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# *Public School Retirement System of Missouri*

Actuarial Valuation as of  
June 30, 2020





November 12, 2020

Board of Trustees  
Public School Retirement System of Missouri  
3210 W. Truman Blvd.  
Jefferson City, MO 65109

**Re: Certification of the Actuarial Valuation of the Public School Retirement System of Missouri  
as of June 30, 2020**

Dear Board of Trustees:

An actuarial valuation is performed annually for the Public School Retirement System of Missouri ("PSRS") defined benefit pension plan ("Plan"). The results of the latest actuarial valuation were prepared as of June 30, 2020 and are presented herein pursuant to the engagement letter between PSRS and PricewaterhouseCoopers LLP ("PwC"), dated July 11, 2019. This report is intended to provide the Board of Trustees ("Board") with information on the funded status of the Plan, development of the actuarially determined contribution rates, and certain financial statement disclosure information.

**Financing Objectives and Funding Policy**

Under Missouri statutes, contribution rates are adopted annually by the Board. The actuarially determined contribution presented herein was based on the funding policy, actuarial assumptions, and actuarial methods adopted by the Board.

In setting contribution rates, the principal objectives of the Board's funding policy are:

- To set contribution rates such that the funded ratio will reach 100% over a closed 30-year period.
- To set contribution rates such that they remain stable over time.
- To set contribution rates such that they promote intergenerational equity.
- To provide a reasonable margin for adverse experience to help offset risks of not meeting the above target.

**Progress Toward Realization of Financing Objectives**

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a measure of a Plan's funded status. Absent changes in plan provisions and actuarial assumptions and methods, it should increase over time until it reaches 100% under the current funding policy, though adverse experience could prevent this from being achieved. The funded ratio for the Plan is 84.0%, as of June 30, 2020, compared to 84.4% as of June 30, 2019. The decrease is primarily due to the January 1, 2021 COLA being 2.00% versus the 1.30% assumed COLA and lower than expected investment returns, but partially offset by lower than expected salary increases. We note that the Board's funding policy generally results in a COLA of either 0.00% or 2.00%, with the assumed COLA being an average that is between these amounts. Therefore, in years when a 2.00% COLA is granted, the Plan will experience a loss, and in years when the COLA is 0.00%, the Plan will experience a gain. Over time, we expect the annual gains/losses to be offsetting.

**Benefit Provisions**

The benefit provisions reflected in the valuation reports are those which were in effect at June 30, 2020, as set forth in the related Missouri statutes. It is our understanding that the only change in benefit provisions since the prior valuation was a change in the working after retirement provisions that had no impact on our valuation of the benefit liabilities.

**Assets and Member Data**

The valuation was based on asset values of the trust funds and member census data as of June 30, 2020. All asset information and member data were provided by PSRS. While we performed certain checks for reasonableness relative to the prior year's data, the data was used unaudited. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying asset and census information.

**Actuarial Assumptions and Methods**

The actuarial assumptions used in the June 30, 2020 valuations were adopted by the Board pursuant to an experience study completed in June 2016. All economic and demographic assumptions were reviewed and updated by the Board, where appropriate, based on the results of the experience study completed in June 2016. Since the last experience study, the investment return and COLA assumptions have been updated. For the June 30, 2017 valuation, the investment return assumption was lowered from 7.75% to 7.60% and the COLA assumption was increased based on changes to the Board's funding policy relating to COLAs. Both changes were adopted at the November 3, 2017 meeting. For the June 30, 2018 valuation, the investment return assumption was further lowered from 7.60% to 7.50%, as adopted by the Board at the October 29, 2018 meeting. There have been no assumption changes since the June 30, 2018 valuation.



We believe the actuarial assumptions and methods are reasonable for the purposes of this valuation report, were developed in accordance with the Actuarial Standards of Practice, and comply with the parameters set forth in Statements No. 67 and No. 68 (as amended) of the Governmental Accounting Standards Board ("GASB"). Different assumptions and methods may be reasonable for other purposes. As such, the results presented in the valuation reports should only be relied upon for the intended purpose.

**Certification**

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Plan administered by PSRS as of June 30, 2020 based on the underlying census data, asset information and selected assumptions and methods.

This report contains certain accounting information required to be included in the System's Comprehensive Annual Financial Report. This information has been prepared in accordance with our understanding of GASB No. 67, as amended. This report also contains employer accounting information prepared in accordance with our understanding of GASB No. 68, as amended.

In preparing the results presented herein, we have used and evaluated actuarial models in accordance with Actuarial Standards of Practice ("ASOP") No. 56. PwC uses the ProVal valuation system developed by Winklevoss Technologies, LLC in performing valuations of pension and postretirement benefit plans. We have utilized the ProVal software to prepare the valuation results presented herein. ProVal is used to value participant data through projecting retirement benefits and applying plan specific assumptions, methods and plan provisions under applicable accounting and funding standards. PwC is not aware of any material limitations or known weaknesses in the ProVal software.

A range of results, different from those presented in this report could be considered reasonable. Future actuarial measurements may differ significantly from the current measurement presented in this report due to a number of factors including but not limited 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 methods 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); rounding conventions; and changes in plan provisions or applicable law. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

To the best of our knowledge this actuarial statement is complete and accurate and has 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 that may impair our objectivity.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose. This document has been prepared pursuant to an engagement letter between PSRS and PwC, and is intended solely for the use and benefits of PSRS and not for reliance by any other person.

Respectfully submitted,

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Ms. Cindy Fraterrigo  
Member, American Academy of Actuaries  
Fellow of the Society of Actuaries  
Enrolled Actuary (No. 20-06229)

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Mr. Brandon Robertson  
Member, American Academy of Actuaries  
Associate of the Society of Actuaries  
Enrolled Actuary (No. 20-07568)

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## SECTION I - EXECUTIVE SUMMARY

### **HIGHLIGHTS OF THE ACTUARY'S REPORT**

This report presents the results of the actuarial valuation of the Public School Retirement System of Missouri ("PSRS") defined benefit pension plan ("Plan") as of June 30, 2020, and has been prepared to present the current funded status of the Plan, contribution requirements for fiscal year 2022 (July 1, 2021 through June 30, 2022), and certain financial statement disclosure information. The valuation was performed using census data for plan members as of June 30, 2020 provided by PSRS and summarized in Section IV of this report, asset information as of June 30, 2020 provided by PSRS and summarized in Sections II and III, the actuarial assumptions and methods approved by the Board and summarized in Section V, and our understanding of the plan provisions effective June 30, 2020 summarized in Section VI.

#### **Contributions**

The Board sets, at its discretion, but subject to certain statutory restrictions, the applicable employer and member contribution rates upon considering the results of the actuarial valuation and other analysis as appropriate. Based on the objectives of the Board's funding policy, the assumptions and methods approved by the Board, and our valuation of the Actuarially Determined Contribution Rate, the contribution rate approved by the Board is 29.00% (14.50% for employers and 14.50% for members) for fiscal year 2022. A contribution rate of 29.00% represents no change from the rate currently in effect for fiscal year 2021. The contribution rate approved by the Board becomes effective on July 1, 2021. Therefore, the dollar cost will depend on the actual payroll during fiscal year 2022.

Members of PSRS pay half of the total contribution rate, currently 14.50% of pay. If a member terminates employment with less than 5 years of service, their accumulated contributions with interest can be withdrawn as a lump sum, or the member may direct PSRS to make a direct rollover of the distribution amount. When a member becomes vested with at least 5 years of service, the member also has the option to leave their contributions in the Plan and select from various retirement annuity options commencing at retirement age.

#### **Funded Status**

The funded status of PSRS is measured as the ratio of assets available for benefits to a benefit liability measure for the System. While there are several such measures that could be appropriately used, the benefit liability measure that ties most closely to the funding strategy is the Actuarial Accrued Liability ("AAL") computed in accordance with assumptions and methods summarized in Section V. The funded status is an indicator of future contribution requirements in that a funded status below 100% results in an Actuarially Determined Contribution rate that includes contributions towards the deficit. The funded status measured on this basis is not intended to represent the sufficiency of plan assets for settling the plan's benefit obligations and should not be relied on for that purpose in isolation.

Using the Actuarial Value of Assets ("AVA"), a smoothed asset value that recognizes 20% of the total investment gain or loss on the AVA for each of the preceding five (5) years, the PSRS AAL funded ratio is 84.0% as of June 30, 2020, compared to 84.4% as of June 30, 2019. The decrease is primarily due to the January 1, 2021 COLA being 2.00% versus the 1.30% assumed COLA and lower than expected investment returns, but partially offset by lower than expected salary increases. We note that the Board's funding policy generally results in a COLA of either 0.00% or 2.00%, with the assumed COLA being an average that is between these amounts. Therefore, in years when a 2.00% COLA is granted, the Plan will experience a loss, and in years when the COLA is 0.00%, the Plan will experience a gain. Over time, we expect the annual gains/losses to be offsetting. The funded status is 82.0% when based on the market value of assets rather than the actuarial value of assets.

#### **Investment Experience**

The market value of the assets available for benefits has increased from \$40.6 billion as of June 30, 2019 to \$40.7 billion as of June 30, 2020. The actuarial value of assets increased from \$40.5 billion as of June 30, 2019, to \$41.7 billion as of June 30, 2020. The actuarial value of assets is greater than the market value by \$1.2 billion and the difference will be recognized over the next four years.

The assets of the Plan returned 3.7% (net of all expenses) for the year ended June 30, 2020. Based on the Actuarial Value of Assets, the approximate return for the same period was 6.4%. The return on actuarial value is different due to the smoothing of returns greater or less than expected returns over five years. For GASB accounting purposes, the money-weighted return, net of investment expenses only, was also 3.7%.

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## SECTION I - EXECUTIVE SUMMARY

### **HIGHLIGHTS OF THE ACTUARY'S REPORT (CONTINUED)**

#### **Funding Policy**

The Board has adopted a formal funding policy with the objective of fully funding the system over a closed 30-year period while adhering to the applicable statutes of the State of Missouri, as well as sound financial principles, such as maintaining contribution rate stability and intergenerational equity. The policy sets forth certain actions, actuarial assumptions, and actuarial methods that are to be utilized in executing the funding strategy. Key principles and objectives of the funding policy are summarized in Section II.

There have been no changes to the funding policy that affect our valuation since the prior year.

#### **Governmental Accounting Standards**

This report contains certain financial statement information, including notes and required supplemental information, prepared in accordance with our understanding of Governmental Accounting Standards No. 67 and No. 68 ("GASB 67" and "GASB 68"), as amended. Information prepared in accordance with GASB 67 is intended to assist PSRS with the preparation of its Comprehensive Annual Financial Report. Information shown in this report prepared in accordance with GASB 68 are the collective amounts for all participating employers in aggregate. Further calculation is required to determine the proportionate share applicable to each participating employer. PSRS is responsible for confirming the accuracy and completeness of any financial reporting information contained herein.

#### **Changes in Actuarial Assumptions**

There were no changes in the actuarial assumptions for the June 30, 2020 valuation.

#### **Changes in Plan Provisions**

The working after retirement provision for PSRS retirees under Section 169.560 of the Revised Statutes of the State of Missouri was amended during the year to change the working after retirement limitations without a suspension of retirement allowance for PSRS retirees returning to work at community colleges to equal 550 hours and 50% of salary. The provisions limitation for such retired members was \$15,000 of salary (with no hours-based limit).

This amendment to the working after retirement provisions has no impact on our valuation of the benefit liabilities.

It is our understanding that other provisions are the same as the prior year.

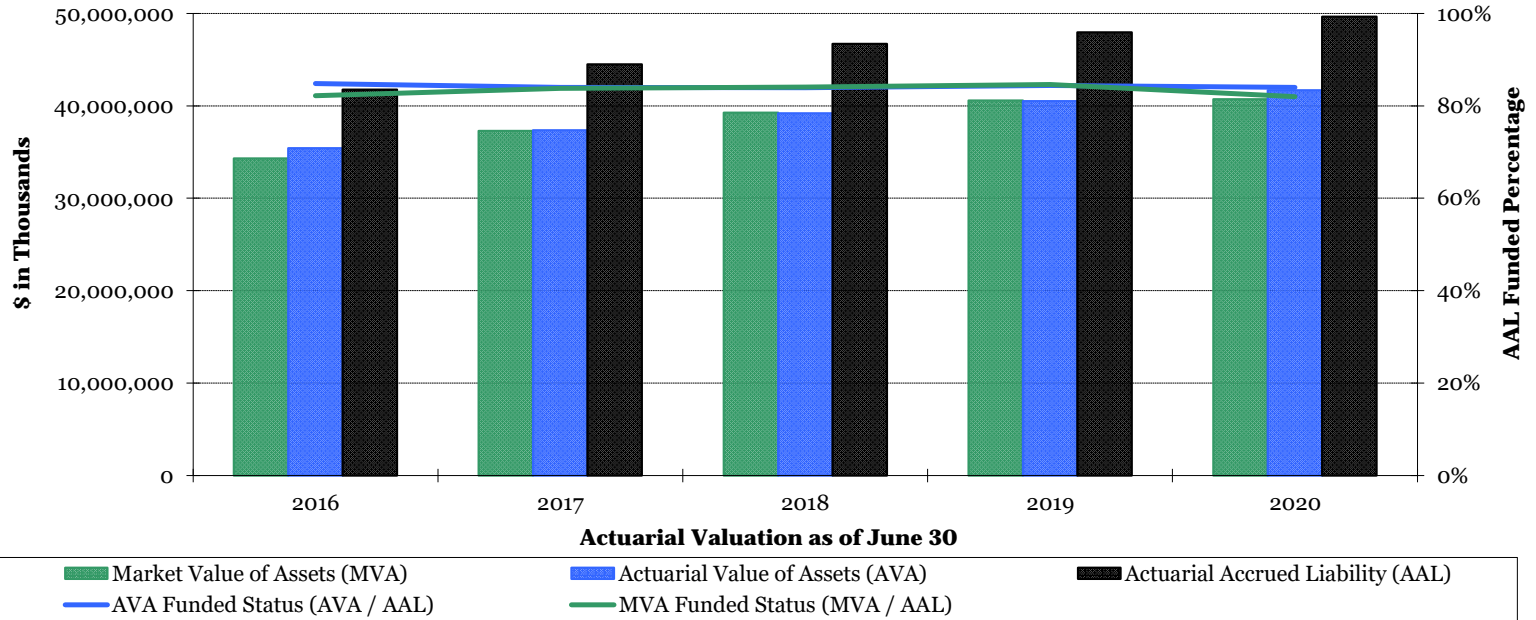
#### **Changes in Actuarial Methods**

There were no changes in the actuarial methods for the June 30, 2020 valuation.

SECTION I - EXECUTIVE SUMMARY

HISTORICAL SUMMARY

**5-Year History of Funded Status**



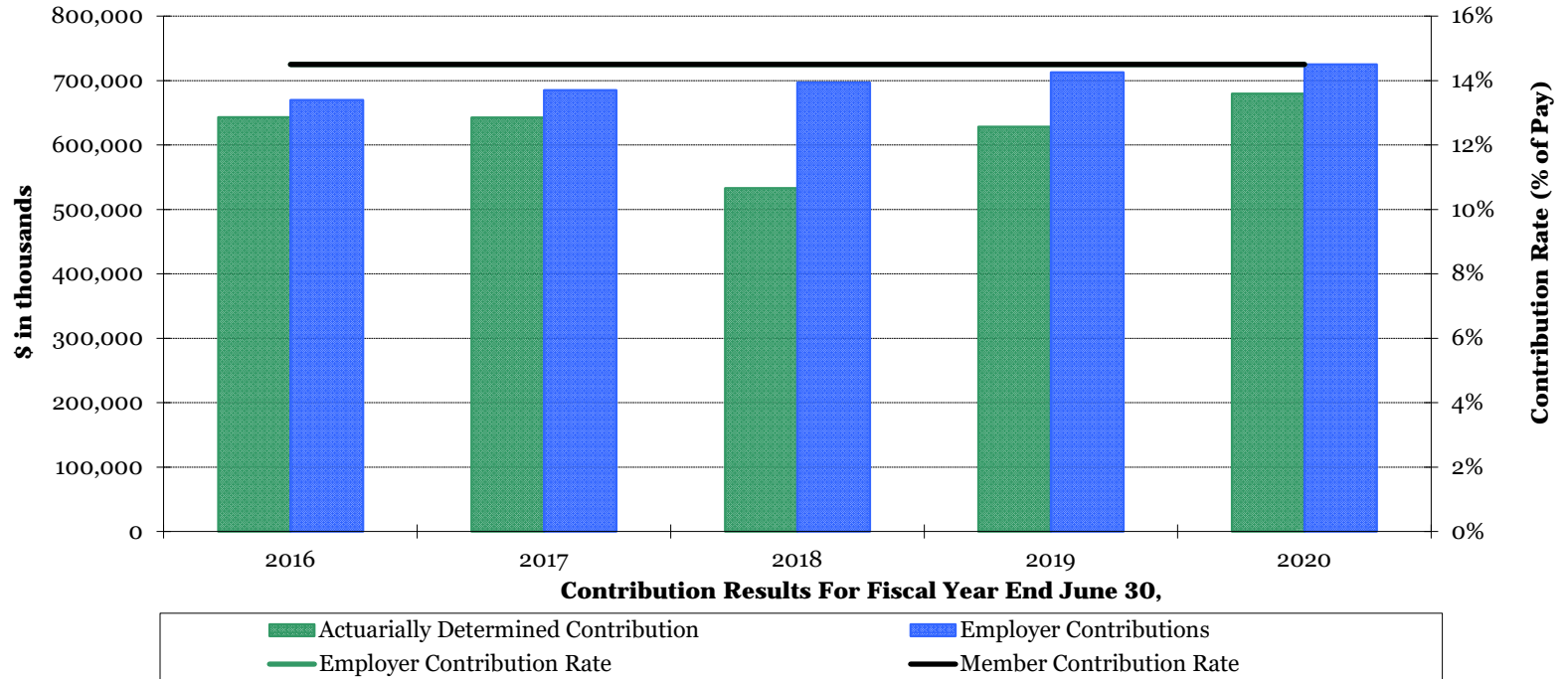
**Actuarial Valuation as of June 30:**

(\$ in '000's)	2016	2017	2018	2019	2020
Actuarial Accrued Liability (AAL)	\$41,744,618	\$44,501,771	\$46,702,002	\$47,973,829	\$49,641,020
Actuarial Value of Assets (AVA)	\$35,419,277	\$37,373,739	\$39,211,452	\$40,498,479	\$41,705,059
Market Value of Assets (MVA)	\$34,303,970	\$37,280,246	\$39,259,545	\$40,593,759	\$40,710,304
Unfunded Liability (AAL - AVA)	\$6,325,340	\$7,128,033	\$7,490,550	\$7,475,351	\$7,935,962
AVA Funded Status (AVA / AAL)	84.8%	84.0%	84.0%	84.4%	84.0%
MVA Funded Status (MVA / AAL)	82.2%	83.8%	84.1%	84.6%	82.0%

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**5-Year History of Contributions**



**Contribution Results For Fiscal Year:**

<b><u>(\$ in '000's)</u></b>	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Actuarially Determined Contribution <sup>1</sup>	\$643,156	\$642,822	\$533,062	\$628,514	\$679,496
Employer Contributions	\$669,954	\$684,858	\$696,970	\$712,545	\$724,995
ADC % Contributed	104.2%	106.5%	130.7%	113.4%	106.7%
Employer ADC Rate	13.92%	13.61%	11.09%	12.79%	13.59%
Employer Contribution Rate	14.50%	14.50%	14.50%	14.50%	14.50%
Member Contribution Rate	14.50%	14.50%	14.50%	14.50%	14.50%

<sup>1</sup> Employer portion only

<sup>2</sup> Actuarially Determined Contribution (ADC) based on ADC percentage calculated in the prior fiscal year and payroll during the current year.



SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results <sup>1</sup>**

<b><u>Valuation Date</u></b>	<b><u>June 30, 2016</u></b>	<b><u>June 30, 2017</u></b>	<b><u>June 30, 2018</u></b>	<b><u>June 30, 2019</u></b>	<b><u>June 30, 2020</u></b>
Development of Actuarially Determined Contribution Rate:					
1. Anticipated Payroll <sup>2</sup>	\$ 4,556,137,282	\$ 4,655,169,121	\$ 4,759,665,456	\$ 4,844,248,703	\$ 4,919,286,103
2. Total Normal Cost: <sup>3</sup>					
a. Amount	\$ 740,176,751	\$ 792,276,388	\$ 830,084,321	\$ 845,283,640	\$ 859,537,572
b. Percentage of Payroll	16.25%	17.02%	17.44%	17.45%	17.47%
3. Total Unfunded Actuarial Accrued Liability Annual Amortizations: <sup>4</sup>					
a. Amount	\$ 425,472,449	\$ 477,985,311	\$ 506,939,657	\$ 518,973,767	\$ 560,501,741
b. Percentage of Payroll	9.34%	10.27%	10.65%	10.71%	11.39%
4. Total Actuarially Determined Contribution Rate:					
a. Percentage of Payroll: (2)(b) + (3)(b)	<b>25.59%</b>	<b>27.29%</b>	<b>28.09%</b>	<b>28.16%</b>	<b>28.86%</b>
b. Effective UAAL Amortization Period	24.6 Years	24.2 Years	23.4 Years	22.4 Years	21.7 Years
5. Recommended Total Contribution Rate, Member + Employer:					
a. Percentage of Payroll	<b>29.00%</b>	<b>29.00%</b>	<b>29.00%</b>	<b>29.00%</b>	<b>29.00%</b>
b. Effective UAAL Amortization Period	14.8 Years	18.6 Years	20.4 Years	19.7 Years	21.3 Years
c. Effective Date	July 1, 2017	July 1, 2018	July 1, 2019	July 1, 2020	July 1, 2021

<sup>1</sup> The contribution rates shown were developed on a funding basis only and do not reflect accounting requirements.

<sup>2</sup> Reflects two-thirds of the anticipated payroll for members covered by Social Security and expected to contribute two-thirds of the contribution rate.

<sup>3</sup> The Normal Cost is as of the beginning of the year and includes a 1.00% load for anticipated losses on service purchases.

<sup>4</sup> The UAAL Amortization is as of the beginning of the year.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

	<u>June 30, 2016</u>	<u>June 30, 2017</u>	<u>June 30, 2018</u>	<u>June 30, 2019</u>	<u>June 30, 2020</u>
Census Information					
Active					
Number <sup>1</sup>	78,129	78,274	78,700	78,863	78,848
Average Age	42.0	42.0	42.1	42.2	42.3
Average Years of Service	11.6	11.7	11.8	12.0	12.2
Anticipated Payroll of Actives (\$ in 000's) <sup>2</sup>	\$ 4,556,137	\$ 4,655,169	\$ 4,759,665	\$ 4,844,249	\$ 4,919,286
Inactive					
Vested					
Number <sup>3</sup>	8,112	8,500	8,697	9,076	9,272
Annual Deferred Annuities (\$ in 000's)	\$ 88,177	\$ 95,168	\$ 98,640	\$ 105,197	\$ 109,645
Non Vested					
Number	4,821	4,796	4,949	5,037	4,817
Account Balance (\$ in 000's)	\$ 50,241	\$ 53,582	\$ 57,981	\$ 62,531	\$ 61,709
Former Members					
Entitled to a Deferred Annuity					
Number	80	63	59	54	44
Annual Deferred Annuities (\$ in 000's)	\$ 1,129	\$ 781	\$ 826	\$ 744	\$ 558
Entitled to a Refund of Contributions					
Number	3,363	3,397	3,819	3,908	4,286
Account Balance (\$ in 000's)	\$ 27,284	\$ 28,196	\$ 35,035	\$ 33,766	\$ 40,656
Retiree/Beneficiary/Disabled					
Number	58,020	59,772	61,295	63,072	64,595
Annual Benefits Payable (\$ in 000's) <sup>4</sup>	\$ 2,358,773	\$ 2,446,466	\$ 2,548,443	\$ 2,642,949	\$ 2,734,868

<sup>1</sup> The number of active members as of June 30, 2020 includes 1,990 members who retired in July 2020.

<sup>2</sup> Figures shown are the anticipated payroll for the one-year period following the valuation date. For the June 30, 2020 valuation, anticipated payroll excludes 1,990 members who retired in July 2020 and reflects two-thirds of the anticipated payroll for members covered by Social Security and expected to contribute two-thirds of the contribution rate.

<sup>3</sup> The number of inactive vested members as of June 30, 2020 includes 23 members who retired in July 2020.

<sup>4</sup> Excludes \$5,000 death benefits and tax sheltered annuities, but these amounts were included in the valuation. The annual benefits payable as of June 30, 2020 does not include 2,013 members who retired in July 2020. The annual benefits payable for the 2,013 members who retired in July 2020 are \$88,162,742.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

	<u>June 30, 2016</u>	<u>June 30, 2017</u>	<u>June 30, 2018</u>	<u>June 30, 2019</u>	<u>June 30, 2020</u>
<b>Present Value of Future Benefits</b>					
Member Contribution Balances <sup>1</sup>	\$ 6,994,369,700	\$ 7,267,681,769	\$ 7,593,868,722	\$ 7,928,035,824	\$ 8,268,226,449
Retiree/Beneficiary	25,559,758,445	27,185,059,855	28,435,300,101	29,042,424,680	30,109,313,428
Disabled	335,253,120	359,021,885	375,851,216	387,568,147	406,249,791
Inactive	124,310,214	146,873,655	154,634,188	191,218,443	169,697,361
Active	15,664,041,020	17,003,335,076	17,980,239,466	18,371,091,887	18,716,214,677
Total	\$ 48,677,732,499	\$ 51,961,972,240	\$ 54,539,893,693	\$ 55,920,338,981	\$ 57,669,701,706
<b>Actuarial Accrued Liability (AAL)</b>					
Member Contribution Balances <sup>1</sup>	\$ 6,994,369,700	\$ 7,267,681,769	\$ 7,593,868,722	\$ 7,928,035,824	\$ 8,268,226,449
Retiree/Beneficiary	25,559,758,445	27,185,059,855	28,435,300,101	29,042,424,680	30,109,313,428
Disabled	335,253,120	359,021,885	375,851,216	387,568,147	406,249,791
Inactive	124,310,214	146,873,655	154,634,188	191,218,443	169,697,361
Active	8,730,927,183	9,543,134,127	10,142,347,645	10,424,582,142	10,687,533,378
Total	\$ 41,744,618,662	\$ 44,501,771,291	\$ 46,702,001,872	\$ 47,973,829,236	\$ 49,641,020,407
<b>Actuarial Value of Assets (AVA)</b>					
Member Contribution Balances	\$ 6,994,369,700	\$ 7,267,681,769	\$ 7,593,868,722	\$ 7,928,035,824	\$ 8,268,226,449
Retiree/Beneficiary	25,559,758,445	27,185,059,855	28,435,300,101	29,042,424,680	30,109,313,428
Disabled	335,253,120	359,021,885	375,851,216	387,568,147	406,249,791
Inactive	124,310,214	146,873,655	154,634,188	191,218,443	169,697,361
Active	2,405,585,800	2,415,102,455	2,651,798,261	2,949,231,468	2,751,571,637
Total	\$ 35,419,277,279	\$ 37,373,739,619	\$ 39,211,452,488	\$ 40,498,478,562	\$ 41,705,058,666
<b>Unfunded Actuarial Accrued Liability: AAL - AVA <sup>2</sup></b>					
Member Contribution Balances	\$ -	\$ -	\$ -	\$ -	\$ -
Retiree/Beneficiary	-	-	-	-	-
Disabled	-	-	-	-	-
Inactive	-	-	-	-	-
Active	6,325,341,383	7,128,031,672	7,490,549,384	7,475,350,674	7,935,961,741
Total	\$ 6,325,341,383	\$ 7,128,031,672	\$ 7,490,549,384	\$ 7,475,350,674	\$ 7,935,961,741
<b>Funded Percentage: AVA / AAL <sup>2</sup></b>					
Member Contribution Balances	100.0%	100.0%	100.0%	100.0%	100.0%
Retiree/Beneficiary	100.0%	100.0%	100.0%	100.0%	100.0%
Disabled	100.0%	100.0%	100.0%	100.0%	100.0%
Inactive	100.0%	100.0%	100.0%	100.0%	100.0%
Active	27.6%	25.3%	26.1%	28.3%	25.7%
Total	84.8%	84.0%	84.0%	84.4%	84.0%
<b>Market Value of Assets</b>					
	\$ 34,303,969,835	\$ 37,280,246,064	\$ 39,259,545,410	\$ 40,593,758,865	\$ 40,710,304,168
<b>Summary of Assumptions</b>					
Valuation Interest Rate	7.75%	7.60%	7.50%	7.50%	7.50%
Salary Increases	3.00% - 9.50%	3.00% - 9.50%	3.00% - 9.50%	3.00% - 9.50%	3.00% - 9.50%
Cost-of-Living Assumption	1.00% - 1.50%	1.20% - 1.65%	1.20% - 1.65%	1.20% - 1.65%	1.20% - 1.65%

<sup>1</sup> Member contribution balances as of June 30, 2020 include \$7,546,983,404 associated with active members and \$721,243,045 associated with inactive members.

<sup>2</sup> In determining the funded percentage, the assets are allocated first to member contribution balances, then to the retiree/beneficiary/disabled liability, then to the inactive liability, and then to the active liability. This does not represent a legal allocation of assets.

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## SECTION II - FUNDING

### **FUNDING**

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## SECTION II - FUNDING

### **A. Summary of Funding Policy**

#### **Introduction**

The Board of Trustees (Board) for the Public School Retirement System of Missouri (PSRS) has adopted a funding policy to record the Board's funding objectives, including the systematic funding of future benefit payments for members of PSRS. The Board, through its funding policy, adopts the actuarial assumptions and methods to be used in performing the actuarial valuation, which is the basis for determining the annual contribution rate for both employers and members. The funding policy is updated every five years in conjunction with an experience study. Other changes to the funding policy may be considered in the interim as deemed appropriate by the Board or as recommended by the actuary. The funding policy was most recently amended at the October 29, 2018 Board meeting, with all changes effective for the June 30, 2018 actuarial valuations.

The "Funding" results presented in this section of the report were prepared in accordance with our understanding of the funding policy.

#### **Funding Objective**

The funding objective set by the Board 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.

#### **Principles of Funding**

The Board has identified the following principles to guide its funding policy:

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 an 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, the contribution rate first paid during 2011-2012.

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## SECTION II - FUNDING

### **A. Summary of Funding Policy (Continued)**

#### **Annual Actuarial Valuation to Set Contribution Rates**

In accordance with statute, annual actuarial valuations of the System's assets and liabilities shall be performed by an actuary. The contribution rate shall be established based on the results of these valuations. The funding policy requires that the Actuarially Determined Contribution ("ADC") Rate is equal to the sum of the employer Normal Cost Rate and the Unfunded Actuarial Accrued Liability ("UAAL") Amortization Rate. The Normal Cost Rate is the portion of the Present Value of Future Benefits allocated to the year following the Actuarial Valuation Date by the Actuarial Cost Method, expressed as a percentage of anticipated payroll. The Unfunded Actuarial Accrued Liability (UAAL) Amortization Rate is the portion of difference between the Actuarial Accrued Liability and Actuarial Value of Assets as of the valuation date that is to be amortized, expressed as a percentage of anticipated payroll. The contribution rates shall be approved by the Board no later than December 31st for the upcoming school year.

The Board, at its discretion, but subject to certain statutory restrictions, may authorize a change in the member and employer contribution rates from one year to the next should the actuary determine that the contribution rates currently in effect are more or less than required to fully fund the plan over the weighted-average period of the existing UAAL amortization bases established in accordance with the funding policy. The decision by the Board will be based on the expected number of years required to fully fund under the current contribution rates. By statute, the contribution rates cannot be increased by more than 1.0% (0.5% for employers and 0.5% for members) per year.

SECTION II - FUNDING

**B. Development of Funded Status**

	<b>June 30, 2019</b>	<b>June 30, 2020</b>
1. Present Value of Future Benefits		
a. Member Contribution Balances <sup>1</sup>	\$ 7,928,035,824	\$ 8,268,226,449
b. Retirees, Beneficiaries, and Disableds	29,429,992,827	30,515,563,219
c. Inactives	191,218,443	169,697,361
d. Actives	18,371,091,887	18,716,214,677
e. Total: (1)(a) + (1)(b) + (1)(c) + (1)(d)	\$ 55,920,338,981	\$ 57,669,701,706
2. Actuarial Accrued Liability		
a. Member Contribution Balances <sup>1</sup>	\$ 7,928,035,824	\$ 8,268,226,449
b. Retirees, Beneficiaries, and Disableds	29,429,992,827	30,515,563,219
c. Inactives	191,218,443	169,697,361
d. Actives	10,424,582,142	10,687,533,378
e. Total: (2)(a) + (2)(b) + (2)(c) + (2)(d)	\$ 47,973,829,236	\$ 49,641,020,407
3. Actuarial Value of Assets <sup>2</sup>		
a. Member Contribution Balances	\$ 7,928,035,824	\$ 8,268,226,449
b. Retirees, Beneficiaries, and Disableds	29,429,992,827	30,515,563,219
c. Inactives	191,218,443	169,697,361
d. Actives	2,949,231,468	2,751,571,637
e. Total: (3)(a) + (3)(b) + (3)(c) + (3)(d)	\$ 40,498,478,562	\$ 41,705,058,666
4. Unfunded Actuarial Accrued Liability <sup>2</sup>		
a. Member Contribution Balances: (2)(a) - (3)(a)	\$ -	\$ -
b. Retirees, Beneficiaries, and Disableds: (2)(b) - (3)(b)	-	-
c. Inactives: (2)(c) - (3)(c)	-	-
d. Actives: (2)(d) - (3)(d)	7,475,350,674	7,935,961,741
e. Total: (2)(e) - (3)(e)	7,475,350,674	7,935,961,741
5. Funded Percentage <sup>2</sup>		
a. Member Contribution Balances: (3)(a)/(2)(a)	100.0%	100.0%
b. Retirees, Beneficiaries, and Disableds: (3)(b)/(2)(b)	100.0%	100.0%
c. Inactives: (3)(c)/(2)(c)	100.0%	100.0%
d. Actives: (3)(d)/(2)(d)	28.3%	25.7%
e. Total: (3)(e)/(2)(e)	84.4%	84.0%

<sup>1</sup> Member contribution balances include \$7,546,983,404 associated with active members and \$721,243,045 associated with inactive members.

<sup>2</sup> In determining the funded percentage, the assets are allocated first to member contribution balances, then to the retiree/beneficiary/disabled liability, then to the inactive liability, and then to the active liability. This does not represent a legal allocation of assets.

SECTION II - FUNDING

**C. Reconciliation of Unfunded Actuarial Accrued Liability**

1. June 30, 2019 Unfunded Actuarial Accrued Liability	\$	7,475,350,674
2. Normal Cost for 2019 Plan Year		845,283,640
3. Actuarially Determined Contribution (Employer + Member)		1,364,257,407
4. Interest of 7.50% on (1) + (2) - (3)		<u>521,728,268</u>
5. Expected June 30, 2020 Unfunded Actuarial Accrued Liability: (1) + (2) - (3) + (4)	\$	7,478,105,175
6. Actuarial Value of Assets Experience (Gain)/Loss <sup>1</sup>	\$	417,365,593
7. Actuarial Accrued Liability Experience (Gain)/Loss		
a. Actuarial Accrued Liability Experience	\$	(143,890,935)
b. Additional Liability Due to Cost-of-living Adjustments <sup>2</sup>		184,381,908
c. Additional Liability Due to Changes in Actuarial Assumptions		-
d. Additional Liability Due to Changes in Plan Provisions		<u>-</u>
8. Total Experience (Gain)/Loss - New Amortization Base (6) + (7)(a) + (7)(b) + (7)(c) + (7)(d)	\$	457,856,566
9. Actual June 30, 2020 Unfunded Actuarial Accrued Liability: (5) + (8)	\$	7,935,961,741

<sup>1</sup> Based on Actuarial (smoothed) Value of Assets. Includes a gain due to contributions made in excess of the Actuarially Determined Contribution.

<sup>2</sup> The Board granted a Cost-of-Living Adjustment (COLA) of 2.00% effective January 1, 2021, in accordance with the Board's COLA policy, compared to the assumed increase of 1.30%.



SECTION II - FUNDING

**D. Reconciliation of Actuarial Accrued Liability**

1. June 30, 2019 Actuarial Accrued Liability	\$	47,973,829,236	
2. Normal Cost for 2019 Plan Year		845,283,640	
3. Actual Benefit Payments <sup>1</sup>		2,813,232,110	
4. Transfers, Purchases, and Reinstatements <sup>2</sup>		35,497,147	
5. Interest of 7.50% on (1) + (2) - (3) + (4) <sup>3</sup>		<u>3,559,151,521</u>	
6. Expected June 30, 2020 Actuarial Accrued Liability: (1) + (2) - (3) + (4) + (5)	\$	<u>49,600,529,434</u>	
		<u>Dollar Change</u>	<u>Percent Change</u>
		<u>in Liability</u>	<u>in Liability</u>
7. (Gain)/Loss Components			
a. Member Experience Other Than Salary Experience	\$	35,650,571	0.1%
b. Member Salary Experience		(179,541,506)	(0.4%)
c. Additional Liability Due to Cost-of-Living Adjustment <sup>4</sup>		184,381,908	0.4%
d. Additional Liability Due to Assumption Changes		-	0.0%
e. Additional Liability Due to Plan Provision Changes		-	0.0%
f. Total: (7)(a) + (7)(b) + (7)(c) + (7)(d) + (7)(e)	\$	<u>40,490,973</u>	<u>0.1%</u>
8. Actual June 30, 2020 Actuarial Accrued Liability: (6) + (7)(f)	<b>\$</b>	<b><u>49,641,020,407</u></b>	

<sup>1</sup> Includes refunds of accumulated member contributions.

<sup>2</sup> Includes \$876,729 of employer reciprocity and RSMo 169.655 transfers and \$34,620,418 of member service purchases and reinstatements.

<sup>3</sup> Reflects a half year of interest on benefit payments and transfers, purchases and reinstatements.

<sup>4</sup> The Board granted a Cost-of-Living Adjustment (COLA) of 2.00% effective January 1, 2021, in accordance with the Board's COLA policy, compared to the assumed increase of 1.30%.

SECTION II - FUNDING

**E. Reconciliation of Market Value of Assets**

	<b>June 30, 2019</b>	<b>June 30, 2020</b>
1. Market Value of Assets, Prior June 30	\$ 39,259,545,410	\$ 40,593,758,865
2. Operating Revenues (Receipts)		
a. Employer Contributions	\$ 712,545,096	\$ 724,995,473 <sup>1</sup>
b. Member Contributions	747,402,726	757,916,937 <sup>2</sup>
c. Interest	225,956,742	219,400,809
d. Dividends	229,988,612	196,827,541
e. Net Income from Security Lending Activities	4,475,013	2,977,639
f. Net Capital Appreciation/(Depreciation)	2,590,083,212	1,423,571,244
g. Investment Expenses	(454,644,412)	(385,450,713)
h. Other Income	6,366	191,770
i. Total Receipts:	\$ 4,055,813,355	\$ 2,940,430,700
(2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f) + (2)(g) + (2)(h)		
3. Operating Expenses (Disbursements)		
a. Benefit Payments	\$ 2,660,977,570	\$ 2,758,725,793
b. Refunds to Members	49,295,932	54,506,317
c. Administrative Expenses	11,282,371	10,653,233 <sup>3</sup>
d. Other Expenses	44,027	54
e. Total Disbursements:	\$ 2,721,599,900	\$ 2,823,885,397
(3)(a) + (3)(b) + (3)(c) + (3)(d)		
4. Excess of Revenues over Expenses: (2)(i) - (3)(e)	\$ 1,334,213,455	\$ 116,545,303
5. Market Value of Assets, Current June 30: (1) + (4)	<b>\$ 40,593,758,865</b>	<b>\$ 40,710,304,168</b>

<sup>1</sup> Includes \$876,729 of reciprocity and RSMo 169.655 transfers, \$94,099 of contributions for system employees other than investment staff, and \$54,439 of interest and other adjustments.

<sup>2</sup> Includes \$34,620,418 of member service purchases and reinstatements.

<sup>3</sup> Includes \$94,099 of contributions for system employees other than investment staff.

SECTION II - FUNDING

**F. Development of Actuarial Value of Assets**

1.	Actuarial Value of Assets June 30, 2019		\$ 40,498,478,562
2.	Activity for Fiscal Year 2020		
a.	Contributions <sup>1</sup>		\$ 1,482,912,410
b.	Benefit Payments <sup>2</sup>		<u>(2,813,232,110)</u>
c.	Net Cash Flow		\$ (1,330,319,700)
3.	Expected Returns <sup>3</sup>		\$ 2,988,400,770
4.	Assets Before Allocation of Gain/Loss: (1) + (2)(c) + (3)		\$ 42,156,559,632
5.	Actual Returns for 2020 (Net of Expenses)		\$ 1,446,865,003
6.	Excess Returns for 2020: (5) - (3)		\$ (1,541,535,767)
7.	Recognized Excess Returns:		
	<u>Year</u>	<u>Excess Return</u>	<u>% Unrecognized</u>
	2020	(1,541,535,767)	80%
	2019	(310,280,225)	60%
	2018	366,045,145	40%
	2017	1,391,120,962	20%
	2016	(2,162,854,947)	0%
	Total		<u>\$ (451,500,966)</u>
8.	Actuarial Value of Assets, June 30, 2020: (4) + (7)		<b>\$ 41,705,058,666</b>

<sup>1</sup> Includes \$876,729 of reciprocity and RSMo 169.655 transfers, \$94,099 of contributions for system employees other than investment staff, \$54,439 of interest and other adjustments, and \$34,620,418 of member service purchases and reinstatements.

<sup>2</sup> Includes refunds of accumulated member contributions.

<sup>3</sup> Assumes cash flows occur at mid-year.

SECTION II - FUNDING

**G. Contribution Rate**

<b>Development of Actuarially Determined Contribution Rate:</b>	<b>June 30, 2019</b>	<b>June 30, 2020</b>
1. Anticipated Payroll	\$ 4,844,248,703	\$ 4,919,286,103 <sup>1</sup>
2. Normal Cost		
a. Amount	\$ 845,283,640	\$ 859,537,572
b. Percentage of Payroll	17.45%	17.47%
3. Unfunded Actuarial Accrued Liability (UAAL) Amortization		
a. Amount	\$ 518,973,767	\$ 560,501,741
b. Percentage of Payroll	10.71%	11.39%
4. Actuarially Determined Contribution Rate		
a. Percentage of Payroll: (2)(b) + (3)(b)	<b>28.16%</b>	<b>28.86%</b>
b. Effective UAAL Amortization Period	22.4 Years	21.7 Years
5. Recommended Total Contribution Rate, Member + Employer		
a. Percentage of Payroll	<b>29.00%</b>	<b>29.00%</b>
b. Effective UAAL Amortization Period	19.7 Years	21.3 Years
c. Effective Date	July 1, 2020	July 1, 2021

<sup>1</sup> Equal to \$4,877,365,030 of anticipated payroll for members that are not covered by Social Security and two-thirds (2/3) of \$62,881,610 of anticipated payroll for members that are covered by Social Security and expected to contribute two-thirds of the contribution rate.

SECTION II - FUNDING

**H. Development of the Normal Cost Rate**

	<u>Dollar <sup>1</sup></u>	<u>Rate</u>
1. Active Members		
a. Retirement Benefits	\$ 698,793,456	14.20%
b. Termination Benefits	141,013,105	2.87%
c. Death and Disability Benefits	<u>19,731,011</u>	<u>0.40%</u>
d. Total Normal Cost	\$ 859,537,572	17.47%
2. Anticipated Member Payroll <sup>2</sup>	\$ 4,919,286,103	

<sup>1</sup> Normal cost amounts include a 1.00% load for anticipated losses on service purchases.

<sup>2</sup> Equal to \$4,877,365,030 of anticipated payroll for members that are not covered by Social Security and two-thirds (2/3) of \$62,881,610 of anticipated payroll for members that are covered by Social Security and expected to contribute two-thirds of the contribution rate.

SECTION II - FUNDING

**I. Development of the Unfunded Actuarial Accrued Liability Amortization Rate**

	Date Base Established	Reason	Remaining Balance <sup>1</sup>	Remaining Period	Amortization Amount	Rate
1.	6/30/2007	Plan Amendment	\$ 23,354,981	7	\$ 3,805,300	0.08%
2.	6/30/2011	UAAL Fresh Start	5,407,981,688	21	389,889,736	7.93%
3.	6/30/2012	Actuarial Experience	1,616,353,814	22	113,367,422	2.30%
4.	6/30/2013	Actuarial Experience	744,529,405	23	50,898,710	1.03%
5.	6/30/2013	Plan Amendment	(66,648,467)	23	(4,556,329)	-0.09%
6.	6/30/2014	Actuarial Experience	(843,790,138)	24	(56,322,784)	-1.14%
7.	6/30/2015	Actuarial Experience	(202,683,757)	25	(13,230,560)	-0.27%
8.	6/30/2016	Actuarial Experience and Assumption Changes	(305,108,045)	26	(19,505,118)	-0.40%
9.	6/30/2017	Actuarial Experience and Assumption Changes	794,335,891	27	49,797,620	1.01%
10.	6/30/2018	Actuarial Experience and Assumption Changes	342,162,082	28	21,060,718	0.43%
11.	6/30/2019	Actuarial Experience	(32,382,279)	29	(1,959,167)	-0.04%
12.	6/30/2020	Actuarial Experience	<u>457,856,566</u>	30	<u>27,256,193</u>	0.55%
	Total		\$ 7,935,961,741		\$ 560,501,741	11.39%
10.	Anticipated Member Payroll <sup>2</sup>				\$ 4,919,286,103	

<sup>1</sup> In accordance with the funding policy, amounts are amortized as a level percent of payroll assuming 2.75% payroll growth and 7.50% discount rate.

<sup>2</sup> Equal to \$4,877,365,030 of anticipated payroll for members that are not covered by Social Security and two-thirds (2/3) of \$62,881,610 of anticipated payroll for members that are covered by Social Security and expected to contribute two-thirds of the contribution rate.

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SECTION II - FUNDING

**J. History of Contribution Rates**<sup>1</sup>

<u>Valuation Date</u>	<u>Effective Date</u>	<u>Total Contribution Rate</u>
June 30, 2001	July 1, 2002	21.00%
June 30, 2002	July 1, 2003	21.00%
June 30, 2003	July 1, 2004	22.00%
June 30, 2004	July 1, 2005	23.00%
June 30, 2005	July 1, 2006	24.00%
June 30, 2006	July 1, 2007	25.00%
June 30, 2007	July 1, 2008	26.00%
June 30, 2008	July 1, 2009	27.00%
June 30, 2009	July 1, 2010	28.00%
June 30, 2010	July 1, 2011	29.00%
June 30, 2011	July 1, 2012	29.00%
June 30, 2012	July 1, 2013	29.00%
June 30, 2013	July 1, 2014	29.00%
June 30, 2014	July 1, 2015	29.00%
June 30, 2015	July 1, 2016	29.00%
June 30, 2016	July 1, 2017	29.00%
June 30, 2017	July 1, 2018	29.00%
June 30, 2018	July 1, 2019	29.00%
June 30, 2019	July 1, 2020	29.00%
June 30, 2020	July 1, 2021	29.00%

<sup>1</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.

SECTION II - FUNDING

**K. Historical Investment Experience**

Year Ending June 30	Rate of Investment Return		Actuarial Assumed Interest Rate
	Market Basis <sup>1</sup>	Actuarial Basis <sup>2,3</sup>	
2008	(4.4%)	8.1%	8.00%
2009	(19.5%)	2.1%	8.00%
2010	12.8%	2.3%	8.00%
2011	21.6%	4.0%	8.00%
2012	1.7%	1.2%	8.00%
2013	12.4%	4.4%	8.00%
2014	16.7%	11.0%	8.00%
2015	4.3%	10.2%	8.00%
2016	1.6%	7.2%	8.00%
2017	12.3%	8.8%	7.75%
2018	8.7%	8.2%	7.60%
2019	6.9%	6.6%	7.50%
2020	3.7%	6.4%	7.50%

<sup>1</sup> As provided by PSRS. Net of all expenses and fees.

<sup>2</sup> Approximate return net of all expenses and fees and assuming all cash flows occurred at mid-year.

<sup>3</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.



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SECTION III - ACCOUNTING

**ACCOUNTING**

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SECTION III - ACCOUNTING

**PLAN FINANCIAL STATEMENTS UNDER GASB #67**

**A. Statement of Fiduciary Net Position under GASB #67 as of June 30, 2020**

1.	Assets		
	a. Cash	\$	477,073,140
	b. Receivables		
	i. Contributions Receivable	\$	186,415,456
	ii. Accrued Interest and Dividends		80,164,310
	iii. Investment Sales		2,079,124,234
	iv. Due from PEERS		909,995
	v. Other		4,939
	vi. Total Receivables	\$	2,346,618,934
	c. Total Investments		
	i. Short-Term Investments	\$	847,870,071
	ii. US Treasuries and TIPS		7,427,600,013
	iii. US Public Equities		10,806,150,721
	iv. Global Public Equities		6,106,269,068
	v. Public Debt		1,818,366,904
	vi. Private Equity		5,203,924,420
	vii. Private Credit		687,963,926
	viii. Private Real Estate		3,487,595,641
	ix. Hedged Assets		3,871,363,162
	x. Total Investments	\$	40,257,103,926
	d. Invested Securities Lending Collateral		115,258,679
	e. Prepaid Expenses		86,073
	f. Fixed Assets, Net of Depreciation		27,430,262
	g. Total Assets: (1)(a) + (1)(b)(vi) + (1)(c)(x) + (1)(d) + (1)(e) + (1)(f)	\$	43,223,571,014
2.	Deferred Outflow of Resources		
	a. Outflows Related to Other Post Employment Benefit Obligations	\$	119,790
3.	Liabilities		
	a. Accounts Payable	\$	15,289,555
	b. Interest Payable		387,549
	c. Securities Lending Collateral		115,220,794
	d. Investment Purchases		2,377,841,474
	e. Due to PEERS		-
	f. Accrued Medical Claims <sup>1</sup>		33,550
	g. OPEB Liability for System Employees <sup>1</sup>		2,519,142
	h. Compensated Absences <sup>1</sup>		1,930,222
	i. Total Liabilities: (3)(a) + (3)(b) + (3)(c) + (3)(d) + (3)(e) + (3)(f) + (3)(g) + (3)(h)	\$	2,513,222,286
4.	Deferred Inflow of Resources		
	a. Inflows Related to Other Post Employment Benefit Obligations	\$	164,350
5.	Fiduciary Net Position Restricted for Pensions: (1)(g) + (2)(a) - (3)(i) - (4)(a)	<b>\$</b>	<b>40,710,304,168</b>

<sup>1</sup> Compensation and benefit costs related to System employees and paid from the Trust.

SECTION III - ACCOUNTING

**PLAN FINANCIAL STATEMENTS UNDER GASB #67**

**B. Statement of Changes in Fiduciary Net Position under GASB #67 for the Year Ended June 30, 2020**

1. Fiduciary Net Position as of June 30, 2019	\$	40,593,758,865
2. Additions		
a. Contributions		
i. Member Contributions <sup>1</sup>		757,916,937
ii. Employer Contributions - Proportionate Share		723,970,206
iii. Employer Contributions - Other <sup>2</sup>		1,025,267
iv. Non-Employer Contributing Entity Contributions		-
v. Total Contributions	\$	<u>1,482,912,410</u>
b. Investment Income/(Loss)		
i. Net Appreciation/(Depreciation)	\$	1,423,571,244
ii. Net Interest and Dividend Income		416,228,350
iii. Net Income from Security Lending Activities		2,977,639
iv. Other Net Investment Income		-
v. Investment Expenses and Rebates		<u>(385,450,713)</u>
vi. Total Investment Income/(Loss)	\$	1,457,326,520
c. Other Additions		
i. Miscellaneous Income	\$	<u>191,770</u>
ii. Total Other Additions	\$	191,770
d. Total Revenue (Additions): (2)(a)(v) + (2)(b)(vi) + (2)(c)(ii)	\$	2,940,430,700
3. Deductions		
a. Monthly Benefits	\$	2,758,725,793
b. Refunds of Contributions		54,506,317
c. Administrative Expenses <sup>3</sup>		10,653,233
d. Other Expenses		<u>54</u>
e. Total Expenses (Deductions): (3)(a) + (3)(b) + (3)(c) + (3)(d)	\$	2,823,885,397
4. Net Increase (Decrease) in Fiduciary Net Position: (2)(d) - (3)(e)	\$	116,545,303
5. Fiduciary Net Position as of June 30, 2020: (1) + (4)	<b>\$</b>	<b>40,710,304,168</b>

<sup>1</sup> Includes \$34,620,418 of member service purchases and reinstatements.

<sup>2</sup> Includes \$876,729 of reciprocity and RSMo 169.655 transfers, \$94,099 of contributions for system employees other than investment staff, and \$54,439 of interest and other adjustments.

<sup>3</sup> Includes \$94,099 of contributions for system employees other than investment staff, but does not include \$54,439 of interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**C. Net Pension Liability under GASB #68 for the Year Ended June 30, 2020**

1.	Total Pension Liability		
	a. Total Pension Liability - Beginning of year	\$	47,973,829,236
	b. Total service cost		845,283,640
	c. Interest cost <sup>1</sup>		3,559,151,521
	d. Experience (gains)/losses		40,490,973
	e. Assumption changes		-
	f. Plan amendments		-
	g. Benefit payments <sup>2</sup>		(2,813,232,110)
	h. Transfers, Purchases, and Reinstatements		<u>35,497,147</u>
	i. Total Pension Liability - End of year	\$	<u>49,641,020,407</u>
2.	Plan Fiduciary Net Position		
	a. Plan Fiduciary Net Position - Beginning of year	\$	40,593,758,865
	b. Employer contributions <sup>3</sup>		724,995,473
	c. Member contributions <sup>4</sup>		757,916,937
	d. Non-employer contributing entity contributions		-
	e. Investment return		
	i. Expected investment return <sup>1,5</sup>	\$	2,995,546,793
	ii. Investment gain/(loss)		<u>(1,538,028,503)</u>
	iii. Net investment return		1,457,518,290
	f. Benefit payments <sup>2</sup>		(2,813,232,110)
	g. Administrative and Other Expenses <sup>6</sup>		<u>(10,653,287)</u>
	h. Plan Fiduciary Net Position - End of year:	\$	<u>40,710,304,168</u>
3.	Net Pension Liability		
	a. Net Pension Liability: (1)(i) - (2)(h)	<b>\$</b>	<b>8,930,716,239</b>
	b. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability : (2)(h) / (1)(i)		82.0%

<sup>1</sup> Reflects interest on total service cost and actual benefit payments.

<sup>2</sup> Includes refunds of accumulated member contributions.

<sup>3</sup> Includes \$876,729 of reciprocity and RSMo 169.655 transfers, \$94,099 of contributions for system employees other than investment staff, and \$54,439 of interest and other adjustments.

<sup>4</sup> Includes \$34,620,418 of member service purchases and reinstatements.

<sup>5</sup> 7.50%, net of investment expenses and assuming cash flows occur at mid-year.

<sup>6</sup> Includes \$94,099 of contributions for system employees other than investment staff, but does not include \$54,439 of interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2020**

Fiscal Year Established	Reason	Remaining Balance At Beginning of Year	Remaining Period <sup>1</sup>	Annual Recognition	Remaining Balance At End of Year
1. Liability experience					
a. Inflows					
2016	Experience gain	\$ 242,405,521	2.23	\$ 108,702,028	\$ 133,703,493
2019	Experience gain	\$ 291,734,268	4.92	\$ 59,295,584	\$ 232,438,684
b. Outflows					
2014	Experience loss	\$ (13,829,548)	0.39	\$ (13,829,548)	\$ -
2015	Experience loss	\$ (140,818,650)	1.54	\$ (91,440,683)	\$ (49,377,967)
2017	Experience loss	\$ (12,521,043)	3.14	\$ (3,987,595)	\$ (8,533,448)
2018	Experience loss	\$ (71,877,552)	4.05	\$ (17,747,545)	\$ (54,130,007)
2020	Experience loss	\$ (40,490,973)	5.82	\$ (6,957,212)	\$ (33,533,761)
2. Assumption changes					
a. Inflows					
None					
b. Outflows					
2016	Assumption loss	\$ (35,883,151)	2.23	\$ (16,091,100)	\$ (19,792,051)
2017	Assumption loss	\$ (654,493,533)	3.14	\$ (208,437,431)	\$ (446,056,102)
2018	Assumption loss	\$ (355,598,200)	4.05	\$ (87,802,024)	\$ (267,796,176)
3. Investment experience <sup>2</sup>					
a. Inflows					
2017	Investment gain	\$ 595,221,998	2.00	\$ 297,611,001	\$ 297,610,997
2018	Investment gain	\$ 230,741,263	3.00	\$ 76,913,755	\$ 153,827,508
b. Outflows					
2016	Investment loss	\$ (442,486,623)	1.00	\$ (442,486,623)	\$ -
2019	Investment loss	\$ (242,048,636)	4.00	\$ (60,512,160)	\$ (181,536,476)
2020	Investment loss	\$ (1,538,028,503)	5.00	\$ (307,605,701)	\$ (1,230,422,802)
4. Total deferred inflows / outflows: (1) + (2) + (3)					
a. Inflows					
	Total	<b>\$ 1,360,103,050</b>		<b>\$ 542,522,368</b>	<b>\$ 817,580,682</b>
b. Outflows					
	Total	<b>\$ (3,548,076,412)</b>		<b>\$ (1,256,897,622)</b>	<b>\$ (2,291,178,790)</b>

<sup>1</sup> The initial amortization period for liability experience gains / losses and assumption change gains / losses is equal to the expected future working lifetime of all members, active and inactive. The initial amortization period for investment gains / losses is five years.

<sup>2</sup> Net of investment expenses.

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2020 (Continued)**

Amounts reported as collective deferred inflows / (outflows) of resources to be recognized in pension expense:

Year Ending June 30:

2021	\$	(215,996,371)
2022	\$	(535,539,817)
2023	\$	(451,068,552)
2024	\$	(265,288,455)
2025	\$	(5,704,913)
Thereafter	\$	-

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**E. Pension Expense under GASB #68 for the Year Ended June 30, 2020**

1. Service cost	
a. Total service cost	\$ 845,283,640
b. Member contributions <sup>1</sup>	(723,296,519)
c. Administrative and other expenses <sup>2</sup>	10,504,749
d. Net employer service cost	<u>\$ 132,491,870</u>
2. Plan amendments	\$ -
3. Interest cost	\$ 3,559,151,521
4. Expected return on assets	\$ (2,995,546,793)
5. Recognition of deferred (inflows) / outflows of resources related to:	
a. Liability experience (gains) / losses	\$ (34,035,029)
b. Assumption changes (gains) / losses	312,330,555
c. Investment (gains) / losses	436,079,728
d. Total: (5)(a) + (5)(b) + (5)(c)	<u>\$ 714,375,254</u>
6. Total collective pension expense: (1)(d) + (2) + (3) + (4) + (5)(d)	<b>\$ 1,410,471,852</b>

<sup>1</sup> Excludes \$34,620,418 of member service purchases and reinstatements.

<sup>2</sup> Administrative expenses exclude \$94,099 of contributions for system employees other than investment staff, but includes \$54,439 of interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**NOTES TO THE FINANCIAL STATEMENTS UNDER GASB #67 AND #68**

**F. Selected Notes to the Financial Statements under GASB #67 and #68**

1. The Public School Retirement System of Missouri is a cost-sharing multiple-employer plan for GASB accounting purposes.
2. Significant actuarial assumptions and other inputs used to measure the total pension liability:
  - Measurement Date                      June 30, 2020
  - Valuation Date                            June 30, 2020
  - Experience Study                        The Board of Trustees adopts actuarial assumptions, each of which individually represents a reasonable long-term estimate of anticipated experience under the System, derived from experience studies conducted every fifth year. The most recent comprehensive experience study was completed in June 2016. All economic and demographic assumptions were reviewed and updated, where appropriate, based on the results of the study and effective with the June 30, 2016 valuation. Since the last experience study, the investment return and COLA assumptions were updated as of June 30, 2017, based on changes to the Board's funding policy adopted at the November 3, 2017 meeting. For the June 30, 2018 valuation, the investment return assumption was again reviewed and updated from 7.60% to 7.50% as adopted at the October 29, 2018 meeting. The next experience study is scheduled to be completed prior to the June 30, 2021 valuation.
  - Inflation                                    Increasing from 1.95% to 2.25% over six years, beginning January 1, 2022, and 2.25% thereafter
  - Total Payroll Growth                    2.75% per annum, consisting of 2.25% inflation, 0.25% real wage growth due to the inclusion of active health care costs in pensionable earnings, and 0.25% of real wage growth due to productivity.
  - Future Salary Increases                3.00% - 9.50%, depending on service and including 2.25% inflation, 0.25% real wage growth due to the inclusion of active health care costs in pensionable earnings, and 0.25% of real wage growth due to productivity.
  - Cost-of-Living Increases                The cost of living adjustment (COLA) assumed in the valuation increases from 1.35% to 1.65% over six years, beginning January 1, 2022. The COLA reflected for January 1, 2021 is 2.00%, in accordance with the COLA proposed for approval by the Board at the October 26, 2020 meeting. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:
    - If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
    - If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
    - If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be grantedThe COLA is effective each January 1, beginning on the second January after retirement, and capped at 80% lifetime increase.
  - Mortality Assumption
    - Actives:                                      75% of the White Collar RP-2006 Mortality Tables with static projection to 2028 using the 2014 Improvement Scale.



SECTION III - ACCOUNTING

**NOTES TO THE FINANCIAL STATEMENTS UNDER GASB #67 AND #68**

**F. Selected Notes to the Financial Statements under GASB #67 and #68 (Continued)**

- Mortality Assumption (Continued)

Non-Disabled Retirees, Beneficiaries and Survivors: White Collar RP-2006 Mortality Tables with plan-specific experience adjustments and static projection to 2028 using the 2014 SSA Improvement Scale.

Disabled Retirees: RP-2006 Disabled Retiree Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale.

A summary of mortality rates can be found in Section V.

- Discount Rate

The discount rate used to measure the total pension liability was 7.50% as of June, 30, 2020, and is equal to the long-term expected return on plan investments. Consistent with the Board's funding policy, we have assumed that the employer contributions would be made at a rate consistent with the actuarially determined rate, computed in accordance with assumptions and methods stated in the funding policy. The funding policy requires payment of the normal cost and amortization of the unfunded actuarially accrued liability as a level percent of employee payroll in installments over 30 years utilizing a closed period, layered approach. Based on this policy, which has been followed for the past several years, the pension plan's fiduciary net position would be sufficient to make all projected future benefit payments of current plan members.

- Discount Rate Sensitivity	<u>1% Decrease (6.50%)</u>	<u>Current Rate (7.50%)</u>	<u>1% Increase (8.50%)</u>
Net Pension Liability	\$ 15,154,947,371	\$ 8,930,716,239	\$ 3,754,469,990

3. Classes of plan members covered:

- Retired members, beneficiaries and disabled members receiving benefits:	64,595
- Inactive members (vested and non-vested):	14,089
- Former members:	4,330
- Active Plan Members:	78,848
- Total membership:	161,862

4. Money-weighted rate of return:

The money-weighted rate of return equals the investment performance, net of pension plan investment expenses, and adjusted for the changing amounts actually invested. For the fiscal year ending June 30, 2020, the money-weighted return on the plan assets is 3.7%.

5. The components of the Net Pension Liability for the Public School Retirement System of Missouri as of June 30, 2020, are as follows:

- Total Pension Liability	\$ 49,641,020,407
- Plan Fiduciary Net Position	40,710,304,168
- Net Pension Liability	\$ 8,930,716,239
- Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	82.0%

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68**

**G. Schedule of Changes in the Net Pension Liability and Plan Fiduciary Net Position under GASB #67 and #68 <sup>1</sup>**

Year Ending June 30:	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
<b>1. Total Pension Liability</b>					
a. Total Pension Liability - Beginning of year	\$ 36,758,165,411	\$ 38,483,183,932	\$ 40,610,539,616	\$ 41,744,618,662	\$ 44,501,771,291
b. Total service cost <sup>2</sup>	849,712,130	836,085,151	842,548,463	740,176,751	792,276,388
c. Interest cost <sup>3</sup>	2,885,182,982	3,019,050,250	3,263,288,365	3,198,060,384	3,346,220,624
d. Experience (gains)/losses	226,591,816	598,022,063	(677,213,633)	24,483,828	107,372,642
e. Assumption changes	-	-	100,247,551	1,279,805,826	531,202,248
f. Plan amendments	-	-	-	-	-
g. Benefit payments <sup>4</sup>	(2,236,468,407)	(2,326,196,773)	(2,430,906,732)	(2,521,832,399)	(2,606,985,013)
h. Transfers, Purchases, and Reinstatements	-	394,993	36,115,032	36,458,239	30,143,693
i. Total Pension Liability - End of year	<u>\$ 38,483,183,932</u>	<u>\$ 40,610,539,616</u>	<u>\$ 41,744,618,662</u>	<u>\$ 44,501,771,291</u>	<u>\$ 46,702,001,872</u>
<b>2. Plan Fiduciary Net Position</b>					
a. Plan Fiduciary Net Position - Beginning of year	\$ 30,375,416,792	\$ 34,380,608,561	\$ 34,837,679,504	\$ 34,303,969,835	\$ 37,280,246,064
b. Employer contributions <sup>5</sup>	643,989,869	656,924,899	670,794,045	684,857,718	696,970,397
c. Member contributions <sup>6</sup>	679,390,918	689,187,215	704,785,734	719,625,373	726,996,161
d. Non-employer contributing entity contributions	-	-	-	-	-
e. Net investment return	4,927,198,588	1,447,169,203	533,180,246	4,104,123,249	3,173,735,919
f. Benefit payments <sup>4</sup>	(2,236,468,407)	(2,326,196,773)	(2,430,906,732)	(2,521,832,399)	(2,606,985,013)
g. Administrative and Other Expenses <sup>7</sup>	(8,919,199)	(10,013,601)	(11,562,962)	(10,497,712)	(11,418,118)
h. Plan Fiduciary Net Position - End of year	<u>\$ 34,380,608,561</u>	<u>\$ 34,837,679,504</u>	<u>\$ 34,303,969,835</u>	<u>\$ 37,280,246,064</u>	<u>\$ 39,259,545,410</u>

<sup>1</sup> As allowable under GASB #68, PSRS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> The Service Cost shown for fiscal years ending on or before June 30, 2016 is mid-year and includes a 1.00% load for anticipated losses on service purchases. The Service Cost shown for fiscal year ending on or after June 30, 2017 is as of the beginning of the year and includes a 1.00% load for anticipated losses on service purchases. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PSRS.

<sup>3</sup> Reflects actual benefit payments. The Interest Cost shown for fiscal year ending June 30, 2016 includes an adjustment due to changes from mid-year to beginning-of-year and from simple to compound interest. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PSRS.

<sup>4</sup> Includes refunds of accumulated member contributions and other interfund transfers.

<sup>5</sup> Includes contributions for reciprocity and RSMo 169.655 transfers, contributions for system employees, and interest and other adjustments.

<sup>6</sup> Includes contributions for service purchases and reinstatements.

<sup>7</sup> Includes contributions for system employees, but excludes interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68**

**G. Schedule of Changes in the Net Pension Liability and Plan Fiduciary Net Position under GASB #67 and #68 (continued) <sup>1</sup>**

Year Ending June 30:	<u>2019</u>	<u>2020</u>
1. Total Pension Liability		
a. Total Pension Liability - Beginning of year	\$ 46,702,001,872	\$ 47,973,829,236
b. Total service cost <sup>2</sup>	830,084,321	845,283,640
c. Interest cost <sup>3</sup>	3,466,455,927	3,559,151,521
d. Experience (gains)/losses	(351,029,852)	40,490,973
e. Assumption changes	-	-
f. Plan amendments	-	-
g. Benefit payments <sup>4</sup>	(2,710,273,502)	(2,813,232,110)
h. Transfers, Purchases, and Reinstatements	36,590,470	35,497,147
i. Total Pension Liability - End of year	<u>\$ 47,973,829,236</u>	<u>\$ 49,641,020,407</u>
2. Plan Fiduciary Net Position		
a. Plan Fiduciary Net Position - Beginning of year	\$ 39,259,545,410	\$ 40,593,758,865
b. Employer contributions <sup>5</sup>	712,545,096	724,995,473
c. Member contributions <sup>6</sup>	747,402,726	757,916,937
d. Non-employer contributing entity contributions	-	-
e. Net investment return	2,595,865,533	1,457,518,290
f. Benefit payments <sup>4</sup>	(2,710,273,502)	(2,813,232,110)
g. Administrative and Other Expenses <sup>7</sup>	<u>(11,326,398)</u>	<u>(10,653,287)</u>
h. Plan Fiduciary Net Position - End of year	<u>\$ 40,593,758,865</u>	<u>\$ 40,710,304,168</u>

<sup>1</sup> As allowable under GASB #68, PSRS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> The Service Cost shown for fiscal years ending on or before June 30, 2016 is mid-year and includes a 1.00% load for anticipated losses on service purchases. The Service Cost shown for fiscal year ending on or after June 30, 2017 is as of the beginning of the year and includes a 1.00% load for anticipated losses on service purchases. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PSRS.

<sup>3</sup> Reflects actual benefit payments. The Interest Cost shown for fiscal year ending June 30, 2016 includes an adjustment due to changes from mid-year to beginning-of-year and from simple to compound interest. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PSRS.

<sup>4</sup> Includes refunds of accumulated member contributions and other interfund transfers.

<sup>5</sup> Includes contributions for reciprocity and RSMo 169.655 transfers, contributions for system employees, and interest and other adjustments.

<sup>6</sup> Includes contributions for service purchases and reinstatements.

<sup>7</sup> Includes contributions for system employees, but excludes interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68**

**H. Schedule of Net Pension Liability and Related Ratios under GASB #67 and #68** <sup>1</sup>

1. Year Ending	2. Total Pension Liability	3. Plan Fiduciary Net Position	4. Net Pension Liability (2) - (3)	5. Fiduciary Net Position as a Percentage of Total Pension Liability (3) / (2)	6. Anticipated Covered Employee Payroll <sup>2</sup>	7. Net Pension Liability as a Percentage of Covered Payroll (4) / (6)
6/30/2014	\$ 38,483,183,932	\$ 34,380,608,561	\$ 4,102,575,371	89.3%	\$ 4,425,567,630	92.7%
6/30/2015	\$ 40,610,539,616	\$ 34,837,679,504	\$ 5,772,860,112	85.8%	\$ 4,508,241,581	128.1%
6/30/2016	\$ 41,744,618,662	\$ 34,303,969,835	\$ 7,440,648,827	82.2%	\$ 4,556,137,282	163.3%
6/30/2017	\$ 44,501,771,291	\$ 37,280,246,064	\$ 7,221,525,227	83.8%	\$ 4,655,169,121	155.1%
6/30/2018	\$ 46,702,001,872	\$ 39,259,545,410	\$ 7,442,456,462	84.1%	\$ 4,759,665,456	156.4%
6/30/2019	\$ 47,973,829,233	\$ 40,593,758,867	\$ 7,380,070,366	84.6%	\$ 4,844,248,703	152.3%
6/30/2020	\$ 49,641,020,407	\$ 40,710,304,168	\$ 8,930,716,239	82.0%	\$ 4,919,286,103	181.5%

<sup>1</sup> As allowable under GASB #68, PSRS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> Pensionable pay as provided by PSRS. Gross member compensation, which may include components of compensation not included in pensionable pay, was not made available to PwC. Reflects two-thirds of the anticipated payroll for members covered by Social Security and expected to contribute two-thirds of the contribution rate.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68**

**I. Schedule of Contributions under GASB #67 and #68**

1.  Year Ending	2.  Actuarially Determined Contribution <sup>1</sup>	3.  Actual Employer Contributions	4.  Contribution Excess / (Deficiency)  (3) - (2)	5.  Actual Covered Member Payroll	6.  Contributions as a Percentage of Covered Payroll  (3) / (5)
6/30/2011	684,366,766	594,732,137	(89,634,629)	4,248,086,693	14.00%
6/30/2012	720,303,976	620,214,231	(100,089,745)	4,277,339,524	14.50%
6/30/2013	507,232,268	634,040,335	126,808,067	4,372,691,966	14.50%
6/30/2014	608,459,393	643,989,869	35,530,476	4,441,309,441	14.50%
6/30/2015	666,438,984	656,924,899	(9,514,085)	4,530,516,545	14.50%
6/30/2016	643,155,536	669,953,683	26,798,147	4,620,370,228	14.50%
6/30/2017	642,821,624	684,857,718	42,036,094	4,723,156,676	14.50%
6/30/2018	533,062,186	696,970,397	163,908,211	4,806,692,393	14.50%
6/30/2019	628,513,916	712,545,096	84,031,180	4,914,104,110	14.50%
6/30/2020	679,495,757 <sup>2</sup>	724,995,473	45,499,716	4,999,968,779	14.50%

<sup>1</sup> Employer portion of the Actuarial Determined Contribution, net of member contributions.

<sup>2</sup> The actuarially determined contribution rate for employers for the year ending June 30, 2020 is 13.59%. This consists of an employer normal cost rate of 2.94%, which is net of the 14.5% contribution rate for members, and a UAAL amortization rate of 10.65%. Based on these percentages, the actuarial determined contribution amount for employers consists of \$146,999,082 for normal cost and \$532,496,675 for UAAL amortization.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68**

**J. Schedule of Money-Weighted Returns under GASB #67 and #68**<sup>1</sup>

1. Year Ending	2. Money-Weighted Rate of Return
6/30/2014	16.7%
6/30/2015	4.3%
6/30/2016	1.6%
6/30/2017	12.3%
6/30/2018	8.7%
6/30/2019	6.9%
6/30/2020	3.7%

<sup>1</sup> As allowable under GASB #68, PSRS elected to prepare the information prospectively from June 30, 2013.

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SECTION IV - CENSUS DATA

**CENSUS DATA**

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SECTION IV - CENSUS DATA

**A. Reconciliation of Member Counts**

	Actives <sup>1</sup>	Former Members <sup>2</sup>	Inactive Members <sup>3</sup>	Disabled Retirements	Service Retirements <sup>4</sup>	Beneficiary <sup>5</sup>	Total
Total as of June 30, 2019	78,863	3,962	14,113	1,020	57,502	4,550	160,010
New Memberships	4,508	0	253	0	0	0	4,761
Terminated Members Reinstated	745	0	(745)	0	0	0	0
Refunds	(546)	(546)	(606)	0	0	0	(1,698)
Other Terminations	(2,255)	729	1,526	0	0	0	0
Service Retirements	(2,205)	0	(267)	0	2,472	0	0
Disabled Retirements	(43)	0	(13)	56	0	0	0
Death with Beneficiary	(22)	(4)	(4)	(23)	(306)	370	11
Death without Beneficiary	(32)	(11)	(7)	(13)	(805)	(224)	(1,092)
Voided memberships	(16)	0	(1)	0	0	0	(17)
Refund Pending	(51)	201	(150)	0	0	0	0
Benefit Expirations	0	0	0	0	0	(14)	(14)
Critical Shortage	(97)	0	(10)	0	0	0	(107)
Death Pending	(1)	0	(1)	(7)	(9)	18	0
Data Adjustments	0	(1)	1	(1)	1	8	8
Total as of June 30, 2020	78,848	4,330	14,089	1,032	58,855	4,708	161,862

<sup>1</sup> The number of active members as of June 30, 2020 includes 1,990 members who retired in July 2020.

<sup>2</sup> Terminated and deceased former members whose contributions had yet to be distributed as of the valuation date.

<sup>3</sup> The number of inactive members as of June 30, 2020 includes 23 members who retired in July 2020.

<sup>4</sup> Includes members with benefits on hold that will be re-started at a future date.

<sup>5</sup> Includes 155 dependent children whose payment accounts were consolidated with a spouse survivor.



SECTION IV - CENSUS DATA

**B. Member Census Statistics as of June 30, 2020**

	<u>Male</u>	<u>Female</u>	<u>Total</u>
1. Active			
Number <sup>1</sup>	18,057	60,791	78,848
Average Age	42.7	42.1	42.3
Average Years of Service	12.4	12.1	12.2
Anticipated Payroll of Actives <sup>2</sup>	\$ 1,250,224,787	\$ 3,669,061,316	\$ 4,919,286,103
2. Inactive			
Vested			
Number <sup>3</sup>	1,723	7,549	9,272
Annual Deferred Annuities	\$ 23,729,942	\$ 85,915,401	\$ 109,645,343
Non Vested			
Number	1,006	3,811	4,817
Account Balance	\$ 12,824,163	\$ 48,885,050	\$ 61,709,213
Former Members Entitled to a Deferred Annuity			
Number	15	29	44
Annual Deferred Annuities	\$ 290,957	\$ 267,398	\$ 558,355
Former Members Entitled to a Refund of Contributions			
Number	863	3,423	4,286
Account Balance	\$ 7,741,638	\$ 32,913,868	\$ 40,655,506
4. Retiree/Beneficiary/Disabled			
Number <sup>4</sup>	16,917	47,678	64,595
Average Age	71.6	70.5	70.8
Annual Benefits Payable <sup>5</sup>	\$ 805,331,488	\$ 1,929,536,036	\$ 2,734,867,524

<sup>1</sup> Includes 1,990 members who retired in July 2020.

<sup>2</sup> Figures shown are the anticipated pay for the one-year period following the valuation date; excludes 1,990 members who retired in July 2020. Reflects two-thirds of the anticipated payroll for members covered by Social Security and expected to contribute two-thirds of the contribution rate.

<sup>3</sup> Includes 23 members who retired in July 2020.

<sup>4</sup> Does not include 2,013 members who retired in July 2020. Of these 2,013 members, 1,990 members are included in the active members and 23 members are included in the inactive members.

<sup>5</sup> Excludes \$5,000 death benefits and tax sheltered annuities, but these amounts were included in the valuation. The annual benefits payable as of June 30, 2020 does not include 2,013 members who retired in July 2020. The annual benefits payable for the 2,013 members who retired in July 2020 are \$88,162,742.

SECTION IV - CENSUS DATA

**C. History of Active Member Average Pay, Age, and Service**<sup>1</sup>

1. Valuation Date	2. Active Members	3. Covered Payroll (\$ in Thousands)	4. Average Pay (3) / (2)	5. Annual Percent Change	6. Average Attained Age	7. Average Years of Service
6/30/2000	71,706	2,836,062	39,551	3.1%	42.5	11.6
6/30/2001	72,688	2,982,051	41,025	3.7%	42.4	11.3
6/30/2002	73,673	3,213,461	43,618	6.3%	42.3	11.2
6/30/2003	74,347	3,373,058	45,369	4.0%	42.4	11.3
6/30/2004	73,797	3,408,230	46,184	1.8%	42.5	11.4
6/30/2005	73,850	3,540,649	47,944	3.8%	42.5	11.4
6/30/2006	75,540	3,775,752	49,983	4.3%	42.4	11.2
6/30/2007	77,121	3,980,698	51,616	3.3%	42.3	11.1
6/30/2008	78,436	4,209,417	53,667	4.0%	42.2	11.1
6/30/2009	79,335	4,439,381	55,957	4.3%	42.2	11.1
6/30/2010	79,256	4,493,865	56,701	1.3%	42.3	11.3
6/30/2011	77,708	4,338,976	55,837	-1.5%	42.3	11.5
6/30/2012	77,529	4,379,060	56,483	1.2%	42.2	11.4
6/30/2013	78,076	4,460,872	57,135	1.2%	42.1	11.4
6/30/2014	75,168	4,425,568	58,876	3.0%	42.2	11.8
6/30/2015	78,314	4,508,242	59,177	0.5%	42.0	11.5
6/30/2016	78,129	4,556,137	59,933	1.3%	42.0	11.6
6/30/2017	78,274	4,655,169	60,928	1.7%	42.0	11.7
6/30/2018	78,700	4,759,665	62,064	1.9%	42.1	11.8
6/30/2019	78,863	4,844,249	63,017	1.5%	42.2	12.0
6/30/2020	78,848 <sup>2</sup>	4,919,286 <sup>3</sup>	64,005 <sup>3</sup>	1.6%	42.3	12.2

<sup>1</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.

<sup>2</sup> Includes 1,990 members who retired in July 2020.

<sup>3</sup> Excludes pay for the 1,990 members who retired in July 2020 and reflects two-thirds of the anticipated payroll for members covered by Social Security and expected to contribute two-thirds of the contribution rate.

SECTION IV - CENSUS DATA

**D. Distribution of Active Members by Salary**<sup>1</sup>

Annual Salary	Number	Percent
Under \$20,000	693	0.91%
\$20,000 - 24,999	542	0.71%
\$25,000 - 29,999	732	0.95%
\$30,000 - 34,999	1,093	1.42%
\$35,000 - 39,999	2,753	3.58%
\$40,000 - 44,999	6,179	8.04%
\$45,000 - 49,999	9,308	12.11%
\$50,000 - 54,999	10,139	13.19%
\$55,000 - 59,999	9,110	11.85%
\$60,000 - 64,999	7,564	9.84%
\$65,000 - 69,999	6,239	8.12%
\$70,000 - 74,999	5,084	6.61%
\$75,000 - 79,999	3,909	5.09%
\$80,000 - 84,999	3,107	4.04%
\$85,000 - 89,999	2,549	3.32%
\$90,000 - 94,999	2,012	2.62%
\$95,000 - 99,999	1,524	1.98%
\$100,000 & Over	4,321	5.62%
Total	76,858	100.00%

<sup>1</sup> Excludes 1,990 members who retired in July 2020.

SECTION IV - CENSUS DATA

**E. Distribution of Active Members by Age and Service <sup>1</sup>**

<b>Attained Age</b>	Distribution of Active Members by Age and Service as of June 30, 2020							Total
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	
<25	1,585	3						1,588
25-29	6,522	1,894						8,416
30-34	2,771	6,513	1,270					10,554
35-39	2,179	3,104	5,746	1,445				12,474
40-44	1,625	2,020	2,725	5,165	1,419	2		12,956
45-49	1,222	1,559	1,780	2,358	4,359	935	8	12,221
50-54	813	1,078	1,381	1,716	2,291	2,653	358	10,290
55-59	580	651	936	1,240	1,390	772	471	6,040
60-64	372	408	479	662	648	297	173	3,039
>=65	197	190	186	210	242	133	112	1,270
<b>Total</b>	<b>17,866</b>	<b>17,420</b>	<b>14,503</b>	<b>12,796</b>	<b>10,349</b>	<b>4,792</b>	<b>1,122</b>	<b>78,848</b>

<sup>1</sup>Includes 1,990 members who retired in July 2020.

SECTION IV - CENSUS DATA

**F. Distribution of Inactive Members by Age and Service** <sup>1</sup>

<b>Attained Age</b>	Distribution of Inactive Members by Age and Service as of June 30, 2020							Total
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	
<25	90							90
25-29	1,448	53						1,501
30-34	1,221	812	17					2,050
35-39	591	1,294	340	5				2,230
40-44	436	1,157	529	129				2,251
45-49	318	999	435	220	45			2,017
50-54	269	856	433	222	81	8		1,869
55-59	198	686	389	196	44	1		1,514
60-64	154	167	64	23	5			413
>=65	92	40	16	6				154
Total	4,817	6,064	2,223	801	175	9		14,089

<sup>1</sup> Includes 23 members who retired in July 2020.

SECTION IV - CENSUS DATA

**G. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired**

<b>Attained Age</b>	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2020							
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	Total
<50	239	128	79	37	24	5	5	517
50-54	971	168	29	25	8	6	9	1,216
55-59	2,939	1,367	129	23	14	8	10	4,490
60-64	3,847	3,860	1,398	167	26	13	17	9,328
65-69	2,068	5,204	4,483	1,853	247	27	36	13,918
70-74	533	2,656	4,939	4,824	2,104	59	40	15,155
75-79	96	481	1,567	3,174	3,376	551	65	9,310
80-84	17	78	225	909	2,281	1,493	356	5,359
85-89	3	15	36	144	757	1,356	945	3,256
>90	3	2	8	18	99	457	1,459	2,046
Total	10,716	13,959	12,893	11,174	8,936	3,975	2,942	64,595

<sup>1</sup> Does not include 2,013 members who retired in July 2020.

SECTION IV - CENSUS DATA

**H. History of Retirees, Beneficiaries, and Disabled Members**<sup>1,2</sup>

Valuation Date	Service Retirees			Disability Retirees			Beneficiaries		
	Added	Removed	End of Year	Added	Removed	End of Year	Added	Removed	End of Year
6/30/2001	2,639	759	26,639	45	29	596	189	89	1,999
6/30/2002	2,262	773	28,128	42	41	597	248	107	2,140
6/30/2003	2,078	783	29,423	37	30	604	197	115	2,222
6/30/2004	2,458	829	31,052	54	28	630	482	156	2,548
6/30/2005	2,639	690	33,001	59	25	664	236	128	2,656
6/30/2006	2,441	811	34,631	41	34	671	279	127	2,808
6/30/2007	2,396	770	36,257	41	29	683	241	161	2,888
6/30/2008	2,596	808	38,045	45	37	691	289	175	3,002
6/30/2009	2,711	797	39,959	39	32	698	382	139	3,245
6/30/2010	2,443	873	41,529	49	25	722	297	161	3,381
6/30/2011	3,141	891	43,779	77	36	763	336	194	3,523
6/30/2012	2,926	810	45,895	70	30	803	304	181	3,646
6/30/2013	2,642	891	47,646	68	28	843	332	161	3,817
6/30/2014	2,868	807	49,707	52	36	859	276	173	3,920
6/30/2015	2,565	927	51,345	66	29	896	333	369	3,884
6/30/2016	2,607	883	53,069	84	23	957	311	201	3,994
6/30/2017	2,602	1,042	54,629	57	33	981	372	204	4,162
6/30/2018	2,406	1,105	55,930	50	40	991	425	213	4,374
6/30/2019	2,507	935	57,502	44	15	1,020	367	191	4,550
6/30/2020	2,473	1,120	58,855	56	44	1,032	396	238	4,708

<sup>1</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.

<sup>2</sup> Does not include 2,013 members who retired in July 2020.

<sup>3</sup> Includes 155 dependent children whose payment accounts were consolidated with a spouse survivor.

SECTION IV - CENSUS DATA

**I. History of Cost of Living Increases to Retired Members**

Retirement In	Effective Date of First COLA	First COLA Percentage Increase	Total Increases Through January 2020 <sup>1</sup>	January 2021 Increase Based on Proposal	Total Increases Through January 2021 <sup>1</sup>	Number of Retired Members at 6/30/2020 <sup>2</sup>
1989 & Earlier	Various	Various	80.00%	0.00%	80.00%	1,558
1990	Jan. 1994	3.00%	78.81%	0.67%	80.00%	430
1991	Jan. 1995	2.50%	73.59%	2.00%	77.06%	487
1992	Jan. 1996	3.00%	69.35%	2.00%	72.74%	619
1993	Jan. 1997	2.80%	64.42%	2.00%	67.71%	577
1994	Jan. 1998	2.30%	59.93%	2.00%	63.13%	698
1995	Jan. 1999	1.70%	56.34%	2.00%	59.47%	850
1996	Jan. 2000	2.00%	53.71%	2.00%	56.78%	1,326
1997	Jan. 2001	3.70%	50.71%	2.00%	53.72%	1,273
1998	Jan. 2002	3.30%	45.34%	2.00%	48.25%	1,520
1999-2001 <sup>3</sup>	Jan. 2003	1.10%	40.70%	2.00%	43.51%	5,697
2000-2002 <sup>4</sup>	Jan. 2004	2.10%	39.16%	2.00%	41.94%	1,995
2003	Jan. 2005	3.30%	36.29%	2.00%	39.02%	2,124
2004	Jan. 2006	2.50%	31.96%	2.00%	34.60%	2,398
2005	Jan. 2007	4.30%	28.73%	2.00%	31.30%	2,212
2006	Jan. 2008	2.70%	23.42%	2.00%	25.89%	2,197
2007	Jan. 2009	5.00%	20.17%	2.00%	22.57%	2,346
2008	Jan. 2010	0.00%	14.44%	2.00%	16.73%	2,555
2009	Jan. 2011	0.00%	14.44%	2.00%	16.73%	2,125
2010	Jan. 2012	2.00%	14.44%	2.00%	16.73%	3,019
2011	Jan. 2013	2.00%	12.20%	2.00%	14.44%	2,896
2012	Jan. 2014	2.00%	10.00%	2.00%	12.20%	2,613
2013	Jan. 2015	2.00%	7.85%	2.00%	10.01%	2,831
2014	Jan. 2016	2.00%	5.74%	2.00%	7.85%	2,551
2015	Jan. 2017	0.00%	3.66%	2.00%	5.73%	2,628
2016	Jan. 2018	1.63%	3.66%	2.00%	5.73%	2,612
2017	Jan. 2019	2.00%	2.00%	2.00%	4.04%	2,428
2018	Jan. 2020	0.00%	0.00%	2.00%	2.00%	2,570
2019	Jan. 2021	2.00%		2.00%	2.00%	2,752
<b>Total</b>						<b>59,887</b>

<sup>1</sup> Cumulative lifetime COLA increases are limited to 80%.

<sup>2</sup> Includes Service Retirees and Disabled Retirees only (beneficiaries of deceased members have been excluded) as of June 30, 2020; does not include 2,013 members who retired during July 2020, or any additional members who have retired since.

<sup>3</sup> Includes all retirements in 1999, and, because of legislation in 2000 and 2001, all persons retiring between July 1, 2000 and December 31, 2000, and between July 1, 2001 and December 31, 2001.

<sup>4</sup> Includes all retirements in 2002, and, because of legislation in 2000 and 2001, all persons retiring between January 1, 2000 and June 30, 2000, and between January 1, 2001 and June 30, 2001.



SECTION IV - CENSUS DATA

**J. Distribution of Retired Members by Type and Monthly Amount**

<u>Monthly</u>	<u>Service</u>	<u>Disability</u>	<u>Retirement Based Survivor</u>	<u>Dependent Based Survivor</u>	<u>Total</u>
Less than \$500	1,605	1	182	23	1,811
\$500 - 999	3,562	18	361	469	4,410
\$1,000 - 1,499	3,307	92	456	17	3,872
\$1,500 - 1,999	3,292	254	450	7	4,003
\$2,000 - 2,499	4,441	282	471	1	5,195
\$2,500 - 2,999	6,023	196	471	0	6,690
\$3,000 - 3,499	6,784	95	437	0	7,316
\$3,500 - 3,999	6,800	63	343	0	7,206
\$4,000 - 4,499	6,195	18	299	0	6,512
\$4,500 - 4,999	5,024	8	239	0	5,271
\$5,000 - 5,499	3,900	2	158	0	4,060
\$5,500 - 5,999	2,903	2	117	0	3,022
\$6,000 & Over	5,019	1	207	0	5,227
Total	<u>58,855</u>	<u>1,032</u>	<u>4,191</u>	<u>517</u>	<u>64,595</u>

<sup>1</sup> Does not include 2,013 members who retired in July 2020.

SECTION IV - CENSUS DATA

**K. Distribution of Retired Members by Type of Benefit**<sup>1,2</sup>

<u>Type of Benefit</u>	<u>Number</u>	<u>Annual Benefit</u>
Service Retirees		
Options 1 & 10 (Life Only)	31,281	\$ 1,318,528,003
Options 2 & 21 (100% J&S with Pop-Up)	15,361	664,831,315
Options 3 & 31 (75% J&S with Pop-Up)	3,575	171,626,209
Options 4 & 41 (50% J&S with Pop-Up)	5,959	282,392,923
Option 5 (10 Years Certain & Life)	1,887	79,310,019
Option 6 (5 Years Certain & Life)	373	16,954,790
Options 20 (100% J&S)	325	14,841,853
Options 30 (75% J&S)	13	892,308
Options 40 (50% J&S)	81	4,042,144
Total	58,855	\$ 2,553,419,564
Disability Retirees	1,032	\$ 29,516,662
Beneficiaries	4,708	\$ 151,931,298

<sup>1</sup> Does not include 2,013 members who retired in July 2020. The annual benefits payable for the 2,013 members who retired in July 2020 are \$88,162,742.

<sup>2</sup> Excludes \$5,000 death benefits and tax sheltered annuities.

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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**ACTUARIAL ASSUMPTIONS AND METHODS**

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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Investment Returns

Funding: 7.50% per annum (net of investment and administrative expenses).  
 Accounting: 7.50% per annum (net of investment expenses).

Cost of Living Adjustments (COLA)

The COLA reflected for January 1, 2021 is 2.00%, in accordance with the actual COLA approved by the Board. The COLA assumed for future years increases from 1.35% to 1.65% over six years, beginning January 1, 2022. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:

- If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
- If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
- If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.

The COLA is effective each January 1, beginning on the second January after retirement, and capped at 80% lifetime increase.

The COLA assumption applies to service retirements and beneficiary annuities. The COLA does not apply to the dependent-based survivor benefits payable to a qualified spouse, a qualified spouse with children, dependent children, or dependent parents. Members begin receiving COLAs on the second January after benefit commencement. 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 the valuation.

Mortality Rates

Pre-Retirement: 75% of the RP-2006 White Collar Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale to 2028. Illustrative rates per 1,000 members at various ages are as follows:

<u>Age</u>	<u>Male</u>	<u>Female</u>
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

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Mortality Rates (Continued):

Post-Retirement: RP-2006 White Collar Mortality Tables with plan-specific experience adjustments and static projection to 2028 using the 2014 SSA Improvement Scale. The plan-specific experience adjustments are as follows:

Age	Males	Females
<60	1.00	1.00
60-74	0.89	0.67
75-89	1.05	0.91
>=90	1.05	1.16

Illustrative rates per 1,000 members at various ages are as follows:

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

Disabled Retirees: RP-2006 Disabled Retiree Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale to 2028. Illustrative rates per 1,000 members at various ages are as follows:

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

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Withdrawal Rates

Termination of membership prior to eligibility for retirement from all causes other than death, disability or retirement, whether resulting in a refund or a deferred benefit, is assumed in accordance with the following illustrative rates per 1,000 members:

<u>Years of Service</u>	<u>Rate</u>
0	240
1	115
2	100
3	80
4	70
5	60
10	28
15	15
20	10
25+	0

Disability Rates

Retirement for disability prior to age 60 is assumed in accordance with the following illustrative rates per 1,000 eligible members:

<u>Age</u>	<u>Male and Female Rates</u>
25	0.017
30	0.080
35	0.220
40	0.480
45	0.780
50	1.110
55	1.460

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Retirement Rates

Retirement is assumed in accordance with the following rates per 1,000 eligible members:

Age	Service										
	<u>&lt;=20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>&gt;=30</u>
<50	0	0	0	0	0	50	30	30	30	30	450
50	0	0	0	0	0	50	30	30	30	30	450
51	0	0	0	0	0	50	30	30	30	200	450
52	0	0	0	0	0	50	30	30	200	200	450
53	0	0	0	0	0	50	30	300	200	200	450
54	0	0	0	0	0	50	300	200	200	200	450
55	50	50	50	50	50	400	200	200	200	200	450
56	30	30	30	30	400	200	200	200	200	200	450
57	30	30	30	400	200	200	200	200	200	200	450
58	30	30	400	200	200	200	200	200	200	200	450
59	30	400	200	200	200	200	200	200	200	200	450
60	150	150	150	150	150	200	200	200	200	200	450
61	150	150	150	150	150	200	200	200	200	200	450
62	150	150	150	150	150	200	200	200	200	200	450
63	150	150	150	150	150	200	200	200	200	200	450
64	150	150	150	150	150	200	200	200	200	200	450
65	250	250	250	250	250	400	400	400	400	400	450
66	250	250	250	250	250	300	300	300	300	300	450
67	250	250	250	250	250	300	300	300	300	300	450
68	250	250	250	250	250	300	300	300	300	300	450
69	250	250	250	250	250	300	300	300	300	300	450
>=70	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000



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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Refund of Contributions	<p>For active members assumed to terminate employment with less than five years of service, regardless of age, 100% are assumed to take an immediate refund of their contributions.</p> <p>For active members assumed to terminate employment with five or more years of service, but prior to satisfying the age and service requirements for service retirement, 100% are assumed to select the option that has the greater present value between an immediate refund and a deferred annuity.</p> <p>For active members assumed to terminate employment with five or more years of service and satisfy the age and service requirements for service retirement upon termination, 100% are assumed to elect an immediate lifetime annuity benefit.</p> <p>For inactive members with less than five years of service, regardless of age, 100% are assumed to take a immediate refund of their contributions.</p> <p>For inactive members with five or more years of service, 100% are assumed to select the option that has the greater present value between an immediate refund and a deferred annuity.</p>
Interest on Member Accounts	1.00% per annum.
Service Purchases	A 1.00% load is added to the Normal Cost to account for anticipated losses resulting from service purchases and reinstatements.
Provisions for Expenses	There is no specific provision for expenses. The implicit assumption for funding purposes is that investment and administrative expenses are paid from investment income in excess of 7.50% per annum. For accounting purposes the expected return is assumed to be net of investment expenses. Administrative expenses are included in the current year expense.
Dependent Assumptions (Pre-Retirement)	<p>70% of male and female members are assumed to be married.</p> <p>Beneficiaries are assumed to be of the opposite sex from the member.</p> <p>Male spouses are assumed to be 2 years older than females spouses.</p>
Beneficiary Age (Post-Retirement)	Members are assumed to be 3 years older than their joint annuitant.
Dependent/Survivor Benefits (Pre-Retirement)	All active members under age 50 are assumed to receive a dependent-based survivor benefit for a spouse and 2 dependent children. The spouse is assumed to receive payments of \$860 per month for life, and 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 0 years if the member is age 50. All active members age 50 or older are assumed to receive a retirement-based survivor benefit for life.
Return of Unused Member Account Balance	The cash refund is explicitly valued.

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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Form of Payment	For active members assumed to terminate employment with five or more years of service, benefits are assumed to be paid in the form of a single life annuity since all optional forms are actuarially equivalent using the same interest and mortality assumptions that are used in the valuation.
Data Assumptions	Members without a date of birth provided are assumed to be 30 years old. Pensionable pay for members who did not earn service during the past year is assumed to be the greater of the current year's salary, the previous year's salary and \$10,000. Pensionable pay for other active members is assumed to be the greater of annualized pay and \$10,000.
Social Security Coverage	It is assumed that members who are currently employed in positions covered by Social Security will continue to be employed in Social Security covered positions for the remainder of their PSRS tenure and receive 2/3 PSRS membership credit for each year of future service. All others are assumed to continue to be employed in a position that is not covered by Social Security and receive full PSRS membership credit for future service.
Assumption Changes Since the Prior Valuation	None.

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## SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

### **B. Assumptions Rationale**

Investment Return	The investment return assumption is based on analysis completed by the PSRS investment advisor and an independent, high-level analysis completed by PwC using a "building block" approach that considered the target asset allocation from the Board's investment policy and capital market forecasts from various investment professionals. It is also based on the Board's funding policy, which was most recently amended at the October 29, 2018 meeting.
Cost of Living Adjustments	<p>The cost of living adjustment (COLA) assumed in the valuation increases from 1.35% to 1.65% over six years, beginning January 1, 2022. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:</p> <ul style="list-style-type: none"><li>• If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.</li><li>• If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.</li><li>• If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.</li></ul>
Other Assumptions	The Board of Trustees adopts actuarial assumptions, each of which individually represents a reasonable long-term estimate of anticipated experience under the System, derived from experience studies conducted every fifth year. The most recent comprehensive experience study was completed in June 2016. The economic and demographic assumptions listed previously in the report were reviewed and updated, where appropriate, based on the historical experience observed during the study and expectations for the future.

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**C. Actuarial Methods**

The actuarial methods used in the valuation for funding purposes and noted below were selected and approved by the PSRS Board of Trustees. The actuarial methods are generally reviewed in conjunction with experience studies of the assumptions. In this way, the actuary provides guidance to the Board in selecting the methods. The actuarial methods used for financial reporting purposes and noted below are prescribed by GASB 67 and 68.

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.

Amortization of Unfunded Actuarial Accrued Liability

For funding, 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 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.

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 (actives and inactives). Gains and losses occurring from investment experience different than assumed are amortized into expense over a 5-year period. The effect of plan changes on the plan liability are fully recognized in expense in the year in which they occur.

Asset Valuation Method

The Actuarial Value of Assets is a smoothed value of assets. The actuarial value at June 30, 2019 was projected by increasing the amount with 7.50% interest, adding contributions made during the year with 7.50% interest for half the year, and subtracting benefit payments made during the year with 7.50% interest for half the year to arrive at a preliminary June 30, 2020 Actuarial Value of Assets. 20% of the difference between the actual returns on market value for the year and the expected 7.50% 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 preliminary value to arrive at the final June 30, 2020 Actuarial Value of Assets.

For accounting purposes, market value was used as required under GASB 67 and 68.

Changes Since the Prior Valuation

None.

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## SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

### **D. Assessment of Risk Associated with Measurement of Pension Liability and Contributions**

The actuarial valuation results presented herein are based on a single set of actuarial assumptions; however, there is a risk that emerging results may differ significantly if actual experience proves to be different than expected by the current assumptions.

In accordance with Actuarial Standard of Practice No. 51 we have assessed the risks related to the measurement of the Plan's obligations and determination of contributions, and have identified the following as being the most significant risks:

- Investment risk
- Interest rate risk
- Asset/Liability mismatch risk
- Longevity and other demographic risks
- Contribution risk

A numerical assessment of the risks identified was beyond the scope of this engagement, though we encourage such an assessment be performed to better understand exposure to these risks.

**Investment risk:** *The potential that investment returns will be different than expected.*

Poor investment performance decreases the Plan's funded position and could increase the funding deficiency and future contribution amounts.

**Interest rate risk:** *The potential that interest rates will be different than expected.*

The risk that future interest rates negatively affect investment returns. This risk is linked to investment risk as both accounting and funding results use a discount rate that is equal to the expected investment return.

**Asset/Liability mismatch risk:** *The potential that changes in asset values are not matched by changes in the value of liabilities.*

For assets that are not liability hedged, asset/liability mismatch exists to the extent that market fluctuations do not have the same impact on assets and liabilities. This impacts the funded status of the plan and the unfunded actuarial accrued liability that needs to be funded in the future.

**Longevity and other demographic risks:** *The potential that mortality or other demographic experience will be different than expected.*

For participants whose benefits are paid as lifetime annuities, living longer than expected could increase the UAAL of the Plan. Similarly, turnover, retirement, and other demographic experience different than assumed could result in an increase in the UAAL of the Plan.

**Contribution risk:** *The potential of actual future contributions deviating from expected future contributions.*

The Board has adopted a formal funding policy with the objective of fully funding the system over a closed 30-year period while adhering to the applicable statutes of the State of Missouri, as well as sound financial principles, such as maintaining contribution rate stability and intergenerational equity. The risks noted above could trigger changes in the UAAL of the Plan, thus requiring additional funding. In addition, the financial viability and cash position, as well as applicable law of the State of Missouri, could change over time. Finally, the funding method currently assumes a stable payroll growth into the future. To the extent future covered payroll declines, this would lead to a higher contribution rate. For the reasons noted, there is risk that the Actuarially Determined Contribution could increase and/or that some/all employers and members may not fully contribute at the rates established by the Board.

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**D. Assessment of Risk Associated with Measurement of Pension Liability and Contributions (continued)**

As the population ages and the plan matures, the level of risk associated with funding the plan increases. Below are some plan maturity measures that are significant to understanding the risks associated with the plan.

**Ratio of Market Value of Assets to Active Participant Payroll:** The amount of plan assets relative to covered payroll is a significant indicator of contribution risk for the plan since the size of the market value of assets will increase relative to active payroll as the plan matures. A higher ratio means that the PSRS contribution rate would be more sensitive to investment returns that are higher or lower than expected.

Valuation Date	Market Value of Assets (a)	Covered Payroll (b)	Ratio (c) = (a)/(b)
6/30/2016	\$ 34,303,969,835	\$ 4,556,137,282	7.53
6/30/2017	\$ 37,280,246,064	\$ 4,655,169,121	8.01
6/30/2018	\$ 39,259,545,410	\$ 4,759,665,456	8.25
6/30/2019	\$ 40,593,758,865	\$ 4,844,248,703	8.38
6/30/2020	\$ 40,710,304,168	\$ 4,919,286,103	8.28

**Ratio of Retired Life Actuarial Accrued Liability to Total Actuarial Accrued Liability:** As the plan matures, the percentage of the liability attributable to retirees will grow. When more of the total liability is associated with retirees, volatility of investment returns has an impact on the funding of PSRS as it becomes more challenging to recover from investment losses when there is less active payroll to spread costs over. A higher retiree AAL percentage means that the PSRS contribution rate would be more sensitive to investment returns that are higher or lower than expected.

Valuation Date	Retiree AAL (a)	Total AAL (b)	Retiree AAL Percentage (c) = (a)/(b)
6/30/2016	\$ 25,895,011,565	\$ 41,744,618,662	62.03%
6/30/2017	\$ 27,544,081,740	\$ 44,501,771,291	61.89%
6/30/2018	\$ 28,811,151,317	\$ 46,702,001,872	61.69%
6/30/2019	\$ 29,429,992,827	\$ 47,973,829,236	61.35%
6/30/2020	\$ 30,515,563,219	\$ 49,641,020,407	61.47%

**Ratio of Contributions Less Benefit Payments to Market Value of Assets:** The ratio of net cash flow to assets is an indicator of investment risk. When a plan has negative cash flows, meaning benefit payments are greater than contributions, and has a year with lower than expected investment returns, there will then be less total assets invested to recover those losses in future years.

Valuation Date	Contributions (a)	Benefit Payments (b)	Net Cash Flow (c) = (a) - (b)	Market Value of Assets (d)	Ratio (e) = (c)/(d)
6/30/2016	\$ 1,375,579,779	\$ 2,430,906,732	\$ (1,055,326,953)	\$ 34,303,969,835	-3.08%
6/30/2017	\$ 1,404,483,091	\$ 2,521,832,399	\$ (1,117,349,308)	\$ 37,280,246,064	-3.00%
6/30/2018	\$ 1,423,966,558	\$ 2,606,985,013	\$ (1,183,018,455)	\$ 39,259,545,410	-3.01%
6/30/2019	\$ 1,459,947,822	\$ 2,710,273,502	\$ (1,250,325,680)	\$ 40,593,758,865	-3.08%
6/30/2020	\$ 1,482,912,410	\$ 2,813,232,110	\$ (1,330,319,700)	\$ 40,710,304,168	-3.27%

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**SUMMARY OF BENEFIT PROVISIONS**

Page

A. Summary of Benefit Provisions

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## SECTION VI - SUMMARY OF PLAN PROVISIONS

### **A. Summary of Benefit Provisions**

Below is a summary of the plan provisions that are pertinent to the valuation herein and may exclude certain provisions that are not deemed relevant to our calculations. This summary is based on our understanding of the plan provisions set forth in the applicable statutes of the State of Missouri. If there is a discrepancy between the summary below and the applicable statutes, the applicable statutes shall govern.

Member Contributions	Half the total PSRS contribution rate. For fiscal year 2020, the total PSRS contribution rate was 29.00%.
Normal (Unreduced) Retirement	
Eligibility	Attainment of age 60 with at least five years of Creditable Service, or at any age after completion of 30 years of Creditable Service, or at any age when age plus Creditable Service is at least 80.
Benefit	2.50% of Final Average Salary for each year of Membership Service. A minimum benefit applies for Members with at least 15 years of Creditable Service and varies from \$600/month at 15 years of Creditable Service to \$1,200/month at 30 years of Creditable Service. Benefits are also subject to a maximum equal to 100% of the Member's Final Average Salary at the time of retirement.
Compensation	All regular earnings as an employee of a PSRS-covered employer. Compensation or salary includes, but is not limited to, payments for extra duties, overtime payments, career ladder payments, payments for overloads (e.g. extra hours taught) and additional courses, and employer-paid medical, dental and vision insurance premiums for the member.
Final Average Salary	Average monthly salary over the Member's three highest consecutive years of service. Effective August 28, 2007, the maximum increase in the annual compensation used for the final average salary shall not exceed ten percent.
Membership Service	Service while a participating member of PSRS. Service is measured each year in relation to full contract salary for that year. Members employed in position that are covered by Social Security receives two-thirds for each year of Membership Service earned in those positions.
Prior Service	Service in a covered position prior to July 1, 1946. A year of Prior Service is the equivalent of 0.6 years of Membership Service.
Creditable Service	Membership Service plus any Prior Service.



SECTION VI - SUMMARY OF PLAN PROVISIONS

**A. Summary of Benefit Provisions (Continued)**

Normal Form of Benefit            Single Life Annuity  
Options available include joint and survivor (50%, 75%, or 100%), term certain (60 or 120 months) and life thereafter, and partial lump sum option (PLSO).

Early (Age Reduced) Retirement

Eligibility                            Attainment of age 55 and under age 60 with at least five years of creditable service.

Benefit                                Normal retirement benefit accrued to the date of early retirement, actuarially reduced from age 60.

Special Early Retirement Under Modified Formula

Eligibility                            Retirement at an age under 55 and with at least 25 years of creditable service but not eligible for the Rule of 80.

Benefit                                Based on a percentage of final average salary per year of creditable service. Percentages are as follows:

<u>Years of Service</u>	<u>Benefit Percentage</u>
25-25.9	2.20%
26-26.9	2.25%
27-27.9	2.30%
28-28.9	2.35%
29-29.9	2.40%

Post-Retirement Death Benefit    Regardless of the form of benefit selected, a lump sum benefit of \$5,000 is paid at the death of the retiree.

COLA Adjustments

Applicable statutes provide the Board with limited discretion in granting COLAs. The Board has established a policy of granting a COLA on each January 1 as follows, which is compliant with current statutes:

- If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
- If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
- If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.

For any member retiring on or after July 1, 2001, such adjustments commence in the second January after commencement of benefits. The total of such increases may not exceed 80% of the original benefit for any member.

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**A. Summary of Benefit Provisions (Continued)**

Disability Benefits

Definition of Disability	Incapacity for performance of gainful employment after completion of five years of creditable service and before age 60.
Benefit	Lifetime benefit equal to 90% of accrued normal retirement benefit. This benefit level is subject to a minimum of 50% salary in the last full year of membership but not greater than the member's accrued normal retirement benefit assuming continuous employment to age 60 at current pay. COLA adjustments similar to those provided to retirees are provided on this benefit.
Form of Benefit	If eligible, surviving designated spouse or dependent child or parent may elect a monthly survivor benefit.

Vesting

Eligibility	Accrual of five years of creditable service.
Benefit	Accrued normal retirement benefit payable at earliest retirement age based on service at date of termination. Benefit is based on formula in effect at commencement of benefit.

Death/Survivor Benefits

Refund	Refund of accumulated member contributions with interest.
Dependent-Based Survivor Benefits	<p>In lieu of the refund, survivors of a member with at least 2 years of service at death may elect the following survivor benefit package:</p> <ol style="list-style-type: none"><li>1. Spouse who was married to the deceased member for at least three years and with no dependent children - up to \$860 per month payable after spouse age 60 (immediately if spouse is disabled) and prior to remarriage.</li><li>2. Spouse with dependent children<ol style="list-style-type: none"><li>a. Up to \$860 per month payable to spouse with at least one dependent child under age 18.</li><li>b. Up to an additional \$430 per month payable for each child under age 18. Benefits continue to the spouse after the child reaches age 18, up to age 24, if the child is a full-time student.</li><li>c. Family maximum - \$2,160 per month.</li></ol></li></ol>

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**A. Summary of Benefit Provisions (Continued)**

Death/Survivor Benefits (continued)

Dependent-Based Survivor Benefits (continued)

3. If no surviving spouse, each eligible child receives up to \$720 per month payable as in 2.b. above, subject to a family maximum of \$2,160.
4. If no surviving spouse or children, a benefit of up to \$720 per month is payable to a dependent parent over age 65, subject to a maximum of \$1,440.

No COLA adjustments apply to this benefit.

Retirement-Based Survivor Benefits

In lieu of the benefits described above, if the member has at least 5 years of membership service at date of death, the designated spouse may receive a survivor benefit based on 100% J&S equivalent of the benefit accrued to date of death. The benefit may commence:

1. immediately if member is eligible to retire at date of death, or
2. at a future retirement date of the deceased member.

The benefit may be reduced for early commencement if the deceased member would not have been eligible for unreduced retirement at that date based on service to date of death.

COLA adjustments similar to those provided to retirees are provided on these benefits.

Changes in Benefit Provisions

The working after retirement provision for PSRS retirees under Section 169.560 of the Revised Statutes of the State of Missouri was amended during the year to change the working after retirement limitations without a suspension of retirement allowance for PSRS retirees returning to work at community colleges to equal 550 hours and 50% of salary. The provisions limitation for such retired members was \$15,000 of salary (with no hours-based limit).

This amendment to the working after retirement provisions has no impact on our valuation of the benefit liabilities.

It is our understanding that other provisions are the same as the prior year.