

Maine Public Employees Retirement System

State Employee and Teacher Retirement Program

**Actuarial Valuation Report
as of June 30, 2019**

Produced by Cheiron

October 2019

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October 15, 2019

Board of Trustees
Maine Public Employees Retirement System
PO Box 349
Augusta, Maine 04332-0349

Dear Members of the Board:

We are pleased to submit the June 30, 2019, Actuarial Valuation Report for the State Employee and Teacher Retirement Program (Program) of the Maine Public Employees Retirement System (MainePERS or System).

This report is intended solely for the MainePERS Board and its auditors in preparing financial reports according to applicable law and accounting requirements. This report contains information on assets, liabilities, and contributions of the Program, as well as the required accounting statement disclosures under the Governmental Accounting Standards Board (GASB) Statement No. 67.

We prepared this report according to generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. This includes the use of assumptions and methods for funding purposes that comply with the Actuarial Standards of Practice.

As credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

In preparing our report, we relied on information, both oral and written, supplied by the System's staff. This information includes, but is not limited to, Program provisions, member data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The results of this report rely on future Program experience conforming to the underlying assumptions and methods outlined in this report. Future experience may differ significantly from the current experience because of differences from the anticipated assumptions; changes in assumptions or methods; and changes in Program provisions or applicable law.


Sincerely,
Cheiron



Gene Kalwarski, FSA, EA
Principal Consulting Actuary



Fiona E. Liston, FSA, EA
Principal Consulting Actuary



Elizabeth Wiley, FSA, EA
Consulting Actuary

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
STATE EMPLOYEE AND TEACHER RETIREMENT PROGRAM
ACTUARIAL VALUATION AS OF JUNE 30, 2019**

FOREWORD

Cheiron has completed the Actuarial Valuation Report for the Maine Public Employees Retirement System (MainePERS or System) State Employee and Teacher Program (Program) as of June 30, 2019. The purpose of this report is to:

- 1) Measure and disclose, as of the valuation date, the financial condition of the Program;
- 2) Indicate trends, both historical and prospective, in the condition of the Program;
- 3) Assess and disclose actuarial risks of the Program;
- 4) Report on the contribution rates developed in this valuation for informational purposes (Note: the actual contributions to be paid by the employers for Fiscal Year (FY) 2019 were developed in the budgeting process in July 2016, based on a roll-forward of the June 30, 2015 valuation); and
- 5) Provide specific information required for MainePERS's financial disclosures.

An actuarial valuation establishes and analyzes assets and liabilities on a consistent basis, and tracks the progress of both from one year to the next. It includes measurement of investment performance as well as an analysis of actuarial liability gains and losses.

Section I presents a summary containing our key findings, disclosing important Program trends in recent years, and providing analysis relating to the future status of the Program.

Section II is a new section that assesses and discloses various actuarial risk measures of the Program. While much of this information had been disclosed in previous reports, it was combined in this new section with additional disclosures added to reflect a new Actuarial Standard of Practice (ASOP 51).

Section III contains details on various asset measures, together with pertinent performance measurements.

Section IV shows similar information on liability measures for various purposes, including analysis of key changes in the measures.

Section V develops informational employer contribution rates to be compared to those established during the ratemaking process.

Section VI includes financial disclosure information.

Finally, we present appendices containing the following summaries:

- Program membership information at the valuation date (Appendix A);
- Major benefit provisions of the Program (Appendix B);
- Actuarial assumptions and methods used in the current valuation (Appendix C); and
- Terminology used in the Governmental Accounting Standards Board (GASB) disclosures (Appendix D).

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SECTION I – BOARD SUMMARY

General Comments

The annual employer contributions to this Program are determined on a biennial basis in even years. The contributions for fiscal year (FY) 2018 and FY 2019 were developed through this ratemaking process in 2016. The assets used in developing these rates were the preliminary June 30, 2016 assets. These were then combined with liability measures as of June 30, 2016 that were developed as an adjustment (i.e., roll-forward) of the liabilities of the June 30, 2015 actuarial valuation. This adjustment included updating to reflect anticipated growth in benefits, reductions due to benefit payouts, and any changes in assumptions or benefits between the June 30, 2015 valuation date and the June 30, 2016 measurement date. Similarly, the contributions for FY 2020 and FY 2021 were developed in 2018 and were based on estimated assets as of June 30, 2018 and liabilities based on the June 30, 2017 actuarial valuation liabilities adjusted to our best estimate of the June 30, 2018 liabilities.

The liability results of this June 30, 2019 valuation will be adjusted to a June 30, 2020 measurement date and combined with preliminary assets as of June 30, 2020 and be used as the basis for the applicable FY 2022 and FY 2023 State contributions. The results of this June 30, 2019 valuation will also be used for accounting disclosures.

Experience from July 1, 2018 through June 30, 2019 (FY 2019)

The State of Maine composite total employer rate produced by the June 30, 2018 valuation reflecting all Plans in the State Employee and Teacher Retirement Program was 19.92% of payroll. The equivalent rate produced in this June 30, 2019 valuation is 20.06% of payroll. The change in contribution rate is attributable to several elements, a small gain from investment returns and a liability experience loss that consisted primarily of higher salaries than expected and an actual cost of living adjustment (COLA) of 2.9%, greater than the expected 2.2% COLA.

As of June 30, 2019, the Program had an unfunded actuarial liability (UAL) based on the actuarial value of assets (AVA) of \$2.652 billion. This represents an increase of \$0.041 billion from the \$2.611 billion AVA UAL measured as of June 30, 2018. The specific factors contributing to this change are presented in Table I-1 that follows. This table has separate columns showing the components of the changes in liabilities and investments during FY 2019 as well as their combined effect on the UAL.

Table I-1 (Amounts in Billions)			
	Liabilities	Assets*	UAL
Value as of June 30, 2018	\$ 14.031	\$ 11.420	\$ 2.611
Expected Change	0.307	0.417	(0.110)
Impact of Assumption Changes	0.000	0.000	0.000
Recognized Investment Gain	0.000	0.058	(0.058)
Recognized Liability Loss	<u>0.209</u>	<u>0.000</u>	<u>0.209</u>
Value as of June 30, 2019	\$ 14.547	\$ 11.895	\$ 2.652

*This table uses actuarial value of assets. Results would be different if the market value was used.

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The remainder of this Board Summary section summarizes the Program’s historical trends, provides baseline projections of the Program’s future status, and summarizes the principal results of the valuation. These principal results compare key results between this year’s and last year’s valuations for member counts, assets and liabilities, and contribution rates.

Trends

It is important to take a step back from the latest results and view them in the context of the Program’s history. On the next few pages, we present a series of graphs that display key historical trends relating to the Program’s condition. In addition to considering the past, examining future possible trajectories of the Program is also vital to understanding the current results. Baseline projections are provided in this Board Summary and the potential variability of these results is explored further in the risk section of this report.

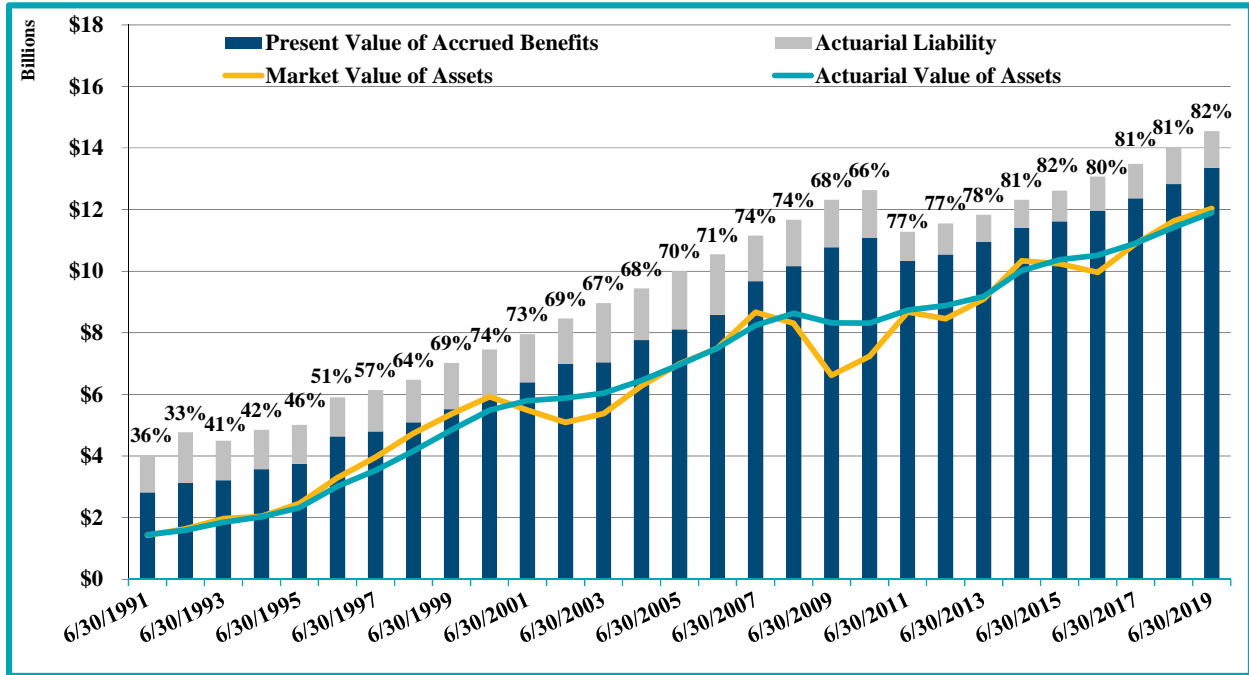
Assets and Liabilities

The following graph illustrates the progress of assets and liabilities for the Program as well as the Program’s funded ratio since June 30, 1991 on an actuarial value of assets (AVA) basis.

Liability measures are shown as bars as of June 30 of the indicated years. The actuarial liability (AL), the liability measure used for the Program’s funding purposes, is represented by the top of the grey bars. The blue bars represent the present value of accrued benefits (PVAB). Measures of the assets are shown as lines. The AVA is shown with a teal line, while the market value of assets (MVA) is shown as a yellow line. The AVA divided by the AL is the AVA funded ratio that is often used in evaluating the Program’s financial status. The values of this metric as of each valuation date are shown as the percentages in the graph labels.

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SECTION I – BOARD SUMMARY



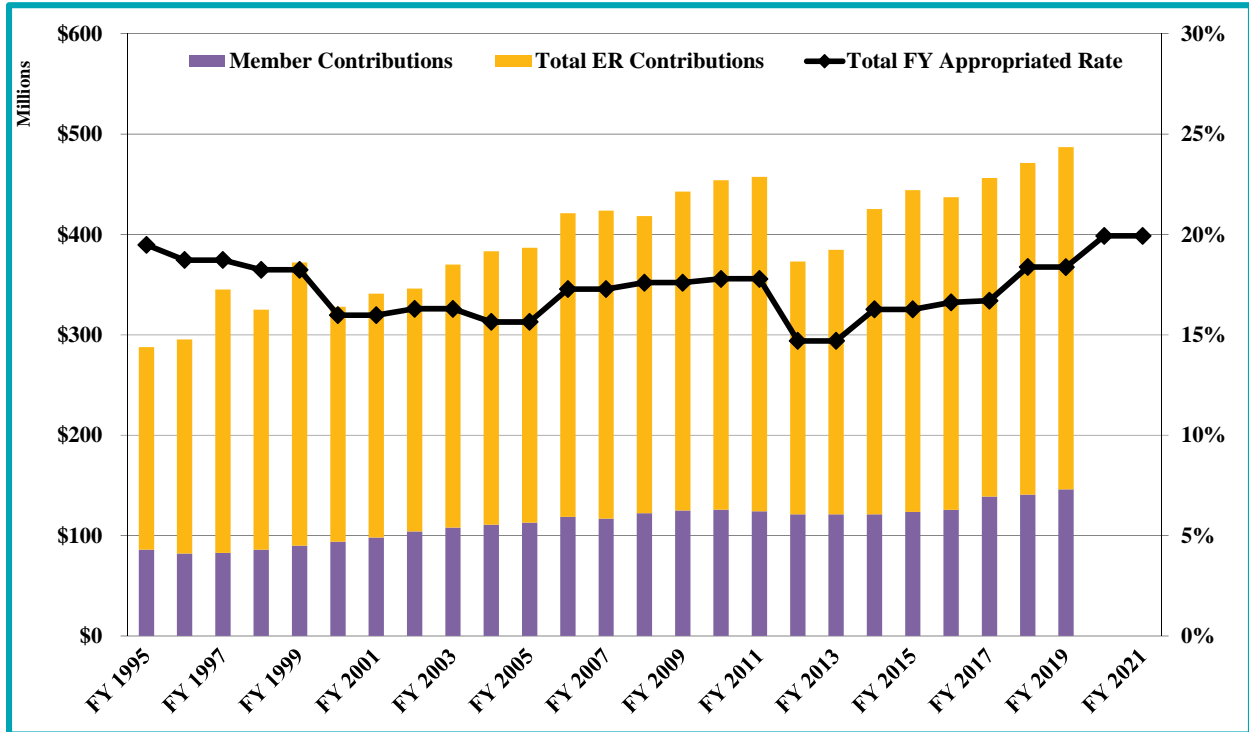
Plan changes were legislated during 2010 and first reflected in the 2011 valuation, resulting in the reduction in liability seen for that year. As of June 30, 2019, the Program is funded 81.8% based on the AVA funded ratio, which represents a slight increase from the 81.4% ratio reported in the prior valuation.

Contributions

The next graph shows the history of contributions to the Program, both as dollar amounts and as percentages of payroll. The bars in this graph show the contributions made by both the employers and the members in dollar terms for each fiscal year (FY) as indicated by the horizontal axis since 1995. These bars are read using the left-hand axis. The black line shows the total appropriated employer contribution rate for the FY indicated as a percentage of payroll and references the right-hand axis. The FY 2020 through FY 2021 contribution rates have already been determined based on the ratemaking process, so two additional years of the contribution rate are shown versus dollars received.

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The increase in employer contribution rate from FY 2018/2019 to FY 2020/2021 was caused by a number of factors including the delayed recognition (because of the biennial budget process) of losses sustained in 2016 and 2017 into the contribution rate and the reduction in the assumed annual rate of investment return from 6.875% to 6.75%. These losses were partially offset by net positive investment experience recognized in 2018 that were a part of the ratemaking process for FY 2020/2021.

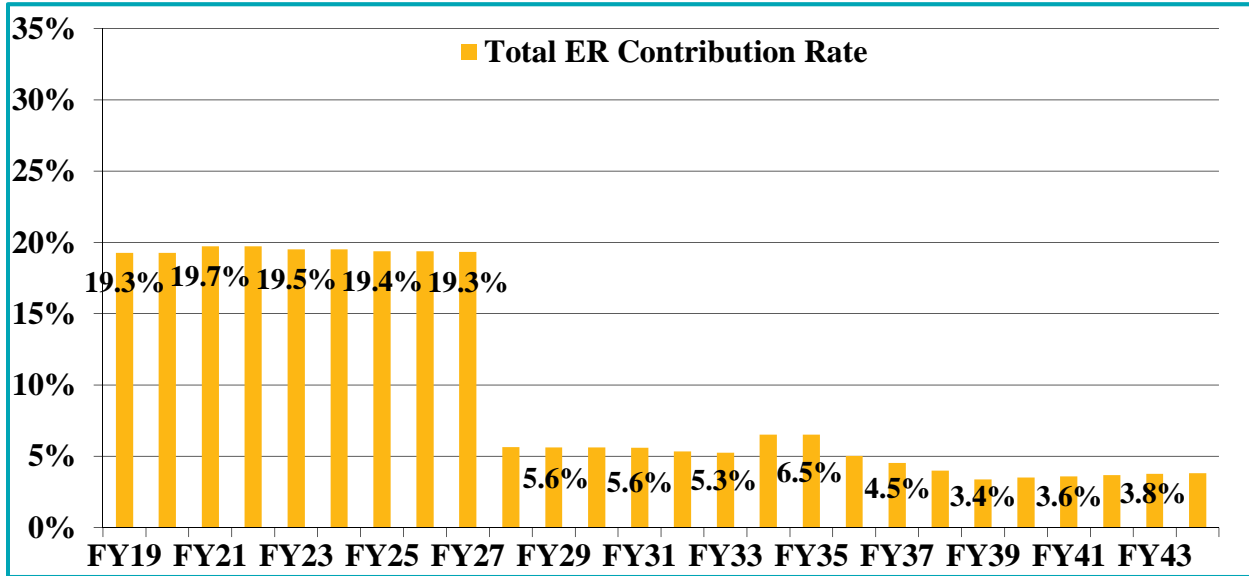
The member contribution rates are set by statute, based on the Plan within the Program that each member participates in. The total employer contribution rate is set by the ratemaking process on a biennial basis. The contribution rate for FY 2019 was based on a roll-forward of the June 30, 2015 valuation to June 30, 2016, as previously described in this Board Summary.

Baseline Projections

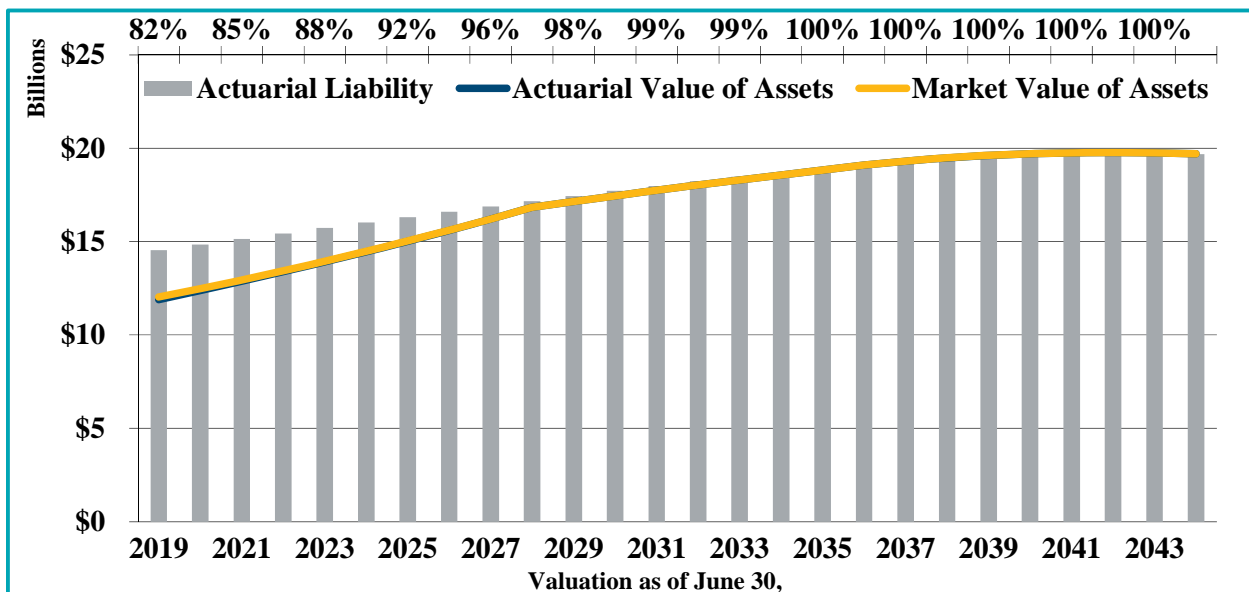
Our analysis of the projected financial trends for the Program is an important part of this valuation. In this section we project future valuation results, focusing on the previously referenced AVA funded ratio (AVA over AL) and the expected employer contributions. We present a baseline projection of these metrics based on all actuarial assumptions being exactly met during the projection period, including the assumed 6.75% investment return being achieved each year. In the risk section of the report, we demonstrate how sensitive future valuation results are to deviations in actual returns from the assumed investment returns by presenting similar results with investment returns deviating from those assumed.

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The graph above shows the expected progress of the Program’s employer contribution rates based on the budgeting process over the next 25 years assuming that the Program’s assets earn 6.75% on their *market value*. It shows that the overall composite employer contribution rate for the Program is projected to remain fairly flat for the next nine years. The initial UAL balance under the current funding method will be paid off in FY 2028. At that point, the employer contribution rate under this scenario drops substantially to 5.6%, with small further changes thereafter. Note that this baseline projection is based on all assumptions being met each and every year where the reality is that there will be gains and losses each and every year, resulting in new amortization layers (negative or positive) occurring every year. This concept is explored further in the risk section of this report.



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The graph above shows the projected funded ratio (AVA divided by AL) over the next 25 years in this baseline scenario. It shows that the Program's funded ratio is projected to improve from the starting level of 82% as of FY 2019 to almost 100% funding as of FY 2028, which is the year that the Maine Constitution mandates that the Program's 1996 UAL is to be paid off. Under this scenario where all underlying assumptions are exactly met, the funded ratio increases to and stays at approximately 100% thereafter. The amounts shown are as of June 30 of the year identified in the horizontal axis.

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Principal Results Summary

The last section of this Board Summary presents a summary of the principal results of the valuation, comparing key results between this year's and last year's valuations for member counts, assets and liabilities, and contribution rates. These summary results are shown for the total State Employee and Teacher Program, and then for each of these subgroups as well as the division of the State Employee Program into the Regular and Special Plans.

**Table I-2
Summary of Principal Results
Total State and Teacher Program**

Valuation as of:	June 30, 2018	June 30, 2019	% Change
<u>Member Counts</u>			
Active Members	39,843	39,876	0.1%
Retired Members	27,152	28,071	3.4%
Beneficiaries of Retired Members	6,215	6,226	0.2%
Survivors of Deceased Members	626	600	(4.2)%
Disabled Members	1,608	1,574	(2.1)%
Terminated Vested Members	7,965	8,188	2.8%
Inactives Due Refunds	<u>39,074</u>	<u>38,640</u>	(1.1)%
Total Membership	122,483	123,175	0.6%
Annual Payroll of Active Members	\$ 1,891,366,352	\$ 1,979,024,476	4.6%
Annual Payments to Benefit Recipients	\$ 792,094,655	\$ 831,655,042	5.0%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 14,031,187,845	\$ 14,547,222,913	3.7%
Actuarial Value of Assets (AVA)	<u>11,419,986,652</u>	<u>11,894,672,150</u>	4.2%
Unfunded Actuarial Liability (UAL)	\$ 2,611,201,193	\$ 2,652,550,763	1.6%
AVA Funded Ratio (AVA/AL)	81.4%	81.8%	
MVA Funded Ratio (MVA/AL)	82.9%	82.7%	
Accrued Benefit Liability (PVAB)	\$ 12,829,762,283	\$ 13,354,334,757	4.1%
Market Value of Assets (MVA)	<u>11,632,179,683</u>	<u>12,035,563,047</u>	3.5%
Unfunded PVAB	\$ 1,197,582,600	\$ 1,318,771,710	10.1%
Accrued Benefit Funded Ratio	90.7%	90.1%	
<u>Contributions as a Percentage of Payroll</u>			
Program Employer Normal Cost Rate	4.18%	3.98%	
Program UAL Amortization Rate	<u>15.74%</u>	<u>16.08%</u>	
Total Program Employer Rate	19.92%	20.06%	
From 2016 Ratemaking (FY18/FY19)	18.38%	18.37%	
From 2018 Ratemaking (FY20/FY21)	19.93%	19.93%	

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SECTION I – BOARD SUMMARY

**Table I-3
Summary of Principal Results
Teacher Program**

Valuation as of:	June 30, 2018	June 30, 2019	% Change
<u>Member Counts</u>			
Active Members	27,396	27,441	0.2%
Retired Members	16,691	17,313	3.7%
Beneficiaries of Retired Members	2,906	2,929	0.8%
Survivors of Deceased Members	285	280	(1.8)%
Disabled Members	684	667	(2.5)%
Terminated Vested Members	4,983	5,161	3.6%
Inactives Due Refunds	<u>31,513</u>	<u>30,670</u>	(2.7)%
Total Membership	84,458	84,461	0.0%
Annual Payroll of Active Members	\$ 1,243,442,243	\$ 1,303,736,188	4.8%
Annual Payments to Benefit Recipients	\$ 497,775,004	\$ 524,764,315	5.4%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 9,099,129,498	\$ 9,469,173,597	4.1%
Actuarial Value of Assets (AVA)	<u>7,608,317,761</u>	<u>7,909,609,357</u>	4.0%
Unfunded Actuarial Liability (UAL)	\$ 1,490,811,737	\$ 1,559,564,240	4.6%
AVA Funded Ratio (AVA/AL)	83.6%	83.5%	
MVA Funded Ratio (MVA/AL)	85.2%	84.5%	
Accrued Benefit Liability (PVAB)	\$ 8,240,066,231	\$ 8,612,381,790	4.5%
Market Value of Assets (MVA)	<u>7,749,686,754</u>	<u>8,003,297,686</u>	3.3%
Unfunded PVAB	\$ 490,379,477	\$ 609,084,104	24.2%
Accrued Benefit Funded Ratio	94.0%	92.9%	
<u>Contributions as a Percentage of Payroll</u>			
Program Employer Normal Cost Rate	4.06%	3.84%	
Program UAL Rate	<u>14.00%</u>	<u>14.54%</u>	
Total Program Employer Rate	18.06%	18.38%	
From 2016 Ratemaking (FY18/FY19)	15.05%	15.05%	
From 2018 Ratemaking (FY20/FY21)	18.49%	18.49%	

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SECTION I – BOARD SUMMARY

**Table I-4
Summary of Principal Results
State Program (Regular and Special Plans)**

Valuation as of:	June 30, 2018	June 30, 2019	% Change
<u>Member Counts</u>			
Active Members	12,447	12,435	(0.1)%
Retired Members	10,461	10,758	2.8%
Beneficiaries of Retired Members	3,309	3,297	(0.4)%
Survivors of Deceased Members	341	320	(6.2)%
Disabled Members	924	907	(1.8)%
Terminated Vested Members	2,982	3,027	1.5%
Inactives Due Refunds	<u>7,561</u>	<u>7,970</u>	5.4%
Total Membership	38,025	38,714	1.8%
Annual Payroll of Active Members	\$ 647,924,109	\$ 675,288,288	4.2%
Annual Payments to Benefit Recipients	\$ 294,319,651	\$ 306,890,727	4.3%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 4,932,058,347	\$ 5,078,049,316	3.0%
Actuarial Value of Assets (AVA)	<u>3,811,668,891</u>	<u>3,985,062,793</u>	4.5%
Unfunded Actuarial Liability (UAL)	\$ 1,120,389,456	\$ 1,092,986,523	(2.4)%
AVA Funded Ratio (AVA/AL)	77.3%	78.5%	
MVA Funded Ratio (MVA/AL)	78.7%	79.4%	
Accrued Benefit Liability (PVAB)	\$ 4,589,696,052	\$ 4,741,952,967	3.3%
Market Value of Assets (MVA)	<u>3,882,492,929</u>	<u>4,032,265,361</u>	3.9%
Unfunded PVAB	\$ 707,203,123	\$ 709,687,606	0.4%
Accrued Benefit Funded Ratio	84.6%	85.0%	
<u>Contributions as a Percentage of Payroll</u>			
Program Employer Normal Cost Rate	4.40%	4.24%	
Program UAL Rate	<u>19.08%</u>	<u>19.08%</u>	
Total Program Employer Rate	23.48%	23.32%	
From 2016 Ratemaking (FY18/FY19)	24.30%	24.25%	
From 2018 Ratemaking (FY20/FY21)	22.54%	22.53%	

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SECTION I – BOARD SUMMARY

**Table I-5
Summary of Principal Results
State Program – Regular Plans Only**

Valuation as of:	June 30, 2018	June 30, 2019	% Change
<u>Member Counts</u>			
Active Members	10,704	10,698	(0.1)%
Retired Members	9,525	9,782	2.7%
Beneficiaries of Retired Members	2,965	2,943	(0.7)%
Survivors of Deceased Members	326	307	(5.8)%
Disabled Members	850	830	(2.4)%
Terminated Vested Members	2,678	2,714	1.3%
Inactives Due Refunds	6,634	6,992	5.4%
Total Membership	33,682	34,266	1.7%
Annual Payroll of Active Members	\$ 539,377,384	\$ 562,792,726	4.3%
Annual Payments to Benefit Recipients	\$ 258,659,480	\$ 269,104,909	4.0%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 4,198,210,148	\$ 4,307,346,025	2.6%
Actuarial Value of Assets (AVA)	3,249,770,360	3,379,710,758	4.0%
Unfunded Actuarial Liability (UAL)	\$ 948,439,788	\$ 927,635,267	(2.2)%
AVA Funded Ratio (AVA/AL)	77.4%	78.5%	
MVA Funded Ratio (MVA/AL)	78.8%	79.4%	
Accrued Benefit Liability (PVAB)	\$ 3,916,703,072	\$ 4,032,335,860	3.0%
Market Value of Assets (MVA)	3,310,153,846	3,419,743,008	3.3%
Unfunded PVAB	\$ 606,549,226	\$ 612,592,852	1.0%
Accrued Benefit Funded Ratio	84.5%	84.8%	
<u>Contributions as a Percentage of Payroll</u>			
Employer Normal Cost Rate	4.29%	4.07%	
UAL Rate	18.63%	18.53%	
Total Employer Rate	22.92%	22.60%	
From 2016 Ratemaking (FY18/FY19)	24.05%	24.01%	
From 2018 Ratemaking (FY20/FY21)	21.98%	21.98%	

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**Table I-6
Summary of Principal Results
State Program – Special Plans Only**

Valuation as of:	June 30, 2018	June 30, 2019	% Change
<u>Member Counts</u>			
Active Members	1,743	1,737	(0.3)%
Retired Members	936	976	4.3%
Beneficiaries of Retired Members	344	354	2.9%
Survivors of Deceased Members	15	13	(13.3)%
Disabled Members	74	77	4.1%
Terminated Vested Members	304	313	3.0%
Inactives Due Refunds	927	978	5.5%
Total Membership	4,343	4,448	2.4%
Annual Payroll of Active Members	\$ 108,546,725	\$ 112,495,562	3.6%
Annual Payments to Benefit Recipients	\$ 35,660,171	\$ 37,785,818	6.0%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 733,848,199	\$ 770,703,291	5.0%
Actuarial Value of Assets (AVA)	561,898,531	605,352,035	7.7%
Unfunded Actuarial Liability (UAL)	\$ 171,949,668	\$ 165,351,256	(3.8)%
AVA Funded Ratio (AVA/AL)	76.6%	78.5%	
MVA Funded Ratio (MVA/AL)	78.0%	79.5%	
Accrued Benefit Liability (PVAB)	\$ 672,992,980	\$ 709,617,107	5.4%
Market Value of Assets (MVA)	572,339,083	612,522,353	7.0%
Unfunded PVAB	\$ 100,653,897	\$ 97,094,754	(3.5)%
Accrued Benefit Funded Ratio	85.0%	86.3%	
<u>Contributions as a Percentage of Payroll</u>			
Employer Normal Cost Rate	4.96%	5.09%	
UAL Rate	21.26%	21.74%	
Total Employer Rate	26.22%	26.83%	
From 2016 Ratemaking (FY18/FY19)	25.48%	25.43%	
From 2018 Ratemaking (FY20/FY21)	25.17%	25.17%	

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SECTION II – RISK ASSESSMENT AND DISCLOSURE

Introduction

Actuarial Standard of Practice (ASOP) No. 51 was recently published by the Actuarial Standards Board to provide guidance to actuaries on the assessment and disclosure of risks related to the possibility that future pension plan experience will deviate from assumptions. This standard does not introduce new concepts to actuarial work; it simply attempts to provide some codification of the practice. Our reports have routinely included stress testing of the valuation results showing the impact of future experience deviating from the underlying assumptions as well as other communications related to the risks that the actual condition of the Program will deviate from our valuation results. However, with this ASOP becoming effective for this June 30, 2019 Actuarial Valuation Report, we have taken this as an opportunity to consolidate the information regarding assessment and disclosure of the Program's risks in this section as well as add a number of additional items helping to communicate and understand these risks.

The Program's actuarial valuation results are dependent on assumptions about future economic and demographic experience. Based on actuarial standards of practice, the assumptions represent a reasonable estimate for future experience. However, actual future experience will never conform exactly to the assumptions and may differ significantly from the assumptions. This deviation is the risk that pension plan sponsors undertake in relying on a pension plan's actuarial valuation results.

This section of this report is intended to identify the primary drivers of these risks, provide background information and assessments about these identified risks, and communicate the significance of these risks to this Program.

Identification of Risks

For this Program, the three primary valuation results that can significantly differ from those expected are in the assets, liabilities, and employer contributions. While there are several factors that could lead to these results being different, we believe the primary risks are:

- Investment risk,
- Longevity and other demographic risks,
- Plan change risk, and
- Assumption change risk.

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SECTION II – RISK ASSESSMENT AND DISCLOSURE

Other risks that we have not identified may also turn out to be significant.

Investment Risk is the potential for investment returns to deviate from what is expected. When actual investment returns are lower than the investment assumption used in the actuarial valuation, the unfunded liability will increase and will require higher contributions than otherwise anticipated. But, when actual returns exceed the assumption, the resulting unfunded liability measurements and actuarially determined contributions will be lower than anticipated. As seen in the historical section that follows, this has been a significant driver of deviations in the actual measurements for this Program from those expected by the valuations.

Longevity and Other Demographic Risk is the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time as the actual experience deviates from expected. In addition, the extensive number of assumptions related to longevity and demographic experience often result in offsetting factors contributing to the Program's overall liability experience. As such, these risks are often dwarfed by other risks, particularly those due to the investment returns. The historical section shows that this has been true for this Program, with the magnitude of the gains and losses from investment experience often significantly larger than the gains and losses from liability experience.

Assumption Change Risk is the potential for the environment to change such that future valuation assumptions are adjusted to be different than the current assumptions. For example, declines in interest rates over time may result in a change in the assumed rates of return used in the valuation. A healthier workforce may result in changes in employee behavior such that retirement rates are adjusted to reflect employees working longer. Assumption change risk is an extension of the risks previously identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in the environment when the current assumption is no longer reasonable. The historical review section will show that assumption change risk has been a relatively significant risk for this Program.

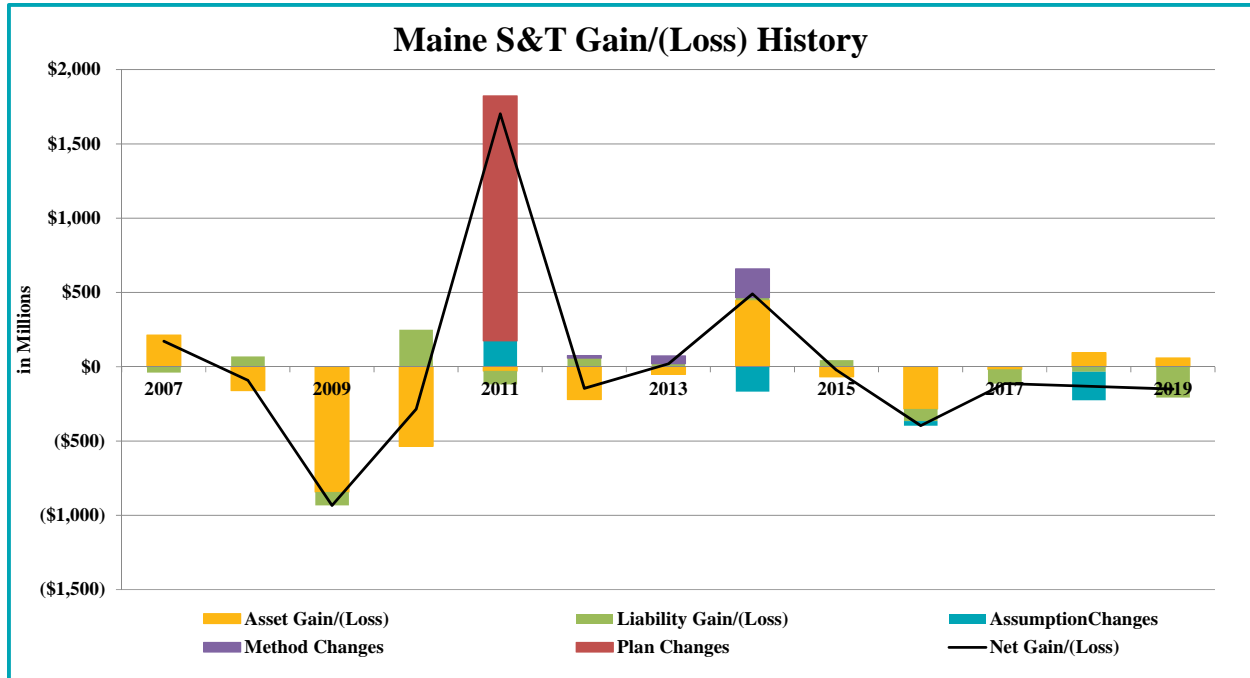
Plan Change Risk is the potential for the provisions of the Program to be changed such that the funding or benefits are changed materially. In addition to the actual payments to and from the Program being changed, future valuation measurements can also be impacted, with Program changes leading to deviations between actual future measurements and those expected by the current valuation. The historical review section will show that plan change risk has been a significant driver of deviations in the actual measurements for this Program from those expected by the valuations.

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Historical Experience Deviations

In understanding the impact of some of these risks, it is useful to look at past experience deviations. These deviations are commonly referred to as actuarial gains and losses. The following graph shows the gains/(losses) at each valuation date between the actual and expected experience broken down by cause.



As described previously and is evident in this graph, plan changes and asset gains and losses have been the most significant risks for the Program. The next two most significant causes of experience deviations are the assumption and method changes and the liability gains/(losses).

Plan Maturity Measures

As pension plans become more mature, the primary risks of adverse investments, demographic deviations, plan changes, and assumption change experience become of more significant concern. As a result, it has become increasingly important to examine measures that indicate a pension plan’s maturity level. With shrinking workforces, aging Baby Boomers, and retirees living longer, plans pay out more in benefits than they receive in contributions – leading to negative cash flows, excluding investment income.

When plans with negative cash flows suffer investment losses, they need to liquidate enough assets to pay for benefits in excess of contributions. That means these plans will need to earn higher returns to rebuild their assets to the previous levels. Plans with negative cash flows exceeding six percent of assets are especially vulnerable to asset losses.

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The balance of this section discloses and examines three maturity measures: the asset leverage ratio, the support ratio, and the net cash flow ratio.

Asset Leverage Ratio

One of the more important plan maturity measures is the asset leverage ratio – the market value of assets divided by the plan’s payroll. As a plan matures, its assets increase. Once a plan is fully funded, contributions will decrease. The greater the plan’s assets are relative to payroll, the more vulnerable the plan is to investment volatility.

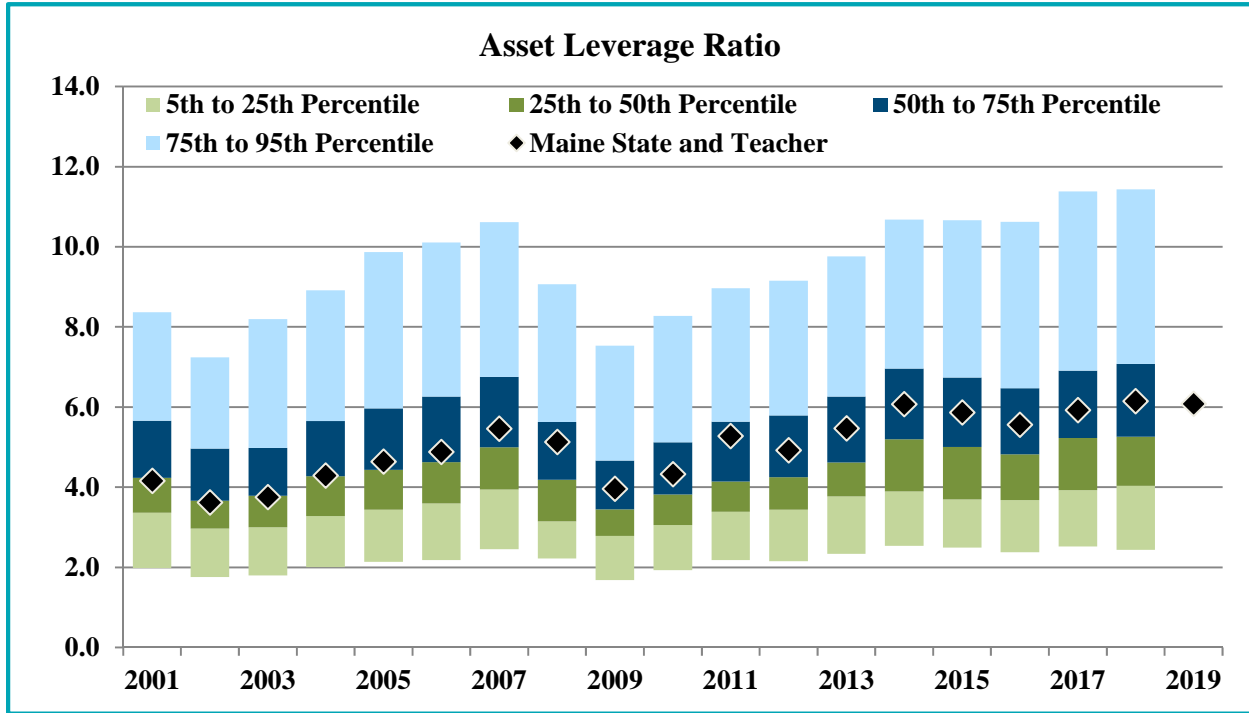
As an example, here are two plans that both experience a 10% investment loss equaling \$500 million. Plan A’s asset leverage ratio is 10 and Plan B’s ratio is 5 – this means that Plan A has to spread, or amortize, that loss over a payroll that is half as large as Plan B’s.

	(\$ in millions)	
	Plan A	Plan B
Plan Assets	\$ 5,000	\$ 5,000
Payroll	\$ 500	\$ 1,000
Asset Leverage Ratio	10.0	5.0
10% investment loss	\$ 500.0	\$ 500.0

The Boston College’s Center for Retirement Research, NASRA and the Center for State and Local Government Excellence maintain the Public Plan Database that contains the majority of state plans as well as many large municipal plans. The chart shows the asset leverage ratios for all plans in this database since 2001. The colored bars represent the central 90% of the asset leverage ratios for the plans. The Maine State and Teacher Program is represented by the black diamonds. From 2001 through 2004, the Program’s asset leverage ratio was close to the 50th percentile of all plans. Since 2004, the Program’s asset leverage ratio has grown to just above 6.0 putting the Program in just over the 60th percentile. This means the Program is maturing at a faster rate than the database of plans based on this particular metric.

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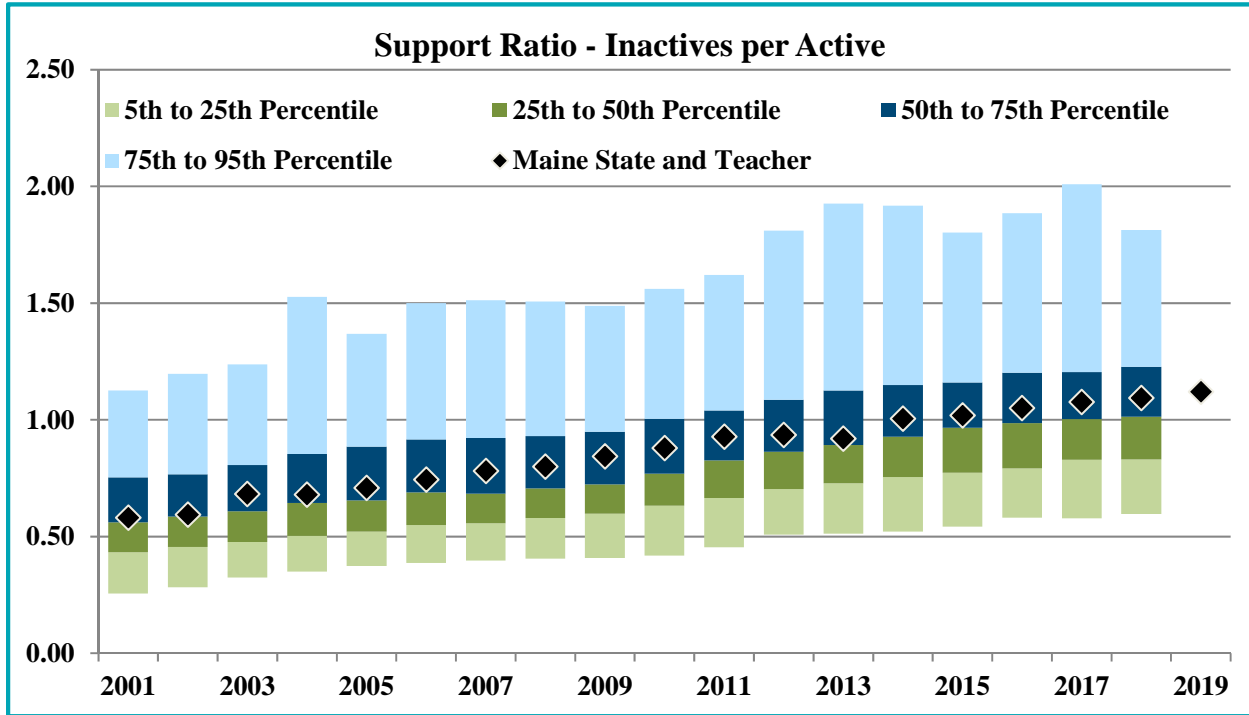
Support Ratios

A commonly used measure of plan maturity is the Support Ratio – the ratio of retired and inactive members or those receiving benefits or entitled to a deferred benefit to the number of active members or those currently accruing benefits in the plan. The greater this ratio, the more likely that the plan will have or develop negative cash flows.

The graph shows the support ratio over time for the Program compared to the Public Plan database.

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The black diamonds in this graph shows that the Program’s support ratio for each year has generally increased over time and has gone from the 50th percentile level to close to the 60th percentile. This indicates that the Program is maturing, as have most plans in this database over the years, and has done so at a slightly faster rate than the universe of plans.

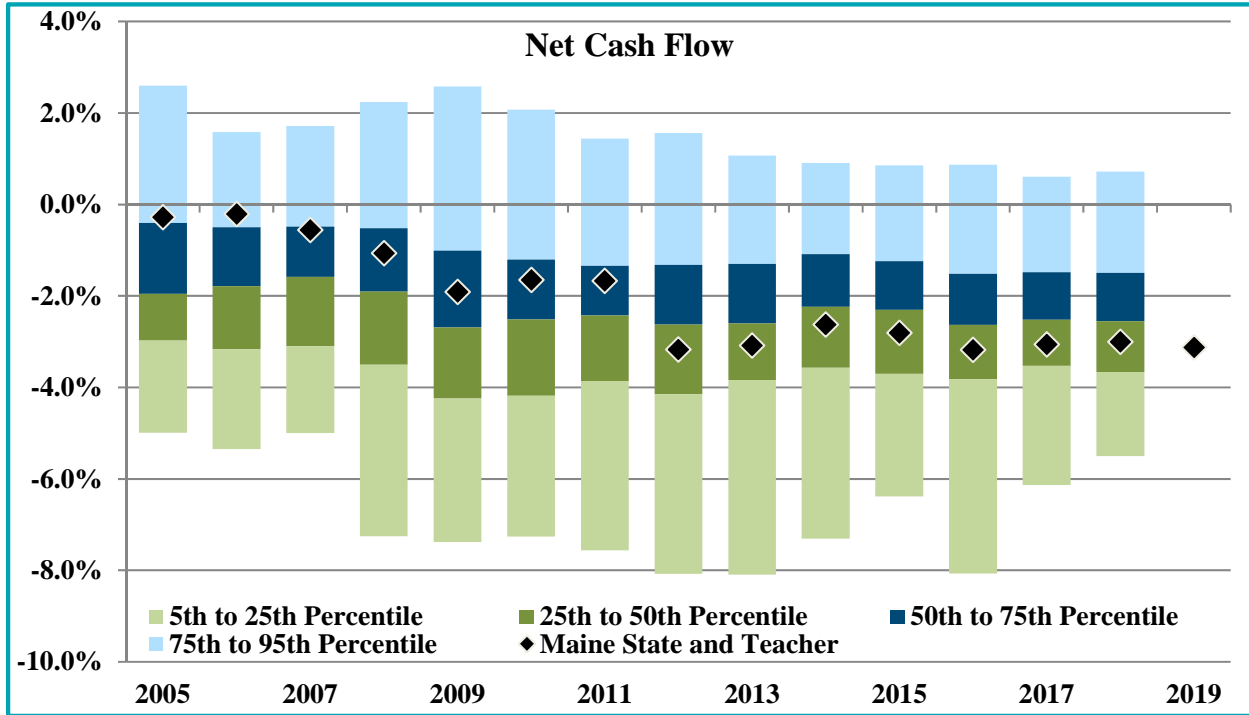
Net Cash Flow Ratio

Another measure of plan maturity is the ratio of the net cash flow out of the plan – benefits and expenses less contributions – divided by the market value of plan assets. When this ratio is significantly negative or greater, a plan is very vulnerable to market declines.

This chart shows that the Program’s net cash flow ratio in 2005 was about -0.3%, just under 0%, and in 2019 is just under -3%. Relative to the universe, the Program had less negative cash flows than the median plan in the public plan database at the beginning of this period, but in recent years has had net cash flows that are more negative than the median plan in the universe. This measure thus again provides some indication that this Program is maturing at a pace faster than the typical public plan.

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Assessing Future Risk

Assessing the future risk that the expected measurements produced by the actuarial valuations will deviate from the actual values over time is complex and can never be exactly known.

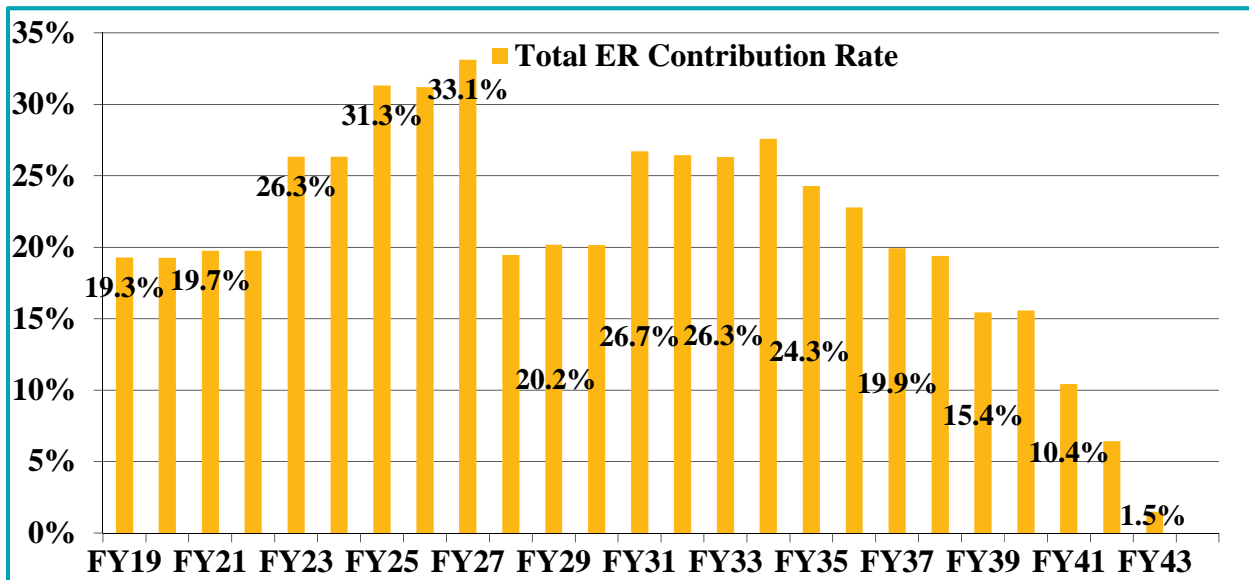
Pages 4-6 have additional detail on the baseline projection. It is important to note that baseline projections, while valid, **are not going to occur** as experience never conforms exactly to assumptions every year. As discussed in the plan maturity section, as plans become more mature some, it becomes more difficult to recover from market declines even when the average investment return over a long period is equal to the expected return. As a demonstration of this, the following projection is included, which is based on assuming varying returns in the future. We based this varying return on assuming the returns for the next 20 years are those that actually occurred for the 20 years ending June 30, 2000 through June 30, 2019 and then returning to 6.75%, averaging 6.628% over the next 25 years, just below the current assumed return of 6.75%. The rates assumed for this scenario are shown in the following table.

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FY	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Return	6.71%	-9.62%	-12.66%	2.28%	15.35%	6.42%	6.74%	17.70%	-9.07%	-19.76%
FY	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Return	13.44%	25.38%	5.85%	16.34%	20.56%	6.31%	4.39%	14.25%	11.42%	9.91%
FY	2040	2041	2042	2043	2044					
Return	6.75%	6.75%	6.75%	6.75%	6.75%					

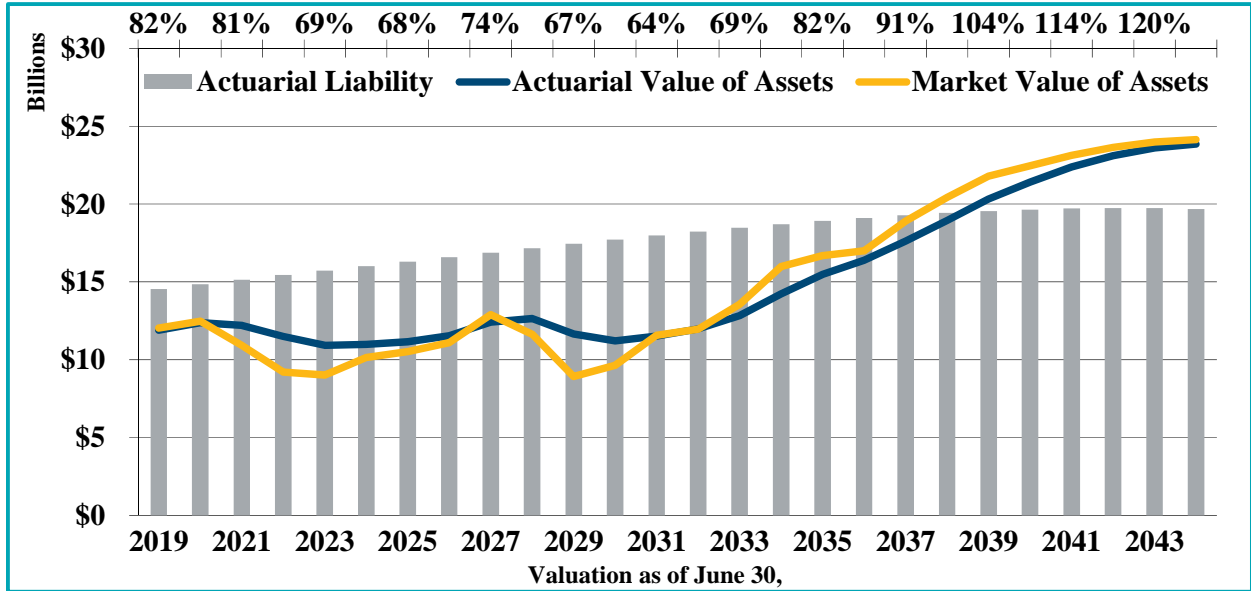
With varying annual earnings, one can see the volatility in the employer contributions in the first chart. Note that this chart reflects an illustrative scenario and is not intended to reflect future expectations as the volatility of the contributions will vary with the volatility of the returns.



The funded ratio of the Program is also more volatile with varied returns as seen in the following graph from this one illustrative scenario. Note also that timing of contribution development and payment as well as the combination of the amortization layers results in the Plan being funded over 100% at times.

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SECTION III – ASSETS

Pension plan assets play a key role in the financial operation of plans and in the decisions Trustees make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contribution rates, and the ultimate security of members' benefits.

The assets for all Defined Benefit (DB) Programs administered by MainePERS are invested together. These Programs are the State Employee and Teacher Retirement Program, the Judicial Retirement Program, the Legislative Retirement Program, and the Participating Local District Retirement Program, including both the Consolidated Plan and the several Nonconsolidated PLDs. The assets of all of these Programs are entirely commingled for investment purposes, so the actuarial value of assets (AVA) for each of these Programs is developed by first developing it for the entire asset pool and then subsequently allocating that total AVA to each of the specific Programs.

In this section, we present detailed information on the Program's assets including:

- Disclosure of total MainePERS DB assets at June 30, 2018 and June 30, 2019;
- Statement of changes in total MainePERS DB market values during the year;
- Development of the total MainePERS DB actuarial value of assets;
- Allocation of the total actuarial value to MainePERS DB Programs;
- Assessment of the total MainePERS DB investment performance; and
- Projection of expected cash flows for the Program for the next ten years.

Disclosure

The market value of assets (MVA) represents a “snap-shot” or “cash-out” value, which provides the principal basis for measuring financial performance from one year to the next. However, market values can fluctuate widely with corresponding swings in the marketplace, resulting in volatility in the resulting contributions if the unadjusted market value is used in the valuation process that develops the contributions. Therefore, a smoothed, actuarial value is developed for use in this process and for evaluating the Program's ongoing ability to meet its obligations. The actuarial value of the total MainePERS DB assets are then allocated to each Program. This section discloses the market and actuarial values of the MainePERS DB assets both in total and for each Program.

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SECTION III – ASSETS

Table III-1 that follows develops the change in the market value of assets for the total MainePERS DB assets during FY 2019.

Table III-1	
Changes in Market Value of Total MainePERS Defined Benefit (DB) Assets	
Market Value of Total MainePERS DB Assets – June 30, 2018	\$ 14,569,405,260
<u>Additions</u>	
Contributions:	
Employer Contributions	\$ 414,682,379
Member Contributions	201,855,646
Transfers	<u>(225,354)</u>
Total Contributions	\$ 616,312,671
Investment Income:	
Net Appreciation (Depreciation) in Fair Value of Investments	\$ 1,081,164,176
Interest on Bank Balances	<u>1,422,767</u>
Total Investment Income	\$ 1,082,586,943
Investment Activity Expenses:	
Management Fees	\$ (111,281,450)
Investment Related Expense	(5,736,147)
Banking Fees	<u>(29,783)</u>
Total Investment Activity Expenses	\$ (117,047,380)
Net Income from Investing Activities	\$ 965,539,563
Total Additions	\$ 1,581,852,234
<u>Deductions</u>	
Retirement Benefits	\$ (943,958,705)
Disability Benefits	(30,669,902)
Survivor Benefits	(24,140,215)
Refunds	(25,818,720)
Administrative Expenses	<u>(14,004,118)</u>
Total Deductions	\$ (1,038,591,660)
<u>Total</u>	
Net Increase (Decrease)	\$ 543,260,574
Market Value of Total MainePERS DB Assets – June 30, 2019	\$ 15,112,665,834

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SECTION III – ASSETS

Table III-2 below develops the actuarial value of assets for the total MainePERS DB assets as of June 30, 2019 using the adopted actuarial valuation methodology.

Table III-2 Development of Actuarial Value of Total MainePERS Defined Benefit (DB) Assets as of June 30, 2019	
1. Actuarial Value of Total MainePERS DB Assets at June 30, 2018	\$ 14,303,631,662
2. Amount in (1) with Interest to June 30, 2019	15,269,126,799
3. Employer and Member Contributions for FY 2019	616,312,671
4. Interest on Contributions in (3), Assuming Received Uniformly throughout FY 2019	20,460,913
5. Total Disbursements without Administrative Expenses for FY 2019	(1,024,587,542)
6. Interest on Disbursements in (5), Assuming Payments made Uniformly throughout FY 2019	<u>(34,015,196)</u>
7. Expected Value of Total MainePERS DB Assets at June 30, 2019 = (2) + (3) + (4) + (5) + (6)	\$ 14,847,297,645
8. Actual Market Value of Total MainePERS DB Assets at June 30, 2019	15,112,665,834
9. Excess of (8) Over (7)	<u>265,368,189</u>
10. Actuarial Value of Total MainePERS DB Assets at June 30, 2019 = (7) + [33⅓% of (9)]	\$ 14,935,753,708

Actuarial Value of Total MainePERS DB Assets

As discussed in the disclosure portion of this section, the actuarial value of assets for the Program represents a “smoothed” value developed by the actuary to reduce, or eliminate, volatility in contribution rates that could develop from short-term fluctuations in the market value of assets. Current actuarial methods employed in this Program use an allocated portion of the total actuarial value of assets based on the actuarial valuation process applied to the total MainePERS DB assets. This methodology for the total MainePERS DB assets sets the actuarial value of assets equal to the expected value of the actuarial value of assets plus one-third of the difference between the actual market value of assets and the expected actuarial value of assets. The expected value of the actuarial value of assets takes the prior year’s actuarial value of assets and adjusts it for contributions, benefit payments, and expected interest earnings at the investment return assumption that was in effect for the previous year, 6.75% for this valuation. The previous table, Table III-2, illustrates the calculation of the actuarial value of assets for the total MainePERS DB assets as of June 30, 2019.

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SECTION III – ASSETS

Allocation of Actuarial Value of Assets to the Program

The assets for all of the defined benefit (DB) Programs administered by MainePERS are commingled for investment purposes, with the adopted actuarial smoothing methodology applied to the market value of the total MainePERS DB assets. This produces an asset ratio (total MainePERS actuarial value of assets divided by total MainePERS market value of assets) that is then applied to the market value of assets attributable to each of the Programs to determine their actuarial value of assets as of the valuation date. The asset ratio derived in this June 30, 2019 valuation as shown in Table III-2 above is 0.988294 ($\$14,935,753,708 \div \$15,112,665,834$). The allocation of actuarial value of the total MainePERS DB assets to each of the MainePERS DB Programs based on this asset ratio is shown in the following chart.

Table III-3 Allocation of Actuarial Value of Total MainePERS DB Assets as of June 30, 2019		
Program	Market Value	Actuarial Value
Teacher	\$ 8,003,297,686	\$ 7,909,609,357
State (Regular & Special)	4,032,265,361	3,985,062,793
Judicial	73,637,441	72,775,425
Legislative	13,248,022	13,092,938
Participating Local Districts (Consolidated & Non-Consolidated)	<u>2,990,217,324</u>	<u>2,955,213,195</u>
Total	\$ 15,112,665,834	\$ 14,935,753,708

Investment Performance

The market value of assets for the total MainePERS DB assets returned a positive 6.62% during FY 2019. This is lower than the assumed return of 6.75% for FY 2019. The equivalent market value returns for the total MainePERS DB assets for FY 2018 and FY 2017 were positive 9.95% and positive 12.72%, respectively.

On an actuarial value of assets basis, the return for FY 2019 was a positive 7.38% for the total MainePERS DB assets. This return is greater than the return on a market value basis, and it is higher than the 6.75% assumption for FY 2019. Therefore, this return gave rise to an investment gain on the total MainePERS DB assets this year.

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SECTION III – ASSETS

Cash Flow Projections

Table III-4 Projection of State and Teacher Program Benefit Payments and Contributions				
FY Ending June 30,	Expected Benefit Payments	Expected Employer Contributions	Expected Member Contributions	Total Expected Contributions
2020	\$ 895,412,000	\$ 386,571,000	\$ 154,670,000	\$ 541,241,000
2021	923,417,000	397,082,000	158,923,000	556,005,000
2022	950,760,000	418,154,000	163,293,000	581,447,000
2023	978,811,000	429,563,000	167,784,000	597,347,000
2024	1,006,367,000	436,157,000	172,398,000	608,555,000
2025	1,035,567,000	448,070,000	177,139,000	625,209,000
2026	1,064,757,000	457,688,000	182,010,000	639,698,000
2027	1,093,558,000	470,281,000	187,016,000	657,297,000
2028	1,120,506,000	481,726,000	192,159,000	673,885,000
2029	1,146,318,000	144,685,000	197,443,000	342,128,000

In Table III-4 above, we provide a projection of expected cash flows in and out of the Program for the next ten years for informational purposes. The Board may share these projections with its investment advisor for consideration of the gap shown between the cash expected to come into the Program through employer and member contributions and the cash expected to be paid out of the Program to provide benefit payments.

The expected benefit payments in Table III-4 were developed using the data currently included in this valuation and on the assumption that the actuarial assumptions disclosed in Appendix C will be exactly met. Actual benefit payments will vary if members retire sooner or later than assumed, if salary increases and actual future post-retirement COLAs differ from those assumed, or if other assumptions differ from the actual experience seen. These benefit projections exclude any assumption about new Program participants, whose experience will eventually lead to increased benefit payments. However, we do not feel this exclusion will materially impact the projections for the time period shown.

Expected employer contributions in this table use the budgeted contributions for FY 2020 through FY 2021. Future contributions beyond that point are developed based on the assumption that all actuarial assumptions will be exactly met in the projection period, including that the market value of assets will earn 6.75% per year, that payroll grows at 2.75% per year, and that these rates are based on following the biennial budgeting process. These future employer contributions are shown graphically in the baseline projection on page five.

The expected member contributions are similarly based on a 2.75% per year assumed increase in covered payroll multiplied by the current average aggregate member contribution rate of 7.71% for FY 2020.

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SECTION IV – LIABILITIES

In this section, we present detailed information on liabilities including:

- Disclosure of the Program’s liabilities as of June 30, 2018 and June 30, 2019;
- Statement of changes in these liabilities during the year; and
- An allocation of liabilities to the Teacher, State Regular, and State Special Plans.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the purpose for which the figures are ultimately used.

- **Present Value of Future Benefits (PVB):** Used for analyzing the overall financial obligations of the Program, this represents the amount of money needed today to fully fund all future benefits of the Program, assuming active members continue to earn salary increases and accrue benefits under their current Program provisions and assuming all actuarial assumptions are exactly met, including the 6.75% per year investment return.
- **Actuarial Liability (AL):** Used for funding calculations and GASB disclosures, this liability is calculated taking PVB above and subtracting the value of accruals that are assigned to future years on a person-by-person basis. This offset is equal to the present value of future member contributions and future employer normal cost contributions under an acceptable actuarial funding method. For this Program and the other MainePERS Defined Benefit Programs, this method is referred to as the entry age normal (EAN) funding method, which is the only acceptable actuarial funding method for GASB disclosures.
- **Present Value of Accrued Benefits (PVAB):** Used for communicating the liabilities for benefits accrued as of the valuation date.

Table IV-1 on the following page discloses each of these liabilities for the current and prior years’ valuations. With respect to the actuarial liability and the present value of accrued benefits, a subtraction of the appropriate value of the Program’s assets yields, for each respective type, a net surplus or an unfunded liability. For the PVB measure, it is compared to the market value of assets plus the expected future value of contributions to the Plan. The future employer contributions are calculated as the expected rates for each year times the expected future payroll as of each date. The future member contribution are calculated assuming the current average rate will be continued for all future years and applied to the expected future payroll as of each date. The difference between the PVB and these anticipated resources indicates either an expected shortfall or an expected surplus representing either additional funding or excess funding and indicates the size of the Program’s stored gains or losses that remain outside of the valuation process currently.

We note that none of the liabilities presented in this report is an appropriate measure of a settlement liability.

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SECTION IV – LIABILITIES

**Table IV-1
Disclosure of Liabilities**

	June 30, 2018	June 30, 2019
Present Value of Benefits (PVB)		
Active Member Benefits	\$ 6,619,296,005	\$ 6,762,906,771
Retired, Disabled, Survivor, and Beneficiary Benefits	8,411,202,297	8,762,386,474
Terminated (Vested & Nonvested) Benefits	<u>619,587,244</u>	<u>698,294,520</u>
Total PVB	\$ 15,650,085,546	\$ 16,223,587,765
Market Value of Assets (MVA)	\$ 11,632,179,683	\$ 12,035,563,047
Future Member Contributions	1,110,068,806	1,169,497,992
Future Employer Contributions	3,213,773,735	3,256,994,438
Projected (Surplus)/Shortfall	<u>(305,936,678)</u>	<u>(238,467,712)</u>
Total Resources	\$ 15,650,085,546	\$ 16,223,587,765
Actuarial Liability (AL)		
Present Value of Benefits (PVB)	\$ 15,650,085,546	\$ 16,223,587,765
Present Value of Future Normal Costs (PVFNC)		
Employer Portion	508,828,895	506,866,860
Member Portion	<u>1,110,068,806</u>	<u>1,169,497,992</u>
Actuarial Liability (AL = PVB – PVFNC)	\$ 14,031,187,845	\$ 14,547,222,913
Actuarial Value of Assets (AVA)	<u>11,419,986,652</u>	<u>11,894,672,150</u>
Net (Surplus)/Unfunded (AL – AVA)	\$ 2,611,201,193	\$ 2,652,550,763
Present Value of Accrued Benefits		
Present Value of Future Benefits (PVB)	\$ 15,650,085,546	\$ 16,223,587,765
Present Value of Future Benefit Accruals (PVFBA)	<u>2,820,323,263</u>	<u>2,869,253,008</u>
Accrued Liability (PVAB = PVB – PVFBA)	\$ 12,829,762,283	\$ 13,354,334,757
Market Value of Assets (MVA)	11,632,179,683	12,035,563,047
Net (Surplus)/Unfunded (PVAB – MVA)	\$ 1,197,582,600	\$ 1,318,771,710

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SECTION IV – LIABILITIES

Changes in Liabilities

Each of the liabilities disclosed in the prior table is expected to change at each subsequent valuation. The components of these changes, depending upon which liability is analyzed, can include:

- New program members since the last valuation
- Benefits accrued since the last valuation
- Program amendments changing benefits since the last valuation
- Passage of time, which adds interest to the prior liability
- Benefits paid to members since the last valuation
- Members retiring, terminating, or dying at rates different than expected since the last valuation
- Salaries changing at rates different than expected since the last valuation
- A change in actuarial assumptions since the last valuation
- A change in the actuarial funding method since the last valuation

Unfunded liability measurements will change because of all of the above, as well as due to changes in the Program’s asset measurements resulting from:

- Contributions being different than expected
- Investment earnings being different than expected
- A change in the method used to measure the Program’s assets in developing the unfunded liability measure since the last valuation

In each valuation, we report on those elements of change in the Program’s liability measures that are of particular significance, potentially affecting the long-term financial outlook of the Program. In Table IV-2 below, we present key changes in the Program’s liability measures since the last valuation.

	Table IV-2 Present Value of Future Benefits	Actuarial Liability	Present Value of Accrued Benefits
Liability Measurement – June 30, 2018	\$ 15,650,085,546	\$ 14,031,187,845	\$ 12,829,762,283
Liability Measurement – June 30, 2019	<u>16,223,587,765</u>	<u>14,547,222,913</u>	<u>13,354,334,757</u>
Liability Measurement Increase/ (Decrease) Due to:	\$ 573,502,219	\$ 516,035,068	\$ 524,572,474
Program Amendment	\$ 0	\$ 0	\$ 0
Assumption Change	0	0	0
Actuarial (Gain)/Loss	N/C	208,719,412	N/C
Benefits Accumulated and Other Sources	\$ 573,502,219	\$ 307,315,656	\$ 524,572,474

N/C = Not calculated

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SECTION IV – LIABILITIES

Table IV-3 below presents the actuarial liability information for the Program in total as well as divided into the Teacher Program, the State Regular Plans, and the State Special Plans.

Table IV-3				
Allocation of Actuarial Liability as of June 30, 2019				
	Total Program	Teacher Program	State Regular Plans	State Special Plans
1. Actuarial Liabilities for:				
a. Active Members	\$ 5,086,541,919	\$3,438,484,823	\$ 1,332,131,924	\$ 315,925,172
b. Retired, Disabled, Survivor, and Beneficiary Members	8,762,386,474	5,557,545,446	2,766,184,106	438,656,922
c. Terminated (Vested & Nonvested) Members	698,294,520	473,143,328	209,029,995	16,121,197
2. Total Actuarial Liability [1(a) + 1(b) + 1(c)]	\$ 14,547,222,913	\$9,469,173,597	\$ 4,307,346,025	\$ 770,703,291
3. Actuarial Value of Assets	<u>11,894,672,150</u>	<u>7,909,609,357</u>	<u>3,379,710,758</u>	<u>605,352,035</u>
4. Unfunded Actuarial Liability (2 – 3)	\$ 2,652,550,763	\$1,559,564,240	\$ 927,635,267	\$ 165,351,256

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SECTION V – CONTRIBUTIONS

In this section, we present detailed information on employer contribution rates as developed in this June 30, 2019 valuation for the Program, including:

- Development of the composite total employer contribution rate, including the composite employer normal cost rate and the composite unfunded actuarial liability (UAL) amortization rate (UAL rate);
- Summary of the employer normal cost rate, the UAL rate, and the total employer rate by plan;
- Derivation and division of the composite UAL rate into the two component Programs, Teacher and State; and
- Allocation of the UAL rate for the total State Program into each State Regular and Special Plan.

Note that these contribution rates are only informational and the actual contribution rates are set by the budgeting process described in the Board Summary at the beginning of this report.

Description of Rate Components

For the Plans in this Program, the funding methodology employed to determine the employer contribution rates is the entry age normal (EAN) funding method. Under this method, there are two components to the total employer contribution rate: the normal cost rate (NC rate) and the unfunded actuarial liability (UAL) amortization rate (UAL amortization rate). Both of these rates are developed separately for each Plan within the Program, consisting of the Teacher Plan, the State Regular Plan, and several State Special Plans.

An individual EAN cost rate is determined for each active member. The normal cost is determined by the following steps. First, an individual normal cost rate for each member is determined by taking the value of their projected future benefits, as of entry age, into the Program. Second, this value is then divided by the value, also at entry age, of the member's expected future salary. Finally, the resulting total normal cost rate is reduced by the member contribution rate to produce the employer normal cost rate for the member. These rates are then multiplied by each member's salary as of the valuation date and added together to get the total employer normal cost dollars as of the valuation date for the Program, which is then divided by the total payroll at the valuation date for the Program to get the employer normal cost rate for the Program. This process results in specific total and employer normal cost rates for each of the Plans in the Program.

The unfunded actuarial liability under the EAN funding method equals the present value, at the time of valuation, of the future benefit payments less the present value of future employer normal cost contributions, future member contributions, and current assets. The UAL amortization rate determined is the percentage that applied to member payroll, which is assumed to increase 2.75% per year, is expected to amortize the UAL according to the Program's amortization policy. Specifically, the remaining original UAL has nine years of its amortization period left and all

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other gains, losses, and changes since then are amortized over twenty-year periods beginning on the date as of which they were first measured.

Contribution Calculations

Table V-1 below presents and compares the composite total employer contribution rate, as well as its two components, for all Plans in the Program in aggregate as developed in this valuation and the prior one.

Table V-1 Composite Total Employer Rate		
Valuation Date	June 30, 2018	June 30, 2019
Composite Employer NC Rate	4.18%	3.98%
Composite UAL Amortization Rate	<u>15.74%</u>	<u>16.08%</u>
Composite Total Employer Rate	19.92%	20.06%

Table V-2 shows the employer NC rate, the UAL amortization rate, and the total employer rate for each Plan in the Program as well as the Program in total and divided into the Teacher and State Programs.

The liability and contributions associated with groups that no longer have any active participants as of the current valuation date are included with the State Regular Program.

Table V-2 Total Employer Contribution Rates by Plan					
Valuation Date	Total	Employee	Employer	UAL	Total
June 30, 2019	NC Rate	Contribution	NC Rate	Contribution	Employer
		Rate		Rate	Contribution
					Rate
Total Program	11.69%	7.71%	3.98%	16.08%	20.06%
Teacher Program	11.49%	7.65%	3.84%	14.54%	18.38%
State Program	12.06%	7.82%	4.24%	19.08%	23.32%
State Regular	11.72%	7.65%	4.07%	18.53%	22.60%
State Police*	20.85%	8.65%	12.20%	32.98%	45.18%
Inland F&W*	21.81%	8.65%	13.16%	34.52%	47.68%
Forest Rangers*	11.34%	8.65%	2.69%	17.93%	20.62%
25 & Out Plan	13.02%	8.65%	4.37%	20.60%	24.97%
1998 Special Plan	14.11%	8.65%	5.46%	22.33%	27.79%

*Closed plan

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SECTION V – CONTRIBUTIONS

Table V-3 that follows provides the development of the 16.08% UAL amortization rate for the Program as a whole and divided between the Teacher and State Programs.

**Table V-3
Derivation of Unfunded Actuarial Liability Rates**

Valuation Date June 30, 2019	Teacher Program	State Program (Regular and Special Plans)	Total Program
1. Actuarial Liability (AL)	\$ 9,469,173,597	\$ 5,078,049,316	\$ 14,547,222,913
2. Actuarial Value of Assets (AVA)	<u>7,909,609,357</u>	<u>3,985,062,793</u>	<u>11,894,672,150</u>
3. Unfunded Actuarial Liability (UAL)	\$ 1,559,564,240	\$ 1,092,986,523	\$ 2,652,550,763
4. Remaining Balances of Prior Amortization Bases			
a. Original UAL Amount	\$ 1,308,047,138	\$ 753,208,760	\$ 2,061,255,898
b. 2012 (Gain)/Loss Base	28,574,552	25,457,172	54,031,724
c. 2013 (Gain)/Loss Base	(124,783,891)	140,256,514	15,472,623
d. 2014 (Gain)/Loss Base	(197,714,166)	(89,413,511)	(287,127,677)
e. 2015 (Gain)/Loss Base	3,729,069	(5,971,790)	(2,242,721)
f. 2016 (Gain)/Loss Base	174,836,781	195,898,857	370,735,638
g. 2017 (Gain)/Loss Base	105,749,112	19,228,478	124,977,590
h. 2018 (Gain)/Loss Base	113,090,771	29,608,330	142,699,101
i. 2019 (Gain)/Loss Base	<u>148,034,874</u>	<u>24,713,713</u>	<u>172,748,587</u>
j. Sum of the Bases	\$ 1,559,564,240	\$ 1,092,986,523	\$ 2,652,550,763
5. UAL Amortizations			
a. Original UAL Amount 9 Years	\$ 174,100,369	\$ 100,251,680	\$ 274,352,049
b. 2012 (Gain)/Loss Base 13 Years	2,826,906	2,518,501	5,345,407
c. 2013 (Gain)/Loss Base 14 Years	(11,665,125)	13,111,546	1,446,421
d. 2014 (Gain)/Loss Base 15 Years	(17,552,418)	(7,937,839)	(25,490,257)
e. 2015 (Gain)/Loss Base 16 Years	315,755	(505,655)	(189,900)
f. 2016 (Gain)/Loss Base 17 Years	14,173,648	15,881,106	30,054,754
g. 2017 (Gain)/Loss Base 18 Years	8,235,274	1,497,429	9,732,703
h. 2018 (Gain)/Loss Base 19 Years	8,485,392	2,221,563	10,706,955
i. 2019 (Gain)/Loss Base 20 Years	<u>10,730,143</u>	<u>1,791,346</u>	<u>12,521,489</u>
j. Sum of Amortization Payments	\$ 189,649,944	\$ 128,829,677	\$ 318,479,621
6. Covered Payroll	\$ 1,303,736,188	\$ 675,288,288	\$ 1,979,024,476

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**Table V-3
Derivation of Unfunded Actuarial Liability Rates**

Valuation Date June 30, 2019	Teacher Program	State Program (Regular and Special Plans)	Total Program
7. UAL Amortization Rates			
a. Original UAL Amount 9 Years	13.35%	14.85%	13.86%
b. 2012 (Gain)/Loss Base 13 Years	0.22%	0.37%	0.27%
c. 2013 (Gain)/Loss Base 14 Years	(0.89)%	1.94%	0.07%
d. 2014 (Gain)/Loss Base 15 Years	(1.35)%	(1.18)%	(1.29)%
e. 2015 (Gain)/Loss Base 16 Years	0.02%	(0.07)%	(0.01)%
f. 2016 (Gain)/Loss Base 17 Years	1.09%	2.35%	1.52%
g. 2017 (Gain)/Loss Base 18 Years	0.63%	0.22%	0.49%
h. 2018 (Gain)/Loss Base 19 Years	0.65%	0.33%	0.54%
i. 2019 (Gain)/Loss Base 20 Years	<u>0.82%</u>	<u>0.27%</u>	<u>0.63%</u>
j. Sum of UAL Amortization Rates	14.54%	19.08%	16.08%

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Table V-4 below shows the development of the UAL amortization rate for each specific plan within the State Program.

Table V-4 Allocation of Unfunded Actuarial Liability Amortization Rate within State Program (Regular & Special Plans)							
Valuation Date June 30, 2019	Total State Program	State Regular Plan	State Police (Closed)	Inland F&W (Closed)	Forest Rangers (Closed)	25 & Out Plan	1998 Special Plan
1. Employer NC Rate	4.24%	4.07%	12.20%	13.16%	2.69%	4.37%	5.46%
2. Member Contribution Rate	<u>7.82%</u>	<u>7.65%</u>	<u>8.65%</u>	<u>8.65%</u>	<u>8.65%</u>	<u>8.65%</u>	<u>8.65%</u>
3. Total NC Rate	12.06%	11.72%	20.85%	21.81%	11.34%	13.02%	14.11%
4. UAL Amortization Rates*							
a. Original UAL Amount	14.85%	14.43%	25.67%	26.86%	13.96%	16.03%	17.37%
b. 2012 Loss Base	0.37%	0.36%	0.64%	0.67%	0.35%	0.40%	0.43%
c. 2013 Loss Base	1.94%	1.89%	3.35%	3.51%	1.82%	2.09%	2.27%
d. 2014 Gain Base	(1.18)%	(1.15)%	(2.04)%	(2.13)%	(1.11)%	(1.27)%	(1.38)%
e. 2015 Gain Base	(0.07)%	(0.07)%	(0.12)%	(0.13)%	(0.07)%	(0.08)%	(0.08)%
f. 2016 Loss Base	2.35%	2.28%	4.06%	4.25%	2.21%	2.54%	2.75%
g. 2017 Loss Base	0.22%	0.21%	0.38%	0.40%	0.21%	0.24%	0.26%
h. 2018 Loss Base	0.33%	0.32%	0.57%	0.60%	0.31%	0.36%	0.39%
i. 2019 Loss Base	<u>0.27%</u>	<u>0.26%</u>	<u>0.47%</u>	<u>0.49%</u>	<u>0.25%</u>	<u>0.29%</u>	<u>0.32%</u>
j. Sum of Amortization Rates	19.08%	18.53%	32.98%	34.52%	17.93%	20.60%	22.33%

* The 19.08% UAL amortization rate for the State Program in total is allocated to each of the Plans within the Program based on the ratio of that Plan's total NC rate to the 12.06% total NC rate for the State Program in total.

The rates developed in this section are for informational purposes only. Actual budgeted rates are set based on the ratemaking process described in the Board Summary section.

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SECTION VI – FINANCIAL DISCLOSURE INFORMATION

This section contains financial disclosure information regarding the Program developed under a number of accounting standards and guidance.

First, for informational purposes, we show the Program's funded status under the Financial Accounting Standards Board (FASB) ASC Topic 960, which discloses how the market value of assets would compare to accrued liabilities if contributions were to stop and accrued benefit claims had to be satisfied as of the valuation date. However, due to potential legal requirements and the possibility that alternative interest rates would have to be used to determine the liabilities, these values may not be a good indication of the amount of money it would take to buy the benefits for all members if all provisions of the Program were to terminate. We have prepared the following exhibit in this section based on FASB ASC Topic 960:

- Table VI-1: Accrued Benefits information

The Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 establish standards for disclosure of pension information by public employee retirement systems (PERS) and governmental employers in financial statements, notes to financial statements, and supplementary information. We have prepared the following exhibits reflecting provisions of GASB Statement Nos. 67 and 68:

- Table VI-2: Schedule of Changes in Net Pension Liability and Related Ratios
- Table VI-3: Sensitivity of Net Pension Liability to Changes in Discount Rate
- Table VI-4: Schedule of Employer Contributions
- Table VI-5: Average Expected Remaining Service Lives

A summary of the terminology used in GASB Statement Nos. 67 and 68 is provided in Appendix D of this report. Note that while much of the information provided in this report under GASB No. 67 is also utilized in GASB No. 68, Table VI-5 included in this section is only applicable to GASB No. 68.

Finally, we have also developed disclosure information in this section based on additional guidance relating to Comprehensive Annual Financial Reports (CAFRs) of PERS provided by the Government Finance Officers Association (GFOA) in their publication, *Governmental Accounting, Auditing, and Financial Reporting* (GAAFR). We have prepared the following exhibits reflecting guidance in the GAAFR:

- Table VI-6: Analysis of Financial Experience
- Table VI-7: Schedule of Funded Liabilities by Type

The present value of accrued benefits, the total pension liability (GASB 67/68), and the actuarial liability (GAAFR) disclosures in this section are all determined assuming that the Program is ongoing and participants continue to terminate employment, retire, etc., in accordance with the actuarial assumptions. Liabilities as of June 30, 2019 are discounted at the assumed valuation interest rate of 6.75% per annum in all of these disclosures.

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Table VI-1 below includes the relevant amounts as of June 30, 2018 and June 30, 2019 as well as a reconciliation between the two dates under FASB ASC Topic 960.

Table VI-1 Accrued Benefits Information		
FASB ASC Topic 960 Basis	June 30, 2018	June 30, 2019
1. Present Value of Benefits Accrued to Date (PVAB)		
a. Members Currently Receiving Payments	\$ 8,411,202,297	\$ 8,762,386,474
b. Terminated Vested Members	619,587,244	698,294,520
c. Active Members	<u>3,798,972,742</u>	<u>3,893,653,763</u>
d. Total PVAB	\$ 12,829,762,283	\$ 13,354,334,757
2. Market Value of Assets (MVA)	<u>11,632,179,683</u>	<u>12,035,563,047</u>
3. Unfunded Present Value of Accrued Benefits, But Not Less Than Zero	\$ 1,197,582,600	\$ 1,318,771,710
4. Ratio of MVA to PVAB (2)/(1)(d)	90.7%	90.1%
Change in Present Value of Benefits Accrued to Date during FY 2019		
Increase/(Decrease) during Year Attributable to:		
Passage of Time	\$ 837,741,103	
Benefits Paid	(851,469,104)	
Assumption Changes	0	
Program Changes	0	
Benefits Accrued, Other Gains/Losses	<u>538,300,475</u>	
Net Increase (Decrease)	\$ 524,572,474	

Table VI-2 that follows shows the changes in the total pension liability (TPL), the Program's fiduciary net position (FNP) (i.e., fair value of the Program's net assets), and the net pension liability (NPL) during the measurement year ending June 30, 2019 as well as related ratios calculated under the provisions of GASB Statement No. 67 for the Program.

As of the June 30, 2019 valuation, the fiduciary net position for this Program was projected to be available to make all projected future benefit payments for current program members. As such, the long-term expected rate of return on the Program's investments was applied to all periods of projected benefit payments in determining the total pension liability under GASB Nos. 67 and 68. The projection of cash flows used to determine the discount rate assumed that member contributions will be made at the current contribution rates and the employer contributions will be made according to the actuarial calculations developed in the biennial ratemaking process.

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Table VI-2
Schedule of Changes in Net Pension Liability and Related Ratios
FY 2019

	Teacher Program	State Program	Total State and Teacher Program
<u>Total Pension Liability (TPL)</u>			
Service Cost (SC)	\$ 145,625,695	\$ 79,149,417	\$ 224,775,112
Interest (Includes Interest on SC)	606,148,068	327,861,580	934,009,648
Changes of Benefit Terms	0	0	0
Differences Between Actual and Expected Experience	156,628,490	52,090,922	208,719,412
Changes of Assumptions	0	0	0
Benefit Payments, Including Refunds of Member Contributions	<u>(538,358,154)</u>	<u>(313,110,950)</u>	<u>(851,469,104)</u>
Net Change in TPL	370,044,099	145,990,969	516,035,068
Beginning of Year (BOY) TPL	<u>9,099,129,498</u>	<u>4,932,058,347</u>	<u>14,031,187,845</u>
End of Year (EOY) TPL	<u>\$9,469,173,597</u>	<u>\$5,078,049,316</u>	<u>\$14,547,222,913</u>
<u>Plan Fiduciary Net Position (FNP)</u>			
Employer Contributions	\$ 189,850,260	\$ 161,493,470	\$ 351,343,730
Member Contributions	98,164,172	47,854,879	146,019,051
Transfers	433	(317,021)	(316,588)
Net Investment Income	511,403,215	257,583,912	768,987,127
Benefit Payments, Including Refunds of Member Contributions	(538,358,154)	(313,110,950)	(851,469,104)
Administrative Expense	<u>(7,448,994)</u>	<u>(3,731,858)</u>	<u>(11,180,852)</u>
Net Change in FNP	253,610,932	149,772,432	403,383,364
BOY FNP	<u>7,749,686,754</u>	<u>3,882,492,929</u>	<u>11,632,179,683</u>
EOY FNP	<u>\$8,003,297,686</u>	<u>\$4,032,265,361</u>	<u>\$12,035,563,047</u>
EOY Net Pension Liability (NPL)	<u>\$1,465,875,911</u>	<u>\$1,045,783,955</u>	<u>\$ 2,511,659,866</u>
FNP as a Percentage of TPL	84.5%	79.4%	82.7%
Covered Payroll (Payroll)*	1,260,741,628	663,264,990	1,924,006,618
NPL as a Percentage of Payroll	116.3%	157.7%	130.5%

*For FY 2019.

Notes to Schedule of Changes in Net Pension Liability and Related Ratios

None.

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A ten-year schedule of changes in NPL and related ratios is to be included within the CAFR for PERS. However, based on GASB guidance, this ten-year history can be built one year at a time following implementation. We have shown only the current year of this *Schedule of Changes in Net Pension Liability and Related Ratios* above and believe that you can accumulate the individual years in the MainePERS CAFR to build this schedule to show the full ten-year schedule over time. Notes to this schedule should be included for any factors significantly impacting the trends reported within the period shown in this schedule at that time. As of June 30, 2019, we have not included such a note in the *Notes to Schedule of Changes in Net Pension Liability and Related Ratios* above. However, it is our expectation that the System’s staff will make the final determination regarding any notes needed for this schedule and are available to provide any information they may need for this purpose.

Table VI-3 below illustrates the sensitivity of the net pension liability (NPL) to the discount rate. Changes in the discount rate affect the measurement of the total pension liability (TPL) for the Program. Lower discount rates produce a higher TPL, and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the Net Pension Liability (NPL) can be very significant for relatively small changes in the discount rate.

**Table VI-3
Sensitivity of Net Pension Liability to Changes in Discount Rate
FY 2019**

	1% Decrease 5.750%	Discount Rate 6.750%	1% Increase 7.750%
Teacher Program			
Total Pension Liability (TPL)	\$10,653,565,200	\$ 9,469,173,597	\$ 8,482,199,189
Plan Fiduciary Net Position (FNP)	<u>8,003,297,686</u>	<u>8,003,297,686</u>	<u>8,003,297,686</u>
Net Pension Liability (NPL)	<u>\$ 2,650,267,514</u>	<u>\$ 1,465,875,911</u>	<u>\$ 478,901,503</u>
FNP as a Percentage of TPL	75.1%	84.5%	94.4%
State Program			
Total Pension Liability (TPL)	\$ 5,296,945,325	\$ 5,078,049,316	\$ 4,314,027,057
Plan Fiduciary Net Position (FNP)	<u>4,032,265,361</u>	<u>4,032,265,361</u>	<u>4,032,265,361</u>
Net Pension Liability (NPL)	<u>\$ 1,264,679,964</u>	<u>\$ 1,045,783,955</u>	<u>\$ 281,761,696</u>
FNP as a Percentage of TPL	76.1%	79.4%	93.5%
Total State and Teacher Program			
Total Pension Liability (TPL)	\$15,950,510,525	\$14,547,222,913	\$12,796,226,246
Plan Fiduciary Net Position (FNP)	<u>12,035,563,047</u>	<u>12,035,563,047</u>	<u>12,035,563,047</u>
Net Pension Liability (NPL)	<u>\$ 3,914,947,478</u>	<u>\$ 2,511,659,866</u>	<u>\$ 760,663,199</u>
FNP as a Percentage of TPL	75.5%	82.7%	94.1%

A one percent decrease in the discount rate increases the TPL for the total Program by approximately 10% and increases the NPL by approximately 56%. A one percent increase in the

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discount rate decreases the TPL by approximately 12% and decreases the NPL by approximately 70%.

Table VI-4 that follows provides information relating to the employer contributions for the Program. Under GASB Statement No. 67, if an actuarially determined contribution (ADC) or a contractually or statutorily required contribution (CRC) is developed for a single employer or cost-sharing plan, the following schedule is required. For purposes of this schedule, an ADC is a contribution amount determined in accordance with Actuarial Standards of Practice and a CRC is based on statutory or contractual requirements. Both should exclude any amounts to finance specific liabilities of individual employers of the plan. If an ADC is available, the schedule of employer contributions should be developed on that basis. If there is no ADC, but there is a CRC, the schedule should be developed on that basis. Only if neither an ADC nor a CRC is developed can this schedule be omitted from the PERS’s CAFR.

The Program’s rates set in the ratemaking process meet the definition of an ADC, so for this Program this schedule should be developed on that basis. Based on GASB guidance, a full ten years of information should be shown in this schedule if it is available, but this ten-year history can be built one year at a time following implementation. We have shown only the current year of this *Schedule of Employer Contributions* below and believe that you can accumulate these in the MainePERS CAFR to build this schedule to show the full ten-year schedule over time.

Only the current year of the *Notes to Schedule of Employer Contributions* below needs to be included in the notes to this schedule. However, any factors that significantly affect trends in the *Schedule of Employer Contributions* at any point in the ten-year period should also be included in the notes to this schedule. We believe such a note is not needed to indicate the change in assumptions that were recognized in the 2015 valuation that was the basis of this ADC since this change was already reflected in the FY 2018 rate, but it is our expectation that System staff will make the final determination regarding any notes needed for this schedule and are available to provide any additional information that they may need for this purpose.

**Table VI-4
Schedule of Employer Contributions
FY 2019**

	Teacher Program	State Program	Total State and Teacher Program
Actuarially Determined Contribution (ADC)	\$ 189,741,615	\$ 160,841,760	\$ 350,583,375
Contributions in Relation to the ADC	<u>189,741,615</u>	<u>160,841,760</u>	<u>350,583,375</u>
Contribution Deficiency/(Excess)	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>
Covered Payroll (Payroll)	\$1,260,741,628	\$ 663,264,990	\$ 1,924,006,618
Contributions as a Percentage of Payroll	15.05%	24.25%	18.22%

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ACTUARIAL VALUATION AS OF JUNE 30, 2019**

SECTION VI – FINANCIAL DISCLOSURE INFORMATION

Notes to Schedule of Employer Contributions

Valuation Date: June 30, 2015

Timing: June 30, 2019 ADC rates are calculated based on 2016 liabilities developed as a roll-forward of the 2015 valuation liability, adjusted for expected experience and any assumption or methodology changes during FY 2016 using preliminary actual assets as of June 30, 2016.

Key Methods and Assumptions Used to Determine Contribution Rates

Actuarial Cost Method: Entry age normal

Asset Valuation Method: Three-year smoothed market

Amortization Method: Level percentage of payroll, closed 16-year amortization of UAL prior to 2012 and individual, closed, level percent of payroll, 10-year amortization of UAL arising each year beginning in 2012.

Discount Rate: 6.875%

Amortization
Growth Rate: 2.75%

Price Inflation: 2.75%

Salary Increases: 2.75% plus merit component based on employee's years of service

Mortality: State Employee Program: 104% and 120% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Employee Mortality Table for ages prior to start of the Healthy Annuitant Mortality Table, both projected from the 2006 base rates using MP_2015 model with an ultimate rate of 0.85% for ages 20-85 grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020.

Teacher Program: 99% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table for both males and females, using the RP-2014 Total Dataset Employee Mortality Table for ages prior to the start of the Healthy Annuitant Mortality Table, respectively, both projected using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020.

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A complete description of the methods and assumptions used to determine contribution rates for the year ending June 30, 2019 can be found in the June 30, 2016 actuarial valuation report.

Other Information

None.

Table VI-5 that follows is provided in this report at the request of MainePERS staff, showing the development of the average remaining service life for the Program. GASB No. 68 requires some items be recognized by employers into pension expense over a period “equal to the average of the expected remaining service lives of all employees that are provided with pensions through the pension plan (active employees and inactive employees) determined as of the beginning of the measurement period.” For the current measurement year ending on June 30, 2019, these values are thus developed as of June 30, 2018. The development of this value is shown below, including reflection of the decision by MainePERS to round the resulting value to the nearest whole year. Note that the decision was made to apply GASB No. 68 separately to the Teacher Program and the State Program based upon paragraph 19 of that statement, so this value has been provided separately for these Programs.

Table VI-5 Average Expected Remaining Service Lives For Measurement Year Ending June 30, 2019			
<u>Teacher Program</u>			
Status	Total Expected Future Service	Count	Average Remaining Service Lives
Active Members	280,438	27,396	10
In-Pay Members	0	20,566	0
Terminated Vested Members	0	4,983	0
Inactives Due Refunds	<u>0</u>	<u>31,513</u>	<u>0</u>
Total Membership	280,438	84,458	3
<u>State Program</u>			
Status	Total Expected Future Service	Count	Average Remaining Service Life
Actives	110,036	12,447	9
In-Pay Members	0	15,035	0
Terminated Vested Members	0	2,982	0
Inactives Due Refunds	<u>0</u>	<u>7,561</u>	<u>0</u>
Total Membership	110,036	38,025	3

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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SECTION VI – FINANCIAL DISCLOSURE INFORMATION

Table VI-6 below is a gain/loss analysis of the changes in the actuarial liability over the past six years, reflecting variances between actual experience and assumed experience for different kinds of risk as specified in the GFOA GAAFR.

Table VI-6 Analysis of Financial Experience Gain and Loss in Actuarial Liability During Fiscal Years Ended June 30 Resulting from Differences Between Assumed Experience and Actual Experience						
Type of Activity	Gain (or Loss) For Fiscal Year Ended June 30, 2014	Gain (or Loss) For Fiscal Year Ended June 30, 2015	Gain (or Loss) For Fiscal Year Ended June 30, 2016	Gain (or Loss) For Fiscal Year Ended June 30, 2017	Gain (or Loss) For Fiscal Year Ended June 30, 2018	Gain (or Loss) For Fiscal Year Ended June 30, 2019
Investment Income	\$639,521,136	\$ (67,533,511)	\$(284,220,804)	\$ (18,117,992)	\$ 94,329,730	\$ 57,985,155
Combined Liability Experience	<u>17,694,276</u>	<u>44,287,643</u>	<u>(81,506,701)</u>	<u>(95,207,531)</u>	<u>(34,151,279)</u>	<u>(208,719,412)</u>
Gain (or Loss) during Year from Financial Experience	\$657,215,412	\$ (23,245,868)	\$(365,727,505)	\$ (113,325,523)	\$ 60,178,451	\$(150,734,257)
Non-Recurring Items	<u>(167,650,573)</u>	<u>0</u>	<u>(30,436,605)</u>	<u>0</u>	<u>(191,998,939)</u>	<u>0</u>
Composite Gain (or Loss) During Year	\$ 489,564,839	\$ (23,245,868)	\$ (396,164,110)	\$ (113,325,523)	\$ (131,820,488)	\$ (150,734,257)

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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SECTION VI – FINANCIAL DISCLOSURE INFORMATION

Table VI-7 below compares the Program’s assets as of each valuation date shown to the Program’s actuarial liability divided into three separate groups: liabilities for contributions on deposit for current active members, liabilities for future benefits for inactive members, and employer-financed liabilities for current active members. This Schedule of Funded Liabilities by Type is used to assess funding progress based on what percentage of the liabilities for each of these groups the Program’s assets are sufficient to cover. Per GFOA guidance, this schedule is to include this assessment for the ten most recent years and notes to this schedule should be provided to explain any factors that affect the comparability of the data. We do not believe such a note is needed for the measurement year ending June 30, 2019, but it is our expectation that the System’s staff will make the final determination regarding any notes needed for this schedule.

Table VI-7 Schedule of Funded Liabilities by Type							
Aggregate Actuarial Liabilities for:							
Valuation Date	(1)	(2)	(3)	Reported Assets*	Portion of Actuarial Liabilities Covered by Reported Assets		
	Active Member Contributions	Retirees, Vested Terms, Beneficiaries	Active Members (Employer Financed Portion)		(1)	(2)	(3)
June 30, 2019	\$2,499,498,544	\$9,460,680,994	\$2,587,043,375	\$11,894,672,150	100%	99%	0%
2018	2,453,797,249	9,030,789,541	2,546,601,055	11,419,986,652	100	99	0
2017	2,402,112,525	8,727,549,999	2,355,223,988	10,904,082,221	100	97	0
2016	2,359,818,665	8,399,121,582	2,311,014,701	10,512,524,178	100	97	0
2015	2,339,138,044	7,831,348,903	2,445,800,107	10,375,552,497	100	100	8
2014	2,315,075,905	7,572,038,284	2,433,044,594	10,017,512,006	100	100	5
2013	2,290,505,939	7,181,259,077	2,358,884,866	9,177,749,627	100	96	0
2012	2,271,164,594	6,656,860,191	2,625,281,496	8,880,730,120	100	99	0
2011	2,229,984,967	6,453,384,730	2,598,295,489	8,736,885,121	100	100	2
2010	2,117,903,830	6,856,828,427	3,642,411,748	8,313,459,810	100	90	0

* Reported assets are measured at actuarial value. Results would be different if market value of assets were used. Despite the name of this exhibit, the liabilities presented in this schedule are not an appropriate measurement of the settlement liability of the Program.

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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APPENDIX A – MEMBERSHIP INFORMATION

Active Member Data as of June 30, 2019	
<u>Teacher Plan</u>	
Count	27,441
Average Current Age	46.0
Average Benefit Service	12.2
Average Vesting Service	12.3
Average Valuation Pay	\$ 47,511
<u>State Employee Regular Plan</u>	
Count	10,698
Average Current Age	48.3
Average Benefit Service	12.0
Average Vesting Service	12.5
Average Valuation Pay	\$ 52,607
<u>Forest Rangers Special Plan (Closed Plan)</u>	
Count	1
Average Current Age	60.6
Average Benefit Service	40.1
Average Vesting Service	40.1
Average Valuation Pay	\$109,762
<u>Inland Fisheries & Wildlife Officers Special Plan (Closed Plan)</u>	
Count	1
Average Current Age	63.9
Average Benefit Service	41.2
Average Vesting Service	41.2
Average Valuation Pay	\$ 72,826
<u>State Police Special Plan (Closed Plan)</u>	
Count	1
Average Current Age	65.8
Average Benefit Service	41.9
Average Vesting Service	41.9
Average Valuation Pay	\$ 84,470

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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ACTUARIAL VALUATION AS OF JUNE 30, 2019**

APPENDIX A – MEMBERSHIP INFORMATION

Active Member Data as of June 30, 2019

<u>State Employee Special 25 & Out Plan</u>	
Count	468
Average Current Age	41.4
Average Benefit Service	14.7
Average Vesting Service	15.1
Average Valuation Pay	\$ 83,713
<u>State Employee 1998 Special Plan</u>	
Count	1,266
Average Current Age	43.1
Average Benefit Service	11.5
Average Vesting Service	11.9
Average Valuation Pay	\$ 57,702
<u>State Employee Totals (Excludes Teachers)</u>	
Count	12,435
Average Current Age	47.5
Average Benefit Service	12.1
Average Vesting Service	12.5
Average Valuation Pay	\$ 54,305

**Non-Active Member Data as of June 30, 2019
Teachers**

	Count	Average Age	Total Annual Benefit	Average Annual Benefit
Retired	17,313	73.0	\$ 468,101,894	\$ 27,038
Retired – Concurrent Beneficiary	1,391	73.5	8,413,924	6,049
Disability – Section 1122	0		0	0
Disability – Section 3 and 3A	667	68.4	19,654,125	29,466
Beneficiary of Above	1,538	71.8	26,851,939	17,459
Pre-Retirement Death Beneficiary	280	62.6	1,742,433	6,223
Terminated Vested	5,161	52.6	44,988,757	8,717
Inactive Due Refund	30,670	NA	NA	NA

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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Non-Active Member Data as of June 30, 2019				
State Regular				
	Count	Average Age	Total Annual Benefit	Average Annual Benefit
Retired	9,782	72.9	\$ 213,301,467	\$ 21,806
Retired – Concurrent Beneficiary	987	72.6	5,229,619	5,298
Disability – Section 1122	2	92.7	38,106	19,053
Disability – Section 3 and 3A	828	66.6	20,324,279	24,546
Beneficiary of Above	1,956	65.9	28,308,226	14,473
Pre-Retirement Death Beneficiary	307	67.6	1,903,212	6,199
Terminated Vested	2,714	52.9	21,945,081	8,086
Inactive Due Refund	6,992	NA	NA	NA

Non-Active Member Data as of June 30, 2019				
State Special				
	Count	Average Age	Total Annual Benefit	Average Annual Benefit
Retired	976	68.4	\$ 30,947,996	\$ 31,709
Retired – Concurrent Beneficiary	135	66.6	879,357	6,514
Disability – Section 1122	1	88.6	20,199	20,199
Disability – Section 3 and 3A	76	60.2	2,190,181	28,818
Beneficiary of Above	219	71.8	3,677,504	16,792
Pre-Retirement Death Beneficiary	13	49.3	70,582	5,429
Terminated Vested	313	46.8	2,392,639	7,644
Inactive Due Refund	978	NA	NA	NA

**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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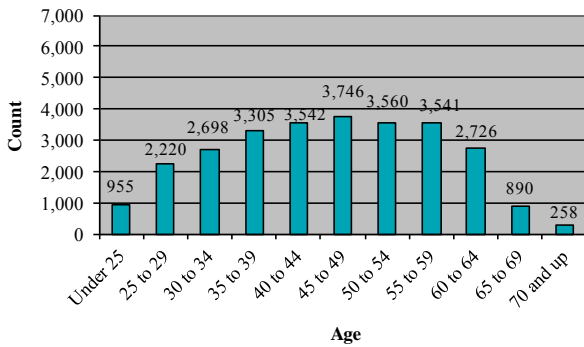
APPENDIX A – MEMBERSHIP INFORMATION

**Distribution of Active Members
As of June 30, 2019**

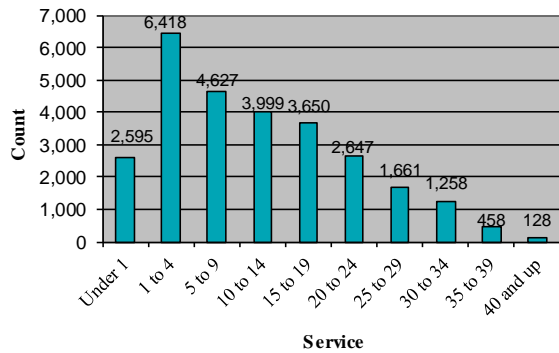
Teachers

	Years of Service										Totals
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	
Under 25	506	449	0	0	0	0	0	0	0	0	955
25 to 29	380	1,382	457	1	0	0	0	0	0	0	2,220
30 to 34	345	940	1,079	334	0	0	0	0	0	0	2,698
35 to 39	331	870	700	1,048	356	0	0	0	0	0	3,305
40 to 44	273	788	652	636	917	276	0	0	0	0	3,542
45 to 49	229	676	610	589	632	793	215	2	0	0	3,746
50 to 54	170	510	446	561	565	490	616	202	0	0	3,560
55 to 59	152	380	329	407	583	496	398	636	160	0	3,541
60 to 64	105	279	237	311	459	426	320	298	232	59	2,726
65 to 69	66	94	84	86	116	144	91	94	57	58	890
70 and up	38	50	33	26	22	22	21	26	9	11	258
Total	2,595	6,418	4,627	3,999	3,650	2,647	1,661	1,258	458	128	27,441

Age Distribution



Service Distribution



**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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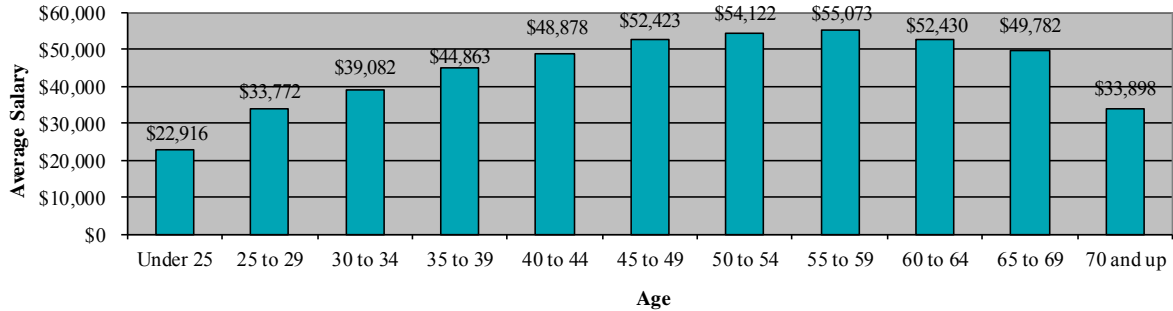
APPENDIX A – MEMBERSHIP INFORMATION

**Distribution of Active Members
As of June 30, 2019**

Teachers

	Average Salary										Average
	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	
Under 25	15,694	31,055	0	0	0	0	0	0	0	0	22,916
25 to 29	18,930	35,054	42,189	54,813	0	0	0	0	0	0	33,772
30 to 34	21,152	35,286	44,332	51,329	0	0	0	0	0	0	39,082
35 to 39	20,489	35,185	46,072	54,521	60,365	0	0	0	0	0	44,863
40 to 44	18,697	33,832	44,996	56,217	63,074	66,783	0	0	0	0	48,878
45 to 49	17,334	33,184	43,621	54,922	63,464	69,370	73,304	68,006	0	0	52,423
50 to 54	18,536	30,983	41,368	50,689	59,175	69,124	73,588	70,309	0	0	54,122
55 to 59	19,391	32,281	41,534	44,633	54,287	62,385	69,141	72,403	73,804	0	55,073
60 to 64	14,572	29,275	36,576	43,028	50,338	58,066	63,304	71,836	75,200	71,593	52,430
65 to 69	12,839	25,526	32,391	39,838	51,370	57,145	64,877	68,356	72,147	73,836	49,782
70 and up	19,962	17,469	19,375	35,978	45,121	45,981	44,416	49,071	63,239	68,795	33,898
Average	18,313	33,463	43,107	51,709	58,788	65,067	69,658	71,141	74,098	72,369	47,511

Average Salary Distribution



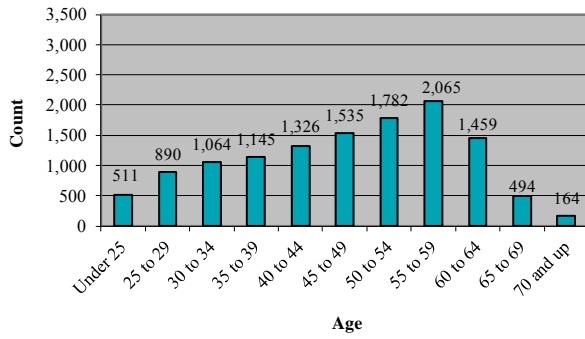
**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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APPENDIX A – MEMBERSHIP INFORMATION

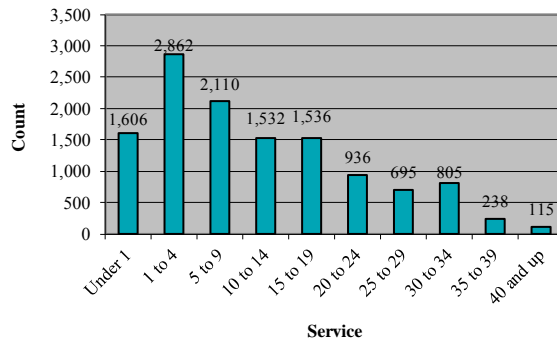
**Distribution of Active Members
As of June 30, 2019**

	State										Totals
	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	
Under 25	336	171	4	0	0	0	0	0	0	0	511
25 to 29	258	507	123	2	0	0	0	0	0	0	890
30 to 34	204	439	344	75	2	0	0	0	0	0	1,064
35 to 39	152	364	292	234	101	2	0	0	0	0	1,145
40 to 44	174	282	250	249	279	92	0	0	0	0	1,326
45 to 49	127	304	264	206	274	251	91	18	0	0	1,535
50 to 54	114	292	246	240	274	211	206	194	5	0	1,782
55 to 59	123	273	262	227	294	188	212	358	120	8	2,065
60 to 64	77	152	214	211	218	147	135	175	76	54	1,459
65 to 69	26	52	93	67	72	38	34	49	25	38	494
70 and up	15	26	18	21	22	7	17	11	12	15	164
Total	1,606	2,862	2,110	1,532	1,536	936	695	805	238	115	12,435

Age Distribution



Service Distribution



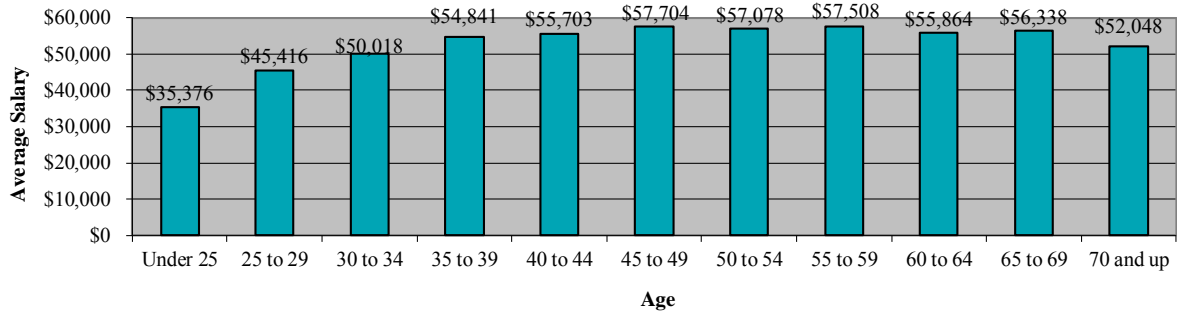
**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
STATE EMPLOYEE AND TEACHER RETIREMENT PROGRAM
ACTUARIAL VALUATION AS OF JUNE 30, 2019**

APPENDIX A – MEMBERSHIP INFORMATION

**Distribution of Active Members
As of June 30, 2019**

	State										Average
	Average Salary										
	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	
Under 25	31,383	42,995	45,015	0	0	0	0	0	0	0	35,376
25 to 29	38,652	47,254	52,016	46,214	0	0	0	0	0	0	45,416
30 to 34	40,002	48,585	56,364	56,405	55,394	0	0	0	0	0	50,018
35 to 39	42,006	51,300	56,562	62,061	65,365	47,490	0	0	0	0	54,841
40 to 44	40,234	49,555	56,717	59,142	63,399	68,399	0	0	0	0	55,703
45 to 49	42,651	46,262	54,702	57,889	62,972	72,078	68,075	66,034	0	0	57,704
50 to 54	36,763	48,602	51,581	56,076	60,762	66,004	69,532	61,724	61,908	0	57,078
55 to 59	42,340	47,236	53,924	53,729	61,154	62,398	65,394	63,382	62,800	65,754	57,508
60 to 64	38,933	47,209	49,197	54,426	57,314	58,865	63,352	63,531	66,702	63,560	55,864
65 to 69	32,168	39,408	55,240	57,837	56,946	61,962	61,964	66,660	66,742	64,125	56,338
70 and up	36,848	33,335	48,888	49,202	46,836	61,183	71,956	74,711	69,301	57,860	52,048
Average	38,148	47,704	54,250	57,143	61,139	65,783	66,568	63,428	64,769	63,156	54,305

Average Salary Distribution



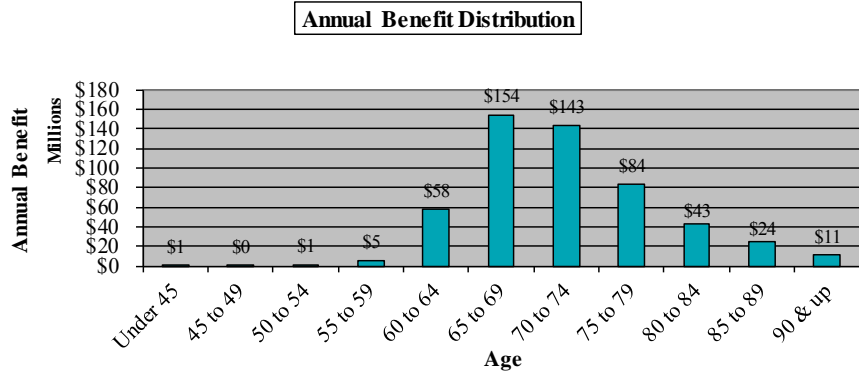
**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
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APPENDIX A – MEMBERSHIP INFORMATION

**Distribution of Retirees, Disabled
Members, Beneficiaries, and Survivors
As of June 30, 2019**

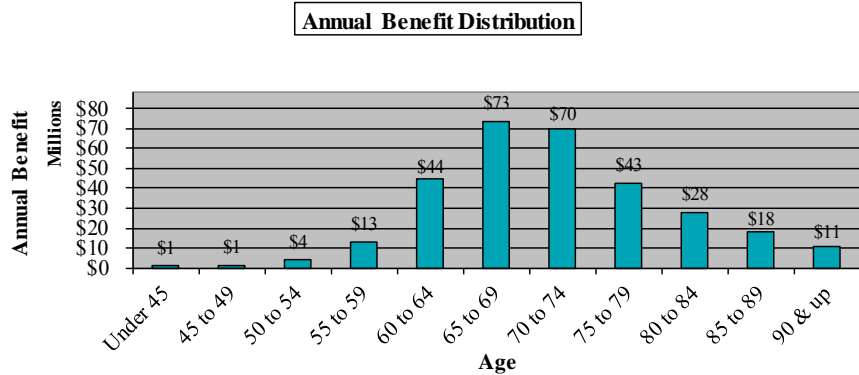
Teachers

Age	Count	Annual Benefit
Under 45	135	\$ 844,516
45 to 49	56	463,875
50 to 54	83	1,030,382
55 to 59	243	5,433,487
60 to 64	2,035	57,928,983
65 to 69	5,807	154,249,810
70 to 74	5,646	143,049,217
75 to 79	3,488	83,606,289
80 to 84	1,923	42,875,930
85 to 89	1,156	24,401,235
90 & up	<u>617</u>	<u>10,880,591</u>
Total	21,189	\$ 524,764,315



State

Age	Count	Annual Benefit
Under 45	131	\$ 1,074,151
45 to 49	116	1,327,257
50 to 54	223	3,901,764
55 to 59	609	12,821,395
60 to 64	2,067	44,479,355
65 to 69	3,525	73,318,404
70 to 74	3,316	69,969,826
75 to 79	2,114	42,737,866
80 to 84	1,463	28,041,316
85 to 89	1,035	18,283,443
90 & up	<u>683</u>	<u>10,935,950</u>
Total	15,282	\$ 306,890,727



**MAINE PUBLIC EMPLOYEES RETIREMENT SYSTEM
STATE EMPLOYEE AND TEACHER RETIREMENT PROGRAM
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APPENDIX A – MEMBERSHIP INFORMATION

Status Reconciliation - Teachers						
	Active Members	Retired Members	Beneficiaries of Retired Members	Survivors of Deceased Members	Disabled Members ¹	Terminated Vested Members ²
As of June 30, 2018	27,396	16,691	2,906	285	684	4,983
New hires	1,976					
Rehires	627					(227)
Movement between plans	(4)					(4)
New retirees	(525)	955				(426)
New beneficiaries due to retirements			59			
New disabled retirees	(12)				22	(7)
New deferred vested members	(882)					957
Non-vested terminations	(942)					
Refunds	(181)					(99)
Deaths, no future benefits	(7)	(294)	(100)	(6)	(13)	(12)
Deaths with a survivor or beneficiary	(5)	(56)	63	12	(8)	(6)
Benefits expired				(11)		
Data correction		17	1		(18)	2
As of June 30, 2019	27,441	17,313	2,929	280	667	5,161

1. Former disabled retirees who have changed to service retirement as mandated by the Plan are still included as disabled members.
2. Terminated vested members includes those indicated to us in the data who have terminated and are eligible for a future annuity.

Status Reconciliation - State Regular and Special Groups						
	Active Members	Retired Members	Beneficiaries of Retired Members	Survivors of Deceased Members	Disabled Members ¹	Terminated Vested Members ²
As of June 30, 2018	12,447	10,461	3,309	341	924	2,982
New hires	1,347					
Rehires	146					(56)
Movement between plans	(12)					2
New retirees	(407)	584				(172)
New beneficiaries due to retirements			67			
New disabled retirees	(19)				30	(7)
New deferred vested members	(319)					357
Non-vested terminations	(550)					
Refunds	(190)					(69)
Deaths, no future benefits	(7)	(254)	(149)	(20)	(19)	(10)
Deaths with a survivor or beneficiary	(1)	(44)	69	5	(14)	(4)
Benefits expired				(5)		
Data correction		11	1	(1)	(14)	4
As of June 30, 2019	12,435	10,758	3,297	320	907	3,027

1. Former disabled retirees who have changed to service retirement as mandated by the Plan are still included as disabled members.
2. Terminated vested members includes those indicated to us in the data who have terminated and are eligible for a future annuity.

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1. Membership

Membership is a condition of employment for state employees and teachers, and optional for elected and appointed officials.

Membership ceases on the earlier of withdrawal of contributions, retirement, or death.

2. Member Contributions

Except as otherwise described below, members are required to contribute 7.65% of earnable compensation. Member contributions earn annual interest at the rate adopted by the Board of Trustees each February.

Contribution Requirements for Special State Employee Groups

State police and inland fisheries and wildlife officers employed before September 1, 1984: required to contribute 8.65% of earnable compensation for 20 years of service and 7.65% thereafter.

Forest rangers employed before September 1, 1984: required to contribute 8.65% of earnable compensation until eligible for retirement and 7.65% thereafter.

1998 Special Plan employees, which includes state prison employees, airplane pilots, forest rangers, defense, veterans and emergency management firefighters employed at Bangor International Airport, corrections employees, Baxter State Park Authority rangers, fire marshals, investigators and inspectors, oil and hazardous materials emergency response workers, and capitol security officers: required to contribute 8.65% of earnable compensation for 25 years and 7.65% thereafter.

State police employed on or after September 16, 1984 and special agent investigators hired before June 21, 1982: required to contribute 8.65% of earnable compensation for 25 years and 7.65% thereafter.

Inland fisheries and wildlife officers and marine resources officers employed on or after September 1, 1984: required to contribute 8.65% of earnable compensation for 25 years and 7.65% thereafter.

3. Average Final Compensation

For purposes of determining benefits payable, average final compensation is the average annual rate of earnable compensation for the three years of creditable service (not necessarily consecutive) that produce the highest such average.

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For compensation paid on or after July 1, 1993, increases in earnable compensation of greater than 5% per year or greater than 10% over the highest three years are not included in calculating average final compensation unless the employer pays the cost of including such compensation. Earnable compensation does not include sick and vacation pay for those members who had less than ten years of service at July 1, 1993. For members for whom sick and vacation pay is includable in earnable compensation, these payments are included in applying the caps described above.

4. Creditable Service

Creditable service includes service while a member, certain service prior to the establishment of the Program, purchased service credit of which there are several types, and service while receiving disability benefits under the Program.

5. Service Retirement Benefits

A. Regular Plan (State Employees and Teachers)

- i. Provisions for Members with at Least Ten Years of Creditable Service on July 1, 1993

Normal Retirement Age: 60

Eligibility for Members in Active Service and Inactive Members: 25 years of creditable service.

Eligibility Alternative for Members in Active Service: At least one year of creditable service immediately before retirement and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement and not in Active Service on or after October 1, 1999: At least ten years of creditable service and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement, but in Active Service on or after October 1, 1999: At least five years of creditable service and at least normal retirement age.

Benefit: 1/50 of average final compensation multiplied by years of creditable service and up to 25 years of prior service, reduced by the following approximate percentages for each year retirement age is less than age 60.

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Age	Reduction	Age	Reduction
45	29.3%	53	16.6%
46	28.0	54	14.6
47	26.6	55	12.5
48	25.2	56	10.3
49	23.6	57	7.9
50	22.0	58	5.4
51	20.3	59	2.8
52	18.5	60	0.0

Form of Payment: Life annuity.

- ii. Provisions for Members with Less Than Ten Years of Creditable Service on July 1, 1993

Normal Retirement Age: 62

Eligibility for Members in Active Service and Inactive Members: 25 years of creditable service.

Eligibility Alternative for Members in Active Service: At least one year of creditable service immediately before retirement age and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement and not in Active Service on or after October 1, 1999: At least ten years of creditable service and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement, but in Active Service on or after October 1, 1999: At least five years of creditable service and at least normal retirement age.

Benefit: 1/50 of average final compensation multiplied by years of membership service and up to 25 years of prior service, reduced by 6% for each year retirement age is less than age 62.

Form of Payment: Life annuity.

- iii. Provisions for Members with Less Than Five Years of Creditable Service on July 1, 2011

Normal Retirement Age: 65

Eligibility for Members in Active Service and Inactive Members: 25 years of creditable service.

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Eligibility Alternative for Members in Active Service: At least one year of creditable service immediately before retirement age and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement and not in Active Service on or after October 1, 1999: At least ten years of creditable service and at least normal retirement age.

Eligibility for Members not in Active Service at Retirement, but in Active Service on or after October 1, 1999: At least five years of creditable service and at least normal retirement age.

Benefit: 1/50 of average final compensation multiplied by years of membership service and up to 25 years of prior service, reduced by 6% for each year retirement age is less than age 65.

Form of Payment: Life annuity.

B. Special Plans (State Employees)

- i. State Police Employed Before September 16, 1984 and Inland Fisheries and Wildlife Officers Employed Before September 1, 1984

Eligibility: 20 years of creditable service in named positions.

Benefit: One-half of average final compensation plus 2% for each year of service in excess of 20. If greater, the pro-rated portion of the benefit for service before July 1, 1976 is based on annual pay instead of average final pay.

Form of Payment: 50% joint and survivor annuity or life annuity.

- ii. Forest Rangers Employed Before September 1, 1984

Eligibility: Age 50 with 25 years of creditable service as a forest ranger.

Benefit: One-half of average final compensation plus 2% for each year of service earned after qualification for retirement. If greater, the pro-rated portion of the benefit for service before July 1, 1976 is based on annual pay instead of average final pay.

Form of Payment: Life annuity.

- iii. 1998 Special Plan

1998 Entrants: State prison employees, airline pilots, forest rangers and liquor inspectors, employed after August 31, 1984; defense, veterans, and emergency management firefighters employed on and after July 1, 1998.

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2000 Entrants: Baxter State Park Authority rangers, correctional employees and state fire marshals employed on or after January 1, 2000.

2002 Entrants: Capitol Police and oil and hazardous materials emergency response workers.

Eligibility: Ten years of creditable service under the 1998 Special Plan in one or a combination of the covered capacities and the attainment of age 55 – OR – 25 years of creditable service in one or a combination of the covered capacities.

Benefit: For service prior to coverage in the 1998 Special Plan, 1/50 of average final compensation multiplied by years of service reduced for retirement before age 60, 62, or 65 (as determined by the applicable Regular Plan provisions described in 5.A.), except oil and hazardous materials emergency response workers, certain prison employee, and Capitol Police benefits are reduced for retirement before age 55.

-PLUS-

For service under the 1998 Special Plan, 1/50 of average final compensation multiplied by years of service reduced for retirement before age 55.

Form of Payment: Life annuity.

iv. 25 & Out Plan

1998 Entrants: State police employed on or after September 16, 1984 and special agent investigators hired before June 21, 1982.

2002 Entrants: Inland fisheries and wildlife officers and marine resources officers employed on and after August 31, 1984.

Eligibility: 25 years of creditable service in named positions.

Benefit: 1/50 of average final compensation multiplied by years of service.

Form of Payment: Life annuity.

Members in Special Plans who fail to qualify for Special Plan benefits can receive Regular Plan benefits when and as eligible and qualified.

v. Minimum Service Retirement Benefit

\$100 per month

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6. Disability Retirement Benefits Other Than No Age Benefits (See Item 7)

Eligibility: Disabled as defined in the MainePERS statutes prior to applicable normal retirement age, employed prior to October 16, 1992 and did not elect No Age Disability Benefits, and either disabled in the line-of-duty or disabled with at least five years of creditable service.

Benefit: 66 $\frac{2}{3}$ % of average final compensation, reduced by employment earnings over the specified statutory limit, and to the extent that the benefit, in combination with Workers' Compensation and Social Security, exceeds 80% of average final compensation.

Form of Payment: Payment begins on termination of service and ceases on cessation of disability or after two years, unless the member is unable to engage in any substantially gainful activity, in which case payments cease on the earlier of ten years following normal retirement age or on the date that the service retirement benefit equals or exceeds the disability benefit.

Conversion to Service Retirement: During the period of disability, service is credited and average final compensation is increased at same rate as any cost-of-living adjustments for which the member is eligible (not subject to a cap) (see item 12). On the date when service benefits reach a level of 66 $\frac{2}{3}$ % of average final compensation or ten years after the normal retirement date, if earlier, the disability converts to a service retirement benefit based on service and average final compensation at that time.

7. No Age Disability Retirement Benefits

Eligibility: Disabled as defined in the MainePERS statutes, employed on or after October 16, 1992 or employed prior to October 16, 1992 and elected the provisions of No Age Disability, and either disabled in the line-of-duty or disabled with at least five years of creditable service.

Benefit: 59% of average final compensation, reduced by employment earnings over the specified statutory limit, and to the extent that the benefit, in combination with Workers' Compensation and Social Security, exceeds 80% of average final compensation.

Form of Payment: Payment begins on termination of service and ceases on cessation of disability or after two years, unless the member is unable to engage in any substantially gainful activity, in which case payments cease on the date the service retirement benefit equals or exceeds the disability benefit.

Conversion to Service Retirement: During the period of disability, service is credited and average final compensation is increased at the same rate as any cost-of-living adjustments for which the member is eligible (not subject to a cap) (see item 12). On the date when service benefits reach a level of 59% of average final compensation, the disability benefit converts to a service retirement benefit based on service and average final compensation at that time.

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8. Pre-Retirement Ordinary Death Benefits

Eligibility: Death while active, inactive eligible to retire, or disabled not resulting from an injury received in the line-of-duty.

Benefit: Designated beneficiary, spouse, children, or parents entitled to benefit calculated as if deceased member had retired under Option 2 (see item 13); however, beneficiary may elect survivor benefits payable to a surviving spouse, dependent children, parent, or other designated beneficiaries in monthly amounts varying by status of beneficiary and number of eligible survivors. Otherwise accumulated contributions with interest are payable to designated beneficiary, spouse, children, older parents, or estate.

9. Pre-Retirement Accidental Death Benefits

Eligibility: Death while active or disabled resulting from an injury received in the line-of-duty.

Benefit:

- If the member leaves no dependent children, two-thirds of the member's average final compensation to the surviving spouse until death.
- If the member is survived by a spouse who has the care of dependent children of the member, the surviving spouse shall receive an annual sum equal to the member's average final compensation while having the care of dependent children. When there are no longer any dependent children, the surviving spouse shall receive two-thirds of member's average final compensation until death.
- If the member is survived by a spouse who does not have the care of the member's dependent children, the surviving spouse and dependent children shall share equally an annual sum equal to the member's average final compensation. When there are no longer any dependent children, the surviving spouse shall receive two-thirds of the member's average final compensation until death.
- If the member leaves no spouse, the dependent children shall share an annual amount equal to the member's average final compensation. Benefits will cease when the last dependent child no longer meets the definition of "dependent child."

10. Termination Benefit

Eligibility: Termination of service other than by retirement or death with at least five years of creditable service.

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Benefit: The member's choice of a refund of the accumulated contributions with interest or a retirement benefit using creditable service and average final compensation as of date of termination, deferred to normal retirement age.

11. Refund of Contributions

Eligibility: Termination of service other than by retirement or death with less than five years of creditable service.

Benefit: Refund of member's accumulated contributions with interest.

12. Cost-of-Living Adjustments

All service and disability retirement and survivor benefits are adjusted each year that there is a percentage change in the Consumer Price Index, based on the Index. If the percentage change is negative, then no adjustment is made in that year. In subsequent years, the adjustment that would have been made will be adjusted downward to the extent necessary to recoup the full actuarial value of not having made the previous year's negative adjustment. This process of adjustment may occur over a multi-year period if needed to recoup the full value of negative changes in the Index.

Cost-of-living adjustments (COLA) are effective September 1 of each year and are applied to that portion of the benefit that is not in excess of a COLA cap whose value grows annually with the same adjustment as the COLA (see values below) for all benefits that have been in payment for at least twelve months as of that date. The maximum annual increase is 3%. Average final compensation used in determining disability benefits for disabled members is similarly adjusted for purposes of determining the recipient's service retirement benefit if and when the recipient moves to service retirement.

COLA Cap History: (value as of September 1 of listed year when COLA effective):

2014 - \$20,000.00
2015 - \$20,420.00
2016 - \$20,940.71
2017 - \$21,474.70
2018 - \$21,818.30
2019 - \$22,451.03

Members who did not have ten years of service on July 1, 1993 will begin receiving cost-of-living adjustments at the later of 12 months after their normal retirement age and the first September 1 following a minimum of twelve months of being in receipt of their benefit.

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13. Methods of Payment of Service Retirement Benefits

At retirement, a member who retires with a benefit must choose from the following methods of payment:

Full Benefit: Unadjusted benefit paid for the life of the member only.

Option 1: Cash refund equal to the remaining member contribution balance, if any, at the date of death (where the member contribution balance has been reduced each month by the portion of the monthly benefit deemed to be provided by member contributions).

Option 2: 100% joint and survivor annuity.

Option 3: 50% joint and survivor annuity.

Option 4: Joint and survivor annuity at any percentage other than those available under Option 2 and Option 3.

Option 5: Designated percentage of the benefit (not less than 51%) payable to the member, with the remaining percentage (the two to equal 100%) payable to a beneficiary (may only be a sole beneficiary) while both are alive. At the death of either, the higher of the two percentages is paid to the survivor for the survivor's life, and the lower-percentage benefit ceases to be paid.

Option 6: 100% joint and survivor annuity (Option 2) with pop-up*.

Option 7: 50% joint and survivor annuity (Option 3) with pop-up*.

Option 8: Option 4 with pop-up*.

* The "pop-up" feature attached to a given Option means that in the case of a beneficiary predeceasing the member, the member's benefit will be revised prospectively to the amount that the benefit would have been had the member selected Full Benefit payment upon retirement.

14. Plan Changes since Prior Valuation

None.

This Appendix B is intended to be a brief summary of provisions. In the event of a dispute, applicable statutes and administrative policy supersede this report description.

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APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Annual Rate of Investment Return

State Employees	6.75%
Teachers	6.75%

Rate is net of both administrative and investment expense.

2. Cost-of-Living Adjustment (COLA) Assumed Rate

State Employees	2.20%
Teachers	2.20%

3. Annual Rate of Individual Salary Increase (% at Selected Years of Service)

Service	State Employees	Teachers
0	8.75%	14.50%
5	5.00%	5.75
10	3.75%	4.75
15	3.20%	4.00
20	2.95%	2.75
25 and over	2.75%	2.75

The above rates include a 2.75% across-the-board increase at each year of service.

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4. Sample Rates of Termination (% at Selected Years of Service)

State Employees and Teachers	
Service	
0	33.50%
5	10.50
10	5.95
15	4.25
20	4.00
25	4.00

Non-vested members are assumed to take a refund of contributions with interest. Once vested, the member is assumed to elect the greater of the deferred vested benefit or a refund of member contributions with interest based on present value at time of termination.

5. Sample Rates of Mortality for Healthy Annuitant Lives at Selected Ages (number of deaths per 10,000 members)

(Showing values in 2019)				
Age	State Employees		Teachers	
	Male	Female	Male	Female
50	40	31	38	26
55	57	42	54	35
60	77	62	74	51
65	110	94	105	78
70	170	152	162	125
75	277	249	264	205
80	467	421	444	347
85	815	747	776	616
90	1,447	1,345	1,377	1,110
95	2,299	2,228	2,189	1,838

Rates for State Employees are based on 104% and 120% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Employee Mortality Table for ages prior to start of the Healthy Annuitant Mortality Table, both projected from the 2006 base rates using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020. Proposed rates for Teachers are based on 99% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table for both males and females, using the RP-2014 Total

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Dataset Employee Mortality Table for ages prior to the start of the Healthy Annuitant Mortality Table, respectively, both projected using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020.

6. Sample Rates of Mortality for Active Healthy Lives at Selected Ages (number of deaths per 10,000 members)*

(Showing values in 2019)				
Age	<u>State Employees</u>		<u>Teachers</u>	
	Male	Female	Male	Female
20	4	2	3	1
25	4	2	4	2
30	4	2	4	2
35	5	3	5	3
40	6	5	6	4
45	9	7	9	6
50	17	12	16	10
55	28	20	26	16
60	47	29	44	24
65	83	43	79	36

* For State Regular and Teachers 5% of deaths assumed to arise out of and in the course of employment; for State Special 20% of deaths are assumed to arise out of and in the course of employment.

Rates for State Employees are based on 104% and 120% of the RP-2014 Total Dataset Employee Mortality Table, respectively, for males and females, using the RP-2014 Total Dataset Healthy Annuitant Mortality Table rates after the end of the Total Employee Mortality Table, both projected from the 2006 base rates using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020. Proposed rates for Teachers are based on 99% of the RP-2014 Total Dataset Healthy Annuitant Mortality Table for both males and females, using the RP-2014 Total Dataset Healthy Annuitant Mortality Table rates after the end of the Total Employee Mortality Table, respectively, both projected using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020.

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7. Sample Rates of Mortality for Disabled Annuitant Lives at Selected Ages (number of deaths per 10,000 members)

(Showing values in 2019)				
Age	State Employees		Teachers	
	Male	Female	Male	Female
25	81	24	81	24
30	78	30	78	30
35	92	42	92	42
40	110	57	110	57
45	171	90	171	90
50	209	118	209	118
55	242	148	242	148
60	275	176	275	176
65	329	214	329	214
70	425	291	425	291

Rates are based on 108% and 105% of the RP-2014 Total Dataset Disabled Annuitant Mortality Table, respectively, for males and females, projected from the 2006 base rates using the RPEC_2015 model, with an ultimate rate of 0.85% for ages 20-85, grading down to an ultimate rate of 0.00% for ages 111-120, and convergence to the ultimate rate in the year 2020.

8. Sample Rates of Retirement at Selected Ages (number retiring per 1,000 members)

Teachers and State Regular Plans

Age	State Employees and Teachers		
	Tier 1	Tier 2	Tier 3
45	13	NA	NA
50	29	NA	NA
55	40	40	40
59	150	40	40
60	250	75	40
61	200	175	40
62	200	250	40
63	200	150	75
64	250	200	225
65	350	250	300
70	200	200	300
75	1,000	1,000	1,000

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In the case of State Regular and Teacher employees, Tier 1 refers to those who had accrued at least 10 years of service by July 1, 1993. Tier 2 refers to those who had not accrued at least 10 years of service by July 1, 1993 or were hired after that date but had five years of service by July 1, 2011. Tier 3 refers to those who did not have five years of service by July 1, 2011. Rates are only applied for early retirement when the member is at least age 57. Earlier rates are applicable for normal retirement.

State Special Plans

Members of the 1998 Special Plan are assumed to retire at rates that vary by age and whether service is less than 25 years or not. Sample rates are as follows:

1998 Special Plan Retirement		
Age	Service < 25	Service >= 25
55	20.0%	25.0%
57	10.0	25.0
60	20.0	30.0
62	15.0	30.0
65	23.4	30.0
67	36.8	50.0
70	100.0	100.0

Members of the 25 & Out Plan are assumed to retire at rates that vary by service. Sample rates are as follows:

25 & Out Plan	
Service	Rate
< 24	0.0%
25 - 29	25.0%
30 - 34	50.0%
35+	100.0%

Members of State Special Plans other than the 25 & Out Plan and the 1998 Special Plan are all currently assumed to retire at a rate of 50% per year, beginning when they reach eligibility for unreduced benefits, with a 100% assumed rate at age 70. Rates are only applied when the member is at least age 50.

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9. Sample Rates of Disability at Selected Ages (number becoming disabled per 10,000 members)*

Age	State Employees		Teachers
	Regular	Special	
25	5.0	5.4	2.1
30	6.1	6.5	2.3
35	9.3	9.9	2.3
40	14.8	15.8	3.1
45	22.8	24.4	7.0
50	34.0	36.4	10.9
55	39.9	42.6	14.9
60	43.4	46.4	18.8

* 10% assumed to receive Workers Compensation benefits offsetting disability benefit; also, current rates for State Special groups are higher by 7 per 10,000 at all ages.

10. Family Composition Assumptions

80% of active members are assumed to be married and have two children born when the member is 24 and 28; children are assumed dependent until age 18; female spouse is assumed to be three years younger than male spouse; member is assumed to have no dependent parents; unmarried members are assumed to have beneficiaries entitled to benefits worth 80% as much as those of married members' beneficiaries.

11. Vacation/Sick Leave Credits

For members who had ten years of service on July 1, 1993, credits for unused vacation and sick leave may be used to increase final average compensation and/or creditable service. In order to reflect this, projected retirement benefits are increased by 0.48% for state (regular) employees and 0.75% for teachers for impacted members.

12. Technical and Miscellaneous Assumptions

Decrement Timing: Middle of the valuation year

Pay Increase Timing: Salary provided is treated as the rate of pay as of valuation date. Annual increases are applied as of the beginning of each subsequent valuation.

Member Contribution Interest Rate: 5% assumed for all future years

COLA Timing: September 1

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Special Plan Member Contribution Rates: For members of Special Plans where the contribution rate drops from 8.65% to 7.65% after a given number of years, 8.65% is used for all years for valuation purposes as a simplifying assumption reflecting data limitations.

13. Rationale for Assumptions

The assumptions were adopted by the Board of Trustees at their July 14, 2016 meeting. The demographic assumptions adopted are based on an experience study covering the period from June 30, 2012 through June 30, 2015 and the economic assumptions are based on this experience study along with advice of the MainePERS investment consultants.

14. Changes since Last Valuation

None.

15. Rationale for Change in Actuarial Assumptions

N/A

B. Actuarial Methods

1. Funding Method

For the plans in this Program, the funding methodology employed is the entry age normal funding method. Under this method, there are two components to the total contribution: the normal cost rate (NC rate), and the unfunded actuarial liability rate (UAL rate). Both of these rates are developed for each Plan within the Program, consisting of the Teacher Program, the State Regular Plan, and several State Special Plans.

For each Plan in the Program, an individual entry age normal cost rate is determined for each active member. The normal cost is determined by the following steps. First, an individual normal cost rate is determined by taking the value, as of entry age into a Plan, of each active member's projected future benefit. Second, this value is then divided by the value, also at entry age, of the member's expected future salary. Finally, the rate is reduced by the member contribution rate to produce the employer normal contribution rate. These rates are then multiplied by each member's salary as of the valuation date to get the total normal cost dollars as of the valuation date for that Plan and then divided by the total payroll at the valuation for the Plan to get the normal cost rate for that Plan. This process results in specific normal cost rates for each of the Plans in the Program.

The unfunded actuarial liability under the entry age normal funding method equals the present value, at the time of valuation, of the future benefit payments less the present

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value of future employer normal cost contributions, future member contributions, future UAL payments, and current assets. The UAL rate determined is the percentage that applied to member payroll is expected to amortize the UAL according to the Program's amortization policy. Specifically, the remaining original UAL has 9 years of its prescribed amortization period remaining and all other gains and losses are amortized over twenty-year periods beginning on the date as of which they occur.

2. Asset Valuation Method

For purposes of determining the employer contributions to the Program and the Program's funded ratio, we use an actuarial value of assets. The asset adjustment method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

In determining the actuarial value of assets, we calculate an expected actuarial value based on cash flow for the year and imputed returns at the actuarial assumption. This expected value is compared to the market value and one-third of the difference is added to the preliminary actuarial value to arrive at the final actuarial value.

3. Changes since Last Valuation

None.

4. Rationale for Change

N/A

APPENDIX D – GLOSSARY OF GASB TERMS

1. Actuarially Determined Contribution

A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

2. Actuarial Valuation Date

The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

3. Deferred Inflow of Resources

An acquisition of net assets by a government employer that is applicable to a future reporting period. In the context of GASB 68, these are experience gains on the Total Pension Liability, assumption changes reducing the Total Pension Liability, or investment gains that are recognized in future reporting periods.

4. Deferred Outflow of Resources

A consumption of net assets by a government employer that is applicable to a future reporting period. In the context of GASB 68, these are experience losses on the Total Pension Liability, assumption changes increasing the Total Pension Liability, or investment losses that are recognized in future reporting periods.

5. Entry Age Actuarial Cost Method

The actuarial cost method required for GASB 67 and 68 calculations. Under this method, the actuarial present value of the projected benefits of each individual, included in an actuarial valuation, is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Service Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future service costs is called the Total Pension Liability.

6. Measurement Date

The date as of which the Total Pension Liability and Plan Fiduciary Net Position are measured. The Total Pension Liability may be projected from the Actuarial Valuation Date to the Measurement Date. The Measurement Date must be the same as the Reporting Date for the plan.

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APPENDIX D – GLOSSARY OF GASB TERMS

7. Net Pension Liability

The liability of employers and non-employer contributing entities for employees for benefits provided through a defined benefit pension plan. It is calculated as the Total Pension Liability less the Plan Fiduciary Net Position.

8. Plan Fiduciary Net Position

The fair or market value of assets.

9. Reporting Date

The last day of the Plan or employer's fiscal year.

10. Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to the current period of employee service in conformity with the requirements of GASB 67 and 68. The Service Cost is the normal cost calculated under the entry age actuarial cost method.

11. Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of GASB 67 and 68. The Total Pension Liability is the actuarial liability calculated under the entry age actuarial cost method.



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