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PSRS/PEERS has witnessed a growth and evolution of our membership as the needs of the Missouri's public system have changed over time. PSRS/PEERS' commitment to provide all members prompt, courteous and accurate service has remained unchanged.

Since  
1946

## Actuarial Section

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## Certification of Actuarial Results



November 10, 2016

Board of Trustees  
Public School Retirement System of Missouri  
Public Education Employee Retirement System of Missouri 3210 West Truman Boulevard  
Jefferson City, MO 65109

### Re: Certification of Actuarial Results as of June 30, 2016

Dear Members of the Board:

At your request, we have performed actuarial valuations of the Public School Retirement System (“PSRS”) and the Public Education Employee Retirement System (“PEERS”) of Missouri as of June 30, 2016. An actuarial valuation of each System is performed annually for purposes of preparing the required accounting information under Governmental Accounting Standards and for purposes of the Actuarial Determined Contribution under the Plan’s funding policy. Our reports have been prepared pursuant to an engagement letter between PSRS and PEERS of Missouri and PwC, and is intended solely for the use and benefits of PSRS and PEERS of Missouri and not for reliance by any other person.

The actuarial valuation is based upon:

- a. Benefit Provisions – Our understanding of the benefit provisions in effect on the valuation date under Missouri Revised Statutes Chapter 169.
- b. Data Relative to the Members of the Systems - Data for all members of each System as of June 30, 2016 was provided by the PSRS and PEERS staff (“staff”). PwC relied on the data provided. The data was tested for reasonableness but was used unaudited.
- c. Assets of the Fund - The values of the trust fund assets as of the valuation date for each System are provided by the staff. An actuarial value of assets, with investment gains and losses relative to the assumed return recognized over five years, is used in the development of the contribution rates.
- d. Actuarial Cost Method - The actuarial cost method utilized by each System for accounting purposes is the Entry Age Normal, Level Percent method, as required by GASB Statement No. 67. The system has elected to use the same cost method in the determination of the contribution rates for pre-funding the benefits. The objective of this method is to allocate the cost of benefits as a level percentage of pay over the entire career of each member. On a funding basis, any Unfunded Actuarial Accrued Liability (“UAAL”) is separately financed as a level percentage of payroll over a fixed 30-year period, where a new 30-year amortization base is established for the gain or loss that occurred during the year prior to the valuation date.
- e. Actuarial Assumptions - The actuarial assumptions used for the June 30, 2016 valuations were based on an experience study that was completed for each System in June 2016. Based on those studies, the Board adopted all assumptions required for the valuations.

For accounting purposes, the actuarial assumptions and methods used in this valuation were selected and approved by the Board and are in accordance with our understanding of GASB Statement No. 67.

For funding purposes, the actuarial assumption and methods were selected and approved by the Board and are consistent with the funding policy adopted by the Board as summarized below. In general, the methods provide orderly funding of all benefits being accrued, as well as funding of any Unfunded Actuarial Accrued Liability over a period of thirty years. The smoothing method employed in determining the Actuarial Value of Assets may accelerate or lengthen the effective funding period, depending on whether gains or losses are experienced. In our opinion, the actuarial assumptions and methods are reasonable for purposes of the actuarial valuations and meet the parameters set by the Actuarial Standards of Practice.

In order to establish long-term, consistent methods for pre-funding the benefits of each System, the Board of Trustees has adopted a funding policy. The objective is to achieve a funded ratio of 100% over a closed 30-year period. For this purpose, the funded ratio is defined as the Actuarial Value of Assets divided by the Actuarial Accrued Liability determined under the Entry Age Normal Level Percent cost method and the actuarial assumptions adopted by the Board.

*PricewaterhouseCoopers LLP, One North Wacker Drive Chicago, IL, 60606 T: (312)298 2000, F: (312) 298 2001, www.pwc.com/us*

## Certification of Actuarial Results, continued

Principles of the funding policy include:

1. Maintain adequate assets so that current plan assets plus future contributions and investment earnings should be sufficient to fund all benefits expected to be paid to members and their beneficiaries.
2. Maintain stability of contribution rates, consistent with other funding objectives.
3. Maintain public policy goals of accountability and transparency. Each policy element is clear in intent and effect, and each should allow an assessment of whether, how and when the funding requirements of the plan will be met.
4. Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring those costs to future members and employers.
5. Provide a reasonable margin for adverse experience to help offset risks.
6. Review the investment earning assumption in conjunction with the periodic asset / liability study and in consideration of the Board's risk profile.
7. Review demographic and economic assumptions in conjunction with the periodic experience study performed by an actuary.
8. Continue progress of systematic reduction of the Unfunded Actuarial Accrued Liabilities (UAAL) while keeping the member and employer contribution rates at or near 14.5% of pay for PSRS and 6.86% of pay for PEERS, the contribution rates paid during 2010-2011.

The actuarially determined contribution rates developed from the June 30, 2016 valuations reflect these principles.

Trend data in the Financial Section and the following schedules and other data in this Actuarial Section are prepared by the staff with our guidance.

- Schedules of Funding Progress
- Required Contribution Rate and Amortization of Unfunded Liability
- Reconciliation of Unfunded Actuarial Accrued Liability
- Solvency Test
- Schedules of Active Member Valuation Data

Subject to reliance on the data provided, all estimates are based on information available as of a point in time and are subject to ongoing unforeseen and random events. As such, any reported results must be viewed as having a likely range of variability from the estimate, both up and down. Differences between our estimates and actual results depend on the extent to which future experience conforms to the assumptions made for this analysis. It is certain that actual experience will not conform exactly to the assumptions used in this analysis. Although estimated amounts have not been rounded, no inference should be made regarding the precision of such results

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

To the best of our knowledge, our actuarial reports are complete and accurate and have been prepared in accordance with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Our calculations also reflect our understanding of the requirements of Missouri state law. The undersigned actuaries are members of the Society of Actuaries and other professional organizations, including the American Academy of Actuaries, and meet the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States relating to pension plans. There is no relationship between the PwC practitioners involved in this engagement and PSRS and PEERS of Missouri that may impair our objectivity.

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Plans administered by PSRS and PEERS of Missouri as of June 30, 2016 based on the underlying census data, asset information and selected assumptions and methods.

Sincerely,



Cindy Fraterrigo, FSA, EA, MAAA Principal



Brandon Robertson, ASA, EA, MAAA Director

Schedule of Funding Progress						
Public School Retirement System of Missouri <i>(Dollar amounts in thousands)</i>						
Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)-Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
6/30/07	\$ 27,049,004	\$ 32,396,723 <sup>2</sup>	\$ 5,347,719	83.5%	\$ 3,980,698	134.3%
6/30/08	28,751,241	34,490,452 <sup>1</sup>	5,739,211	83.4%	4,209,417	136.3%
6/30/09	28,826,075	36,060,121 <sup>1</sup>	7,234,046	79.9%	4,439,381	163.0%
6/30/10	28,931,331	37,233,602 <sup>1</sup>	8,302,271	77.7%	4,493,865	184.7%
6/30/11	29,387,486	34,383,430 <sup>3</sup>	4,995,944	85.5%	4,338,976	115.1%
6/30/12	29,013,002	35,588,030 <sup>1</sup>	6,575,028	81.5%	4,379,060	150.1%
6/30/13	29,443,147	36,758,165 <sup>2</sup>	7,315,018	80.1%	4,460,872	164.0%
6/30/14	31,846,599	38,483,184 <sup>1</sup>	6,636,585	82.8%	4,425,568	150.0%
6/30/15	34,073,415	40,610,540 <sup>1</sup>	6,537,125	83.9%	4,508,242	145.0%
6/30/16	35,419,278	41,744,619 <sup>3</sup>	6,325,341	84.8%	4,556,137	138.8%

<sup>1</sup> There were no legislative changes in fiscal years 2008, 2009, 2010, 2012, 2014 and 2015.

<sup>2</sup> The extension of the 25-and-out and 2.55% provisions to 2014 are included in the AAL for 2013.

<sup>3</sup> There were no legislative changes in fiscal years 2011 and 2016, however actuarial assumptions were revised.

Schedule of Funding Progress						
Public Education Employee Retirement System of Missouri <i>(Dollar amounts in thousands)</i>						
Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)-Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
6/30/07	\$ 2,481,562	\$ 2,982,812 <sup>1</sup>	\$ 501,250	83.2%	\$ 1,275,199	39.3%
6/30/08	2,703,762	3,278,602 <sup>1</sup>	574,840	82.5%	1,377,506	41.7%
6/30/09	2,792,182	3,458,044 <sup>1</sup>	665,862	80.7%	1,417,485	47.0%
6/30/10	2,892,411	3,658,713 <sup>1</sup>	766,302	79.1%	1,433,691	53.4%
6/30/11	3,028,757	3,549,348 <sup>3</sup>	520,591	85.3%	1,414,442	36.8%
6/30/12	3,090,880	3,746,347 <sup>1</sup>	655,467	82.5%	1,437,310	45.6%
6/30/13	3,237,200	3,967,619 <sup>2</sup>	730,419	81.6%	1,470,830	49.7%
6/30/14	3,584,719	4,211,489 <sup>1</sup>	626,770	85.1%	1,442,701	43.4%
6/30/15	3,915,199	4,512,317 <sup>1</sup>	597,118	86.8%	1,469,772	40.6%
6/30/16	4,157,427	4,809,666 <sup>3</sup>	652,239	86.4%	1,519,081	42.9%

<sup>1</sup> There were no legislative changes in fiscal years 2008, 2009, 2010, 2012, 2014 and 2015.

<sup>2</sup> The extension of the 25-and-out provision is included in the AAL for 2013.

<sup>3</sup> There were no legislative changes in fiscal years 2011 and 2016, however actuarial assumptions were revised.

**Required Contribution Rate & Amortization of Unfunded Liability**

**Public School Retirement System of Missouri**

*For the fiscal year ended June 30, 2016*

	<u>Percentage of Payroll</u>
(1) Normal cost rate	16.25%
(2) Rate needed to fund UAAL	<u>9.34%</u>
(3) Benchmark contribution rate - normal cost plus a rate to fund the UAAL over 24.6 years	25.59%
(4) Additional amount towards funding UAAL	<u>3.41%</u>
(5) Recommended rate for FY 2018	<u><u>29.00%</u></u>

**Required Contribution Rate & Amortization of Unfunded Liability**

**Public Education Employee Retirement System of Missouri**

*For the fiscal year ended June 30, 2016*

	<u>Percentage of Payroll</u>
(1) Normal cost rate	9.94%
(2) Rate needed to fund UAAL	<u>2.74%</u>
(3) Benchmark contribution rate - normal cost plus a rate to fund the UAAL over 24.9 years	12.68%
(4) Additional amount towards funding UAAL	<u>1.04%</u>
(5) Recommended rate for FY 2018	<u><u>13.72%</u></u>

## Reconciliation of Unfunded Actuarial Accrued Liability

**Public School Retirement System of Missouri***As of June 30, 2016*

(1) Unfunded actuarial liability as of July 1, 2015		\$ 6,537,124,386
(2) Changes in Unfunded Actuarial Accrued Liability		
a. Impact of Plan Changes	-	
b. Actuarial (Gains)/Losses		
i. From investment	283,283,229	
ii. From actuarial liabilities due to assumption changes	100,247,551	
iii. From actuarial liabilities due to actual vs. expected COLA	(446,690,829)	
iv. From actuarial liabilities due to actual vs. expected salary changes	(247,337,615)	
v. From actuarial liabilities due to other demographic experience	<u>16,814,811</u>	
vi. Total Unfunded Actuarial Accrued Liability (Gain)/Loss		<u>(293,682,853)</u>
c. Total New Amortization Bases: (2)(a) + (2)(b)(vi)		(293,682,853)
d. Net Change in Existing Bases Due to Prior Year Contributions, Net of Interest		<u>81,899,850</u>
e. Total changes in Unfunded Actuarial Accrued Liability		<u>(211,783,003)</u>
(3) Unfunded Actuarial Accrued Liability as of June 30, 2016		<u>\$ 6,325,341,383</u>

## Reconciliation of Unfunded Actuarial Accrued Liability

**Public Education Employee Retirement System of Missouri***As of June 30, 2016*

(1) Unfunded actuarial liability as of July 1, 2015		\$ 597,117,866
(2) Changes in Unfunded Actuarial Accrued Liability		
a. Impact of Plan Changes	-	
b. Actuarial (Gains)/Losses		
i. From investment	40,418,536	
ii. From actuarial liabilities due to assumption changes	65,420,724	
iii. From actuarial liabilities due to actual vs. expected COLA	(30,366,429)	
iv. From actuarial liabilities due to actual vs. expected salary changes	(28,082,246)	
v. From actuarial liabilities due to other demographic experience	<u>(498,993)</u>	
vi. Total Unfunded Actuarial Accrued Liability (Gain)/Loss		<u>46,891,592</u>
c. Total New Amortization Bases: (2)(a) + (2)(b)(vi)		46,891,592
d. Net Change in Existing Bases Due to Prior Year Contributions, Net of Interest		<u>8,229,954</u>
e. Total changes in Unfunded Actuarial Accrued Liability		<u>55,121,546</u>
(3) Unfunded Actuarial Accrued Liability as of June 30, 2016		<u>\$ 652,239,412</u>

**Schedule of Active Member Valuation Data**
**Public School Retirement System of Missouri**

Actuarial Valuation Date	Number of Employers	Number of Members	Covered Annual Payroll (000's)	Average Annual Salary	% Increase in Average Salary	Average Attained Age	Average Years of Service
6/30/07	543	77,121	3,980,698	51,616	3.3%	42.3	11.1
6/30/08	542	78,436	4,209,417	53,667	4.0%	42.2	11.1
6/30/09	540	79,335	4,439,381	55,957	4.3%	42.2	11.1
6/30/10	538	79,256	4,493,865	56,701	1.3%	42.3	11.3
6/30/11	537	77,708	4,338,976	55,837	-1.5%	42.3	11.5
6/30/12	537	77,529	4,379,060	56,483	1.2%	42.2	11.4
6/30/13	535	78,076	4,460,872	57,135	1.2%	42.1	11.4
6/30/14	535	75,168	4,425,568	58,876	3.0%	42.2	11.8
6/30/15	535	78,138	4,508,242	58,582	-0.5%	42.0	11.5
6/30/16	534	78,129	4,556,137	59,005	0.7%	42.0	11.6

**Schedule of Active Member Valuation Data**
**Public Education Employee Retirement System of Missouri**

Actuarial Valuation Date	Number of Employers	Number of Members	Covered Annual Payroll (000's)	Average Annual Salary	% Increase in Average Salary	Average Attained Age	Average Years of Service
6/30/07	536	49,281	1,275,199	25,876	4.7%	46.6	7.2
6/30/08	536	50,865	1,377,506	27,082	4.7%	46.8	7.3
6/30/09	535	51,234	1,417,485	27,667	2.2%	47.1	7.7
6/30/10	535	50,363	1,433,691	28,467	2.9%	47.5	8.0
6/30/11	534	48,800	1,414,442	28,984	1.8%	47.9	8.3
6/30/12	534	48,605	1,437,310	29,571	2.0%	48.1	8.4
6/30/13	532	48,709	1,470,830	30,196	2.1%	48.1	8.5
6/30/14	532	45,589	1,442,701	31,646	4.8%	48.6	8.9
6/30/15	532	46,864	1,469,772	32,220	1.8%	48.4	8.6
6/30/16	530	47,851	1,519,081	32,887	2.1%	48.3	8.6



Solvency Test							
Public School Retirement System of Missouri <i>(Dollar amounts in thousands)</i>							
Actuarial Accrued Liability for:							
Actuarial Valuation Date	Member Contributions	Current Retirees & Beneficiaries	Active & Inactive Members Employer Financed Portion	Actuarial Value of Assets	Percentage of Actuarial Liabilities Covered by Actuarial Value of Assets for:		
					(1)	(2)	(3)
6/30/2007	\$ 5,787,667	\$ 17,059,613	\$ 9,549,443	\$ 27,049,004	100.0%	100.0%	44.0%
6/30/2008	6,174,718	18,548,552	9,767,182	28,751,241	100.0%	100.0%	41.2%
6/30/2009	6,299,067	19,745,129	10,015,925	28,826,075	100.0%	100.0%	27.8%
6/30/2010	6,506,803	20,532,011	10,194,788	28,931,331	100.0%	100.0%	18.6%
6/30/2011	6,571,916	20,023,701	7,787,813	29,387,486	100.0%	100.0%	35.8%
6/30/2012	6,687,358	21,191,032	7,709,641	29,013,002	100.0%	100.0%	14.7%
6/30/2013	6,856,920	22,328,795	7,572,451	29,443,147	100.0%	100.0%	3.4%
6/30/2014	6,985,665	23,579,998	7,917,522	31,846,599	100.0%	100.0%	16.2%
6/30/2015	6,787,038	24,674,171	9,149,331	34,073,415	100.0%	100.0%	28.6%
6/30/2016	6,994,370	25,895,012	8,855,237	35,419,278	100.0%	100.0%	28.6%

Solvency Test							
Public Education Employee Retirement System of Missouri <i>(Dollar amounts in thousands)</i>							
Actuarial Accrued Liability for:							
Actuarial Valuation Date	Member Contributions	Current Retirees & Beneficiaries	Active & Inactive Members Employer Financed Portion	Actuarial Value of Assets	Percentage of Actuarial Liabilities Covered by Net Assets for:		
					(1)	(2)	(3)
6/30/2007	\$ 580,853	\$ 1,093,650	\$ 1,308,310	\$ 2,481,562	100.0%	100.0%	61.7%
6/30/2008	650,970	1,215,036	1,412,596	2,703,762	100.0%	100.0%	59.3%
6/30/2009	693,962	1,305,025	1,459,057	2,792,182	100.0%	100.0%	54.4%
6/30/2010	743,146	1,392,753	1,522,813	2,892,411	100.0%	100.0%	49.7%
6/30/2011	783,112	1,398,620	1,367,616	3,028,757	100.0%	100.0%	61.9%
6/30/2012	822,485	1,541,541	1,382,321	3,090,880	100.0%	100.0%	52.6%
6/30/2013	862,035	1,653,613	1,451,971	3,237,200	100.0%	100.0%	49.7%
6/30/2014	894,650	1,861,575	1,455,264	3,584,719	100.0%	100.0%	56.9%
6/30/2015	892,547	2,040,647	1,579,123	3,915,199	100.0%	100.0%	62.2%
6/30/2016	926,274	2,205,328	1,678,064	4,157,427	100.0%	100.0%	61.1%

**PSRS Schedule of Retirees and Beneficiaries Added to and Removed from Retirement Rolls**

	Added to Rolls		Removed from Rolls		Rolls End of Year		Average Annual Allowances	% Increase	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		in Annual Allowance	in Average Annual Allowance
<b>2015-2016</b>									
Service Retirees	2,603	\$ 94,495,423	883	\$ 30,442,764	53,069	\$ 2,215,921,481	\$ 41,755	5.03 %	1.62 %
Disability Retirees	83	2,292,574	23	524,458	957	25,852,085	27,014	9.35	1.92
Beneficiaries	311	9,947,411	190	4,077,020	3,994	117,916,972	29,524	6.53	3.60
<i>Note: As noted on page 124, other adjustments to 4 service retirees, 5 disability retirees and 11 beneficiaries occurred during the current year.</i>									
<b>2014-2015</b>									
Service Retirees	2,571	\$ 92,740,440	933	\$ 30,965,898	51,345	\$ 2,109,756,890	\$ 41,090	5.07 %	1.61 %
Disability Retirees	74	2,034,400	41	909,636	892	23,641,506	26,504	6.55	2.25
Beneficiaries	351	10,810,471	387	4,706,760	3,884	110,685,031	28,498	7.82	7.48
<i>Note: Effective June 30, 2015, retirees and beneficiaries with their benefits on hold are included in the payment rolls at year-end.</i>									
<b>2013-2014</b>									
Service Retirees	2,906	\$ 110,291,762	848	\$ 27,701,354	49,652	\$ 2,007,864,810	\$ 40,439	6.31 %	1.91 %
Disability Retirees	59	1,461,178	45	827,024	856	22,188,843	25,922	3.82	2.12
Beneficiaries	303	9,030,545	186	3,874,901	3,872	102,660,521	26,514	6.72	3.50
<i>Note: 106 retirees and beneficiaries had their benefit on hold at June 30, 2014 and are not included in the payment rolls at the end of the year.</i>									
<b>2012-2013</b>									
Service Retirees	2,659	\$ 98,663,536	907	\$ 27,431,830	47,594	\$ 1,888,628,855	\$ 39,682	5.92 %	2.02 %
Disability Retirees	69	1,808,376	28	627,785	842	21,372,682	25,383	7.58	2.33
Beneficiaries	376	9,380,442	185	3,088,202	3,755	96,196,708	25,618	8.55	3.02
<i>Note: 115 retirees and beneficiaries had their benefit on hold at June 30, 2013 and are not included in the payment rolls at the end of the year.</i>									
<b>2011-2012</b>									
Service Retirees	2,946	\$ 108,593,761	822	\$ 25,293,380	45,842	\$ 1,783,144,601	\$ 38,898	6.92 %	1.97 %
Disability Retirees	70	1,628,482	30	618,063	801	19,867,641	24,804	7.17	1.82
Beneficiaries	310	11,791,505	181	3,489,331	3,564	88,623,659	24,866	7.27	3.39
<i>Note: 137 retirees and beneficiaries had their benefit on hold at June 30, 2012 and are not included in the payment rolls at the end of the year.</i>									
<b>2010-2011</b>									
Service Retirees	3,145	\$ 115,976,129	891	\$ 25,543,283	43,718	\$ 1,667,760,851	\$ 38,148	5.77 %	0.31 %
Disability Retirees	76	2,095,095	36	885,453	761	18,538,146	24,360	6.98	1.36
Beneficiaries	347	7,794,495	194	3,208,289	3,435	82,616,257	24,051	5.86	1.14
<i>Note: 151 retirees and beneficiaries had their benefit on hold at June 30, 2011 and are not included in the payment rolls at the end of the year.</i>									

**PEERS Schedule of Retirees and Beneficiaries Added to and Removed from Retirement Rolls**

	Added to Rolls		Removed from Rolls		Rolls End of Year		Average Annual Allowances	% Increase	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		in Annual Allowance	in Average Annual Allowance
<b>2015-2016</b>									
Service Retirees	1,903	\$ 20,486,168	746	\$ 4,299,969	25,061	\$ 214,643,511	\$ 8,565	8.59 %	3.57 %
Disability Retirees	53	333,484	31	149,572	782	4,198,147	5,368	5.38	3.35
Beneficiaries	192	1,254,525	90	413,164	1,740	10,163,757	5,841	11.60	4.60
<i>Note: As noted on page 125, other adjustments to 4 service retirees, 7 disability retirees and 7 beneficiaries occurred during the current year.</i>									
<b>2014-2015</b>									
Service Retirees	1,886	\$ 20,303,553	742	\$ 4,999,606	23,900	\$ 197,661,001	\$ 8,270	9.23 %	3.62 %
Disability Retirees	62	373,039	30	183,496	767	3,983,823	5,194	7.38	2.49
Beneficiaries	171	1,199,171	78	371,236	1,631	9,107,407	5,584	11.51	5.08
<i>Note: Effective June 30, 2015, retirees and beneficiaries with their benefits on hold are included in the payment rolls at year-end.</i>									
<b>2013-2014</b>									
Service Retirees	1,943	\$ 20,062,595	704	\$ 3,843,918	22,673	\$ 180,951,822	\$ 7,981	10.14 %	4.12 %
Disability Retirees	66	360,139	39	195,300	732	3,710,104	5,068	6.19	2.26
Beneficiaries	165	911,764	71	263,425	1,537	8,167,504	5,314	9.61	2.90
<i>Note: 87 retirees and beneficiaries had their benefit on hold at June 30, 2014 and are not included in the payment rolls at the end of the year.</i>									
<b>2012-2013</b>									
Service Retirees	1,674	\$ 16,712,855	694	\$ 4,168,985	21,434	\$ 164,297,318	\$ 7,665	8.23 %	3.27 %
Disability Retirees	69	408,169	29	158,081	705	3,493,840	4,956	9.21	3.01
Beneficiaries	164	1,155,936	77	357,536	1,443	7,451,611	5,164	13.14	6.32
<i>Note: 92 retirees and beneficiaries had their benefit on hold at June 30, 2013 and are not included in the payment rolls at the end of the year.</i>									
<b>2011-2012</b>									
Service Retirees	1,747	\$ 17,066,211	647	\$ 3,356,576	20,454	\$ 151,802,237	\$ 7,422	10.26 %	4.33 %
Disability Retirees	69	405,024	21	86,830	665	3,199,134	4,811	12.69	4.56
Beneficiaries	151	800,248	58	254,077	1,356	6,586,250	4,857	10.13	2.58
<i>Note: 87 retirees and beneficiaries had their benefit on hold at June 30, 2012 and are not included in the payment rolls at the end of the year.</i>									
<b>2010-2011</b>									
Service Retirees	1,675	\$ 16,740,804	595	\$ 2,955,819	19,354	\$ 137,682,745	\$ 7,114	9.86 %	3.73 %
Disability Retirees	73	411,908	31	165,052	617	2,838,986	4,601	9.53	2.06
Beneficiaries	114	672,098	73	276,872	1,263	5,980,471	4,735	7.08	3.61
<i>Note: 94 retirees and beneficiaries had their benefit on hold at June 30, 2011 and are not included in the payment rolls at the end of the year.</i>									

## PSRS Summary Plan Description

The Public School Retirement System of Missouri (PSRS) became operative July 1, 1946. It was established by an Act of the Missouri Legislature and is governed by Chapter 169 of the Revised Statutes of Missouri. Its purpose is to provide benefits to members and their dependents at retirement or in the event of death or disability prior to retirement.

PSRS is a defined benefit plan funded on an actuarial reserve basis, which establishes the availability of funds to pay benefits as prescribed by law. The System is established as an independent trust fund and is not subject to direction by any state agency. Administrative expenses are paid entirely out of investment earnings.

**Administration** – The administration of PSRS is vested in a seven-member Board of Trustees, composed of three elected PSRS members, one elected Public Education Employee Retirement System of Missouri (PEERS) member, and three appointed trustees. The four elected trustees are selected by vote of the members and retirees of both Systems. Two are elected each even-numbered calendar year to serve four-year terms. The three appointed trustees, one of whom must be a PSRS or a PEERS retiree, are named by the governor to serve four-year terms. The appointed trustees must be residents of school districts included in the System but not employees of such districts nor state employees nor state elected officials.

The Board appoints an executive director who is responsible for employment of the retirement office staff, routine operation of the System, and acts as an advisor to the Board on all matters pertaining to the System.

**Member Participation** – PSRS membership is automatic for certificated, full-time employees of public school districts in Missouri (except the St. Louis city and the Kansas City school districts), public two-year colleges in Missouri, PSRS and certain statewide non-profit educational associations that have previously elected to join. Non-profit educational associations are no longer allowed to join the System. Certificated, part-time employees whose services would qualify them for membership in PEERS are contributing members of PSRS unless PEERS membership is elected. The vast majority of PSRS members are not covered by Social Security. However, there are a few exceptions

due to specific guidance from the Social Security Administration. Those members who are also covered by Social Security contribute to PSRS at two-thirds the rate of other members and receive two-thirds benefits.

Members working in covered employment are considered active members. Such members contribute 14.5% of total retirement salary to PSRS. The contributions are deducted and remitted by the employer and are credited by PSRS to individual member accounts. Since July 1, 1989, member contributions have been tax-deferred for federal and state income tax purposes under IRS 414(h) (2). Contributions are not considered income for such purposes until they are paid as a lump-sum refund or monthly benefits.

Interest at a rate set each year by the Board of Trustees is credited to individual member accounts each June 30 on the previous June 30 balance. The interest rate set annually by the board, was 1% on June 30, 2016. Since PSRS is a defined benefit plan, benefits are based upon the member's final average salary and years of service. The amount of interest credited to a member's account has no bearing on the monthly benefit amount payable at retirement.

In addition to service earned for covered employment, members may purchase service in various categories including several types of leave, out-of-state school service, other public and private employment, active U.S. military duty, and service under the federal Uniformed Services Employment and Re-Employment Rights Act of 1994 (USERRA).

Members who have contributions on deposit with PSRS but are not working in covered employment are considered inactive members.

**Employer Participation** – The employers served by PSRS withhold members' contributions from salary payments and contribute an amount equal to those contributions at a current rate of 14.5% of payroll. Employer contributions and investment earnings on those funds are placed by PSRS in a general reserve account to pay monthly benefits to retirees and to beneficiaries of deceased members. Employers are responsible for remitting contributions promptly and for furnishing contribution information and new membership records to PSRS. Employers also provide needed data when members apply for monthly benefits or for refunds upon termination of employment.

**Survivor Benefits** – The designated beneficiary of a member who dies before retirement is eligible for a lump-sum refund of the member’s contributions and interest. If the beneficiary is an eligible dependent and the member dies while in covered employment with at least two years of service, or while eligible for disability retirement benefits, monthly survivor benefits based on a percentage of the member’s salary for the last full year of covered service can be elected instead of a lump-sum refund. Monthly survivor benefits may also be payable to qualified dependents of an inactive member who has at least five years of service.

In lieu of a lump-sum refund or monthly survivor benefits, survivors with an insurable interest and beneficiaries of disability retirees may elect to receive monthly benefits under the Joint-and-Survivor 100% benefit plan. Such benefits are payable when the member would have been eligible for early or normal service retirement.

**Refund of Contributions** – Member contributions and interest are fully refundable upon termination of covered employment or death. All service and benefit rights are forfeited upon voluntary refund or automatic termination of membership.

A member may, upon returning to covered employment, reinstate the service forfeited through termination of a previous membership by repaying the money refunded plus interest.

**Membership Termination** – Membership is terminated by death, retirement, refund of contributions or absence from covered employment by a non-vested member for five consecutive school years.

**Disability Retirement Benefits** – Disability retirement benefits are payable to eligible members who have met service and eligibility requirements and who, because of permanent disability, are unable to earn a livelihood in any occupation. In most instances, the disability retirement benefit is calculated at 50% of the member’s salary for the last full year of service.

**Service Retirement Benefits** – Service retirement benefits are payable to members who have terminated covered employment and have met certain eligibility requirements.

**Benefit Formula** – All service retirement benefits are based on a formula which multiplies final average salary by the applicable benefit factor, by the years of service and, in the case of early retirement, by an age-reduction factor. Final average salary is obtained by dividing the total salaries for the three highest consecutive years of service by 36 months to arrive at a monthly average; the applicable factor is determined by the type of retirement eligibility; total service is the amount accumulated at retirement for covered employment and purchased service; and the age-reduction factor, when applicable, is determined by the age at retirement.

**Normal Retirement** – A member may retire with benefits calculated under the standard (2.5%) benefit factor at age 60 with five years of service, at any age with 30 years of service, or when a combination of age and service equals 80 or more. Between July 1, 2001 and July 1, 2014, a member could retire with a 2.55% benefit factor with 31 or more years of service.

**Early Retirement** – A member may retire with benefits calculated under the standard (2.5%) formula with an age-reduction factor applied, at age 55 with five years of service or at any age with 25 years of service, as long as he or she does not qualify for Rule of 80.

A special provision allows members under age 55 with 25.0 to 29.9 years of service to retire with benefits calculated under a modified benefit factor ranging from 2.2% to 2.4% with no age-reduction factor applied.

**Payment Options** – A retiring member may choose to receive the maximum benefits payable under the Single Life benefit plan, or may elect to receive a reduced benefit under one of three Joint-and-Survivor benefit plans or under one of two Term-Certain benefit plans, to provide survivor benefit coverage in varying degrees after the retiree’s death.

Certain benefit minimums apply to normal or early retirement with 15 or more years of service. The minimums for 15 but fewer than 25 years of service are reduced if a Joint-and-Survivor or a Term-Certain benefit plan is elected and/or if an age-reduction factor is applicable because of early retirement. The minimums for 25 or more years of service are reduced only if a Joint-and-Survivor or a Term-Certain benefit plan is selected.

## PEERS Summary Plan Description

The Partial Lump Sum Option (PLSO) is available to qualified members. This option allows qualified members to choose to have their lifetime monthly benefits actuarially reduced in exchange for the right to also receive a one-time, lump-sum payment at retirement.

**Cost-of-Living Adjustments** – Cost-of-living adjustments (COLAs) are provided beginning the second January after retirement to service and disability retirees, and to Joint-and-Survivor and Term-Certain beneficiaries of deceased retirees. Lifetime COLAs are limited to 80% of the original retirement benefit.

The Department of Labor Consumer Price Index for Urban Consumers (CPI-U) for the previous fiscal year is used as a guideline for the annual COLA which is set by the Board. By law, if the change in CPI-U is 2% or more, the COLA must be at least 2%, but no more than 5%. If the change in CPI-U is between 0% and 2%, the Board may grant a COLA of 0% to 5%. If the change in CPI-U is less than 0%, no increase can be given. If it is more than 5%, the Board is required to give a 5% increase. Under the funding policies adopted by the Board in June 2016, a 0% COLA will be given whenever the change in CPI-U for the previous fiscal year is between 0% and 2%, and a 2% COLA will be given whenever the change in CPI-U for the previous fiscal year is between 2% and 5%.

**Member Handbook** – A *Member Handbook* containing detailed information concerning the retirement program is available on our website or can be obtained from the retirement office upon request.

The Public Education Employee Retirement System of Missouri (PEERS) was established by an Act of the Missouri Legislature to begin operations on November 1, 1965, and is governed by Chapter 169 of the Revised Statutes of Missouri. Its purpose is to provide benefits to members and their dependents at retirement or in the event of death or disability prior to retirement.

PEERS is a defined benefit plan funded on an actuarial reserve basis, which establishes the availability of funds to pay benefits as prescribed by law. The System is established as an independent trust fund and is not subject to direction by any state agency. Administrative expenses are paid entirely out of investment earnings.

**Administration** – The law provides that the responsibility for the operation and administration of the retirement system is vested in the Public School Retirement System of Missouri (PSRS) Board of Trustees sitting as the Board of Trustees for PEERS. The Board is comprised of three elected PSRS members, one elected PEERS member and three appointed trustees. The four elected trustees are selected by vote of the members and retirees of both Systems. Two are elected each even-numbered calendar year to serve four-year terms. The three appointed trustees, one of whom must be a PSRS or a PEERS retiree, are named by the governor to serve four-year terms. The appointed trustees must be residents of school districts included in the System but not employees of such districts nor state employees nor state elected officials.

The Board appoints an executive director who is responsible for employment of the retirement office staff, routine operation of the System, and acts as an advisor to the Board on all matters pertaining to the System.

**Member Participation** – PEERS membership is automatic, regardless of position, for all persons not covered by PSRS who are employed for 20 or more hours a week on a regular basis in a position that normally requires at least 600 hours during the school term by the public school districts in Missouri (except the St. Louis city and the Kansas City school districts), public two-year colleges in Missouri (except St. Louis Community College), PEERS and statewide non-profit educational associations that have elected to join.

Members working in covered employment are considered active members. Such members contribute 6.86% of their total retirement salary to PEERS. The contributions are deducted by the employer and are credited by PEERS to individual member accounts. PEERS members are also covered by Social Security.

PEERS membership can be elected by employees with Missouri educator certificates who work in any position for 17 or more hours weekly but less than full time; however, PSRS membership is automatic if a PEERS election is not made. The election to join PEERS must be filed with the Board within 90 days after entering first time, part-time employment.

Since July 1, 1989, member contributions have been tax-deferred for federal and state income tax purposes under IRC 414(h)(2). Contributions are not considered as income for federal or state income tax purposes until they are paid in a lump-sum refund or in monthly benefits.

Individual accounts are maintained for all PEERS members. Interest is credited each June 30 on the previous June 30 balance. The interest rate, set annually by the Board, was 1% on June 30, 2016. Since PEERS is a defined benefit plan, benefits are based upon the member's final average salary and years of service. The amount of interest credited to a member's account has no bearing on the monthly benefit amount payable at retirement.

In addition to service earned for covered employment, members may purchase service in various categories including several types of leave, out-of-state school service, other public and private employment, active U.S. military duty, and service under the federal Uniformed Services Employment and Re-employment Rights Act of 1994 (USERRA).

Members who have contributions on deposit with PEERS but are not currently working in covered employment are considered inactive members.

**Employer Participation** – The employers served by PEERS withhold members' contributions from salary payments and contribute an amount equal to employee contributions at a current rate of 6.86% of payroll. Employer contributions and investment earnings on those funds are placed in a general reserve account to pay monthly benefits to retirees and to beneficiaries of deceased members. It is the responsibility of the employers to remit contributions promptly and for furnishing contribution information and new

membership records to PEERS. Employers also provide needed data when members apply for benefits or refund of contributions upon termination of employment.

**Survivor Benefits** – When a member dies before retirement, the designated beneficiary becomes eligible for a lump-sum refund of the employee's contributions and interest. In lieu of a lump-sum refund, survivors with an insurable interest and beneficiaries of disability retirees may elect to receive monthly benefits under the Joint-and-Survivor 100% benefit plan. Such benefits are payable when the member would have been eligible for early or normal service retirement.

**Refund of Contributions** – Member contributions and interest are fully refundable upon termination of covered employment or death. All service and benefit rights are forfeited upon voluntary refund or automatic termination of membership.

A member may, upon returning to covered employment, reinstate the service forfeited through termination of a previous membership by repaying the money refunded plus interest.

**Membership Termination** – Membership is terminated by death, retirement, refund of contributions or absence from covered employment by a non-vested member for five consecutive school years.

**Disability Retirement Benefits** – Disability retirement benefits are payable to members who have met service and eligibility requirements and who, because of permanent disability, are unable to earn a livelihood in any occupation. The disability retirement benefit is calculated at 90% of the normal service retirement benefit.

**Service Retirement Benefits** – Service retirement benefits are payable to members who have terminated covered employment and who have met certain eligibility requirements.

**Benefit Formula** – All service retirement benefits are based on a formula which multiplies final average salary by the applicable benefit factor, by the years of service and, in the case of early retirement, by an age-reduction factor. Final average salary is obtained by dividing the total salaries for the three highest consecutive years of service by 36 months to arrive at a monthly average; the applicable factor is determined by the type of retirement eligibility; total service is the amount accumulated at retirement for covered employment and purchased service; and the age-reduction factor, when applicable, is determined by the age at retirement.

Because of the conversion of the System from a formula integrated with Social Security to the present basis, a special “frozen benefit” is in effect for certain members for service prior to July 1, 1973.

**Normal Retirement** – A member may retire with benefits calculated under the standard (1.61%) formula at age 60 with five years of service, at any age with at least 30 years of service, and at the point where the member’s age plus service equals 80 or more (Rule of 80). A member may retire under the standard (1.61%) formula when the member qualifies for Rule of 80 or 30-and-Out and will receive an additional .8% multiplier until reaching minimum eligibility age for Social Security benefits (currently age 62).

**Early Retirement** – A member may retire with benefits calculated under the standard (1.61%) formula with an age-reduction factor applied at age 55 with five but fewer than 25 years of service, or at any age with 25 years of service, as long as he or she does not qualify for Rule of 80.

A special provision allows members under age 55 with 25.0 to 29.9 years of service to retire with benefits calculated under a modified benefit factor ranging from 1.51% to 1.59% with no age-reduction factor applied.

**Payment Options** – A retiring member may choose to receive the maximum benefits payable under the Single Life benefit plan, or may choose to receive a reduced benefit under one of three Joint-and-Survivor benefit plans or under one of two Term-Certain benefit plans, to provide survivor benefit coverage in varying degrees after the retiree’s death.

Another option, the Accelerated Payment Plan (APP), allows members to receive a higher PEERS benefit prior to minimum Social Security eligibility age (currently age 62). When the minimum Social Security eligibility age is attained, the member’s PEERS benefit is reduced and remains at a reduced level for the remainder of their retirement.

The Partial Lump Sum Option (PLSO) is available to qualified members. This option allows qualified members to choose to have their lifetime monthly benefits actuarially reduced in exchange for the right to also receive a one-time, lump-sum payment at retirement.

**Cost-of-Living Adjustments** – Cost-of-living adjustments (COLAs) are provided starting the fourth January after retirement to service and disability retirees, and to Joint-and-Survivor and Term-Certain beneficiaries of deceased retirees. Lifetime COLAs are limited to 80% of the original retirement benefit.

The Department of Labor Consumer Price Index for Urban Consumers (CPI-U) for the previous fiscal year is used as a guideline for the annual COLA which is set by the Board of Trustees. By law, if the change in CPI-U is 2% or more, the COLA must be at least 2%, but no more than 5%. If the change in CPI-U is between 0% and 2%, the Board may grant a COLA of 0% to 5%. If the change in CPI-U is less than 0%, no increase can be given. If it is more than 5%, the Board is required to give a 5% increase. Under the funding policies adopted by the Board in June 2016, a 0% COLA will be given whenever the change in CPI-U for the previous fiscal year is between 0% and 2%, and a 2% COLA will be given whenever the change in CPI-U for the previous fiscal year is between 2% and 5%.

**Member Handbook** – A *Member Handbook* containing detailed information concerning the retirement program is available on our website or can be obtained from the retirement office upon request.

# PSRS and PEERS Summary of Actuarial Assumptions and Methods

The Board is responsible for the adoption of the Systems’ Funding Policies and assumptions. A summary of the current Funding Policy is included in the Certification of Actuarial Results.

The actuarial assumptions and methods utilized for funding and financial report purposes differ slightly. The primary difference between the two methods is the fact that financial reporting requires the recognition of investment gains at market with no smoothing.

## Inflation

Inflation is assumed to be 2.25% per annum (effective 6/30/16).

## Payroll Growth

Total payroll growth for PSRS is assumed to be 2.75% per annum, consisting of 2.25% inflation, 0.25% real wage growth due to the inclusion of active health care costs in pension earnings, and 0.25% of real wage growth due to productivity (effective 6/30/16).

Total payroll growth for PEERS assumed to be 3.25% per annum, consisting of 2.25% inflation, 0.50% real wage growth due to the inclusion of active health care costs in pension earnings, and 0.50% of real wage growth due to productivity (effective 6/30/16).

## Individual Salary Growth

### PSRS

Individual salaries for PSRS are assumed to increase each year with inflation of 2.25%, real wage growth generated by the cost of active health care of 0.25% (since health care costs are included in pension earnings), real wage growth due to productivity of 0.25%, and additional real salary growth for merit, promotion, and seniority (effective 6/30/16).

PSRS – Real Salary Growth					
Service	Inflation	Health Care Cost	Productivity	Merit, Promotion, Seniority	Total Individual Salary Growth
0	2.25%	0.25%	0.25%	6.75%	9.50%
1	2.25%	0.25%	0.25%	3.25%	6.00%
2	2.25%	0.25%	0.25%	3.10%	5.85%
3	2.25%	0.25%	0.25%	2.95%	5.70%
4	2.25%	0.25%	0.25%	2.80%	5.55%
5	2.25%	0.25%	0.25%	2.65%	5.40%
6	2.25%	0.25%	0.25%	2.50%	5.25%
7	2.25%	0.25%	0.25%	2.35%	5.10%
8	2.25%	0.25%	0.25%	2.20%	4.95%
9	2.25%	0.25%	0.25%	2.05%	4.80%
10	2.25%	0.25%	0.25%	1.90%	4.65%
11	2.25%	0.25%	0.25%	1.75%	4.50%
12	2.25%	0.25%	0.25%	1.60%	4.35%
13	2.25%	0.25%	0.25%	1.45%	4.20%
14	2.25%	0.25%	0.25%	1.30%	4.05%
15	2.25%	0.25%	0.25%	1.23%	3.98%
16	2.25%	0.25%	0.25%	1.16%	3.91%
17	2.25%	0.25%	0.25%	1.09%	3.84%
18	2.25%	0.25%	0.25%	1.02%	3.77%
19	2.25%	0.25%	0.25%	0.95%	3.70%
20	2.25%	0.25%	0.25%	0.88%	3.63%
21	2.25%	0.25%	0.25%	0.81%	3.56%
22	2.25%	0.25%	0.25%	0.74%	3.49%
23	2.25%	0.25%	0.25%	0.67%	3.42%
24	2.25%	0.25%	0.25%	0.60%	3.35%
25	2.25%	0.25%	0.25%	0.53%	3.28%
26	2.25%	0.25%	0.25%	0.46%	3.21%
27	2.25%	0.25%	0.25%	0.39%	3.14%
28	2.25%	0.25%	0.25%	0.32%	3.07%
29	2.25%	0.25%	0.25%	0.25%	3.00%
30+	2.25%	0.25%	0.25%	0.25%	3.00%



**PEERS**

Individual salaries for PEERS are assumed to increase each year with inflation of 2.25%, real wage growth generated by the cost of active health care of 0.50% (since health care costs are included in pension earnings), real wage growth due to productivity of 0.50%, and additional real salary growth for merit, promotion, and seniority (effective 6/30/16).

PEERS – Real Salary Growth					
Service	Inflation	Health Care Cost	Productivity	Merit, Promotion, Seniority	Total Individual Salary Growth
0	2.25%	0.50%	0.50%	7.75%	11.00%
1	2.25%	0.50%	0.50%	3.00%	6.25%
2	2.25%	0.50%	0.50%	2.50%	5.75%
3	2.25%	0.50%	0.50%	2.25%	5.50%
4	2.25%	0.50%	0.50%	2.00%	5.25%
5	2.25%	0.50%	0.50%	1.90%	5.15%
6	2.25%	0.50%	0.50%	1.80%	5.05%
7	2.25%	0.50%	0.50%	1.70%	4.95%
8	2.25%	0.50%	0.50%	1.60%	4.85%
9	2.25%	0.50%	0.50%	1.50%	4.75%
10	2.25%	0.50%	0.50%	1.40%	4.65%
11	2.25%	0.50%	0.50%	1.30%	4.55%
12	2.25%	0.50%	0.50%	1.20%	4.45%
13	2.25%	0.50%	0.50%	1.10%	4.35%
14	2.25%	0.50%	0.50%	1.00%	4.25%
15	2.25%	0.50%	0.50%	0.95%	4.20%
16	2.25%	0.50%	0.50%	0.90%	4.15%
17	2.25%	0.50%	0.50%	0.85%	4.10%
18	2.25%	0.50%	0.50%	0.80%	4.05%
19	2.25%	0.50%	0.50%	0.75%	4.00%
20+	2.25%	0.50%	0.50%	0.75%	4.00%

**Investment Return**

It is assumed that investments of the Systems will return a yield of 7.75% per annum, net of system expenses (investment and administrative) (effective 6/30/16).

**Cost-of-Living Adjustments**

The long-term cost-of-living adjustment assumed in the valuation is 1.50% per year, based on the current policy of the Board to grant a 0.00% COLA when annual inflation, as measured by the CPI-U index for a fiscal year, increases between 0.00% and 2.00% and to grant 2.00% when the increase is between 2.00% and 5.00%. The actuarial assumption increases from 1.00% to 1.50% over ten years (from fiscal year 2017 to fiscal year 2027). The COLA applies to service retirements and beneficiary annuities. The COLA does not apply to the benefits for in-service death payable to spouses (where the spouse is over age 60), and does not apply to the spouse with children pre-retirement survivor benefit, the dependent children pre-retirement death benefit, or the dependent parent pre-retirement survivor benefit. The total lifetime COLA cannot exceed 80% of the original benefit.

Future COLAs for current benefit recipients reflect actual cumulative adjustments granted at the time of valuation (effective 6/30/16).

**Mortality Rates**

*Active Member Mortality*

**PSRS**

Mortality rates for PSRS active members are based on RP 2006 White Collar Employee Mortality Table, multiplied by an adjustment factor of 0.75 at all ages for both males and females, with static projection using the 2014 SSA Improvement Scale to 2028 (i.e. a 12-year projection from the date first implemented, the approximate duration of the total actuarial accrued liability). Illustrative rates per 1,000 members at various ages are as follows (effective 6/30/16):

PSRS Active Member Mortality		
Age	Male	Female
20	0.196	0.097
30	0.228	0.123
40	0.280	0.224
50	0.851	0.666
60	1.929	1.205
70	6.434	3.579

**PEERS**

Mortality rates for PEERS active members are based on the RP 2006 Total Dataset Employee Mortality Table, multiplied by an adjustment factor of 0.75 at all ages for both males and females, with static projection using the 2014 SSA Improvement Scale to 2028 (i.e. a 12-year projection from the date first implemented, the approximate duration of the total actuarial accrued liability). Illustrative rates per 1,000 members at various ages are as follows (effective 6/30/16):

PEERS Active Member Mortality		
Age	Male	Female
20	0.279	0.114
30	0.325	0.146
40	0.399	0.265
50	1.214	0.789
60	2.751	1.429
70	8.672	4.156

*Service Retiree, Beneficiary and Survivor Mortality*

**PSRS**

Mortality rates for PSRS non-disabled retirees and beneficiaries are based on the RP 2006 White Collar Mortality Table multiplied by the plan specific adjustment factors shown in the table below, with static projections using the 2014 SSA Improvement Scale to 2028 (i.e. a 12-year projection from the date first implemented, the approximate duration of the total actuarial accrued liability) (effective 6/30/16).

PSRS Non-Disabled Retiree and Beneficiary Plan Specific Mortality Adjustment Factors		
Age	Male	Female
<60	1.00	1.00
60-74	0.89	0.66
75-89	1.05	0.91
>=90	1.05	1.16

Illustrative rates per 1,000 members at various ages are as follows (effective 6/30/16):

PSRS Service Retiree, Beneficiary and Survivor Mortality		
Age	Male	Female
40	0.373	0.298
50	2.655	1.982
60	3.639	2.034
70	9.212	6.211
80	34.813	25.742
90	126.672	118.203
100	314.507	310.679
110	465.570	493.661

**PEERS**

Mortality rates for PEERS non-disabled retirees and beneficiaries are based on the RP 2006 Total Dataset Mortality Table multiplied by the plan specific adjustment factors shown in the table below, with static projections using the 2014 SSA Improvement Scale to 2028 (i.e. a 12-year projection from the date first implemented, the approximate duration of the total actuarial accrued liability) (effective 6/30/16).

PEERS Non-Disabled Retiree and Beneficiary Plan Specific Mortality Adjustment Factors		
Age	Male	Female
<60	1.00	1.00
60-74	1.49	0.77
75-89	1.27	1.03
>=90	1.16	1.04

Illustrative rates per 1,000 members at various ages are as follows (effective 6/30/16):

PEERS Service Retiree, Beneficiary and Survivor Mortality		
Age	Male	Female
40	0.532	0.353
50	3.904	2.642
60	9.060	3.119
70	20.854	8.702
80	50.476	33.375
90	153.099	113.293
100	347.456	278.540
110	514.345	442.593

*Disability Retiree Mortality*

Mortality rates for PSRS and PEERS disabled retirees are based on the RP 2006 Disabled Retiree Mortality Table, with static projections using the 2014 SSA Improvement Scale to 2028 (i.e. a 12-year projection from the date first implemented, the approximate duration of the total actuarial accrued liability) (effective 6/30/16).

Illustrative rates per 1,000 members at various ages are as follows (effective 6/30/16):

PSRS and PEERS Disability Retiree Mortality		
Age	Male	Female
40	9.317	4.862
50	19.588	11.367
60	20.817	13.263
70	33.674	24.771
80	68.090	56.760
90	168.008	134.892
100	311.674	275.075
110	443.401	425.570

**Retirement Rates**

Retirement is assumed in accordance with the following rates per 1,000 eligible members (effective 6/30/16):

<b>PSRS Active Member Retirement</b>											
<b>Age</b>	<b>Years of Service</b>										
	<b>&lt;=20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>&gt;=30</b>
<50	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	3.0%	3.0%	3.0%	3.0%	45.0%
50	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	3.0%	3.0%	3.0%	3.0%	45.0%
51	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	3.0%	3.0%	3.0%	20.0%	45.0%
52	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	3.0%	3.0%	20.0%	20.0%	45.0%
53	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	3.0%	30.0%	20.0%	20.0%	45.0%
54	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	30.0%	20.0%	20.0%	20.0%	45.0%
55	5.0%	5.0%	5.0%	5.0%	5.0%	40.0%	20.0%	20.0%	20.0%	20.0%	45.0%
56	3.0%	3.0%	3.0%	3.0%	40.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
57	3.0%	3.0%	3.0%	40.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
58	3.0%	3.0%	40.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
59	3.0%	40.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
60	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
61	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
62	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
63	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
64	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	45.0%
65	25.0%	25.0%	25.0%	25.0%	25.0%	40.0%	40.0%	40.0%	40.0%	40.0%	45.0%
66	25.0%	25.0%	25.0%	25.0%	25.0%	30.0%	30.0%	30.0%	30.0%	30.0%	45.0%
67	25.0%	25.0%	25.0%	25.0%	25.0%	30.0%	30.0%	30.0%	30.0%	30.0%	45.0%
68	25.0%	25.0%	25.0%	25.0%	25.0%	30.0%	30.0%	30.0%	30.0%	30.0%	45.0%
69	25.0%	25.0%	25.0%	25.0%	25.0%	30.0%	30.0%	30.0%	30.0%	30.0%	45.0%
>=70	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

<b>PEERS Active Member Retirement</b>											
<b>Age</b>	<b>Years of Service</b>										
	<b>&lt;=20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>&gt;=30</b>
<50	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	30.0%
50	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	20.0%
51	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	5.0%	30.0%	20.0%
52	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	30.0%	20.0%	20.0%
53	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	30.0%	20.0%	20.0%	20.0%
54	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	30.0%	20.0%	20.0%	20.0%	20.0%
55	5.0%	5.0%	5.0%	5.0%	5.0%	30.0%	20.0%	20.0%	20.0%	20.0%	20.0%
56	5.0%	5.0%	5.0%	5.0%	30.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
57	5.0%	5.0%	5.0%	30.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
58	5.0%	5.0%	30.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
59	5.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
60	10.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
61	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
62	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%
63	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
64	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
65	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%
66	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
67	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
68	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
69	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
70	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
71	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
72	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
73	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
74	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
>=75	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

### Withdrawal Rates

Termination of membership prior to eligibility for retirement from all causes other than death, disability or retirement is assumed in accordance with the following illustrative rates per 1,000 members (effective 6/30/16):

PSRS Active Member Withdrawal		PEERS Active Member Withdrawal	
Years of Service	Rate	Years of Service	Rate
0	240.0	0	350.0
1	115.0	1	230.0
2	100.0	2	180.0
3	80.0	3	150.0
4	70.0	4	125.0
5	60.0	5	100.0
10	28.0	10	55.0
15	15.0	15	33.0
20	10.0	20	18.0
25+	0.0	25+	0.0

### Refund of Contributions

Active members who terminate employment with less than five years of service and inactive members with less than five years of service are assumed to take an immediate refund of their contributions.

Active members who terminate employment with five or more years of service, but prior to satisfying the age and service requirements for service retirement, and inactive members with five or more years of service are assumed to select the option that has the greater present value between an immediate refund of their contributions and a life annuity deferred to their earliest retirement age (effective 6/30/2016).

Active members who terminate employment with five or more years of service and satisfy the age and service requirements for service retirement upon termination, and inactive members with five or more years of service and currently eligible for service retirement are assumed to select an immediate life annuity (effective 6/30/2016).

### Disability Rates

Retirement for disability prior to age 60 is assumed in accordance with the following illustrative rates per 1,000 eligible members (effective 6/30/16):

PSRS Active Member Disability		PEERS Active Member Disability	
Age	Rates	Age	Rates
25	0.0017%	25	0.0017%
30	0.0080%	30	0.0080%
35	0.0220%	35	0.0016%
40	0.0480%	40	0.0320%
45	0.0780%	45	0.0640%
50	0.1110%	50	0.1220%
55	0.1460%	55	0.2100%

### Interest on Member Accounts

1.00% per annum (effective 6/30/10)

### Service Purchases

A 1.00% load for PSRS and a 1.50% load for PEERS is added to the Normal Cost to account for anticipated losses resulting from service purchases and reinstatements (effective 6/30/16).

### Provisions for Expenses

There is no specific provision for expenses. The implicit assumption is that administrative expenses are paid from investment income in excess of 7.75% per annum (effective 6/30/16).

### Dependent Assumptions

(effective 6/30/16)

- **Marriage Assumptions (Pre-retirement)** 70% of male and female members are assumed to be married. Beneficiaries are assumed to be of the opposite sex from the member. Male spouses are assumed to be two years older than that of female spouses.
- **Beneficiary Assumptions (Post-retirement)** Retired members, regardless of gender, are assumed to be three years older than their joint annuitant.

### Survivor Benefits (Pre-retirement PSRS Only)

All active members under age 50 are assumed to have two dependent children. Each child is assumed to receive payments of \$860 per month for 18 years if the member is under age 32, and grading down to zero years if the member is age 50 (effective 6/30/16).

### Return of Unused Member Account Balance

A cash refund feature is included in the valuation of annuity benefits to reflect that cumulative annuity payments to members may not be less than the amount of contributions paid by the member (effective 6/30/16).

### Actuarial Cost Method

The actuarial cost method is Entry Age Normal - Level Percent of Payroll.

The normal cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The actuarial accrued liability on any valuation date is the accumulated value of such normal costs from entry age to the valuation date (effective 1947).

### Asset Valuation Method

The Actuarial Value of Assets is a smoothed value of assets. The actuarial value at June 30 of the prior year is projected by increasing the amount by 8% interest, adding contributions with 8% interest for half the year, and subtracting benefit payments for half the year. Twenty percent of the difference between the actual returns at market value for the year and expected return from the projection of the prior year actuarial value, along with corresponding amounts from each of the prior four years is added to the actuarial value. The Actuarial Value of Assets was reset to market value at June 30, 2003. The assumed rate of return was changed to 7.75% effective June 30, 2016, therefore future years will utilize 7.75% in the projections. The methodology remains unchanged (effective 1994).

### Amortization of Unfunded Actuarial Accrued Liability

Gains and losses occurring from census experience different than assumed and assumption changes are amortized over a 30-year period as a level percent of payroll. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 30-year period. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities. Increases or decrease in the Actuarial Accrued Liability caused by changes in the benefit provisions are amortized over 20 years, as determined in the 2007 session of the Legislature.

The method for amortizing the unfunded Actuarial Accrued Liability was changed from a rolling 30-year method to the closed 30-year method described above effective June 30, 2011.

For accounting, gains and losses occurring from census experience different than assumed and assumption changes are amortized into expense over the average expected future service of all plan participants (active and inactive). Gains and losses occurring from investment experience different than assumed are amortized into expense over a five year period. The effect of plan changes on the plan liability are fully recognized in expense in the year in which they occur.

*Note: Dates reflect the effective date as adopted by the Board of Trustees. The most recent assumption analysis was performed as of June 30, 2016. The revised assumptions were used for the June 30, 2016 valuation.*