357	6,526,533

* Does not include contributions for administrative expenses. Includes member contributions.

50-Year Cash Flow Projection

Projected Net External Cash Flow Expressed as a Percent of Assets



Net External Cash Flow equals: i) Contributions to the plan, less ii) Benefits paid by the plan. A negative Net External Cash Flow means that benefits are being partly funded by investment income --- a natural consequence of advance funding.

50-Year Cash Flow Projection Analysis of Projected Net Cash Flow (In Thousands)

Year Ended June 30	External Cash Flow		Net External Cash Flow		Year Ended June 30	External Cash Flow		Net External Cash Flow	
	Inflow*	Outflow	\$	% of Assets		Inflow*	Outflow	\$	% of Assets
2016	\$ 343,800	\$ 707,102	\$ (363,302)	(4.13)%	2041	\$ 638,910	\$ 1,308,467	\$ (669,557)	(4.84)%
2017	341,301	760,934	(419,633)	(4.60)%	2042	657,403	1,298,355	(640,952)	(4.50)%
2018	348,375	816,838	(468,463)	(4.98)%	2043	676,794	1,288,494	(611,700)	(4.15)%
2019	355,828	868,508	(512,680)	(5.30)%	2044	696,251	1,279,866	(583,615)	(3.82)%
2020	364,064	914,525	(550,461)	(5.55)%	2045	716,123	1,274,562	(558,439)	(3.52)%
2021	372,560	956,476	(583,916)	(5.76)%	2046	292,232	1,273,055	(980,823)	(5.92)%
2022	381,274	991,070	(609,796)	(5.90)%	2047	301,149	1,275,167	(974,018)	(5.77)%
2023	390,713	1,026,320	(635,607)	(6.03)%	2048	309,805	1,281,163	(971,359)	(5.64)%
2024	400,187	1,062,092	(661,905)	(6.17)%	2049	319,143	1,290,733	(971,590)	(5.52)%
2025	410,591	1,096,647	(686,056)	(6.30)%	2050	328,718	1,303,756	(975,038)	(5.42)%
2026	421,270	1,128,986	(707,716)	(6.41)%	2051	338,537	1,319,885	(981,348)	(5.33)%
2027	432,159	1,158,564	(726,405)	(6.49)%	2052	348,629	1,338,873	(990,244)	(5.25)%
2028	444,064	1,186,919	(742,855)	(6.55)%	2053	359,010	1,360,779	(1,001,770)	(5.18)%
2029	455,922	1,212,567	(756,645)	(6.60)%	2054	369,693	1,385,638	(1,015,945)	(5.12)%
2030	468,270	1,236,295	(768,025)	(6.62)%	2055	380,693	1,413,440	(1,032,748)	(5.07)%
2031	481,365	1,257,200	(775,835)	(6.61)%	2056	392,021	1,444,119	(1,052,098)	(5.03)%
2032	494,667	1,275,717	(781,050)	(6.58)%	2057	403,689	1,477,635	(1,073,946)	(4.99)%
2033	508,729	1,291,374	(782,646)	(6.52)%	2058	416,345	1,513,962	(1,097,617)	(4.96)%
2034	522,981	1,304,047	(781,066)	(6.43)%	2059	428,750	1,552,798	(1,124,048)	(4.94)%
2035	538,033	1,313,940	(775,906)	(6.30)%	2060	441,532	1,594,040	(1,152,508)	(4.93)%
2036	553,238	1,320,865	(767,627)	(6.15)%	2061	454,705	1,637,684	(1,182,980)	(4.91)%
2037	569,324	1,325,517	(756,193)	(5.96)%	2062	468,279	1,683,513	(1,215,234)	(4.91)%
2038	585,945	1,326,003	(740,058)	(5.73)%	2063	482,268	1,731,384	(1,249,115)	(4.90)%
2039	603,172	1,323,294	(720,122)	(5.46)%	2064	496,686	1,781,173	(1,284,487)	(4.90)%
2040	620,950	1,317,389	(696,438)	(5.16)%	2065	511,545	1,832,836	(1,321,291)	(4.90)%

* Does not include contributions for administrative expenses.

The portion of investment income needed to pay benefits (the negative external cash flow) increases gradually and begins to level off at the end of the amortization of the unfunded accrued liabilities. After this period, it then approaches the assumed rate of 4.85% (1.08/1.03, minus 1). The remainder of the expected investment income is needed to preserve the purchasing power of the trust fund.

SECTION E
PARTICIPANT DATA

Retirants & Beneficiaries as of June 30, 2015 Tabulated by Plan Year of Retirement

Calendar Year Ended Dec 31,	No.	Total Annual Benefits	Average Monthly Benefit
2015 *	1,392	\$ 20,151,756	\$1,206
2014	3,006	41,359,727	1,147
2013	2,919	39,797,147	1,136
2012	2,919	40,160,903	1,147
2011	2,727	38,232,104	1,168
2010	2,819	42,412,789	1,254
2009	2,267	32,932,198	1,211
2008	2,229	32,251,281	1,206
2007	2,088	29,807,412	1,190
2006	2,006	29,260,497	1,216
2005	1,805	26,794,304	1,237
2004	1,313	18,895,974	1,199
2003	2,482	40,746,221	1,368
2002	1,767	28,589,461	1,348
2001	1,505	25,960,218	1,437
2000	1,977	35,246,121	1,486
1999	1,036	18,247,757	1,468
1998	977	18,510,922	1,579
1997	830	15,219,472	1,528
1996	704	11,985,299	1,419
1995	744	13,442,325	1,506
1994	513	8,182,744	1,329
1993	535	9,076,238	1,414
1992	439	6,927,698	1,315
1991	415	6,866,337	1,379
1990	274	4,372,809	1,330
1989	276	4,160,125	1,256
1988	254	3,734,971	1,225
1987	174	2,002,027	959
1986	161	1,719,916	890
1985	103	1,017,432	823
1984	75	780,151	867
1983	53	548,649	863
1982	51	476,848	779
1981	40	308,076	642
1980	25	262,701	876
1979	18	113,808	527
1978	12	69,699	484
1977	16	130,536	680
1976	7	59,379	707
1975	5	20,208	337
1974	4	27,012	563
1973	2	4,766	199
Totals	42,964	\$650,866,018	\$1,262

* Five months ended May 31, 2015.

**Benefits Payable June 30, 2015
Tabulated by Option and Type of Benefit**

MSEP Benefits

Type of Benefit	No.	Annual Benefits
Service Retirement		
Life Annuity	5,382	\$ 73,481,806
50% Joint and Survivor	5,469	95,800,158
100% Joint and Survivor	2,869	58,351,728
5-Year Certain and Life	142	1,494,782
10-Year Certain and Life	157	1,721,323
Survivor Beneficiary	2,425	30,002,325
Total	<u>16,444</u>	<u>260,852,122</u>
Disability Retirement	4	14,520
Death-in-Service	1,451	16,301,756
Total	17,899	\$ 277,168,398

MSEP 2000 Benefits

Type of Benefit	No.	Annual Benefits
Service Retirement		
Life Annuity	15,080	\$ 213,850,818
50% Joint and Survivor	3,663	72,852,761
100% Joint and Survivor	4,114	66,836,478
5-Year Certain and Life	28	392,580
10-Year Certain and Life	681	7,130,261
15-Year Certain and Life	545	4,597,566
Survivor Beneficiary	788	7,376,718
Total	<u>24,899</u>	<u>373,037,182</u>
Disability Retirement	0	0
Death-in-Service	165	644,634
Total	25,064	\$ 373,681,816

Total Benefits Payable June 30, 2015
Tabulated by Attained Ages of Benefit Recipients

Attained Ages	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20					65	\$ 219,884	65	\$ 219,884
20-24					20	121,198	20	121,198
25-29					8	44,660	8	44,660
30-34					20	114,432	20	114,432
35-39					42	321,242	42	321,242
40-44					86	583,963	86	583,963
45-49	3	\$ 96,492			129	1,104,752	132	1,201,244
50-54	507	15,091,968			195	1,621,841	702	16,713,809
55-59	3,567	75,461,929	1	\$ 2,184	352	3,633,095	3,920	79,097,208
60-64	8,304	126,403,385	3	12,336	519	5,460,906	8,826	131,876,627
65-69	10,214	135,418,187			672	7,573,561	10,886	142,991,748
70-74	6,563	95,829,330			654	8,788,508	7,217	104,617,838
75-79	4,145	70,815,839			660	8,422,858	4,805	79,238,697
80-84	2,560	44,373,961			674	8,308,368	3,234	52,682,329
85-89	1,503	22,870,721			503	5,539,090	2,006	28,409,811
90-94	606	8,300,300			180	1,947,114	786	10,247,414
95	49	548,804			18	130,066	67	678,870
96	42	533,124			6	110,559	48	643,683
97	20	296,232			11	171,408	31	467,640
98	14	148,975			5	58,716	19	207,691
99	9	99,012			5	33,420	14	132,432
100	7	75,624			4	25,536	11	101,160
101	8	89,240			1	2,436	9	91,676
102	4	16,959			1	3,624	5	20,583
103	3	26,412					3	26,412
104	1	6,939					1	6,939
105	1	6,828					1	6,828
Totals	38,130	\$ 596,510,261	4	\$ 14,520	4,830	\$ 54,341,237	42,964	\$ 650,866,018

Average age at Retirement: 60.2 years.

Average age now: 69.7 years.

Summary of Member Data Included in Valuation

June 30, 2015

Active Members

Valuation Group	Number	Payroll	Group Averages		
			Salary	Age (yrs.)	Service (yrs.)
Regular State Employees	47,066	\$ 1,751,131,864	\$ 37,206	45.2	10.9
Elected Officials	6	659,968	109,995	46.7	7.7
Legislative Clerks	18	659,474	36,637	61.0	22.2
Legislators	195	7,011,150	35,955	51.7	4.5
Uniformed Water Patrol	14	934,644	66,760	41.8	16.7
Conservation Department	1,368	59,464,269	43,468	44.9	14.5
School-Term Salaried Employees	1,286	95,866,793	74,546	57.1	21.4
Administrative Law Judges	27	2,799,606	103,689	57.9	21.6
Total MOSERS*	49,980	\$ 1,918,527,768	\$ 38,386	45.5	11.2
Judges*	405	\$ 55,656,457	\$ 137,423	56.3	11.7

The total number of MOSERS active members includes 35,224 MSEP/MSEP 2000 members and 14,756 MSEP 2011 members.

Retired Lives

Type of Benefit Payment	No.	Annual Benefit	Group Averages	
			Benefit	Age (yrs.)
Retirement	38,130	\$ 596,510,261	\$ 15,644	69.6
Disability	4	14,520	3,630	62.0
Survivor of Active Member	1,617	16,962,194	10,490	62.2
Survivor of Retired Member	3,213	37,379,043	11,634	75.1
Total MOSERS*	42,964	\$ 650,866,018	\$ 15,149	69.7
Judges*	539	\$ 32,420,594	\$ 60,150	75.5

This valuation also includes 19,290 terminated vested members, 195 members on leave and 948 members on long-term disability.

* Total covered by MOSERS excluding Judges. Judges assets, liabilities, contribution rates and other valuation results are included in a separate report covering only Judges.

Active Members as of June 30, 2015
By Age and Years of Service#*

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
15-19	36							36	\$ 823,265
20-24	1,700	3						1,703	47,021,889
25-29	3,895	521	1					4,417	139,045,658
30-34	2,848	1,732	441	13				5,034	175,912,619
35-39	1,970	1,514	1,429	424	11			5,348	197,378,413
40-44	1,581	1,177	1,247	1,426	362	13		5,806	222,341,686
45-49	1,452	1,079	1,085	1,406	1,117	480	24	6,643	263,160,509
50-54	1,404	1,137	1,173	1,338	1,063	1,054	435	7,604	308,515,686
55-59	1,096	1,040	1,075	1,302	921	814	563	6,811	277,953,489
60	169	155	207	257	159	137	94	1,178	49,910,681
61	167	172	174	198	125	127	70	1,033	43,737,866
62	126	162	154	201	137	94	65	939	39,285,782
63	98	125	159	177	92	78	85	814	35,159,127
64	85	99	140	130	102	56	79	691	29,571,024
65	48	89	102	100	78	65	60	542	23,763,667
66	39	68	78	67	63	38	40	393	18,683,360
67	24	55	49	44	21	19	27	239	10,731,373
68	20	42	51	37	23	23	26	222	10,731,838
69	16	29	30	32	17	8	23	155	7,188,431
70 & Over	36	56	78	71	43	32	56	372	17,611,405
Totals	16,810	9,255	7,673	7,223	4,334	3,038	1,647	49,980	\$ 1,918,527,768

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.5 years

Service: 11.2 years

Annual Pay: \$38,386

Includes 27 ALJ members.

* A breakdown by gender is included on pages 46 and 47.

**Active Members as of June 30, 2015
By Age and Years of Service**

Male

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
Under 20	12							12	\$ 259,957
20-24	742							742	21,625,696
25-29	1,689	220						1,909	62,045,248
30-34	1,210	709	183	3				2,105	76,243,507
35-39	803	591	560	125	4			2,083	80,348,798
40-44	595	431	511	508	114	2		2,161	88,675,224
45-49	510	418	436	529	424	138	4	2,459	104,983,440
50-54	512	428	452	494	410	444	123	2,863	128,129,872
55-59	402	408	397	513	345	374	185	2,624	118,709,433
60	66	58	78	104	59	66	38	469	22,904,364
61	80	76	67	78	49	66	27	443	20,444,016
62	64	64	60	74	50	46	25	383	17,873,479
63	41	60	67	60	42	45	38	353	17,310,135
64	36	43	65	50	32	25	42	293	13,746,480
65	21	44	39	37	25	25	33	224	11,387,777
66	15	34	40	25	29	16	20	179	9,910,329
67	14	31	20	17	7	5	22	116	5,852,842
68	11	27	22	17	10	9	13	109	6,199,265
69	9	19	16	15	8	3	10	80	4,236,668
70 & Over	21	29	36	32	16	9	40	183	10,473,844
Totals	6,853	3,690	3,049	2,681	1,624	1,273	620	19,790	\$821,360,374

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.4 years

Service: 11.0 years

Annual Pay: \$41,504

**Active Members as of June 30, 2015
By Age and Years of Service**

Female

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
Under 20	24							24	\$ 563,308
20-24	958	3						961	25,396,193
25-29	2,206	301	1					2,508	77,000,410
30-34	1,638	1,023	258	10				2,929	99,669,112
35-39	1,167	923	869	299	7			3,265	117,029,615
40-44	986	746	736	918	248	11		3,645	133,666,462
45-49	942	661	649	877	693	342	20	4,184	158,177,069
50-54	892	709	721	844	653	610	312	4,741	180,385,814
55-59	694	632	678	789	576	440	378	4,187	159,244,056
60	103	97	129	153	100	71	56	709	27,006,317
61	87	96	107	120	76	61	43	590	23,293,850
62	62	98	94	127	87	48	40	556	21,412,303
63	57	65	92	117	50	33	47	461	17,848,992
64	49	56	75	80	70	31	37	398	15,824,544
65	27	45	63	63	53	40	27	318	12,375,890
66	24	34	38	42	34	22	20	214	8,773,031
67	10	24	29	27	14	14	5	123	4,878,531
68	9	15	29	20	13	14	13	113	4,532,573
69	7	10	14	17	9	5	13	75	2,951,763
70 & Over	15	27	42	39	27	23	16	189	7,137,561
Totals	9,957	5,565	4,624	4,542	2,710	1,765	1,027	30,190	\$1,097,167,394

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.6 years

Service: 11.3 years

Annual Pay: \$36,342

SECTION F
METHODS & ASSUMPTIONS

The Actuarial Valuation Process

An *actuarial valuation* is the mathematical process by which actuarial present values and contribution rates are determined. The flow of activity constituting the valuation may be summarized as follows:

- A. ***Census Data***, furnished by the system administrative staff, including:
 - Retired lives now receiving benefits
 - Former members with vested benefits not yet payable
 - Active members
- + B. ***Benefit Provisions*** governing future payments from the retirement system.
- + C. ***Asset data*** (cash & investments), furnished by the system administrative staff.
- + D. ***Assumptions concerning future experiences*** in various risk areas, which assumptions are established by the Board of Trustees after consulting with the actuary.
- + E. ***The funding method*** for employer contributions (the long-term planned pattern for employer contributions).
- + F. ***Mathematically combining the assumptions, the funding method, and the data.***
- = G. ***Determination of:***
 - Plan financial position and***
 - The employer contribution rate.***

Meaning of "Unfunded Actuarial Accrued Liabilities"

"Actuarial accrued liabilities" are *the portion of the present value of plan promises to pay benefits in the future which are not covered by future normal cost contributions* --- a liability has been established ("accrued") because the service has been rendered but the resulting monthly cash benefit may not be payable until years in the future. Actuarial accrued liabilities are the result of complex mathematical calculations, which are made annually by the plan's actuary.

If "actuarial accrued liabilities" at any time exceed the actuarial value of the plan's accrued assets, the difference is *"unfunded actuarial accrued liabilities."* This is the common condition. If the plan's assets equaled the plan's "actuarial accrued liabilities," the plan would be termed "fully funded."

Each time a plan adds a new benefit which applies to service already rendered, an "actuarial accrued liability" is created, which is also an "unfunded actuarial accrued liability" because the plan can't print instant cash to cover the value of the new benefit promises. Payment for such unfunded actuarial accrued liabilities is spread over a period of years.

Unfunded actuarial accrued liabilities can occur in another way: If actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded actuarial accrued liabilities. In plans where benefits are directly related to an employee's pay near time of retirement, unfunded actuarial accrued liabilities increase when unexpected rates of pay increase create additional actuarial accrued liabilities which are not offset by favorable experience in other areas.

The existence of unfunded actuarial accrued liabilities is not bad, but the changes from year to year in the amount of unfunded actuarial accrued liabilities are important and should be monitored.

Unfunded actuarial accrued liabilities are not a bill payable immediately but it is important that policy-makers prevent the amount from becoming unreasonably high and *it is vital for plans to have a sound method for making payments toward them* so that the System will achieve progress towards 100% funded status.

Summary of Assumptions Used for the June 30, 2015 Actuarial Valuation

All actuarial assumptions are expectations of future experience, not market measures. The rationale for the actuarial assumption is based on the System's investment policy, capital market expectations, and demographic experience. Actuarial assumptions were last reviewed in conjunction with the July 1, 2007 through June 30, 2011 4-Year Experience Study dated March 30, 2012.

-----*Economic Assumptions*-----

The economic assumptions were adopted by the Board on July 19, 2012 to be first effective for the June 30, 2012 valuation.

The investment return rate used in the valuations was 8.0% per year, compounded annually (net after investment expenses). This assumption is used to account for the fact that equal amounts of money payable at different points in time in the future do not have the same value presently.

Pay increase assumptions for individual active members are shown for sample ages on page 52. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.0% recognizes wage inflation. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

Price inflation is assumed to be 2.5% per year.

The active member payroll is assumed to increase 3.0% annually, which is the portion of the individual pay increase assumptions attributable to wage inflation. For the 2015 valuation, valuation payroll is expected to grow at 0% the first year and 3.0% per year thereafter.

The annual Cost-of-Living Adjustment (COLA) is assumed to be 4.00%, on a compounded basis, when a minimum COLA of 4% is in effect (4.0% for 12 years, 3.06% the next year to reach a cumulative 65% followed by 2.0%). When no minimum COLA is in effect, price inflation is assumed to be 2.5% and the annual COLA is assumed to be 2.0% (80% of 2.5%), on a compounded basis.

-----*Non-Economic Assumptions*-----

The demographic assumptions were adopted by the Board on June 20, 2012 to be first effective for the June 30, 2012 valuation.

The mortality table, for post-retirement mortality, used in evaluating allowances to be paid was the RP 2000 combined healthy mortality table, projected to 2016 with Scale AA. Related values are shown on page 53. This assumption is used to measure the probabilities of each benefit payment being made after retirement. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females. The mortality tables include a margin of 15% for men and 17% for women for mortality improvements based on the four year experience study from June 30, 2007 to June 30, 2011.

Summary of Assumptions Used for the June 30, 2015 Actuarial Valuation

The probabilities of age and service retirement are shown on page 54. It was assumed that each member will be granted one half year (4 months for 2011 plan members) of service credit for unused leave upon retirement and military service purchases.

The probabilities of withdrawal from service, disability and death-in-service are shown for sample ages on page 52. For disability retirement, impaired longevity was recognized by use of special mortality tables.

The entry age normal actuarial cost method of valuation was used in determining liabilities and normal cost. Each member's normal cost was based on the benefit provisions applicable to that member. The normal cost is projected to the applicable fiscal year. Differences in the past between assumed experience and actuarial experience ("actuarial gains and losses") become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments, (principal & interest) which are level percents of payroll contributions.

The amortization of the unfunded actuarial accrued liability is based on a closed 30-year amortization period, level percent of payroll amortization as adopted by the Board. This method was first effective with the June 30, 2014 valuation. As of June 30, 2015 valuation, 29 years remain. The amortization is based on the projected unfunded actuarial accrued liability to the beginning of the fiscal year during which the contributions are expected to be made.

Employer contribution dollars were assumed to be *paid in equal installments* throughout the employer's fiscal year.

Actuarial value of assets. Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over an open three-year period. Valuation assets are not permitted to deviate from the market value by less than 80% or more than 125%.

The data about persons now covered and about present assets were furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary.

The liabilities for active members hired on or after January 1, 2011 were based on MSEP 2011 benefits. The liabilities for active members hired on or after July 1, 2000 (April 26, 2005 for Administrative Law Judges) were based on MSEP 2000 benefits. The liabilities for active members hired before July 1, 2000 for Elected Officials, General Assembly, and Uniformed Water Patrol were based on MSEP benefits. The liabilities for all other active members hired before July 1, 2000 were based on the assumption that members would elect MSEP 2000 prior to age 62 and MSEP on or after age 62.

For members on long-term disability, the actuarial accrued liability is the present value of benefit under active assumptions plus the difference of the present value of benefit with and without future pay growth to reflect indexing of pay in ultimate retirement benefits.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (M.A.A.A.).

Separations From Active Employment Before Service Retirement & Individual Pay Increase Assumptions June 30, 2015

Sample Ages	Years of Service	Percent of Active Members ----- Separating within the Next Year -----						Pay Increase Assumptions -- For An Individual Employee --		
		Withdrawal ***		Death*		Disability		Merit & Seniority**	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0	23.0 %	26.9 %							
	1	18.0	20.5							
	2	15.0	15.4							
	3	13.0	12.5							
	4	11.0	10.9							
25	5+	13.0	13.3	0.03 %	0.01 %	0.17 %	0.30 %	2.9 %	3.0 %	5.9 %
30		10.2	10.5	0.04	0.02	0.17	0.30	2.2	3.0	5.2
35		7.9	8.1	0.07	0.03	0.21	0.30	1.6	3.0	4.6
40		5.6	5.7	0.09	0.04	0.26	0.32	1.2	3.0	4.2
45		4.2	4.3	0.12	0.07	0.34	0.38	0.9	3.0	3.9
50		2.8	2.9	0.16	0.10	0.49	0.57	0.7	3.0	3.7
55		2.8	2.9	0.27	0.19	1.07	0.89	0.5	3.0	3.5
60		2.8	2.9	0.52	0.37	1.50	1.50	0.4	3.0	3.4
65		2.8	2.9	1.02	0.72	1.60	1.70	0.3	3.0	3.3
70		2.8	2.9	1.74	1.24	1.60	1.70	0.2	3.0	3.2

* 2% of the deaths in active service are assumed to be duty related.

** Does not apply to members of the General Assembly.

*** Does not apply to Elected Officials and Legislators.

Elected Officials and Legislators

Percent of Active Members Separating within the Next Year

Years of Service	Withdrawal
	Male/Female
1	8.0 %
2	8.0
3	8.0
4	8.0
5	12.0
6	12.0
7	12.0
8+	35.0

Post-Retirement Mortality Rates

The mortality tables were the RP 2000 mortality table, projected to 2016 with Scale AA, including a margin of 15% for men and 17% for women for mortality improvements. Disabled mortality tables are the healthy mortality tables set forward 10 years. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females.

Age	Service		Disability	
	Men	Women	Men	Women
45	0.0012	0.0009	0.0027	0.0024
50	0.0016	0.0013	0.0052	0.0047
55	0.0027	0.0024	0.0102	0.0090
60	0.0052	0.0047	0.0174	0.0155
65	0.0102	0.0090	0.0302	0.0247
70	0.0174	0.0155	0.0548	0.0410
75	0.0302	0.0247	0.0990	0.0703
80	0.0548	0.0410	0.1720	0.1255
85	0.0990	0.0703	0.2591	0.1884

Retirement Values June 30, 2015

Sample Attained Ages	Present Value of \$1/Month the First Year (with 50% Joint & Survivor) Increasing 4.0% / 2.0% Yearly				Present Value of \$1/Month the First Year Increasing 2.0% Yearly			
	Service		Disability		Service		Disability	
	Men	Women	Men	Women	Men	Women	Men	Women
40	\$224.11	\$224.12	\$212.76	\$211.89	\$184.40	\$186.75	\$169.01	\$172.32
45	217.22	217.01	202.65	201.39	177.68	180.43	157.94	162.08
50	208.28	207.81	190.14	188.39	169.01	172.32	144.49	149.76
55	196.76	196.07	175.18	172.83	157.94	162.08	128.94	135.56
60	182.48	181.61	157.88	154.80	144.49	149.76	111.76	119.87
65	165.46	164.49	138.11	134.44	128.94	135.56	92.72	102.82
70	145.94	144.91	116.94	112.03	111.76	119.87	73.10	84.62
75	123.90	123.17	96.04	88.83	92.72	102.82	55.15	66.19
80	100.55	100.10	76.52	68.15	73.10	84.62	40.28	50.49
85	78.09	77.41	59.89	52.82	55.15	66.19	30.32	40.10

Sample Attained Ages	Future Life Expectancy (Years)			
	Service		Disability	
	Men	Women	Men	Women
40	41.95	44.10	32.39	34.43
45	37.15	39.24	27.68	29.69
50	32.39	34.43	23.13	25.13
55	27.68	29.69	18.87	20.84
60	23.13	25.13	14.96	16.90
65	18.87	20.84	11.39	13.32
70	14.96	16.90	8.29	10.12
75	11.39	13.32	5.83	7.37
80	8.29	10.12	4.03	5.31
85	5.83	7.37	2.91	4.05

Percent of Eligible Active Members Retiring Next Year

Normal Retirement Pattern					Early Retirement Pattern		
Retirement Age	MSEP and MSEP 2000*			MSEP 2011**	Retirement Age	MSEP and MSEP 2000	MSEP 2011
	Percent Eligible			Percent Eligible		Percent Eligible	Percent Eligible
	1 st Year	2 nd Year	3 rd Year				
48	22%						
49	22	10%					
50	22	10	21%				
51	22	10	21				
52	22	10	21				
53	22	10	18				
54	22	10	18				
55	22	12	26	45%			
56	22	12	25	45			
57	22	12	22	35	57	2.5%	
58	22	12	22	35	58	3.5	
59	22	12	20	30	59	3.5	
60	21	12	22	35	60	5.0	
61	20	12	20	25	61	6.0	
62	19	22	30	40	62	6.0	10%
63	15	18	25	30	63	6.0	10
64	15	20	17	20	64	6.0	10
65	20	20	27	30	65	6.0	50
66	22	20	26	25	66	6.0	50
67	15	25	22	20	67	6.0	
68	15	20	22	20	68	6.0	
69	15	20	22	20	69	6.0	
70	25	20	22	20	70	6.0	
71	25	20	22	20	71	6.0	
72	25	20	22	20	72	6.0	
73	25	20	22	20	73	6.0	
74	25	20	22	20	74	6.0	
75	50	50	22	50	75	6.0	
76	50	50	22	50	76	6.0	
77	75	75	22	75	77	6.0	
78	100	100	100	100	78	100.0	

* For members hired prior to January 1, 2011.

** For members hired on or after January 1, 2011.

Summary of Assumptions Used
June 30, 2015
Miscellaneous and Technical Assumptions

Pay Increase Timing:	Beginning of (Fiscal) year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
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.
Benefit Service:	Exact fractional service is used to determine the amount of the benefit payable.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and withdrawal do not operate during normal retirement eligibility.
Normal Form of Benefit:	The assumed normal form of benefit is the straight life form for MSEP 2000 with 50% continuing to an eligible surviving spouse for MSEP. No adjustment has been made for post-retirement option election changes.
Other Liability Adjustments:	<i>MSEP 2000 Benefits for Active Employees</i>

Option elections were studied for MSEP 2000 retirees and we believe that the normal and early retirement alternate forms of payment assumption are slightly negatively subsidized. We have adjusted the actuarial accrued liability and normal cost by a factor of 0.99 for MSEP 2000 and MSEP 2011 retirements and by .995 for MSEP retirements based on the current rate of form of payment elections.

Pre-Retirement Survivor Benefits for Spouse of Terminated Vested Member

<u>Age</u>	<u>Male/Female</u>
<30	1.97/1.68
30-39	1.40/1.29
40-49	1.15/1.11
>50	1.04/1.03

These factors are used to estimate the cost of immediate unreduced survivor annuities upon the death of a vested member.

Summary of Assumptions Used
June 30, 2015
Miscellaneous and Technical Assumptions
(Continued)

- 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. New entrant normal cost contributions are applied to the funding of new entrant benefits.
- MSEP 2000 Election:** All regular state employees hired on or before June 30, 2000 are assumed to elect MSEP 2000 prior to age 62 and MSEP on or after age 62. Elected Officials, General Assembly, and Uniformed Water Patrol Members hired before July 1, 2000 and Administrative Law Judges hired before April 26, 2005 are assumed to elect MSEP at retirement.
- Service Adjustment:** It is assumed that each member will be granted one half year of service credit, 3 months for unused leave upon retirement and 3 months for military service purchases. For members hired on or after January 1, 2011 it is assumed that each member will be granted 4 months for unused leave.
- Marriage Assumption:** It is assumed that among active members 75% are married at retirement, 70% of those dying in active service are married, and men are three years older than their spouses.
- Forfeitures:** For those hired on or after January 1, 2011, 50% of state employees terminating at first vesting eligibility are assumed to take a refund and forfeit their deferred pension. This percentage decreases to 0% at first retirement eligibility.
- Salary and Benefit Limits:** For purposes of the valuation, no limits were applied to member compensation or benefits.

The number of active members is assumed to remain constant although certain new hires on or after July 1, 2002 will participate in the Colleges and Universities Retirement Plan. Active and retired member data is reported as of May 31. It is assumed for valuation purposes that there is no turnover among members and no new entrants during the month of June. New entrant assumed demographic patterns are based on the demographics of active members hired within the last five years.

Summary of Assumptions Used
June 30, 2015
Miscellaneous and Technical Assumptions
(Concluded)

Data Adjustments:

Active and retired member data was reported as of May 31, 2015. It was brought forward to June 30, 2015 by adding one month of service for all active members and the June COLA for certain retired members. It is expected that this procedure resulted in a slight overstatement of total liabilities as of June 30, 2015. Financial information continues to be reported as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the October 1 statutory deadline.

Active members reported with less than a \$100 annualized salary were assumed to receive the average active member pay, which is \$38,351 (\$103,689 for Administrative Law Judges) as of June 30, 2015. There were 18 Regular State Employee members affected by this assumption.

When the option of choosing plans is available, terminated vested members are reported with two records, one with benefits under the MSEP plan and one with benefits under the MSEP 2000 plan. Because it is unknown what the member will elect at retirement, both records are valued and the plan that produces the higher present value of future benefits is used for valuation purposes.

For any retired member who has elected a joint and survivor benefit yet has no beneficiary date of birth provided, it was assumed that the beneficiary is 3 years younger for male retirees and 3 years older for female retirees.

For the terminated vested members, GRS staff found one member less than what was initially reported. This was confirmed with MOSERS Staff.

For members reported with no gender, the member is assumed to be male.

Due to limitations in our valuation program, members who are not eligible for normal retirement prior to age 85 had their date of birth adjusted.

For the 2015 valuation, a one-time adjustment to the payroll growth from 3% to 0% is assumed for the year after the valuation date to reflect a planned pay freeze.

SECTION G
PLAN PROVISIONS

**Summary of Benefit Provisions Evaluated
June 30, 2015 Actuarial Valuation**

<p align="center">MSEP (Missouri State Employees' Plan)</p>	<p align="center">MSEP 2000 (Missouri State Employees' Plan 2000)</p>	<p align="center">MSEP 2011 (Missouri State Employees' Plan 2011)</p>
<p>PARTICIPATION</p> <p>Participants include:</p> <p>All MOSERS members, vested former members, retirees and survivors who first became members prior to July 1, 2000 and who do not elect to transfer to the MSEP 2000 plan. Election is made at the time benefits commence.</p> <p>AVERAGE COMPENSATION USED FOR BENEFIT DETERMINATION</p> <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average Compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>	<p>PARTICIPATION</p> <p>Participants include:</p> <ol style="list-style-type: none"> (1) All new employees who first become members on or after July 1, 2000, except full-time teaching and senior administrative personnel of the regional colleges and universities hired on or after July 1, 2002 who will be participants in the Colleges and Universities Retirement Plan. (2) MSEP active members and vested former members who elect to transfer to the MSEP 2000 plan prior to retirement. (3) MSEP retirees who elect to transfer to the MSEP 2000 plan during the election window from July 1, 2000 through June 30, 2001, and their survivors. (4) MSEP non-vested terminations rehired on or after July 1, 2000. <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>	<p>PARTICIPATION</p> <p>Participants include:</p> <p>All new employees who first become employees on or after January 1, 2011.</p> <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)
<p>NORMAL RETIREMENT ELIGIBILITY (UNREDUCED BENEFITS)</p> <p><i>Members of the General Assembly:</i> Age 55 with completion of at least 3 full biennial assemblies.</p> <p><i>Statewide Elected Officials:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 65 with at least 4 years of credited service. (2) Age 60 with at least 15 years of credited service. (3) Age 50 with age plus credited service equal to 80 or more. <p><i>General Employees:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 65 and active with at least 4 years of credited service. (2) Age 65 with at least 5 years of credited service. (3) Age 60 with at least 15 years of credited service. (4) Age 48 with age plus credited service equal to 80 or more. <p><i>Uniformed Water Patrol Employees:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 55 and active with at least 4 years of credited service. (2) Age 55 with at least 5 years of credited service. (3) Age 48 with age plus credited service equal to 80 or more. <p><i>Administrative Law Judges:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 62 and active with at least 12 years of credited service. (2) Age 60 with at least 15 years of credited service. (3) Age 55 with at least 20 years of credited service. 	<p><i>Members of the General Assembly:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 55 with completion of at least 3 full biennial assemblies. (2) Age 50 with completion of at least 3 full biennial assemblies and with age plus credited service equal to 80 or more. <p><i>Statewide Elected Officials:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 55 with at least 4 years of credited service as a statewide elected official. (2) Age 50 with age plus credited service equal to 80 or more. <p><i>General Employees:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 62 with at least 5 years of credited service. (2) Age 48 with age plus credited service equal to 80 or more. 	<p><i>Members of the General Assembly:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 62 with completion of at least 3 full biennial assemblies. (2) Age 55 with completion of at least 3 full biennial assemblies and with age plus credited service equal to 90 or more. <p><i>Statewide Elected Officials:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 62 with at least 4 years of credited service as a statewide elected official. (2) Age 55 with age plus credited service equal to 90 or more. <p><i>General Employees:</i> The earliest of attaining:</p> <ol style="list-style-type: none"> (1) Age 67 with at least 10 years of credited service. (2) Age 55 with age plus credited service equal to 90 or more.

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)
<p>BENEFIT AMOUNT</p> <p><i>Members of the General Assembly:</i> \$150 per month per biennial assembly served.</p> <p><i>Statewide Elected Officials:</i></p> <ol style="list-style-type: none"> 1) Less than 12 years of credited service: 1.6% of Average Compensation times years of credited service. 2) 12 or more years of credited service: 50% of pay of the highest elected position held prior to retirement. <p><i>General Employees:</i> 1.6% of Average Compensation times years of credited service.</p> <p>2.1% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p> <p><i>Uniformed Water Patrol:</i> 2.13% of Average Compensation times years of credited service.</p> <p><i>Administrative Law Judges:</i> 50% of Compensation.</p>	<p><i>Members of the General Assembly:</i> 1/24 of pay times first 24 years of credited service as a member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> 1/24 of pay (of the highest elected position held prior to retirement) times the first 12 years of credited service as a statewide elected official.</p> <p><i>General Employees:</i> 1.7% of Average Compensation times years of credited service.</p> <p>Temporary Benefit: If member retires between ages 48 and 62 with age plus credited service equal to 80 or more, a temporary benefit is payable until the attainment of the minimum age at which reduced social security benefits are payable, in the amount of 0.8% of Average Compensation times years of credited service.</p> <p>Non-Social Security Covered Service: 2.5% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p>	<p><i>Members of the General Assembly:</i> 1/24 of pay times first 24 years of credited service as a member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> 1/24 of pay (of the highest elected position held prior to retirement) times the first 12 years of credited service as a statewide elected official.</p> <p><i>General Employees:</i> 1.7% of Average Compensation times years of credited service.</p> <p>Temporary Benefit: If member retires between ages 55 and 62 with age plus credited service equal to 90 or more, a temporary benefit is payable until the attainment of the minimum age at which reduced social security benefits are payable, in the amount of 0.8% of Average Compensation times years of credited service.</p> <p>Non-Social Security Covered Service: 2.5% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p>

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)																																																
<p>EARLY RETIREMENT FOR GENERAL EMPLOYEES</p> <p>Eligibility: Age 55 with at least 10 years of credited service.</p> <p>Amount: Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement.</p> <ol style="list-style-type: none"> 1) Less than 15 years of service: Normal retirement amount actuarially reduced for years younger than age 65. 2) 15 years but less than 20 years of service, and less than the number of years of service necessary for age and service to total 80: Normal retirement amount actuarially reduced for years younger than age 60. 3) 20 or more years of service, but less than the number of years of service necessary for age and service to total 80: Normal retirement amount reduced for years younger than the 80 and out eligibility date. <p>Vested Deferred Benefits</p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at the age the individual would have been eligible for early or normal retirement, considering years of credited service). Unused sick leave is not converted.</p> <table border="1" data-bbox="65 1279 695 1442"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>100%</td> </tr> <tr> <td>6 (3 Assemblies)</td> <td>100%</td> <td></td> <td></td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		5			100%	6 (3 Assemblies)	100%			<p>Eligibility: Age 57 with at least 5 years of credited service.</p> <p>Amount: Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement. Normal retirement is age 62.</p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at age 57 for early retirement or 62 for normal retirement). Unused sick leave is not converted.</p> <table border="1" data-bbox="726 1218 1371 1445"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>100%</td> </tr> <tr> <td>6 (3 Assemblies) HB1455 prospectively</td> <td>100%</td> <td></td> <td></td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		5			100%	6 (3 Assemblies) HB1455 prospectively	100%			<p>Eligibility: Age 62 with at least 10 years of credited service.</p> <p>Amount: Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement. Normal retirement is age 67.</p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at age 67 normal retirement). Unused sick leave is not converted.</p> <table border="1" data-bbox="1396 1198 2041 1442"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>6 (3 Assemblies) HB1455 prospectively</td> <td>100%</td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>100%</td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		6 (3 Assemblies) HB1455 prospectively	100%			10			100%
Years of Service	General Assembly	Elected Officials	General Employees																																															
4		100%																																																
5			100%																																															
6 (3 Assemblies)	100%																																																	
Years of Service	General Assembly	Elected Officials	General Employees																																															
4		100%																																																
5			100%																																															
6 (3 Assemblies) HB1455 prospectively	100%																																																	
Years of Service	General Assembly	Elected Officials	General Employees																																															
4		100%																																																
6 (3 Assemblies) HB1455 prospectively	100%																																																	
10			100%																																															

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)
<p>DEATH PRIOR TO RETIREMENT</p> <p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service and was married on the date of death. If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>	<p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service (3 full assemblies for a member of the General Assembly, 4 years of credited service for a statewide elected official). If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>	<p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service (2 full assemblies for a member of the General Assembly, 4 years of credited service for a statewide elected official). If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)
<p>DEATH AFTER RETIREMENT</p> <p>50% of the benefit the retired member was receiving on the date of death (the normal form of payment), or the benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement and provided the member was married on their date of retirement. Effective July 1, 2000, a member who is not married at retirement but marries thereafter may designate a spouse as beneficiary within one year of marriage. Additionally, a member may designate a new spouse as beneficiary within one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p>DISABILITY (RECIPIENTS OF LTD BENEFITS)</p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability (if the member retires on or after August 28, 1999, the member's rate of pay is based on the rate of pay at the time of disability indexed to the time of benefit commencement). An exception is Uniformed Water Patrol employees who are eligible for an immediate occupational disability benefit equal to 50% of pay at time of disability.</p>	<p>The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement. A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary within one year of marriage. Additionally, a member may designate a new spouse as beneficiary within one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability indexed to the time of benefit commencement. The annual percentage increase in the pay used to compute benefits is the lesser of: i) 80% of the CPI increase and ii) 5%.</p>	<p>The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement. A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary upon completion of one year of marriage. Additionally, a member may designate a new spouse as beneficiary upon completion of one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability indexed to the time of benefit commencement. The annual percentage increase in the pay used to compute benefits is the lesser of: i) 80% of the CPI increase and ii) 5%.</p>

<p align="center">MSEP (Missouri State Employees' Plan)</p>	<p align="center">MSEP 2000 (Missouri State Employees' Plan 2000)</p>	<p align="center">MSEP 2011 (Missouri State Employees' Plan 2011)</p>												
<p>POST-RETIREMENT BENEFIT ADJUSTMENTS</p> <p>Benefits are increased to retired members (including survivors) annually in accordance with the following formulas:</p> <table border="1" data-bbox="86 440 672 768"> <thead> <tr> <th>Increase in CPI</th> <th>Formula 1 Benefit Increase</th> <th>Formula 2 Benefit Increase</th> </tr> </thead> <tbody> <tr> <td>5.00% or less</td> <td>4%</td> <td>80% of CPI increase</td> </tr> <tr> <td>5.01% - 6.24%</td> <td>80% of CPI increase</td> <td>80% of CPI increase</td> </tr> <tr> <td>6.25% or more</td> <td>5%</td> <td>5%</td> </tr> </tbody> </table> <p>Members first hired prior to August 28, 1997 receive COLAs based on Formula 1 until an aggregate increase of 65% is reached. At that point subsequent COLAs based on Formula 2 are granted.</p> <p>Members first hired on or after August 28, 1997 receive COLAs based solely on Formula 2.</p> <p>Statewide Elected Officials with 12 or more years of service have their benefit adjusted annually based on the increase in the pay for an active statewide elected official in the member's highest elected position.</p> <p>Members who are fully vested and work beyond age 65 will have their monthly benefit increased upon retirement. The percentage increase in benefit is equal to all COLAs for the years between age 65 and date of retirement, not to exceed 65% and counts toward the Formula 1 65% maximum.</p>	Increase in CPI	Formula 1 Benefit Increase	Formula 2 Benefit Increase	5.00% or less	4%	80% of CPI increase	5.01% - 6.24%	80% of CPI increase	80% of CPI increase	6.25% or more	5%	5%	<p>Benefits are increased to retired members (including survivors) annually in accordance with the following:</p> <p><i>Members of the General Assembly:</i> Benefit is adjusted annually based on the increase in the pay for an active member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> Benefit is adjusted annually based on the increase in the pay for an active statewide elected official in the retired member's highest elected position.</p> <p><i>General Employees:</i> Annual benefit percentage increase equal to the lesser of: i) 80% of the CPI increase, and 5%.</p> <p>CPI: For the basis of determining CPI, the average monthly reported CPI for the prior calendar year is divided by the average monthly reported CPI for the second prior calendar year to determine the current year increases, if any. If this amount is less than one, benefits are not reduced, nor is there any cumulative effect on future years determination of CPI.</p> <p>Timing of Increase: Benefits are adjusted on the anniversary of the effective date of retirement for most members. Members retiring under the BackDROP provisions have an anniversary based on the retroactive starting date for the BackDROP.</p>	<p>Benefits are increased to retired members (including survivors) annually in accordance with the following:</p> <p><i>Members of the General Assembly:</i> Benefit is adjusted annually based on the increase in the pay for an active member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> Benefit is adjusted annually based on the increase in the pay for an active statewide elected official in the retired member's highest elected position.</p> <p><i>General Employees:</i> Annual benefit percentage increase equal to the lesser of: i) 80% of the CPI increase, and 5%.</p> <p>CPI: For the basis of determining CPI, the average monthly reported CPI for the prior calendar year is divided by the average monthly reported CPI for the second prior calendar year to determine the current year increases, if any. If this amount is less than one, benefits are not reduced, nor is there any cumulative effect on future years determination of CPI.</p> <p>Timing of Increase: Benefits are adjusted on the anniversary of the effective date of retirement.</p>
Increase in CPI	Formula 1 Benefit Increase	Formula 2 Benefit Increase												
5.00% or less	4%	80% of CPI increase												
5.01% - 6.24%	80% of CPI increase	80% of CPI increase												
6.25% or more	5%	5%												

<p>MSEP (Missouri State Employees' Plan)</p>	<p>MSEP 2000 (Missouri State Employees' Plan 2000)</p>	<p>MSEP 2011 (Missouri State Employees' Plan 2011)</p>
<p>POP-UP PROVISION</p> <p>Benefits to members who choose a survivor form of payment and whose spouse precedes the member in death, will "pop-up" or revert to the amount the member would have received had he/she not elected a survivor option.</p> <p>PORTABILITY</p> <p>Purchase/Transfer Provisions (in addition to military). Effective August 28, 1999, a member may purchase up to four years of non-federal full-time Missouri public service, provided the member is not vested in another retirement system for that same service.</p> <p>MEMBER CONTRIBUTIONS. None.</p> <p>BACKDROP. See following page.</p>	<p>Same.</p> <p>Purchase/Transfer Provisions (in addition to military). A member may purchase up to four years of non-federal full-time Missouri public service, provided the member is not vested in another retirement system for that same service. Local vested service credit granted after 10 years of state service if the other retirement plan agrees to transfer assets equal to the accrued liability to MOSERS.</p> <p>Same as MSEP.</p> <p>Same as MSEP.</p>	<p>Same.</p> <p>May purchase qualifying public sector service at full actuarial cost.</p> <p>4.0% of salary, with 4.0% interest credited to member contributions.</p> <p>Not eligible for the BackDROP.</p>

MSEP (Missouri State Employees' Plan)	MSEP 2000 (Missouri State Employees' Plan 2000)	MSEP 2011 (Missouri State Employees' Plan 2011)
<p>BACKDROP</p> <p>To be eligible to participate in the BackDROP, a member must have been eligible to retire under normal age and/or service conditions for at least two years. A retroactive starting date is established for BackDROP purposes which is the later of: 1) the member's normal retirement date or 2) five years prior to the annuity starting date under the retirement plan selected by the member.</p> <p>A member may elect the BackDROP period for the accumulation of the BackDROP account in 12 month increments prior to their actual retirement date or back to the earliest possible date. This results in a BackDROP period of one to five years depending upon the individual situation.</p> <p>A theoretical BackDROP account is accumulated that includes 90% of the value of the benefit payments that would have been paid during the BackDROP period had the member retired at the retroactive starting date with their respective option election. These payments include applicable post-retirement benefit increases.</p> <p>The member is paid the resulting lump sum value of the BackDROP account as of the annuity starting date or as three equal annual installments beginning at the annuity starting date.</p> <p>The annuity benefit payable from the actual retirement date is computed with years of service and average pay as of the retroactive starting date for the BackDROP. Post-retirement benefit increases that occurred during the BackDROP period are applied in the calculation of the monthly annuity.</p>	<p>Same as MSEP.</p>	<p>Not eligible for the BackDROP.</p>

SECTION H
GLOSSARY

June 30, 2015 Actuarial Valuation Glossary

Actuarial Accrued Liability. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

Accrued Service. The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent. A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.

Actuarial Present Value. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Actuarial Value of Assets. Also referred to as funding value of assets, smoothed market value of assets, or valuation assets.

The valuation assets are used to determine funding requirements to the System. Valuation assets recognize assumed investment income fully each year along with one-third of cumulative investment gains or losses. Valuation assets are restricted to be no less than 80% and no more than 125% of the market value of assets. The 80% to 125% corridor is symmetric in that when market value of assets is 80% (125%) of the actuarial value of assets, the actuarial value of assets is 125% (80%) of market. This treatment helps remove the timing of investment activities from the valuation process. During periods when investment performance exceeds the assumed rate, valuation assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, valuation assets will tend to be greater than market value.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

(continued on following page)

June 30, 2015 Actuarial Valuation

Glossary

(concluded)

Plan Termination Liability. The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a "going concern" basis and is not normally determined in a routine actuarial valuation.

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and actuarial value of assets. Sometimes referred to as "unfunded accrued liability."

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

Valuation Payroll. Active member payroll that is intended to reflect the annual salary considered as covered compensation for Retirement System benefits.