

# Pennsylvania Public School Employees' Retirement System

Actuarial Valuation  
June 30, 2015



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January 15, 2016

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Pennsylvania Public School Employees'  
Retirement System  
5 North 5th. Street  
Harrisburg, PA 17101

Ladies and Gentlemen:

This report presents the results of the annual actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) as of June 30, 2015.

The valuation takes into account all of the promised benefits to which members are entitled as of June 30, 2015, including pension and survivor benefits, and as required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) is the basis for the contribution rate for fiscal year 2016/2017.

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were selected on the basis of the July 1, 2005 to June 30, 2010 Experience Review and adopted by the Board of Trustees at their March 11, 2011 meeting, which include a 7.50% per annum rate of investment return. As mandated by the Retirement Code, these assumptions will remain in effect for valuation purposes until such time as the Board of Trustees adopts revised assumptions.

The actuarial assumptions and methods for financial reporting meet the parameters set forth in Governmental Accounting Standards Board (GASB) Statements No. 25, 27, 43, and 50. The actuarial assumptions and methods used for GASB 25 and 27 disclosures are the same as those used for pension funding, except that the GASB 25 and 27 amortization payment is determined based on 30-year level-dollar amortization of the unfunded liability. The Health Insurance funding provisions of the Retirement Code differ from the GASB 43 disclosure requirements. For funding purposes, the actuarial liability equals the assets in the health insurance account, and a contribution is determined that will assure the solvency of the account through the third fiscal year following the valuation date. For purposes of GASB 43 disclosure, the Health Insurance actuarial liability and normal cost requirements have been determined under the entry age actuarial cost method, with 30-year level dollar amortization of the unfunded liability. (The entry age actuarial cost method meets the GASB 43 parameters for determining actuarial liability and normal cost, and is the cost method specified by the Retirement Code for the PSERS pension plan.) The information provided pursuant to GASB Statements No. 25 and 27 is for informational purposes only since they are no longer the operative standards for accounting for public-sector retirement systems in the United States.

Reporting requirements of GASB Statements No. 67 and No. 68 took effect at the June 30, 2014 and June 30, 2015 reporting dates, respectively. These requirements are addressed in separate reports.

### Assets and Membership Data

The Retirement System provided the individual data for members used in the valuation. While we did not verify the data at their source, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared for us by the Retirement System. The accuracy of the results presented in this report is dependent on the accuracy of the data.

### Funding Adequacy

The valuation results indicate that the employer contribution rate for fiscal year 2016/2017 is 30.03%. As of June 30, 2015, the total funded ratio of the plan (for Pensions and Health Insurance combined) is 60.6%, based on the accrued liability and actuarial value of assets calculated under the funding requirements of Section 8328 of the Retirement Code. The funded ratio of the Plan based on the market value of assets is 54.6%.

### Financial Results and Membership Data

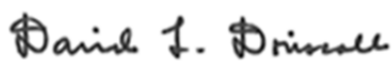
Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are shown in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

Use of this report for any other purpose or by anyone other than the Board or staff of PSERS may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. No one may make any representations or warranties based on any statements or conclusions contained in this report without Buck Consultants' prior written consent.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions concerning it.

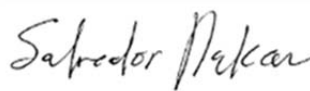
Respectfully submitted,



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# The Pennsylvania Public School Employees' Retirement System

## Table of Contents

### Table/Exhibit

Executive Summary .....	1
Table 1 - Summary of Results of Actuarial Valuation as of June 30, 2015.....	13
Table 2 - Summary of Sources of Employer Contribution Rate as of June 30, 2015.....	14
Table 3 - Determination of Health Insurance Contribution Rate for Fiscal Year 2016/2017.....	15
Table 4 - Summary of Market Value of Plan Assets as of June 30, 2015 .....	16
Table 5 - Derivation of Actuarial Value of Assets as of June 30, 2015.....	17
Table 6 - Analysis of Change in Unfunded Accrued Liability as of June 30, 2015 .....	18
Table 7 - Schedule of Funding Progress .....	19
Table 8a - Schedule of Employer Contributions for Pensions .....	20
Table 8b - Schedule of Employer Contributions for Postemployment Benefits Other than Pensions - GASB Statement No. 43 Disclosure .....	21
Table 9 - Solvency Test — Comparative Summary of Accrued Liability and Actuarial Value of Assets ..	22
Table 10 - History and Projection of Contribution Rates and Funded Ratios .....	23
Table 11 - History and Projection of Annuitants, Beneficiaries, Survivor Annuitants and Active Members .....	24
Table 12 - Description of Actuarial Assumptions and Methods .....	25
Table 13 - Summary of Benefit and Contribution Provisions .....	28
Table 14 - Summary of Membership Data as of June 30, 2015 .....	32
Exhibit I - Active Membership Data as of June 30, 2015 - Number and Average Annual Salary .....	35
Exhibit II - The Number and Average Annual Annuity as of June 30, 2015 – Retired on Account of Superannuation, Early Retirement and Those in Receipt of Withdrawal Annuities .....	36
Exhibit III - The Number and Average Annual Annuity as of June 30, 2015 – Beneficiaries and Survivor Annuitants .....	37
Exhibit IV - The Number and Average Annual Annuity as of June 30, 2015 - Retired on Account of Disability .....	38
Exhibit V - Annuitant and Beneficiary Membership Data as of June 30, 2015 .....	39
Exhibit VI - 10-Year History of Membership Data .....	40
Exhibit VII - Detailed Tabulations of the Data .....	42
Exhibit VIII - Glossary.....	56

## Executive Summary

This report presents the actuarial valuation as of June 30, 2015 for the Pennsylvania Public School Employees' Retirement System.

The principal valuation results include:

- The employer contribution rate for fiscal year 2016/2017, which is 30.03% (29.20% Pension plus 0.83% Premium Assistance).
- The Act 120 maximum employer pension rate for fiscal year 2016/2017 is 29.50% (4.50% collar + fiscal 2015/2016 final employer pension rate of 25.00%)
  - The Act 120 maximum employer pension rate exceeds the actuarially determined pension rate
  - The Act 120 employer pension rate collar does not constrain the actuarially determined rate for fiscal year 2016/2017
  - The Act 120 employer pension rate collar is no longer effective for future valuations
  - The Act 120 minimum employer pension rate is the normal cost rate of 8.31%
- The total funded ratio of the plan determined as of June 30, 2015 under the funding requirements of Section 8328 of the Retirement Code is 60.6%, which is based on the accrued liability and the actuarial value of assets for Pensions and Health Insurance as of that date. The funded ratio of the Plan based on the market value of assets is 54.6%.
- The determination and analysis of actuarial experience in the year ending June 30, 2015, which consisted of a net experience loss of \$1.037 billion.
- The Class T-E and T-F member contribution rates, in accordance with the Act 120-2010 Class T-E and Class T-F "shared-risk" contribution provision, shall remain at 7.50% and 10.30%, respectively. The next Class T-E and Class T-F shared-risk valuation is to be performed for the six-year period ending June 30, 2017. The Act 120-2010 member shared-risk contribution rates are discussed on page 8.
- Annual disclosures as of June 30, 2015 in accordance with Statement Nos. 25, 27 and 43 of the Governmental Accounting Standards Board (GASB). Although Statement Nos. 25 and 27 of the GASB have been superseded by Statement Nos. 67 and 68, respectively, information that would have been required to be disclosed under Statement Nos. 25 and 27 has been included in this report at the request of PSERS staff for informational purposes only. Disclosures in accordance with Statement Nos. 67 and 68 have been provided in separate reports.

The valuation was completed based upon membership and financial data submitted by the Retirement System. Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are included in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

## **Changes Since Last Year**

### Legislative and Administrative Changes

The benefit provisions and contribution provisions are summarized in Table 13. There were no legislative or administrative changes since the prior valuation.

### Actuarial Assumptions and Methods

The actuarial assumptions and methods are outlined in Table 12. There have been no changes in the demographic or economic assumptions from those used in the prior valuation, with the exception of a decrease in the proportion of eligible participants who are assumed to elect Premium Assistance coverage from 65% to 64%. We have reviewed the assumptions and methods used in completing the June 30, 2015 actuarial valuation and believe that they are reasonable and in compliance with the applicable standards.

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were selected on the basis of the July 1, 2005 to June 30, 2010 Experience Review and adopted by the Board at their March 11, 2011 meeting. Subsequent to the adoption of the current assumptions, new studies indicated that longevity had been increasing at a faster pace than had been previously expected. In view of this new evidence, we believe that it would be inappropriate to claim that the annuitant mortality assumption now in use incorporates a provision for improvements in longevity beyond the measurement date. It is beyond the scope of the current valuation to assess the possible implications. In any case, the System's practice of reviewing all demographic assumptions in experience studies conducted at five-year intervals provides ample opportunity to make any needed adjustments to this assumption, or any other, in a timely manner. The next such experience study will be performed as of June 30, 2015.

## Contribution Rates

The results of the valuation as of June 30, 2015 determine the employer contribution rate for fiscal year 2016/2017. The calculated employer contribution rate for the 2016/2017 fiscal year is 30.03%, and the Board of Trustees certified this rate at their December 8, 2015 meeting.

The average contribution rate payable by the members is 7.52%. The average member contribution rate of 7.52% is a pay-weighted average of member rates that vary based on date of hire and Class membership. Effective January 1, 2002, the employee contribution rate for members who elected to have prior school service and intervening military service converted to Class T-D service increased by 1.25% to 7.50%. Anyone who enrolled after July 1, 2001 and before July 1, 2011 is a member of Class T-D. Any employee who becomes a member after June 30, 2011 is a Class T-E member or, alternatively, may elect to become a Class T-F member. The base contribution rate for Class T-E members is 7.50% of compensation. The base contribution rate for Class T-F members is 10.30% of compensation. Class T-E and Class T-F members are subject to a "shared-risk" employee contribution rate, as discussed on page 8.

## Reasons for Change in the Rate Calculated by the Actuary

The employer contribution rate calculated by the actuary increased from 25.84% for fiscal year 2015/2016 to 30.03% for fiscal year 2016/2017. The reconciliation of the employer contribution rates by source is as follows:

• FY 2015/2016 Act 120 final rate	25.84%
• Deferral of FY 2015/2016 pension contribution due to Act 120 4.5% collar	<u>2.82</u>
• FY 2015/2016 actual rate	28.66%
• Decrease due to change in normal rate	(0.07)
• Net increase due to payroll growth and liability experience <sup>1</sup>	0.14
• Increase due to actuarial loss on assets	0.83
• Increase due to deferral of FY 2014/2015 pension contribution due to Act 120 4.5% collar	0.48
• Decrease due to change in health insurance contribution rate	<u>(0.01)</u>
• FY 2016/2017 employer contribution rate	30.03%

1. Reflects increase from appropriation payroll less than expected partially offset by liability gains.



## Summary of Principal Results

Summarized below are the principal financial results for the Public School Employees' Retirement System based upon the actuarial valuation as of June 30, 2015. Comparable results from the June 30, 2014 valuation are also shown.

Item	June 30, 2015	June 30, 2014
<b>Demographics</b>		
Active Members		
• Number	259,868	263,312
• Average Annual Pay	\$ 48,787	\$ 47,931
Annuitants		
• Number <sup>1</sup>	219,775	213,900
• Average Annual Benefit Payment	\$ 25,119	\$ 24,962
<b>Contribution Rates (as a Percentage of Payroll)</b>		
	(Fiscal Year 2016/2017)	(Fiscal Year 2015/2016)
Employer Contribution Rate:		
• Total Pension Rate Calculated by Actuaries	29.20%	27.82%
• Act 120 Employer Pension Rate After Application of Collar	29.20	25.00
• Health Insurance Contribution Rate	<u>0.83</u>	<u>0.84</u>
• Total Contribution Rate	30.03%	25.84%
• Total Contribution Rate Certified by Board	30.03%	25.84%
Member Average Contribution Rate	<u>7.52</u>	<u>7.49</u>
• Total Rate	37.55%	33.33%
<b>Funded Status<sup>2</sup></b>		
• Accrued Liability	\$ 94,697.4 Mil	\$ 92,465.0 Mil
• Actuarial Value of Assets	57,361.6	57,343.9
• Market Value of Assets	51,706.2	53,092.2
• Unfunded Accrued Liability		
• Actuarial Value of Assets	\$ 37,335.8	\$ 35,121.1
• Market Value of Assets	42,991.2	39,372.8
• Funded Ratio		
• Actuarial Value of Assets	60.6%	62.0%
• Market Value of Assets	54.6%	57.4%

1. Excludes 1,446 and 1,459 beneficiaries as of June 30, 2015 and June 30, 2014, respectively, who are only entitled to a pending lump sum distribution.
2. Pensions and Health Insurance combined.

## Five-Year History of Principal Financial Results

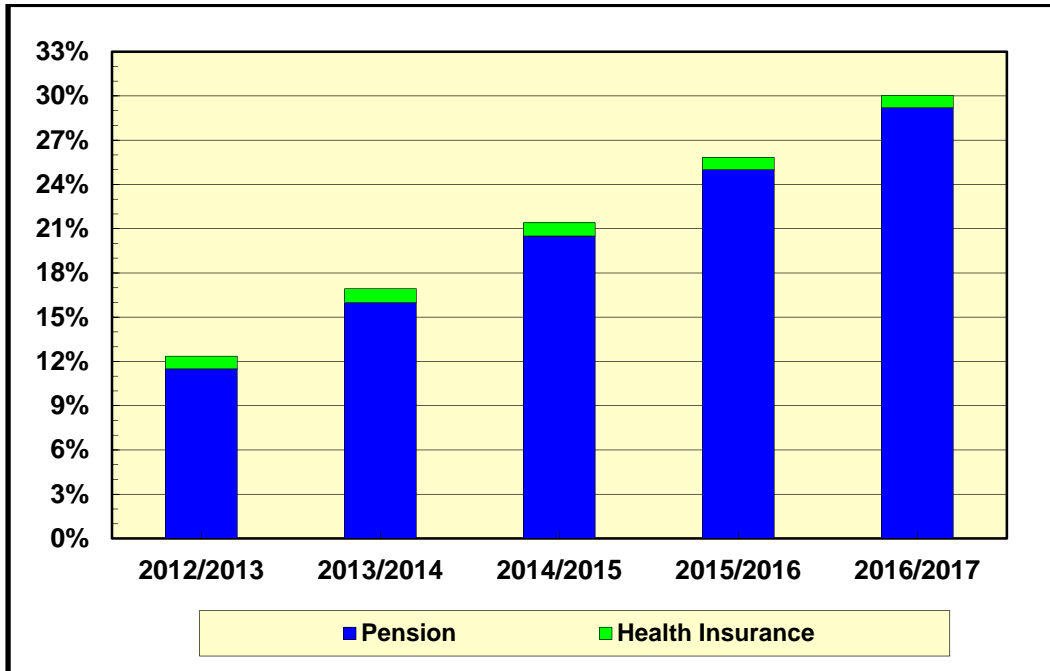
### Five-Year History of Contribution Rates (As a % of Payroll)

Fiscal Year	Member Contributions	Employer Contributions				
		Normal Cost	Unfunded Accrued Liability	Health Insurance	Preliminary Employer Contribution	Final Employer Contribution <sup>1</sup>
2016/2017	7.52%	8.31%	20.89%	0.83%	30.03%	30.03%
2015/2016	7.49	8.38	19.44	0.84	28.66	25.84 <sup>2</sup>
2014/2015	7.46	8.46	17.51	0.90	26.87	21.40 <sup>2</sup>
2013/2014	7.43	8.57	15.25	0.93	24.75	16.93 <sup>2</sup>
2012/2013	7.40	8.66	12.99	0.86	22.51	12.36 <sup>2</sup>

1. Certified by the Board.
2. Reflects Act 120 Pension Collar.

The following chart shows a five-year history of employer contribution rates:

### Five-Year History of Employer Contribution Rates



## **Funded Ratio**

The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method; and
- Liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability will be funded over 10 years based on level-percent-of-pay amortization.
- As directed by Act 2010-120, use pension rate collars to moderate the rise of annual employer pension contribution rates to reach the full actuarially determined contribution funding level in a budgetarily sound manner and within a financially responsible period of time.
  - Effective with the fiscal year 2016/2017, the Act 2010-120 pension collar rate exceeds the full actuarially determined pension contribution. The Act 2010-120 employer pension rate collar is no longer effective for future valuations.
  - The Act 2010-120 minimum employer pension contribution rate will be the normal cost rate for future valuations.

The total contribution rate of 30.03% of payroll payable by employers, when taken together with the contributions payable by the members, current assets, and expected future asset returns, is sufficient to achieve the financing objective.

The Retirement System's total funded ratio on this funding basis is measured by comparing the actuarial value of assets (based on a phased-in, 10-year moving average market value) to the accrued liability. The accrued liability for pensions is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active employees. The accrued liability for Health Insurance equals the assets in the Health Insurance account.

On this basis, the Retirement System's total funded ratio (for Pensions and Health Insurance combined) is 60.6% as of June 30, 2015. This funded ratio is based on an actuarial value of assets of \$57.4 billion and an accrued liability of \$94.7 billion. The funded ratio for Pensions alone is 60.5% as of June 30, 2015, based on an actuarial value of assets of \$57.2 billion, and an accrued liability of \$94.6 billion.

Reasons for Change in the Total Funded Ratio

The total funded ratio decreased from 62.0% as of June 30, 2014 to 60.6% as of June 30, 2015. This decrease is primarily due to returns below expected levels on assets measured at actuarial value and a fiscal year 2014/2015 employer contribution below its recommended level due to the limits imposed by Act 120. These effects were offset in part by experience gains from other sources. There was a net actuarial gain due to demographic experience. Table 6 provides an analysis of the change in the unfunded accrued liability as of June 30, 2015.

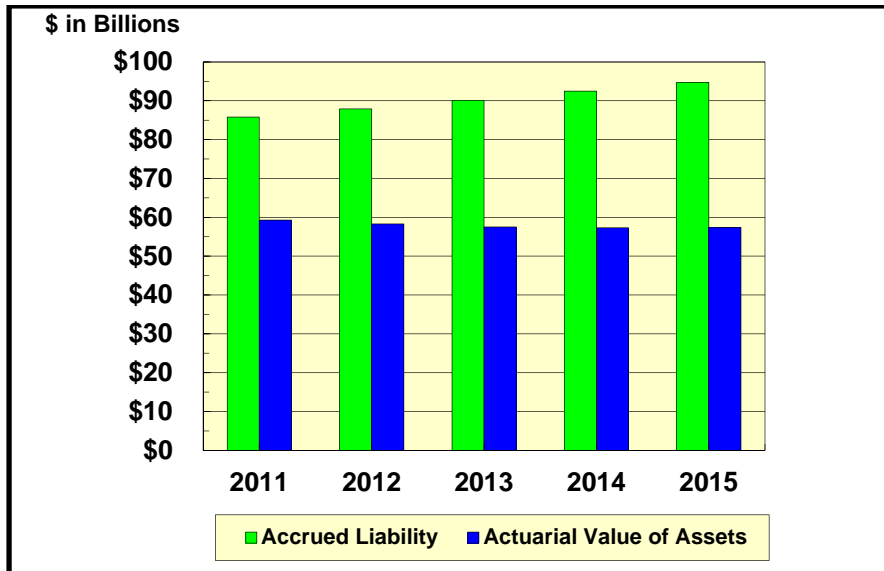
Five-Year History of Total Funded Ratio<sup>1</sup>  
(\$ Amounts in Millions)

Valuation as of June 30	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio
2015	\$ 94,697.4	\$ 57,361.6	\$ 37,335.8	60.6%
2014	92,465.0	57,343.9	35,121.1	62.0
2013	90,052.2	57,453.6	32,598.6	63.8
2012	87,854.4	58,321.4	29,533.0	66.4
2011	85,751.6	59,252.4	26,499.2	69.1

1. For Pensions and Health Insurance (under the funding provisions of the Retirement Code).

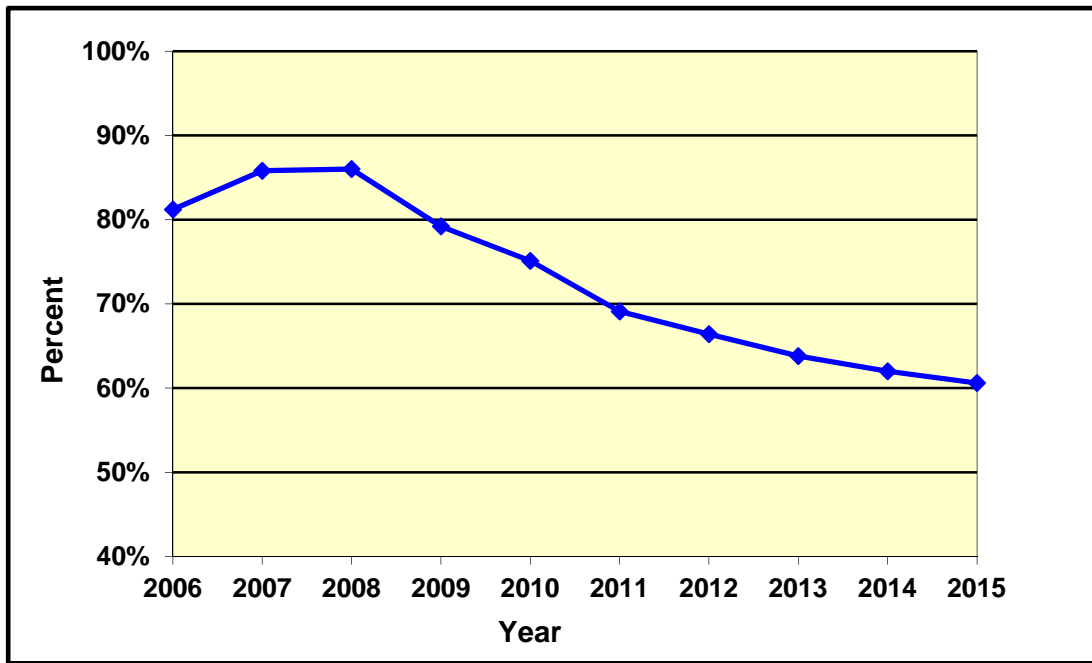
The following chart shows a five-year history of the accrued liability and the actuarial value of assets:

Five-Year History of Accrued Liability and Actuarial Value of Assets



The following chart shows a ten-year history of the total funded ratio based on actuarial value of assets for Pensions and Health Insurance:

**Ten-Year History of Total Funded Ratio (2006 – 2015)**



**Act 120-2010 Class T-E and Class T-F shared risk contributions**

Commencing with the annual actuarial valuation for the period ending June 30, 2014, and every three years thereafter, the Board shall compare the actual investment rate of return, net of fees, to the annual interest rate adopted by the Board for the calculation of the normal contribution rate, based on the market value of assets, for the prior ten-year period. Until the Retirement System has a ten-year period of investment rate of return experience following June 30, 2011, the look-back period shall begin not earlier than June 30, 2011.

If the actual time-weighted investment rate of return, net of fees, is less than the annual interest rate adopted by the Board by an amount of 1% or more, the shared risk contribution rate of Class T-E and T-F members will increase by 0.5%. If the actual time-weighted investment rate of return, net of fees, is equal to or exceeds the annual interest rate adopted by the Board, the shared risk contribution rate of Class T-E and T-F members will decrease by 0.5%. The total member contribution rate for Class T-E

members shall not be less than 7.5%, nor more than 9.5%. The total member contribution rate for Class T-F members shall not be less than 10.3%, nor more than 12.3%. If the Retirement System's total funded ratio based on the actuarial value of assets is at least 100% as of the measurement date, the shared risk contribution rate shall be zero. In the event that the annual interest rate adopted by the Board for the calculation of the normal contribution rate is changed during the period used to determine the shared risk contribution rate, the Board, with the advice of the actuary, shall determine the applicable rate during the entire period, expressed as an annual rate. For any fiscal year in which the employer contribution rate is lower than the final contribution rate under section 8328(h), the total member contribution rate for Class T-E and T-F members shall be prospectively reset to the basic contribution rate. There shall be no increase in the member contribution rate if there has not been an equivalent increase to the employer contribution rate over the previous three-year period.

The time-weighted market rates of return net of fees, for the three-year period ending June 30, 2014 were as follows:

Valuation as of June 30	Time-Weighted Rate of Return (Market Value) <sup>1</sup>
2014	14.91%
2013	7.96
2012	3.43
Three-Year Average	8.66%

1. As provided by the Retirement System's investment consultant.

The time-weighted rate of return, net of fees, for the three-year period ending June 30, 2014 was 8.66% as calculated by Aon Hewitt. Since the time-weighted rate of return exceeded 6.50% (the annual interest rate adopted by the Board over the 3-year period less 1.00%), the contribution rates for Class T-E and Class T-F members remained at 7.50% and 10.30%, respectively for the period July 1, 2015 to June 30, 2018.

The next Class T-E and Class T-F "shared-risk" valuation is to be performed for the six-year period ending June 30, 2017.

### **GASB No. 25 and 27 Disclosures**

Statement Nos. 25 and 27 of the Governmental Accounting Standards Board (GASB) established reporting standards for the annual financial reports of defined benefit pension plans. The Retirement System complied with Statement Nos. 25 and 27 beginning with the June 30, 1996 valuation. Effective June 30, 2014, GASB Statement No. 25 was superseded by GASB Statement No. 67, and effective June 30, 2015, GASB Statement No. 27 has been superseded by GASB Statement No. 68. The disclosures that would have been required under Statement No. 25 as of June 30, 2014, and the disclosures that would have been required under Statement No. 27 as of June 30, 2015, have been provided in this report for information purposes only at PSERS' request. Statement No. 25 requires disclosure of the "schedule of funding progress" while Statement No. 27 requires disclosure of the "schedule of employer contributions" in the Retirement System's financial statements.

The "schedule of funding progress" shows historical trend information about the Retirement System's actuarial value of pension assets, the actuarial accrued liability for pensions and the unfunded actuarial accrued liability for pensions. The actuarial funded ratio for pensions is measured by comparing the actuarial value of pension assets based on a 10-year moving average market value (a 5-year moving average market value prior to June 30, 2010) to the accrued liability for pensions. The accrued liability is the present value of pension benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active employees. On this basis, the Retirement System's funded ratio for pensions is 60.5% as of June 30, 2015. This funded ratio is based on an actuarial value of pension assets of \$57.2 billion and an accrued liability for pensions of \$94.6 billion. See Table 7 for more detail.

The schedule of employer contributions shows historical trend information about the GASB Annual Required Contribution (ARC) for pensions, and the percentage of the ARC contributed to the Retirement System. The pension contribution requirements of the Retirement Code differ from the GASB Statement No.25 disclosure requirements. As a result, there may be different determinations of contributions for GASB Statement No.25 accounting purposes and for State funding purposes. For GASB accounting purposes, the ARC equals the employer normal cost for pensions plus an amount that will amortize the unfunded actuarial accrued liability for pensions over 30 years. Although the employer normal cost for GASB accounting equals the PSERS normal cost for funding, Section 8328 of the Retirement Code specifies different amortization periods for different portions of the unfunded accrued liability, as well as a collar on the employer pension

rate. Therefore, the resulting single amortization period may be any number of years. Table 8a presents the GASB 27 schedule of employer contributions.

### **GASB No. 43 Disclosure**

GASB Statement No. 43 established reporting standards for the annual financial reports of postemployment benefit plans other than pension plans, and these reporting requirements apply to the PSERS health insurance premium assistance plan. The Retirement System complied with Statement No. 43 beginning with the June 30, 2006 valuation. The statement requires disclosure of the "schedule of funding progress" and the "schedule of employer contributions" in the Retirement System's financial statements.

The health insurance liability and funding provisions of the Retirement Code differ from the GASB disclosure requirements. As a result, different determinations of actuarial liability and contribution requirements are made for GASB accounting purposes and for State funding purposes. For purposes of funding, the actuarial liability equals the assets in the health insurance account, and the contribution required is the amount necessary to establish reserves sufficient to provide premium assistance payments to all participating eligible annuitants during the fiscal year that immediately follows the year the employer contribution is made. For GASB accounting purposes, the actuarial liability has been determined under the entry age actuarial cost method, and the Annual Required Contribution (ARC) is equal to the entry age normal cost for health insurance plus an amount that will amortize the entry age unfunded actuarial liability for health insurance over a period of 30 years. (The entry age actuarial cost method was selected for this calculation because it meets the GASB parameters for determining actuarial liability and normal cost, and is the cost method specified by the Retirement Code for the PSERS pension plan.)

The GASB 43 schedule of funding progress, presented in Table 7, shows that as of June 30, 2015, the health insurance assets were \$120,643,000, measured on a market value basis, while the GASB 43 health insurance liabilities were \$1,368,089,000, resulting in a funded ratio of 8.8%.

The GASB 43 schedule of employer contributions is presented in Table 8b.

### **Rate of Return**

The investment return of the trust fund (i.e., total return including both realized and unrealized gains and losses) for fiscal years 2006/2007 through 2014/2015 is shown in



the table below. The return based on the actuarial value of assets used for determining annual contribution rates is also shown.

The rate of return on market value reflects the investment earnings on the market value of assets from the beginning of the fiscal year to the end of the fiscal year. The actuarial value of assets is the amount recognized for valuation purposes. The actuarial value of assets is based on a smoothed market value that spreads the recognition of differences between the actual and expected return over a period of ten years. The rate of return on the actuarial value of assets is a measure of the increase in the actuarial value of assets from the beginning of the fiscal year to the end of the fiscal year.

Fiscal Year	Rate of Return Based on	
	Market Value <sup>1</sup>	Actuarial Value
2014/2015	3.0%	4.7%
2013/2014	14.9	5.3
2012/2013	8.0	4.8
2011/2012	3.4	4.9
2010/2011	20.4	6.0
2009/2010 <sup>2</sup>	14.6	3.1
2008/2009 <sup>2</sup>	-26.5	3.5
2007/2008 <sup>2</sup>	-2.8	12.4
2006/2007 <sup>2</sup>	22.9	13.9

1. Market Value Rate of return provided by PSERS' investment consultants (Aon Hewitt for fiscal years 2013/2014 and 2014/2015 and Wilshire Associates for prior years).

2. The actuarial value of assets was based on a smoothed market value under which differences between the actual and expected return were recognized over a period of five years.

Table 1

**Summary of Results of Actuarial Valuation  
as of June 30, 2015**

(\$ Amounts in Thousands)

Item	June 30, 2015	June 30, 2014
<b>Member Data</b>		
1. Number of Members		
a) Active Members	259,868	263,312
b) Vestees <sup>1</sup>	21,909	20,467
c) Annuitants, Beneficiaries and Survivor Annuitants <sup>2</sup>	219,775	213,900
d) Total	<u>501,552</u>	<u>497,679</u>
2. Annualized Salaries (\$ Amounts in Thousands) <sup>3</sup>	\$ 12,678,213	\$ 12,620,862
3. Annual Annuities (\$ Amounts in Thousands)	\$ 5,520,620	\$ 5,339,477
<b>Valuation Results</b>		
4. Present Value of Future Pension Benefits		
a) Active Members	\$ 61,134,713	\$ 60,153,320
b) Inactive Members and Vestees	1,613,862	1,521,474
c) Annuitants, Beneficiaries and Survivor Annuitants	52,739,489	51,425,295
d) Total	<u>\$ 115,488,064</u>	<u>\$ 113,100,089</u>
5. Present Value of Future Pension Normal Cost		
a) Active Members	\$ 10,232,272	\$ 9,786,167
b) Employer	10,679,082	10,960,939
c) Total	<u>\$ 20,911,354</u>	<u>\$ 20,747,106</u>
6. Pension Accrued Liability		
a) Active Members (4a) - (5c)	\$ 40,223,359	\$ 39,406,214
b) Inactive Members and Vestees	1,613,862	1,521,474
c) Annuitants, Beneficiaries and Survivor Annuitants	52,739,489	51,425,295
d) Total	<u>\$ 94,576,710</u>	<u>\$ 92,352,983</u>
7. Health Insurance Assets for Premium Assistance	\$ 120,643	\$ 112,060
8. Total Accrued Liability for Funding (6) + (7)	\$ 94,697,353	\$ 92,465,043
9. Actuarial Value of Assets	\$ 57,361,589	\$ 57,343,859
10. Funded Status (9) / (8)	60.6 %	62.0 %
11. Unfunded Accrued Liability (8) - (9)	\$ 37,335,764	\$ 35,121,184
12. Total Normal Cost Rate	15.83 %	15.87 %
13. Member Contribution Rate	7.52 %	7.49 %
14. Employer Normal Cost Rate (12) - (13)	8.31 %	8.38 %
<b>Employer Annual Funding Requirement</b>		
15. Employer Contribution Rate Calculated by Actuaries	<b>Fiscal 2016/2017</b>	<b>Fiscal 2014/2015</b>
a) Normal	8.31 %	8.38 %
b) Unfunded Accrued Liability	<u>20.89</u>	<u>19.44</u>
c) Preliminary Pension Rate	29.20 %	27.82 %
d) Act 120 Employer Pension Rate Collar	29.50 %	25.00 %
e) Health Insurance	<u>0.83</u>	<u>0.84</u>
f) Total Rate = Min [(15c), (15d)] + (15e)	30.03 %	25.84 %

1. Excludes 115,277 and 112,097 inactive members and non-members as of June 30, 2015 and June 30, 2014, respectively, who are no longer participating and are valued for their accumulated deductions only.

2. Excludes 1,446 and 1,459 beneficiaries as of June 30, 2015 and June 30, 2014, respectively, who are only entitled to a pending lump sum distribution.

3. The salaries shown represent an annual rate of pay for members who were in active service on the valuation date.

Table 2

Summary of Sources of Employer Contribution Rate  
As of June 30, 2015  
(\$ Amounts in Thousands)

	Funding Period (Years)	Beginning July 1	Initial Liability	7/1/2015 Outstanding Balance	Annual Payment Amount	Annual Payment Percent <sup>1</sup>
1. Amortization of:						
a) Act 120 Fresh Start Unfunded Accrued Liability And Asset Method Change	24	2011	\$ 16,729,283	\$ 18,104,409	\$ 1,409,996	10.41%
b) 2010 Experience	24	2011	3,419,297	3,788,049	295,019	2.18%
c) 2011 Experience	24	2012	564,642	618,361	46,630	0.34%
d) 2011 Assumption Changes	24	2012	4,592,397	5,029,313	379,255	2.80%
e) 2012 Experience	24	2013	2,372,550	2,587,142	189,307	1.40%
f) 2013 Experience	24	2014	2,707,494	2,933,999	208,727	1.54%
g) 2014 Experience	24	2015	2,170,432	2,333,214	161,665	1.19%
h) 2015 Experience	24	2016	1,941,277	<u>1,941,277</u>	<u>139,707</u>	<u>1.03%</u>
Total				\$ 37,335,764	\$ 2,830,306	20.89%
2. Employer Normal Cost Rate						<u>8.31%</u>
3. Preliminary Pension Rate (1) + (2)						29.20%
4. Act 120 Fiscal Year 2016 Employer Pension Rate Collar						29.50%
5. Health Insurance Rate						<u>0.83%</u>
6. Final Total Employer Contribution Rate Calculated by Actuary: Minimum of [(3) and (4)] + (5)						30.03%

1. Based on estimated employer payroll for fiscal year ending 2017 of \$13,549,000.

**Table 3**  
**Determination of Health Insurance Contribution Rate**  
**for Fiscal Year 2016/2017**  
(\$ Amounts in Thousands)

Item			
1. June 30, 2015 Balance in Health Insurance Account			\$ 120,643
2. Estimated Fiscal 2015/2016 Contribution			
(a) Contribution Rate Certified in 2014 Valuation			0.84%
(b) Estimated Fiscal 2015/2016 payroll			\$ 13,151,000
(c) Estimated Contribution = (a) x (b)			\$ 110,468
3. Estimated Number of Annuitants who:		Are Eligible	Elect Coverage
(a) Fiscal 2015/2016		144,300	92,352
(b) Fiscal 2016/2017		145,600	93,184
(c) Fiscal 2017/2018		146,800	93,952
4. Estimated Disbursements:	Administration	Assistance	Total
(a) Fiscal 2015/2016	\$ 2,236	\$ 110,822	\$ 113,058
(b) Fiscal 2016/2017	2,293	111,821	114,114
(c) Fiscal 2017/2018	<u>2,373</u>	<u>112,742</u>	<u>115,115</u>
(d) Total	\$ 6,902	\$ 335,385	\$ 342,287
5. Required Fiscal 2016/2017 Contribution			
(4d) – (1) – (2c)			\$ 111,176
6. Required Health Insurance Contribution Rate			
(a) Estimated 2016/2017 Payroll			\$ 13,549,000
(b) Required Health Insurance Contribution Rate			
(5) / (6a) (rounded up)			0.83%

Notes:

1. Current estimates of fiscal 2015/2016 membership payroll and administrative expenses, and of fiscal 2016/2017 administrative expenses, were provided by PSERS staff.
2. 64% of eligible annuitants are assumed to elect coverage. This decreased from the 65% used in the prior valuation.
3. Premium Assistance payments equal \$100 per month per eligible annuitant.
4. The estimated fiscal 2016 payroll in 2.(b) has been revised from \$13.375 billion to \$13.151 billion.

Table 4

Summary of Market Value of Plan Assets  
as of June 30, 2015  
(\$ Amounts in Thousands)

<b>Market Value</b>	
1. Market Value of Assets as of June 30, 2014	
a) Market Value of Assets as of June 30, 2014	\$ 53,092,175
b) Effect of change in accounting principle	<u>(41,543)</u>
c) Adjusted Market Value of Assets as of June 30, 2014 (a) + (b)	\$ 53,050,632
2. Contributions During Fiscal 2014/2015	3,698,173
3. Disbursements During Fiscal 2014/2015	6,326,899
4. Investment Return During Fiscal 2014/2015	
a) Investment Return (Net of Investment Expenses)	\$ 1,328,731
b) Administrative Expenses	<u>44,473</u>
c) Investment Return After Expenses (a) - (b)	\$ 1,284,258
5. Market Value of Assets as of June 30, 2015 (1c) + (2) - (3) + (4c)	\$ 51,706,164
6. Rate of Return (per Aon Hewitt)	3.04 %
<b>Asset Allocation by Account</b>	
1. Members' Savings Account	\$ 14,079,658
2. Annuity Reserve Account	52,739,489
3. State Accumulation Account	(15,233,626)
4. Health Insurance Account	<u>120,643</u>
5. Total (1) + (2) + (3) + (4)	\$ 51,706,164

Table 5

Derivation of Actuarial Value of Assets  
as of June 30, 2015  
(\$ Amounts in Thousands)

1. Market Value of Assets as of June 30, 2015						\$ 51,706,164
2. Determination of Deferred Gain (Loss)						
	Return on Assets					Deferred
Fiscal	<u>Actual</u>	<u>Expected</u>	<u>Difference</u>	<u>% Deferred</u> <sup>3</sup>	<u>Amount</u>	
<u>Year</u>						
2014/2015	\$ 1,284,258	\$ 4,202,212	\$ (2,917,954)	90.00%	\$ (2,626,159)	
2013/2014	7,057,089	4,193,490	2,863,599	80.00%	2,290,881	
2012/2013	4,086,520	4,239,172	(152,652)	70.00%	(106,857)	
2011/2012	1,057,435	4,303,637	(3,246,202)	60.00%	(1,947,721)	
2010/2011	9,207,766	4,609,422	4,598,344	50.00%	2,299,172	
2009/2010	6,100,499	4,651,504	1,448,995	40.00%	579,598	
2008/2009	(16,237,298)	4,900,688	(21,137,986)	26.67%	(5,636,796)	
2007/2008	(1,816,980)	4,728,472	(6,545,452)	15.00%	(981,818)	
2006/2007	12,658,871	4,359,054	8,299,817	5.71%	474,275	
					<u>\$ (5,655,425)</u>	
3. Actuarial Value of Assets <sup>1</sup> (1) - (2)						\$ 57,361,589
4. Actuarial Rate of Return <sup>2</sup>						4.72%

1. The amounts reported include assets for both Pension and Health Insurance.
2. The actuarial rate of return is the investment return based on the change in the actuarial value of assets from the June 30, 2014 valuation to the June 30, 2015 valuation. The actuarial value of assets developed above is a rolling ten year average. The impact of investment gains and losses is not fully realized in the year the gain or loss arose but is smoothed in over a ten year period.
3. The percentage amounts shown are rounded. The corresponding Deferred Amounts reflect the use of unrounded percentages.

Table 6

Analysis of Change in Unfunded  
Accrued as of June 30, 2015<sup>1</sup>  
(\$ Amounts in Thousands)

Item	Amount
1. Unfunded Accrued Liability at June 30, 2014	\$ 35,121,184
2. Interest Credit to June 30, 2015	2,634,089
3. Expected Contributions Toward Unfunded Accrued Liability	<u>2,360,786</u>
4. Expected Unfunded Accrued Liability at June 30, 2015 (1) + (2) - (3)	\$ 35,394,487
5. Actual Unfunded Accrued Liability at June 30, 2015	<u>37,335,764</u>
6. Increase (Decrease) from Expected (5) - (4)	\$ 1,941,277
7. Reasons for Increase (Decrease)	
(a) Experience Losses (Gains)	
(i) Loss from Investment Return on Actuarial Value of Assets	\$ 1,555,757
(ii) Loss from New Entrants and Pickups	256,568
(iii) Gain from Salary Increases Less than Expected	(261,386)
(iv) Loss from Mortality Experience	84,361
(v) Gain from Vested Termination Experience (Retirement/Disability/Termination)	(594,650)
(vi) Gain from Non-vested Termination Experience	(91,916)
(vii) Loss from Data/Miscellaneous	<u>87,999</u>
Subtotal	\$ 1,036,733
(b) Change due to Act 120 4.5% Collar on FY 2015 Pension Contribution	<u>904,544</u>
(c) Grand Total	\$ 1,941,277

1. The amounts reported include assets and liabilities for Pensions only.

**Table 7**

**Schedule of Funding Progress for Pensions<sup>1</sup>**  
(\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll <sup>3</sup>	Unfunded Accrued Liability as a Percentage of Covered Payroll
2015	\$ 57,240,946	\$ 94,576,710	\$ 37,335,764	60.5 %	\$ 12,678,213	294.5 %
2014	57,231,799	92,352,983	35,121,184	62.0	12,620,862	278.3
2013	57,353,262	89,951,816	32,598,554	63.8	12,577,105	259.2
2012	58,227,623	87,760,660	29,533,037	66.3	12,714,371	232.3
2011	59,141,130	85,640,383	26,499,253	69.1	12,910,043	205.3
2010	59,306,848	79,005,428	19,698,580	75.1	12,788,847	154.0

1. The amounts reported above include assets and liabilities for Pensions.

The schedule above is not required by current GASB standards. The information is provided for historical perspective as PSERS transitions to GASB Statement No. 67.

**Schedule of Funding Progress for Postemployment Benefits Other Than Pensions<sup>2</sup>**  
**GASB Statement No. 43 Disclosure**  
(\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll <sup>3</sup>	Unfunded Accrued Liability as a Percentage of Covered Payroll
2015	\$ 120,643	\$ 1,368,089	\$ 1,247,446	8.8 %	\$ 12,678,213	9.8 %
2014	112,060	1,374,112	1,262,052	8.2	12,620,862	10.0
2013	100,349	1,385,033	1,284,684	7.2	12,577,105	10.2
2012	93,753	1,364,667	1,270,914	6.9	12,714,371	10.0
2011	111,258	1,339,444	1,228,186	8.3	12,910,043	9.5
2010	116,831	1,162,219	1,045,388	10.1	12,788,847	8.2

2. The amounts reported above include assets and liabilities for Health Insurance Premium Assistance. The health insurance liabilities for GASB 43 disclosure have been calculated under the entry age normal cost method, which provides liabilities that differ from those determined under the funding requirements of the Retirement Code.

3. The salaries shown represent an annual rate of pay for the year ended June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.



Table 8a

Schedule of Employer Contributions for Pensions  
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	Annual Required Contribution	Actual Employer Contribution	Percentage Contributed
2015	\$ 3,760,827	\$ 2,596,731	69 %
2014	3,410,373	1,986,384	58
2013	3,110,429	1,434,815	46
2012	2,629,244	1,001,140	38
2011	2,436,602	647,000	27
2010	1,928,278	527,212	27

The Annual Required Contribution (ARC) presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e., the ARC for the fiscal year ended June 30, 2015 was determined by the valuation completed as of June 30, 2013 which was based on an 7.50% interest rate).

Additional information as of the latest actuarial valuation as follows:

Valuation Date:	6/30/2015
Actuarial Cost Method:	Entry Age
Amortization Method:	Level Dollar, Open
Remaining Amortization Period:	30 Years
Asset Valuation Method:	10 Year Smoothed Market

Actuarial Assumptions:

- Investment Rate of Return<sup>1</sup> 7.50%
- Projected Salaried Increases<sup>1</sup> 5.50%

1. Includes Inflation at: 3.00%

The schedule above is not required by current GASB standards. The information is provided for historical perspective as PSERS transitions to GASB Statement No. 68.

Table 8b

**Schedule of Employer Contributions for  
Postemployment Benefits Other Than Pensions  
GASB Statement No. 43 Disclosure  
(\$ Amounts in Thousands)**

Fiscal Year Ended June 30	Annual Required Contribution	Actual Employer Contribution	Percentage Contributed
2015	\$ 128,489	\$ 116,808	91 %
2014	121,260	117,471	97
2013	113,016	107,993	96
2012	102,104	80,936	79
2011	119,320	88,796	74
2010	117,187	102,703	88

The Annual Required Contribution (ARC) presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e., the ARC for the fiscal year ended June 30, 2015 was determined by the valuation completed as of June 30, 2013, which was based on an 7.50% interest rate).

Additional information as of the latest actuarial valuation as follows:

Valuation Date:	6/30/2015
Actuarial Cost Method:	Entry Age
Amortization Method:	Level Dollar, Open
Remaining Amortization Period:	30 Years
Asset Valuation Method:	Market

Actuarial Assumptions:	
- Investment Rate of Return <sup>1</sup>	7.50%
- Projected Salaried Increases <sup>1</sup>	5.50%

1. Includes Inflation at:	3.00%
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Table 9

**Solvency Test**  
**Comparative Summary of Accrued Liability and**  
**Actuarial Value of Assets**  
 (\$ Amounts in Thousands)

**PENSIONS**

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2015	\$ 14,079,658	\$ 52,739,489	\$ 27,757,563	\$ 57,240,946	100 %	82 %	0 %
2014	13,554,229	51,425,295	27,373,459	57,231,799	100	85	0
2013	13,089,342	49,979,444	26,883,030	57,353,262	100	89	0
2012	12,535,442	47,511,912	27,713,306	58,227,622	100	96	0
2011	12,242,308	45,648,780	27,749,294	59,141,131	100	100	5
2010	11,850,031	40,284,383	26,871,014	59,306,848	100	100	27

**POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS**

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2015	\$ 0	\$ 957,954	\$ 410,135	\$ 120,643	N/A	13 %	0 %
2014	0	959,079	415,033	112,060	N/A	12	0
2013	0	961,701	423,332	100,349	N/A	10	0
2012	0	934,506	430,161	93,753	N/A	10	0
2011	0	909,076	430,368	111,258	N/A	12	0
2010	0	767,587	394,632	116,831	N/A	15	0

Table 10

History and Projection of Contribution Rates and Funded Ratios<sup>1</sup>

Fiscal Year Ending June	Budgeted Appropriation Payroll (thousands)	Contribution Rates <sup>2</sup>							Funded Ratio
		Employee	Employer Normal Cost	Employer Unfunded Liability	Preliminary Employer Pension	Final Employer Pension <sup>6</sup>	Employer Health Insurance	Total Employer	
2006	\$ 11,505,093	7.16 %	7.61 %	(4.28) %	3.33 %	4.00 %	0.69 %	4.69 %	81.2 %
2007 <sup>3</sup>	11,821,951	7.21	6.62	(0.95)	5.67	5.72	0.74	6.46	85.8
2008	12,881,244	7.25	6.68	(0.24)	6.44	6.44	0.69	7.13	86.0
2009	12,500,000	7.29	6.68	(3.37)	3.31	4.00	0.76	4.76	79.2
2010 <sup>4</sup>	12,899,000	7.32	7.35	(3.72)	3.63	4.00	0.78	4.78	75.1
2011 <sup>4 5</sup>	13,510,000	7.34	8.08	(0.50)	7.58	5.00	0.64	5.64	69.1
2012	14,112,000	7.37	8.12	10.15	18.27	8.00	0.65	8.65	66.4
2013 <sup>7</sup>	14,297,000	7.40	8.66	12.99	21.65	11.50	0.86	12.36	63.8
2014	13,720,000	7.43	8.57	15.25	23.82	16.00	0.93	16.93	62.0
2015	13,482,000	7.46	8.46	17.51	25.97	20.50	0.90	21.40	<b>60.6</b>
2016	13,375,000	7.49	8.38	19.44	27.82	25.00	0.84	25.84	58.2
<b>2017</b>	<b>13,549,000</b>	<b>7.52</b>	<b>8.31</b>	<b>20.89</b>	<b>29.20</b>	<b>29.20</b>	<b>0.83</b>	<b>30.03</b>	56.8
2018	13,658,010	7.52	8.14	23.07	31.21	31.21	0.83	32.04	56.1
2019	14,012,675	7.52	7.98	24.47	32.45	32.45	0.82	33.27	58.6
2020	14,385,408	7.53	7.81	25.59	33.40	33.40	0.80	34.20	60.1
2021	14,775,522	7.53	7.66	25.06	32.72	32.72	0.79	33.51	61.2
2022	15,181,732	7.53	7.51	25.23	32.74	32.74	0.77	33.51	62.6
2023	15,592,952	7.53	7.36	25.63	32.99	32.99	0.76	33.75	64.1
2024	16,006,876	7.53	7.21	25.89	33.10	33.10	0.74	33.84	65.5
2025	16,425,303	7.53	7.06	26.16	33.22	33.22	0.72	33.94	67.3
2026	16,849,867	7.53	6.90	26.56	33.46	33.46	0.72	34.18	69.2
2027	17,269,991	7.53	6.74	26.87	33.61	33.61	0.69	34.30	71.2

1. The projection of contribution rates is based on the assumption that there are no changes in demographic assumptions, no changes in benefit provisions, and no actuarial gains or losses other than gains or losses on the actuarial value of assets that result from recognizing currently deferred gains or losses on the market value of assets.
2. In general, the Preliminary Employer Pension Rate equals the sum of the rates for the Employer Normal Cost and the Unfunded Liability; and the Final Employer Pension Rate is the greater of the Preliminary Pension Rate and any Pension Rate Floor or Collar stated in the Retirement Code. The Total Employer Rate is the sum of the Final Employer Pension Rate and the Employer Health Insurance Rate.
3. Revised actuarial assumptions based on a five-year experience review ending June 30, 2005 were used to determine the contributions for the fiscal year ended June 30, 2007. Since the benefit changes under Act 2001-9 had not been in effect throughout the entire period covered by the study the Board decided, at its December 2005 meeting, to delay making any changes to the retirement rate assumptions until further data became available. The 5.72% Final Employer Pension Rate equals the 6.46% Total Employer Rate certified by the Board at that meeting, minus the 0.74% Employer Health Insurance Rate. The 5.67% Preliminary Employer Pension Rate equals the sum of the Employer Normal Cost and Unfunded Liability rates. The Normal Cost and Unfunded Liability rates were calculated by the actuary in January 2006, based on the package of assumptions adopted at the December 2005 meeting.
4. At its January 2009 meeting, the Board voted to reduce the interest rate from 8.50% to 8.25% for the June 30, 2008 valuation and to 8.00% for subsequent valuations.
5. Act 2010-46 recertified the fiscal year ended June 30, 2011 pension rate from 7.58% to 5.00%.
6. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.
7. Revised actuarial assumptions based on a five-year experience review ended June 30, 2010 were used to determine the contributions for the fiscal year ending June 30, 2013 and thereafter, which include an interest rate of 7.50%.

Table 11

History and Projection of Annuitants, Beneficiaries, Survivor Annuitants and Active Members

Valuation as of June 30	New Annuitants During the Year <sup>1</sup>	Annuitant Deaths During the Year	Annuitants at End of Year	Beneficiaries and Survivor Annuitants at End of Year	Total Annuitants, Beneficiaries and Survivor Annuitants	Active Members
2006			153,757	8,056	161,813	263,350
2007			159,760	8,266	168,026	264,023
2008			165,091	8,449	173,540	272,690
2009			169,919	8,044	177,963	279,701
2010			176,210	8,724	184,934	282,041
2011			183,665	10,957	194,622	279,152
2012			190,560	11,455	202,015	273,504
2013			197,735	9,818	207,553	267,428
2014			203,756	10,144	213,900	263,312
<b>2015</b>			<b>209,266</b>	<b>10,509</b>	<b>219,775</b>	<b>259,868</b>
2016	14,437	5,162	218,541	11,173	229,714	259,868
2017	11,555	5,370	224,726	11,789	236,515	259,868
2018	11,100	5,594	230,232	12,349	242,581	259,868
2019	10,760	5,841	235,151	12,861	248,012	259,868
2020	10,367	6,098	239,420	13,339	252,759	259,868
2021	10,148	6,317	243,251	13,798	257,049	259,868
2022	9,875	6,554	246,572	14,231	260,803	259,868
2023	9,871	6,778	249,665	14,651	264,316	259,868
2024	9,824	7,005	252,484	15,065	267,549	259,868
2025	9,883	7,250	255,117	15,463	270,580	259,868

1. The number for the fiscal year of the projection reflects the assumption that all Active members age 74 and above, and that all vested inactive members who have reached superannuation age retire immediately.

Table 12

Description of Actuarial Assumptions and Methods

**Assumptions**

**Interest Rate:** 7.50% per annum, compounded annually (adopted as of June 30, 2011). The components are 3.00% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on 4% (since 1960).

**Separation from Service:** Illustrative rates of assumed separation from service are shown in the following table (adopted as of June 30, 2011).

Age	Annual Rate of:						
	Withdrawal less than 5 Years of Service	Withdrawal		Death	Disability	Early Retirement <sup>1</sup>	Superannuation Retirement
		Between 5 and 10 Years of Service	10 or More Years of Service				
<b>Males</b>							
25	12.50%	5.50%	2.00%	.037%	.024%		
30	10.50	3.20	2.00	.038	.024		
35	11.00	3.00	1.50	.056	.100		
40	13.00	3.50	1.25	.090	.180		
45	13.00	3.50	1.25	.121	.180		25.00%
50	13.00	3.50	1.70	.173	.280		25.00
55	11.00	3.50	3.00	.245	.430	15.00%	30.00
60	10.50	3.50	4.50	.363	.580	12.00	28.00
65				.592	.100		20.00
69				.810	.100		18.00
<b>Females</b>							
25	13.00%	8.50%	5.00%	.018%	.030%		
30	13.00	6.50	4.00	.019	.040		
35	13.00	5.50	3.00	.022	.060		
40	10.90	4.50	1.50	.035	.100		
45	10.90	4.00	1.50	.055	.150		30.00%
50	10.90	3.75	1.75	.085	.200		30.00
55	10.90	3.75	3.00	.133	.380	15.00%	30.00
60	10.90	4.50	5.50	.197	.380	15.00	30.00
65				.301	.130		25.00
69				.428	.130		20.00

1. Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

**Death after Retirement:** The RP-2000 Combined Healthy Annuitant Tables (Male and Female) with age set back 3 years for both genders for healthy annuitants and for dependent beneficiaries. The RP-2000 Combined Disabled Tables (Male and Female) with age set back 7 years for males and set back 3 years for females for disabled annuitants. (A unisex table based on the RP-2000 Combined Healthy Annuitant Tables (Male and Female) with age set back 3 years for both genders assuming the population consists of 25% males and 75% females is used to determine actuarial equivalent

benefits.) No specific additional provision has been made to reflect possible future improvements in mortality.

**Salary Increase:** Effective average of 5.50% per annum, compounded annually (adopted as of June 30, 2011). The components are 3.00% for inflation, 1% for real wage growth and 1.5% for merit or seniority increases. Representative values are as follows:

Age	Annual Rate of Salary Increase
20	10.75%
30	8.25
40	6.25
50	4.25
55	3.75
60	3.75
65	3.75
70	3.75

**Payroll Growth:** 3.50% per annum.

#### **Miscellaneous**

**Option 4 Elections:** 100% of Class T-C and Class T-D members are assumed to elect a refund of contributions and a reduced annuity.

**Withdrawal Annuity:** 90% of members are assumed to commence payment immediately and 10% are assumed to defer payment to superannuation age.

#### **Health Insurance**

**Elections:** 64% of eligible retirees are assumed to elect premium assistance. This decreased from the 65% used in the prior valuation.

**Administrative Expenses:** Assumed equal to 2% of contributions made during the year.

#### **Methods**

**Calculations:** The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system, and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System.

**Asset Valuation Method:** A ten-year moving market average (five-year moving market average prior to June 30, 2010) value of assets that recognizes the 7.50% (8.00% prior to June 30, 2011, 8.25% prior to June 30, 2009, and 8.50% prior to June 30, 2008) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The averaging period is being phased-in from fiscal year 2006.

**Actuarial Cost Method for Pension Funding:** Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The results of each June 30 valuation normally determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. Future increases in the unfunded accrued liability due to legislation will be amortized over a 10-year period, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate at which employer contributions may rise from year to year. For the fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014 the pension contribution rate can be no more than 3%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year in which the actuarially required contribution rate is less than the collared rate, the final contribution rate is the actuarially determined contribution rate, provided that the final contribution rate is not less than the employer normal contribution rate.

**Actuarial Cost Method for GASB 25 and 27 Accounting for Pensions:** Same as for pension funding, except that the GASB 25 amortization payment will be set equal to the level dollar amount that will amortize the unfunded accrued liability over a period of 30 years.

**Actuarial Cost Method for Health Insurance Funding:** The actuarial liability equals the assets in the health insurance account, and the results of the June 30 valuation determine the contribution rate for the second succeeding fiscal year. The rate so determined is the rate necessary to establish reserves sufficient to cover administrative expenses and provide premium assistance payments for all participating eligible annuitants during the third fiscal year that follows the valuation date.

**Actuarial Cost Method for GASB 43 Accounting for Health Insurance:** The actuarial liability is determined under the entry age actuarial cost method, and the Annual Required Contribution for the second fiscal year that follows the valuation date is equal to the entry age normal cost for health insurance plus an amount that will amortize the entry age unfunded actuarial liability for health insurance over a period of 30 years.

## **Data**

**Census and Assets:** The valuation was based on members of the Retirement System as of June 30, 2015 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuaries adjust the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.



## Table 13

### Summary of Benefit and Contribution Provisions

#### Membership

For valuation purposes, all employees are considered to be full coverage. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

#### Benefits

##### Superannuation Annuity

**Eligibility** Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age. For Class T-E and Class T-F members, age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service

**Amount** 2.5% of final average salary times years of school service and intervening military service. 2% of final average salary for non-school service, for members who did not elect Class T-D coverage, and for Class T-E members. Minimum of \$100 per year of service. "Final average salary" means the highest average annual salary for any 3 years of service.

Annual salary is subject to a limit of \$200,000, as adjusted under Section 401(a)(17) of the Internal Revenue Code. As of June 30, 2015, the adjusted limit is \$265,000.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

##### Early Retirement Annuity

**Eligibility** Age 55 with 25 years of service.

**Amount** Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

### **Withdrawal Annuity**

Eligibility	5 years of service. For Class T-E and Class T-F members, ten years of service.
Amount	Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately. Actuarially equivalent benefits are based on 4% interest and a unisex table based on the RP-2000 Combined Healthy Annuitant Tables (Male and Female) with age set back 3 years for both genders assuming the population consists of 25% males and 75% females.

### **Disability Annuity**

Eligibility	5 years of service.
Amount	The standard single life annuity if the total number of years of credited service is greater than 16.667, otherwise the standard single life annuity multiplied by the lesser of the following ratios: $(Y^*/Y)$ or $(16.667/Y)$ where Y is the number of years of credited service and Y* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). Minimum of \$100 per year of service.

### **Return of Contributions**

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

### **Death Benefit**

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity that would have been effective if the member retired on the day before death. Option 1 assumed payable if no other option elected.

## Normal and Optional Forms of Benefits

Normal Form (Maximum):	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than \$5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.
Option 2:	Joint and 100% survivorship annuity.
Option 3:	Joint and 50% survivorship annuity.
Option 4:	Benefit of equivalent actuarial value, including lump sum payment of member contributions. Class T-E and Class T-F members cannot elect to receive a lump sum payment of member contributions.

## Health Care Premium Assistance

Eligibility	Retired members who: (a) have 24½ or more years of service, or (b) are disability annuitants, or (c) have 15 or more years of service and who both terminated school service and retired after attaining superannuation age and (d) participate in the PSERS health options program or in an employer-sponsored health insurance program.
Amount	Participating eligible annuitants receive health insurance premium assistance payments from the Health Insurance Account equal to the lesser of \$100 per month or the actual monthly premium. All administrative expenses necessary to operate the health insurance premium assistance program are to be funded by the Health Insurance Account. The Health Insurance Account is credited with contributions of the Commonwealth and the employers.

## Contributions

By Members	Members who elected coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 6½% of compensation, while members who elected coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 contribute at a rate of 7½% of compensation. Members who did not elect coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 5¼% of compensation, while
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members who did not elect coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 and prior to July 1, 2001 contribute at a rate of 6¼% of compensation. Anyone who enrolls or re-enrolls on or after July 1, 2001 automatically has coverage under class T-D for subsequent school service and subsequent intervening military service, and must contribute at a rate of 7½% of compensation.

The base contribution rate for Class T-E members is 7½% of compensation. The base contribution rate for Class T-F members is 10.3% of compensation. Class T-E and Class T-F members are subject to a "shared-risk" employee contribution rate. Members benefit when investments of the fund are doing well and share some of the risk when investments underperform. The member contribution rate will stay within the specified range allotted for Class T-E or Class T-F members, but could increase or decrease every three years starting July 1, 2015 depending on investment performance. The member contribution rate can never go below the base rate of 7.5% for Class T-E members and 10.3% for Class T-F members, nor above 9.5% for Class T-E members and 12.3% for class T-F members. If the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return based on the prior ten-year period, the member contribution rate will decrease by .5%. Likewise, the member contribution rate will increase by .5% if the investment rate of return (less investment fees) during the ten-year period is 1.0% or more below the assumed rate of return. If the Retirement System is fully funded at the time of the comparison, the member contribution rate reverts back to the base rate for the Class. There shall not be an increase in the member contribution rate if there has not been an equivalent increase in the employer contribution rate over the previous three-year period. Until a full ten-year look back period is available, the investment return measurement period will begin on July 1, 2011.

By Commonwealth and  
School Districts

Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor and premium assistance contribution, is funded by the Commonwealth and the School District.

**Table 14**

**Summary of Membership Data  
as of June 30, 2015  
(\$ Amounts in Thousands)**

**Total Active Members<sup>1</sup>**

Item	Male	Female	Total
Number of Members	71,145	188,723	259,868
Total Annual Salaries <sup>4</sup>	\$ 3,861,003	\$ 8,817,209	\$ 12,678,213
Average Age <sup>5</sup>	44.6	45.0	44.9
Average Service <sup>5</sup>	11.5	11.0	11.1

1. Excludes 137,186 inactive members and vestees.

**Class T-C Members<sup>2</sup>**

Item	Male	Female	Total
Number of Members	970	3,004	3,974
Total Annual Salaries <sup>4</sup>	\$ 56,978	\$ 131,024	\$ 188,002
Average Age <sup>5</sup>	49.5	51.8	51.2
Average Service <sup>5</sup>	19.3	17.3	17.8

2. Excludes 31,160 inactive members and vestees.

**Class T-D Members<sup>3</sup>**

Item	Male	Female	Total
Number of Members	55,879	151,546	207,425
Total Annual Salaries <sup>4</sup>	\$ 3,414,949	\$ 7,789,914	\$ 11,204,863
Average Age <sup>5</sup>	46.2	46.8	46.6
Average Service <sup>5</sup>	13.9	13.1	13.3

3. Excludes 79,382 inactive members and vestees.

4. The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2015 for members who were in active service on June 30, 2015.

5. Average completed years of age and service.

**Table 14**  
(Continued)

**Summary of Membership Data  
as of June 30, 2015**  
(\$ Amounts in Thousands)

**Class T-E Members<sup>1</sup>**

Item	Male	Female	Total
Number of Members	12,131	29,058	41,189
Total Annual Salaries <sup>3</sup>	\$ 309,010	\$ 724,254	\$ 1,033,264
Average Age <sup>4</sup>	38.2	37.0	37.4
Average Service <sup>4</sup>	1.3	1.4	1.3

1. Excludes 25,911 inactive members.

**Class T-F Members<sup>2</sup>**

Item	Male	Female	Total
Number of Members	2,165	5,115	7,280
Total Annual Salaries <sup>3</sup>	\$ 80,066	\$ 172,018	\$ 252,084
Average Age <sup>4</sup>	38.0	35.6	36.3
Average Service <sup>4</sup>	1.7	1.6	1.7

2. Excludes 733 inactive members.

3. The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2015 for members who were in active service on June 30, 2015.

4. Average completed years of age and service.

**Table 14**  
(Continued)

**Summary of Membership Data  
as of June 30, 2015**  
(\$ Amounts in Thousands)

**Total Annuitants and Beneficiaries**

Item	Number	Annual Annuities <sup>1</sup>	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	200,161	\$ 5,210,225	\$ 26,030	70.3
Survivors and Beneficiaries	10,509	137,315	13,066	75.6
Disabled Annuitants	<u>9,105</u>	<u>173,080</u>	19,009	64.0
Total	219,775	\$ 5,520,620	\$ 25,119	70.3

**New Annuitants and Beneficiaries  
Who Retired Between July 1, 2014 and June 30, 2015**

Item	Number <sup>2</sup>	Annual Annuities <sup>1</sup>	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	10,513	\$ 268,305	\$ 25,521	60.5
Survivors and Beneficiaries	2,393	14,675	6,132	65.8
Disabled Annuitants	<u>498</u>	<u>10,854</u>	21,795	54.0
Total	13,404	\$ 293,834	\$ 21,921	61.2

1. The annuities shown in the tables above represent the annual amount payable as of July 1, 2015 for participants who were in payment on June 30, 2015.
2. Excludes 1,447 newly reported annuitants who retired prior to June 30, 2014 and 166 members who retired after June 30, 2014 but died prior to June 30, 2015.

**Exhibit I**

**Active Membership Data as of June 30, 2015  
Number and Average Annual Salary**

Age	Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
<b>Under 25</b>	6,898 \$23,882	52 \$30,348								6,950 \$23,930
<b>25-29</b>	15,569 \$34,751	6,587 \$50,429	45 \$40,568							22,201 \$39,415
<b>30-34</b>	7,940 \$32,434	16,331 \$54,378	6,048 \$62,782	47 \$47,784						30,366 \$50,304
<b>35-39</b>	6,224 \$26,660	7,511 \$51,926	13,648 \$65,914	3,920 \$74,254	20 \$47,217					31,323 \$55,792
<b>40-44</b>	7,142 \$22,158	6,022 \$43,043	6,963 \$62,140	11,305 \$77,099	2,561 \$81,792	59 \$53,338				34,052 \$56,806
<b>45-49</b>	7,379 \$20,063	6,796 \$35,931	6,048 \$51,754	6,403 \$70,636	6,940 \$82,306	2,122 \$79,611	60 \$55,746			35,748 \$53,178
<b>50-54</b>	6,007 \$19,550	6,775 \$31,834	7,161 \$42,192	5,569 \$54,583	3,890 \$70,781	4,936 \$79,414	1,690 \$76,508	73 \$50,537		36,101 \$48,185
<b>55-59</b>	4,556 \$18,724	5,118 \$30,995	6,385 \$40,093	6,619 \$48,794	4,307 \$59,641	3,281 \$71,081	2,869 \$79,387	851 \$76,883	32 \$47,914	34,018 \$47,261
<b>60-64</b>	2,906 \$17,313	2,967 \$29,170	3,451 \$39,179	3,877 \$48,093	3,149 \$55,924	2,402 \$62,018	917 \$68,765	709 \$81,446	231 \$76,932	20,609 \$44,746
<b>Over 64</b>	2,322 \$12,796	1,706 \$21,631	1,381 \$31,777	1,070 \$39,091	793 \$44,551	580 \$48,682	293 \$54,086	165 \$62,093	190 \$78,981	8,500 \$30,234
<b>Total</b>	66,943 \$25,668	59,865 \$43,648	51,130 \$54,059	38,810 \$63,706	21,660 \$70,418	13,380 \$72,832	5,829 \$75,366	1,798 \$76,255	453 \$75,742	259,868 \$48,787



**Exhibit II**

**The Number of Average Annual Annuity  
As of June 30, 2015**

**Retired on Account of Superannuation, Early Retirement and Those  
in Receipt of Withdrawal Annuities**

Age	Years of Service									Total
	0-4	5-9 <sup>1</sup>	10-14	15-19	20-24	25-29	30-34	35-39	40+	
<b>Under 50</b>		4,428	1,418	388	128	33				6,395
		\$870	\$2,585	\$6,621	\$12,745	\$21,333				\$1,943
<b>50-54</b>		1,537	1,078	450	229	165	59	21		3,539
		\$1,223	\$2,582	\$6,390	\$11,704	\$23,457	\$33,551	\$41,089		\$4,784
<b>55-59</b>		1,481	1,558	984	642	996	2,220	1,178	13	9,072
		\$1,663	\$3,151	\$7,465	\$14,519	\$32,193	\$48,998	\$56,449	\$43,770	\$25,562
<b>60-64</b>	134	1,981	3,435	2,770	2,800	3,934	8,629	8,004	397	32,084
	\$2,531	\$3,223	\$5,134	\$11,982	\$21,917	\$34,361	\$47,316	\$59,516	\$64,452	\$36,290
<b>65-69</b>	830	2,851	5,644	4,605	4,823	6,034	13,735	12,134	1,352	52,008
	\$1,640	\$3,801	\$5,372	\$12,014	\$20,734	\$30,432	\$42,527	\$55,679	\$68,708	\$33,342
<b>70-74</b>	1,139	2,055	3,912	3,651	3,507	4,199	10,246	6,534	978	36,221
	\$1,110	\$3,242	\$4,780	\$9,839	\$16,817	\$25,911	\$35,647	\$49,033	\$62,684	\$26,978
<b>75-79</b>	939	1,297	2,740	2,679	2,920	3,315	5,156	4,057	912	24,015
	\$860	\$2,687	\$4,219	\$8,095	\$13,037	\$20,846	\$30,479	\$38,345	\$51,118	\$20,989
<b>80-84</b>	588	987	2,232	2,189	2,468	2,687	3,189	2,272	966	17,578
	\$716	\$2,016	\$3,585	\$6,432	\$11,135	\$17,816	\$26,548	\$36,363	\$42,421	\$17,528
<b>85-89</b>	413	680	1,678	1,730	1,978	1,936	1,693	1,319	611	12,038
	\$691	\$1,756	\$3,287	\$6,318	\$11,063	\$16,840	\$23,337	\$31,005	\$40,300	\$14,739
<b>Over 89</b>	317	447	1,125	1,273	1,187	1,080	750	729	303	7,211
	\$1,312	\$1,676	\$3,422	\$6,346	\$10,255	\$14,801	\$19,190	\$24,451	\$34,209	\$11,626
<b>Total</b>	4,360	17,744	24,820	20,719	20,682	24,379	45,677	36,248	5,532	200,161
	\$1,123	\$2,226	\$4,308	\$9,267	\$16,129	\$25,834	\$38,620	\$50,667	\$54,762	\$26,030

1. Includes 79 annuitant records with no service information provided.

Exhibit III

The Number and Average Annual Annuity  
as of June 30, 2015

Beneficiaries and Survivor Annuitants<sup>1</sup>

Age	Years of Service								Total
	0-9 <sup>2</sup>	10-14	15-19	20-24	25-29	30-34	35-39	40+	
<b>Under 50</b>	190	24	24	21	24	15	10	5	313
	\$9,768	\$2,881	\$3,986	\$4,987	\$8,124	\$13,420	\$15,481	\$15,363	\$6,806
<b>50-54</b>	123	12	9	16	10	7	4	4	185
	\$17,671	\$2,776	\$3,948	\$6,774	\$9,770	\$10,456	\$26,113	\$9,208	\$9,283
<b>55-59</b>	315	30	34	33	23	19	14	13	481
	\$27,075	\$3,822	\$5,571	\$9,080	\$11,006	\$16,479	\$13,691	\$13,971	\$11,472
<b>60-64</b>	595	32	35	46	46	59	42	8	863
	\$28,296	\$7,277	\$5,144	\$6,882	\$14,952	\$15,594	\$19,582	\$12,358	\$16,589
<b>65-69</b>	868	43	39	46	59	139	115	19	1,328
	\$26,855	\$3,012	\$5,237	\$8,850	\$13,963	\$17,828	\$20,477	\$12,467	\$18,563
<b>70-74</b>	765	55	68	61	72	188	157	29	1,395
	\$22,660	\$2,965	\$6,091	\$9,501	\$12,319	\$18,951	\$23,447	\$17,393	\$16,760
<b>75-79</b>	785	95	95	93	82	161	152	65	1,528
	\$16,380	\$3,603	\$5,103	\$7,608	\$12,411	\$15,015	\$19,548	\$21,132	\$13,333
<b>80-84</b>	769	98	112	95	92	189	147	105	1,607
	\$13,989	\$3,069	\$4,708	\$7,472	\$9,852	\$13,217	\$16,341	\$21,619	\$11,746
<b>85-89</b>	647	112	111	126	124	158	182	89	1,549
	\$13,515	\$2,946	\$4,336	\$7,120	\$9,018	\$12,263	\$13,105	\$17,416	\$10,113
<b>Over 89</b>	424	118	94	91	116	132	195	90	1,260
	\$10,473	\$2,496	\$3,874	\$5,234	\$7,572	\$9,327	\$11,703	\$14,928	\$8,482
<b>Total</b>	5,481	619	621	628	648	1,067	1,018	427	10,509
	\$14,633	\$3,247	\$4,793	\$7,336	\$10,594	\$14,651	\$17,043	\$17,968	\$13,066

1. In addition, there are 1,446 beneficiaries who are only entitled to a pending lump sum distribution.

2. Includes 5,354 beneficiary or survivor annuitant records with no service information provided.

**Exhibit IV**

**The Number and Average Annual Annuity  
as of June 30, 2015**

**Retired on Account of Disability**

Age	Years of Service									Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
<b>Under 50</b>		221	191	104	45	9					570
		\$14,577	\$19,553	\$24,059	\$34,286	\$48,661					\$20,069
<b>50-54</b>		224	214	145	114	98	5	1			801
		\$11,285	\$13,431	\$20,256	\$32,042	\$41,535	\$39,183	\$43,514			\$20,352
<b>55-59</b>		321	337	318	234	182	76	1	1		1,470
		\$10,444	\$13,751	\$18,689	\$27,891	\$39,840	\$46,971	\$25,466	\$39,130		\$21,321
<b>60-64</b>		369	466	371	390	352	172	6			2,126
		\$9,030	\$12,876	\$17,194	\$25,625	\$36,789	\$47,230	\$45,176			\$22,130
<b>65-69</b>		302	350	292	305	382	205	4	5		1,845
		\$7,684	\$10,486	\$14,175	\$22,223	\$32,287	\$43,745	\$24,833	\$27,980		\$20,839
<b>70-74</b>		174	230	191	212	160	57	3			1,027
		\$5,874	\$8,343	\$11,227	\$18,986	\$26,508	\$35,492	\$48,105			\$15,111
<b>75-79</b>		101	148	122	118	75	20	2	1		587
		\$5,310	\$7,332	\$9,352	\$14,798	\$21,899	\$29,962	\$42,997	\$10,189		\$11,662
<b>80-84</b>		71	103	92	67	39	6	1	1		380
		\$4,352	\$6,086	\$8,971	\$12,332	\$19,341	\$20,475	\$43,179	\$10,304		\$9,258
<b>85-89</b>		42	75	39	33	25	2	1	1		218
		\$3,626	\$5,614	\$8,428	\$11,754	\$18,771	\$23,880	\$24,751	\$54,601		\$8,653
<b>Over 89</b>		16	20	12	16	10	7				81
		\$4,034	\$6,187	\$6,366	\$10,857	\$17,112	\$17,273				\$9,017
<b>Total</b>		1,841	2,134	1,686	1,534	1,332	550	19	9		9,105
		\$9,147	\$11,757	\$15,668	\$23,242	\$33,274	\$43,220	\$38,822	\$28,236		\$19,009

**Exhibit V**

**Annuitant and Beneficiary Membership Data  
as of June 30, 2015**

**Number and Average Annual Benefit  
Excludes Partial Lump Sum Payments**

Age Last Birthday	Number	Annual Benefit (Thousands)	Average Annual Benefit
<b>Annuitants (Normal, Early and Withdrawal)</b>			
Under 60	19,006	\$ 261,250	\$ 13,746
60 - 64	32,084	1,164,335	36,290
65 - 69	52,008	1,734,065	33,342
70 - 74	36,221	977,163	26,978
75 - 79	24,015	504,043	20,989
Over 79	36,827	569,369	15,461
Total	200,161	\$ 5,210,225	\$ 26,030
<b>Survivors and Beneficiaries</b>			
Under 60	979	\$ 9,366	\$ 9,567
60 - 64	863	14,316	16,589
65 - 69	1,328	24,651	18,563
70 - 74	1,395	23,381	16,760
75 - 79	1,528	20,373	13,333
Over 79	4,416	45,228	10,242
Total	10,509	\$ 137,315	\$ 13,066
<b>Disabled Annuitants</b>			
Under 60	2,841	\$ 59,082	\$ 20,796
60 - 64	2,126	47,049	22,130
65 - 69	1,845	38,448	20,839
70 - 74	1,027	15,519	15,111
75 - 79	587	6,846	11,662
Over 79	679	6,136	9,037
Total	9,105	\$ 173,080	\$ 19,009
<b>Grand Total Average Annual Benefit</b>	219,775	\$ 5,520,620	\$ 25,119

**Exhibit VI**

**10-Year History of Membership Data**

**Active Members**

Valuation as of June 30	Number of Active Members	Percentage Change in Membership	Total Annualized Payroll (Thousands) <sup>1</sup>	Percentage Change in Payroll
2015	259,868	(1.31%)	\$ 12,678,213	0.45%
2014	263,312	(1.54%)	12,620,862	0.35%
2013	267,428	(2.22%)	12,577,105	(1.08%)
2012	273,504	(2.02%)	12,714,371	(1.52%)
2011	279,152	(1.02%)	12,910,043	0.95%
2010	282,041	0.84%	12,788,847	2.11%
2009	279,701	2.57%	12,524,593	5.06%
2008	272,690	3.28%	11,921,469	4.48%
2007	264,023	0.26%	11,410,257	(0.08%)
2006	263,350	3.09%	11,419,049	8.47%

1. The salaries shown represent an annual rate of pay for the year ending June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.

**Exhibit VI  
(Continued)**

**10-Year History of Membership Data**

**The Number and Annual Annuities of  
Annuitant and Survivor Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>1</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2015	219,775	\$ 5,520.6	\$ 25,119	15,017	\$ 297.3	9,142	\$ 91.7	2.75%	3.39%
2014	213,900	5,339.5	24,962	15,225	300.5	8,878	84.9	3.06%	3.74%
2013	207,553	5,147.1	24,800	16,404	377.6	10,866	83.7	2.74%	5.63%
2012	202,015	4,872.9	24,121	14,579	332.7	7,186	66.6	3.80%	4.78%
2011	194,622	4,650.8	23,897	16,228	453.7	6,540	76.4	5.24%	7.17%
2010	184,934	4,339.6	23,466	12,649	372.8	5,678	77.6	3.92%	8.59%
2009	177,963	3,996.3	22,456	9,651	314.9	5,228	74.4	2.55%	4.85%
2008	173,540	3,811.5	21,964	10,911	345.3	5,397	73.9	3.28%	8.18%
2007	168,026	3,523.4	20,969	10,612		4,399		3.84%	7.60%
2006	161,813	3,274.5	20,236	10,637		5,343		3.38%	8.16%

1. The annual annuities added and deleted are for the annuitants and survivor annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**10-Year History of Membership Data**

**The Number and Annual Annuities of  
Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>2</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2015	209,266	\$ 5,383.3	\$ 25,725	12,624	\$ 279.2	7,114	\$ 86.5	2.70%	3.30%
2014	203,756	5,211.4	25,577	12,915	283.9	6,894	80.0		

2. The annual annuities added and deleted are for the annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**Exhibit VII**

**Detailed Tabulations of the Data**

Table 1

The Number and Annual Salaries  
Of Members in Active Service Distributed by Age as of June 30, 2015

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
17	11	\$ 48,276	5	\$ 8,366	16	\$ 56,642
18	42	244,381	30	181,335	72	425,716
19	117	1,061,217	75	601,291	192	1,662,508
20	156	1,767,133	146	1,524,888	302	3,292,021
21	198	2,583,976	202	2,268,279	400	4,852,255
22	327	5,115,339	491	9,558,774	818	14,674,113
23	575	12,913,341	1,508	39,254,781	2,083	52,168,122
24	853	22,806,378	2,214	66,376,315	3,067	89,182,693
25	1,038	31,042,160	2,565	85,669,737	3,603	116,711,897
26	1,041	33,896,739	2,877	106,221,119	3,918	140,117,858
27	1,178	42,344,295	3,223	127,338,212	4,401	169,682,507
28	1,319	53,617,165	3,576	154,833,188	4,895	208,450,353
29	1,482	63,139,396	3,902	176,941,986	5,384	240,081,382
30	1,647	74,315,105	4,159	195,708,858	5,806	270,023,963
31	1,568	77,070,990	4,225	207,062,630	5,793	284,133,620
32	1,643	82,392,929	4,361	219,197,504	6,004	301,590,433
33	1,830	97,226,702	4,491	232,126,941	6,321	329,353,643
34	1,883	102,861,874	4,559	239,555,021	6,442	342,416,895
35	1,913	110,442,058	4,564	243,817,758	6,477	354,259,816
36	1,888	109,704,381	4,480	239,354,227	6,368	349,058,608
37	1,789	109,290,787	4,317	233,135,525	6,106	342,426,312
38	1,891	115,490,387	4,393	239,142,665	6,284	354,633,052
39	1,856	117,447,728	4,232	229,743,269	6,088	347,190,997
40	1,810	115,869,487	4,290	235,101,077	6,100	350,970,564
41	1,815	120,644,569	4,390	234,859,163	6,205	355,503,732
42	1,939	128,242,691	4,654	246,017,631	6,593	374,260,322
43	2,056	136,793,785	5,173	271,032,884	7,229	407,826,669
44	2,194	144,825,325	5,731	300,973,829	7,925	445,799,154
45	1,983	132,637,966	5,672	297,861,687	7,655	430,499,653
46	1,963	128,436,005	5,440	271,244,050	7,403	399,680,055
47	1,801	119,112,707	5,163	251,131,648	6,964	370,244,355
48	1,776	111,445,656	5,164	245,359,173	6,940	356,804,829
49	1,803	113,546,580	4,983	230,229,572	6,786	343,776,152
50	1,724	103,762,847	5,316	237,583,256	7,040	341,346,103
51	1,807	110,077,543	5,426	239,236,490	7,233	349,314,033
52	1,750	102,748,325	5,299	238,167,001	7,049	340,915,326
53	1,766	102,269,976	5,494	246,309,739	7,260	348,579,715
54	1,810	105,311,972	5,709	254,062,468	7,519	359,374,440
55	1,725	98,534,204	5,306	231,220,937	7,031	329,755,141
56	1,724	95,633,851	5,284	238,582,021	7,008	334,215,872



**Table 1  
(Continued)**

**The Number and Annual Salaries  
Of Members in Active Service Distributed by Age as of June 30, 2015**

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
57	1,695	\$ 92,630,389	5,286	\$ 237,313,541	6,981	\$ 329,943,930
58	1,631	90,234,942	5,198	232,494,391	6,829	322,729,333
59	1,498	79,033,356	4,671	212,037,474	6,169	291,070,830
60	1,452	73,527,272	4,345	193,803,926	5,797	267,331,198
61	1,296	63,711,105	3,841	172,299,332	5,137	236,010,437
62	1,029	50,682,513	2,860	124,813,543	3,889	175,496,056
63	932	41,187,608	2,364	98,456,911	3,296	139,644,519
64	707	31,645,234	1,783	72,039,628	2,490	103,684,862
65	547	23,477,177	1,231	46,103,499	1,778	69,580,676
66	465	16,829,508	820	28,279,585	1,285	45,109,093
67	390	13,420,257	689	21,157,574	1,079	34,577,831
68	384	12,432,987	636	18,318,155	1,020	30,751,142
69	219	5,889,795	322	9,063,651	541	14,953,446
70	230	6,052,335	275	6,251,393	505	12,303,728
71	186	4,737,022	269	6,225,528	455	10,962,550
72	181	4,907,893	203	4,522,164	384	9,430,057
73	137	3,317,121	205	3,958,273	342	7,275,394
74	104	2,184,240	150	2,896,472	254	5,080,712
75	89	2,039,497	104	1,884,467	193	3,923,964
76	64	1,377,441	84	1,522,007	148	2,899,448
77	55	1,451,287	79	1,519,286	134	2,970,573
78	45	851,875	59	897,562	104	1,749,437
79	30	648,134	43	610,488	73	1,258,622
80	29	610,649	37	719,699	66	1,330,348
81	20	491,380	32	565,887	52	1,057,267
82	11	267,154	15	256,202	26	523,356
83	8	219,596	14	160,773	22	380,369
84	8	185,160	6	205,834	14	390,994
85	5	75,205	7	143,291	12	218,496
86	6	112,015	1	17,481	7	129,496
87	1	56,758	5	76,139	6	132,897
<b>Total</b>	71,145	\$3,861,003,131	188,723	\$8,817,209,451	259,868	\$12,678,212,582

Table 2

The Number and Annual Salaries  
of Members in Active Service Distributed by  
Years of Credited Service as of June 30, 2015

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
0	4,820	\$ 57,153,557	8,909	\$ 112,326,727	13,729	\$ 169,480,284
1	5,671	137,194,055	14,068	338,527,361	19,739	475,721,416
2	3,784	121,396,719	9,879	288,110,732	13,663	409,507,451
3	2,864	101,704,111	8,049	254,779,100	10,913	356,483,211
4	2,273	87,820,344	6,626	219,293,719	8,899	307,114,063
5	2,820	122,821,798	8,200	300,758,265	11,020	423,580,063
6	2,764	128,758,403	8,689	343,132,548	11,453	471,890,951
7	3,003	146,593,295	9,313	390,077,294	12,316	536,670,589
8	2,980	154,805,377	9,526	418,229,292	12,506	573,034,669
9	3,041	165,596,414	9,529	442,185,236	12,570	607,781,650
10	2,925	169,060,240	8,736	424,190,555	11,661	593,250,795
11	2,749	167,958,290	8,093	409,125,566	10,842	577,083,856
12	2,454	154,338,177	7,247	373,402,534	9,701	527,740,711
13	2,436	156,654,763	7,092	375,014,566	9,528	531,669,329
14	2,357	155,908,457	7,041	378,383,924	9,398	534,292,381
15	2,197	149,632,212	6,753	376,695,730	8,950	526,327,942
16	2,622	189,441,833	6,637	390,456,305	9,259	579,898,138
17	2,219	163,967,756	5,391	327,167,198	7,610	491,134,954
18	2,153	164,867,081	4,937	308,435,196	7,090	473,302,277
19	1,737	133,922,295	4,164	267,851,249	5,901	401,773,544
20	1,460	114,883,213	3,763	247,860,573	5,223	362,743,786
21	1,313	100,595,424	3,349	225,721,639	4,662	326,317,063
22	1,579	125,266,875	3,247	219,487,432	4,826	344,754,307
23	1,081	83,782,345	2,617	179,929,736	3,698	263,712,081
24	875	66,772,457	2,376	160,958,947	3,251	227,731,404
25	915	70,143,709	2,231	155,888,208	3,146	226,031,917
26	935	71,208,438	2,136	147,114,943	3,071	218,323,381
27	828	63,902,834	1,870	133,648,018	2,698	197,550,852
28	746	58,307,479	1,624	117,674,503	2,370	175,981,982
29	655	50,922,270	1,440	105,677,952	2,095	156,600,222
30	540	42,475,657	1,146	85,090,617	1,686	127,566,274
31	470	36,305,758	875	63,504,337	1,345	99,810,095
32	435	33,094,598	657	49,151,516	1,092	82,246,114
33	337	25,543,388	580	43,431,993	917	68,975,381
34	310	23,483,127	479	37,228,019	789	60,711,146
35	216	17,088,592	379	27,844,695	595	44,933,287
36	162	12,386,437	283	20,772,134	445	33,158,571
37	108	9,094,782	230	17,393,944	338	26,488,726
38	80	6,908,548	154	11,085,116	234	17,993,664
39	73	5,827,190	113	8,705,883	186	14,533,073

**Table 2  
(Continued)**

**The Number and Annual Salaries  
of Members in Active Service Distributed by  
Years of Credited Service as of June 30, 2015**

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
40	36	\$ 3,037,804	85	\$ 5,642,976	121	\$ 8,680,780
41	39	3,075,558	68	5,299,615	107	8,375,173
42	26	2,366,911	39	3,152,655	65	5,519,566
43	18	1,447,234	21	1,582,575	39	3,029,809
44	11	944,325	18	1,110,600	29	2,054,925
45	7	649,022	19	1,105,747	26	1,754,769
46	5	389,763	14	851,321	19	1,241,084
47	2	178,205	7	424,608	9	602,813
48	2	173,777	6	503,846	8	677,623
49	4	348,321	4	209,277	8	557,598
50	2	213,961	6	375,193	8	589,154
51	1	102,589			1	102,589
52	2	174,203			2	174,203
53			1	49,591	1	49,591
54	1	111,271	2	207,471	3	318,742
55	1	95,000			1	95,000
56	1	106,889	1	95,000	2	201,889
57			2	110,185	2	110,185
59			1	93,789	1	93,789
63			1	81,700	1	81,700
<b>Total</b>	71,145	\$3,861,003,131	188,723	\$8,817,209,451	259,868	\$12,678,212,582

Table 3

The Number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015

Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
25	2	\$ 821	2	\$ 556	4	\$ 1,377
26	7	3,900	1	152	8	4,052
27	4	1,669	7	2,680	11	4,349
28	4	3,167	10	4,701	14	7,868
29	17	9,452	22	11,717	39	21,169
30	27	22,057	38	19,346	65	41,403
31	25	18,587	45	30,576	70	49,163
32	40	28,207	74	49,455	114	77,662
33	72	63,237	90	63,175	162	126,412
34	54	49,080	102	76,565	156	125,645
35	78	93,442	124	113,827	202	207,269
36	78	92,061	161	154,263	239	246,324
37	103	137,011	158	166,285	261	303,296
38	99	165,374	175	204,039	274	369,413
39	103	156,423	206	235,949	309	392,372
40	95	150,963	223	241,183	318	392,146
41	103	164,010	240	327,943	343	491,953
42	113	256,543	241	372,706	354	629,249
43	123	276,965	251	407,625	374	684,590
44	143	314,165	329	601,267	472	915,432
45	160	450,139	359	628,054	519	1,078,193
46	157	546,030	345	796,544	502	1,342,574
47	135	476,094	341	854,852	476	1,330,946
48	156	490,958	372	1,119,223	528	1,610,181
49	174	763,132	407	1,206,327	581	1,969,459
50	168	714,331	431	1,312,096	599	2,026,427
51	175	955,580	479	1,538,737	654	2,494,317
52	203	1,281,479	499	1,837,222	702	3,118,701
53	211	1,548,207	538	2,346,405	749	3,894,612
54	244	2,248,179	591	3,149,294	835	5,397,473
55	311	4,502,808	684	6,569,399	995	11,072,207
56	367	7,633,474	899	13,868,464	1,266	21,501,938
57	530	14,196,911	1,142	24,942,389	1,672	39,139,300
58	684	22,695,259	1,637	44,851,853	2,321	67,547,112
59	799	30,089,813	2,019	62,546,053	2,818	92,635,866
60	1,002	39,173,369	2,561	86,673,262	3,563	125,846,631
61	1,229	48,505,637	3,214	113,331,827	4,443	161,837,464
62	1,712	70,908,150	4,585	162,646,509	6,297	233,554,659

**Table 3  
(Continued)**

**The Number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
63	2,188	\$87,994,643	6,071	\$212,953,466	8,259	\$300,948,109
64	2,677	107,180,921	6,845	234,966,889	9,522	342,147,810
65	2,805	113,208,844	6,931	234,998,436	9,736	348,207,280
66	3,231	128,128,873	7,015	227,204,814	10,246	355,333,687
67	3,509	133,693,941	7,042	220,977,478	10,551	354,671,419
68	4,147	151,043,406	7,626	227,109,086	11,773	378,152,492
69	3,597	126,295,641	6,105	171,404,207	9,702	297,699,848
70	2,941	98,382,495	4,817	131,026,639	7,758	229,409,134
71	2,778	89,236,327	4,613	117,388,599	7,391	206,624,926
72	2,928	91,835,428	4,750	112,838,984	7,678	204,674,412
73	2,843	88,127,898	4,389	99,240,396	7,232	187,368,294
74	2,249	63,922,366	3,913	85,163,371	6,162	149,085,737
75	1,954	54,720,436	3,449	70,181,033	5,403	124,901,469
76	1,787	45,342,472	3,263	62,041,615	5,050	107,384,087
77	1,695	42,869,214	3,134	57,478,577	4,829	100,347,791
78	1,619	40,274,276	2,851	48,560,577	4,470	88,834,853
79	1,528	37,547,849	2,735	45,026,975	4,263	82,574,824
80	1,407	32,470,026	2,575	38,669,636	3,982	71,139,662
81	1,263	28,639,498	2,305	34,109,617	3,568	62,749,115
82	1,216	27,375,329	2,179	31,086,283	3,395	58,461,612
83	1,187	26,839,224	2,198	31,469,865	3,385	58,309,089
84	1,051	25,061,650	2,197	32,380,604	3,248	57,442,254
85	950	19,947,195	1,975	27,394,559	2,925	47,341,754
86	789	15,770,981	1,812	23,035,154	2,601	38,806,135
87	652	13,075,871	1,776	22,049,826	2,428	35,125,697
88	614	11,308,157	1,570	19,243,328	2,184	30,551,485
89	516	9,439,199	1,384	16,169,046	1,900	25,608,245
90	428	7,842,631	1,109	11,630,877	1,537	19,473,508
91	336	5,890,411	998	10,980,857	1,334	16,871,268
92	229	3,519,804	771	7,638,704	1,000	11,158,508
93	180	2,825,323	684	6,590,191	864	9,415,514
94	119	1,990,774	549	5,406,438	668	7,397,212
95	87	1,389,062	448	4,310,175	535	5,699,237
96	42	603,779	309	3,070,060	351	3,673,839
97	45	527,116	262	2,861,578	307	3,388,694
98	22	313,374	193	1,859,922	215	2,173,296
99	20	191,931	124	1,253,405	144	1,445,336
100	10	157,687	79	906,015	89	1,063,702
101	7	149,032	60	659,911	67	808,943
102	4	61,938	38	426,662	42	488,600

**Table 3  
(Continued)**

**The Number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
103	5	\$ 43,999	20	\$ 283,845	25	\$ 327,844
104	3	25,418	11	132,281	14	157,699
105	1	32,473	7	78,122	8	110,595
106			6	113,299	6	113,299
107			2	20,744	2	20,744
108			1	25,679	1	25,679
109			1	4,596	1	4,596
112			1	16,204	1	16,204
<b>Total</b>	65,366	\$ 1,984,483,596	134,795	\$ 3,225,741,145	200,161	\$ 5,210,224,741

**Table 3  
(Continued)**

**The number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

<u>OPTION</u>	<u>MALE</u>		<u>FEMALE</u>	
Maximum	30,335	\$ 931,741,654	78,047	\$ 1,844,924,856
1	9,952	233,125,846	29,069	\$ 558,493,998
2	15,353	443,052,158	16,216	\$ 433,722,797
3	8,280	309,395,754	10,632	\$ 354,020,584
4	<u>1,446</u>	<u>67,168,184</u>	<u>831</u>	<u>34,578,910</u>
	65,366	\$ 1,984,483,596	134,795	\$ 3,225,741,145

**DEFINITIONS OF OPTIONS**

Option 1 A life annuity to the member with a guaranteed payment to the beneficiary equal to the present value of the total maximum single life annuity less any amounts paid to the member prior to death.

Option 2 A joint and one hundred percent (100%) survivor annuity payable during the lifetime of the member with the full amount of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.

Option 3 A joint and fifty percent (50%) survivor annuity payable during the lifetime of the member with one-half of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.

Option 4 A life annuity to the member with a special death benefit other than the normal option 1, 2, or 3 death benefit.

Note: The Option 4 totals above only reflect annuity elections that differ from the Maximum annuity or Options 1, 2 or 3. The Option 4 totals do not reflect Option 4 lump sum elections.

Table 4

The Number and Annual Annuities  
of Beneficiaries and Survivor Annuitants  
as of June 30, 2015

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
5	1	\$ 1,534			1	\$ 1,534
9			1	\$ 1,534	1	1,534
14	2	4,036			2	4,036
15	1	1,898	1	591	2	2,489
16			2	4,388	2	4,388
17	2	11,957	1	9,605	3	21,562
18	2	3,275			2	3,275
20			2	4,814	2	4,814
21	1	2,775			1	2,775
22			2	9,620	2	9,620
23			2	2,855	2	2,855
24	3	19,923	3	19,187	6	39,110
25			3	6,719	3	6,719
26	4	14,871	2	13,428	6	28,299
27	1	4,049	1	3,484	2	7,533
28	5	54,607	3	25,735	8	80,342
29	1	2,483	1	483	2	2,966
30	1	21,281	7	87,104	8	108,385
31	4	22,008	3	20,253	7	42,261
32	1	2,659	2	23,562	3	26,221
33	6	79,892	3	23,371	9	103,263
34	5	29,161	3	10,745	8	39,906
35	7	35,952	2	9,340	9	45,292
36	3	3,031	7	62,203	10	65,234
37	10	99,090	4	21,169	14	120,259
38	6	19,805	3	11,418	9	31,223
39	2	8,515	6	43,027	8	51,542
40	7	102,070	4	33,231	11	135,301
41	7	27,200	8	61,975	15	89,175
42	6	23,376	8	27,804	14	51,180
43	4	32,131	4	27,886	8	60,017
44	1	2,554	13	81,047	14	83,601
45	7	39,932	6	32,691	13	72,623



**Table 4  
(Continued)**

**The Number and Annual Annuities  
of Beneficiaries and Survivor Annuitants  
as of June 30, 2015**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
46	6	\$ 26,966	15	\$ 162,518	21	\$ 189,484
47	11	52,544	14	81,961	25	134,505
48	10	48,585	22	193,945	32	242,530
49	9	64,210	19	150,230	28	214,440
50	8	91,456	20	247,450	28	338,906
51	11	50,278	33	264,459	44	314,737
52	9	99,436	21	169,828	30	269,264
53	8	95,387	23	203,035	31	298,422
54	14	105,551	38	390,420	52	495,971
55	14	115,585	54	591,336	68	706,921
56	16	120,041	70	597,624	86	717,665
57	19	184,611	83	1,040,980	102	1,225,591
58	23	158,810	84	1,026,699	107	1,185,509
59	32	362,227	86	1,320,178	118	1,682,405
60	25	410,623	113	1,699,147	138	2,109,770
61	28	401,343	112	1,747,489	140	2,148,832
62	45	603,207	141	2,272,503	186	2,875,710
63	57	1,186,077	125	2,121,630	182	3,307,707
64	61	1,066,194	156	2,807,988	217	3,874,182
65	57	962,779	146	2,714,045	203	3,676,824
66	67	1,482,874	185	3,486,555	252	4,969,429
67	76	1,676,123	206	3,903,051	282	5,579,174
68	77	1,484,125	241	4,289,420	318	5,773,545
69	74	1,221,925	199	3,430,324	273	4,652,249
70	59	1,161,293	198	3,399,201	257	4,560,494
71	68	1,381,715	173	2,980,027	241	4,361,742
72	81	1,266,227	211	3,390,497	292	4,656,724
73	78	1,469,221	229	3,716,060	307	5,185,281
74	65	1,101,442	233	3,515,143	298	4,616,585
75	48	758,403	257	3,514,220	305	4,272,623
76	50	720,079	224	3,316,321	274	4,036,400
77	48	804,298	271	3,428,662	319	4,232,960
78	63	684,120	238	2,982,128	301	3,666,248

**Table 4  
(Continued)**

**The Number and Annual Annuities  
of Beneficiaries and Survivor Annuitants  
as of June 30, 2015**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
79	55	\$ 782,341	274	\$ 3,382,497	329	\$ 4,164,838
80	58	626,859	264	3,282,956	322	3,909,815
81	52	726,587	262	3,161,832	314	3,888,419
82	40	469,627	257	3,062,344	297	3,531,971
83	50	486,433	250	2,949,234	300	3,435,667
84	58	646,263	316	3,463,460	374	4,109,723
85	58	659,222	291	3,075,180	349	3,734,402
86	43	463,285	266	3,071,492	309	3,534,777
87	37	372,647	279	2,646,372	316	3,019,019
88	43	425,331	258	2,487,597	301	2,912,928
89	46	391,745	228	2,072,601	274	2,464,346
90	43	465,181	206	1,972,308	249	2,437,489
91	41	398,843	200	1,589,953	241	1,988,796
92	34	289,969	152	1,253,607	186	1,543,576
93	21	155,092	122	1,104,140	143	1,259,232
94	24	219,193	99	883,407	123	1,102,600
95	13	124,512	85	689,692	98	814,204
96	12	73,788	46	326,467	58	400,255
97	5	35,652	51	407,479	56	443,131
98	3	13,091	39	262,470	42	275,561
99	4	21,595	15	98,703	19	120,298
100	3	19,410	11	86,436	14	105,846
101	1	11,358	9	35,096	10	46,454
102			9	60,940	9	60,940
103			3	40,908	3	40,908
104			4	42,281	4	42,281
105			2	1,693	2	1,693
106			1	1,838	1	1,838
113	1	1,200			1	1,200
114			1	591	1	591
<b>Total</b>	2,162	\$ 29,967,044	8,347	\$ 107,347,917	10,509	\$ 137,314,961

Table 5

The Number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015

Retired on Account of Disability

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
29			1	\$ 5,595	1	\$ 5,595
30	1	\$ 13,798			1	13,798
31			1	27,819	1	27,819
32			3	60,921	3	60,921
33	5	69,882	1	22,510	6	92,392
34	1	25,422	4	80,017	5	105,439
35	3	51,089	1	21,967	4	73,056
36	2	31,536	5	99,920	7	131,456
37	2	46,832	10	205,188	12	252,020
38	2	49,815	16	352,635	18	402,450
39	6	122,845	17	287,960	23	410,805
40	3	47,808	15	327,640	18	375,448
41	5	78,635	24	416,436	29	495,071
42	11	222,431	25	435,556	36	657,987
43	6	93,706	23	419,462	29	513,168
44	6	137,443	32	662,852	38	800,295
45	20	519,702	35	729,313	55	1,249,015
46	14	277,428	55	934,061	69	1,211,489
47	24	475,659	38	731,403	62	1,207,062
48	22	594,673	51	1,046,365	73	1,641,038
49	29	497,214	51	1,215,563	80	1,712,777
50	27	544,773	78	1,541,513	105	2,086,286
51	42	1,075,646	116	2,278,819	158	3,354,465
52	47	937,069	120	2,388,531	167	3,325,600
53	56	1,279,156	120	2,284,116	176	3,563,272
54	48	1,130,297	147	2,841,848	195	3,972,145
55	52	1,442,350	169	3,327,608	221	4,769,958
56	102	2,299,737	172	3,579,935	274	5,879,672
57	89	1,925,622	210	4,597,962	299	6,523,584
58	98	2,346,289	207	4,117,635	305	6,463,924
59	115	2,417,908	256	5,286,202	371	7,704,110
60	121	2,728,040	278	6,008,640	399	8,736,680
61	121	2,725,632	305	6,473,515	426	9,199,147
62	148	3,208,289	311	6,310,137	459	9,518,426
63	132	3,248,716	301	6,820,125	433	10,068,841
64	120	2,926,059	289	6,600,263	409	9,526,322

**Table 5  
(Continued)**

**The Number and Annual Annuities  
of Annuitants on the Retired List  
as of June 30, 2015**

**Retired on Account of Disability**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
65	104	\$ 2,184,477	274	\$ 6,148,103	378	\$ 8,332,580
66	145	3,399,354	275	5,819,143	420	9,218,497
67	106	2,421,779	250	5,146,274	356	7,568,053
68	114	2,666,787	264	5,017,276	378	7,684,063
69	98	1,903,090	215	3,741,983	313	5,645,073
70	67	1,420,777	158	2,539,552	225	3,960,329
71	63	1,200,042	129	2,082,156	192	3,282,198
72	77	1,191,698	155	2,139,428	232	3,331,126
73	51	718,838	166	2,292,396	217	3,011,234
74	36	459,196	125	1,474,846	161	1,934,042
75	40	593,970	112	1,224,212	152	1,818,182
76	37	535,675	79	920,363	116	1,456,038
77	43	494,273	85	854,361	128	1,348,634
78	31	364,889	77	936,474	108	1,301,363
79	26	295,593	57	626,564	83	922,157
80	22	258,680	77	637,490	99	896,170
81	18	187,116	68	675,305	86	862,421
82	26	295,595	48	381,997	74	677,592
83	10	88,746	56	545,016	66	633,762
84	14	143,131	41	305,043	55	448,174
85	8	88,581	40	288,478	48	377,059
86	12	163,602	37	284,278	49	447,880
87	9	100,225	45	336,413	54	436,638
88	10	166,448	19	109,831	29	276,279
89	10	88,669	28	259,776	38	348,445
90	6	81,044	15	116,308	21	197,352
91	2	11,890	12	95,116	14	107,006
92	1	13,438	12	121,875	13	135,313
93			11	113,866	11	113,866
94			2	8,294	2	8,294
95	1	4,614	4	37,520	5	42,134
96			2	6,090	2	6,090
97			4	43,925	4	43,925
98			3	31,656	3	31,656
99	1	7,175	2	17,743	3	24,918
100			1	7,505	1	7,505
102			2	12,351	2	12,351
<b>Total</b>	2,668	\$ 55,140,893	6,437	\$ 117,939,039	9,105	\$ 173,079,932

## Exhibit VIII

### Glossary

<b>Accrued Liability</b>	The difference between (a) the present value of future plan benefits, and (b) the present value of future normal cost. It is the portion of the present value of future plan benefits attributable to service accrued as of the valuation date. Sometimes referred to as “actuarial accrued liability.”
<b>Accrued Service</b>	The service credited under the plan that was rendered before the date of the actuarial valuation.
<b>Actuarial Assumptions</b>	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.
<b>Actuarial Cost Method</b>	A mathematical budgeting procedure for allocating the dollar amount of the “present value of future plan benefits” between the present value of future normal cost and the accrued liability. Sometimes referred to as the “actuarial funding method.”
<b>Actuarial Equivalent</b>	A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.
<b>Actuarial Value of Assets</b>	The value of current plan assets recognized for valuation purposes. Based on a smoothed market value that recognizes investment gains and losses over a period of ten years.
<b>Amortization</b>	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.
<b>Experience Gain (Loss)</b>	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.
<b>Normal Cost</b>	The annual cost assumed, under the actuarial funding method, for current and subsequent plan years. Sometimes referred to as “current service cost.”
<b>Present Value</b>	The amount of funds presently required to provide a payment or series of payments in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
<b>Unfunded Accrued Liability</b>	The difference between the actuarial accrued liability and valuation assets.