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Maine Public Employees Retirement System

State Employee and Teacher Retirement Program

Actuarial Valuation Report as of June 30, 2018

Produced by Cheiron

October 2018

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October 29, 2018

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, 2018 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 for the use of the MainePERS Board and its auditors in preparing financial reports in accordance with 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.

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 due to such factors as the following: program experience differing from that anticipated by the assumptions; changes in assumptions; and changes in program provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with 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, including the use of assumptions and methods for funding purposes that comply with the Actuarial Standards of Practice. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained 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.

This valuation was prepared for the Maine Public Employees Retirement System for the purposes described herein and for the use by the Program's auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Sincerely,
Cheiron

Gene Kalwarski, FSA, MAAA, EA
Principal Consulting Actuary

Fiona E. Liston, FSA, MAAA, EA
Principal Consulting Actuary

cc: Elizabeth Wiley, FSA

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, 2018. 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) Report on the employer contribution rates developed in this valuation for informational purposes. (Note: the actual contributions to be paid by the employers for Fiscal Year (FY) 2018 were developed in the budgeting process in July 2016, based on a roll-forward of the June 30, 2015 valuation); and

4) Provide specific information and documentation 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 trends experienced by the Program in recent years, and providing analysis relating to the future status of the Program.

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

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

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

Section V includes financial disclosure information.

Finally, at the end of this report we present appendices that contain a summary of the:

- Program membership information at the valuation date (Appendix A);

- Major benefit provisions of the Program and the various plans included in the Program (Appendix B);

- Actuarial methods and assumptions used in the current valuation (Appendix C); and

- Terminology used in the Governmental Accounting Standards Board (GASB) disclosures provided as a glossary (Appendix D).

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) on 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 results of this June 30, 2018 valuation will be used primarily for accounting disclosures. Next year's June 30, 2019 valuation, adjusted to a June 30, 2020 measurement date and combined with preliminary assets as of June 30, 2020, will be used as the basis for the applicable FY 2022 and FY 2023 State contributions.

Experience from July 1, 2017 through June 30, 2018 (FY 2018)

The State of Maine composite total employer rate produced by the June 30, 2017 valuation reflecting all plans in the State Employee and Teacher Retirement Program was 20.03% of payroll. The equivalent rate produced in this June 30, 2018 valuation is 19.92% of payroll. The change in contribution rate is attributable to several elements, including a change in the assumed investment return, increasing the amortization period for gains and losses from 10 years to 20 years, a small gain from investment returns, and a small liability experience loss that consisted primarily of higher salaries than expected.

As of June 30, 2018, the Program had an unfunded actuarial liability (UAL) based on the actuarial value of assets (AVA) of $2.611 billion. This represents an increase of $0.030 billion from the $2.581 billion AVA UAL measured as of June 30, 2017. 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 2018 as well as their combined effect on the UAL.

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Table I-1
(Amounts in Billions)

	Liabilities	Assets*	UAL
Value as of June 30, 2017	$ 13.485	$ 10.904	$ 2.581
Expected Change	0.320	0.422	(0.102)
Impact of Assumption Changes	0.192	0.000	0.192
Recognized Investment Gain	0.000	0.094	(0.094)
Recognized Liability Loss	0.034	0.000	0.034
Value as of June 30, 2018	$ 14.031	$ 11.420	$ 2.611

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

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

The Maine State Constitution has been amended since the last valuation to extend the amortization of gains and losses from the previous 10-year periods to 20-year periods. These amortization extensions have been applied to the gain/losses bases from 2012-2017 as well as for future bases. This retroactive application results in a net increase in the Teacher Program contribution rate due primarily to the slower recognition of significant gains in 2013 and 2014. The State Program's contribution rate decreased as a result of this retroactive application as the impact of negotiating aggregate losses over a longer time period is greater than the extension of gain recognition for this group.

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. As such, following the historical review, we present projections of the probable condition of the Program in the future under various market return scenarios.

Assets and Liabilities

The following graph illustrates the progress of assets and liabilities for the Program since June 30, 1991 as well as the Program's funded ratio 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

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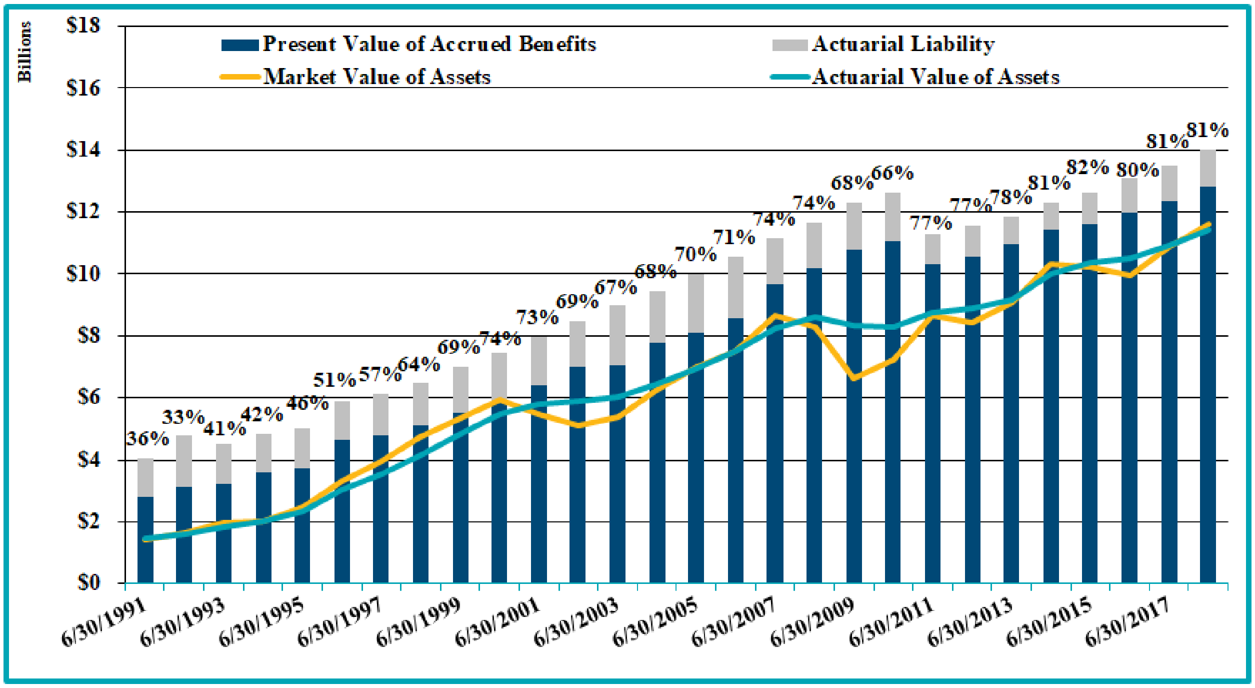
assets (MVA) is shown as a yellow line. The AVA divided by the AL is the AVA funded ratio that is often used in evaluating the Program's financial status. The values of this metric as of each valuation date are shown as the percentages in the graph labels.

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, 2018, the Program is funded 81.4% based on the AVA funded ratio, which represents a slight increase from the 80.9% ratio reported in the prior valuation. This increase in the funded ratio occurred even with the 2018 liabilities being measured at a lower discount rate.



<u>Contributions</u>

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 is read using the right-hand axis. The FY 2019 through FY 2021 contribution rates have already been determined based on the ratemaking process, so three additional years of the contribution rate are shown versus dollars received.

The increase in employer contribution rate from FY 18/19 to FY 20/21 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

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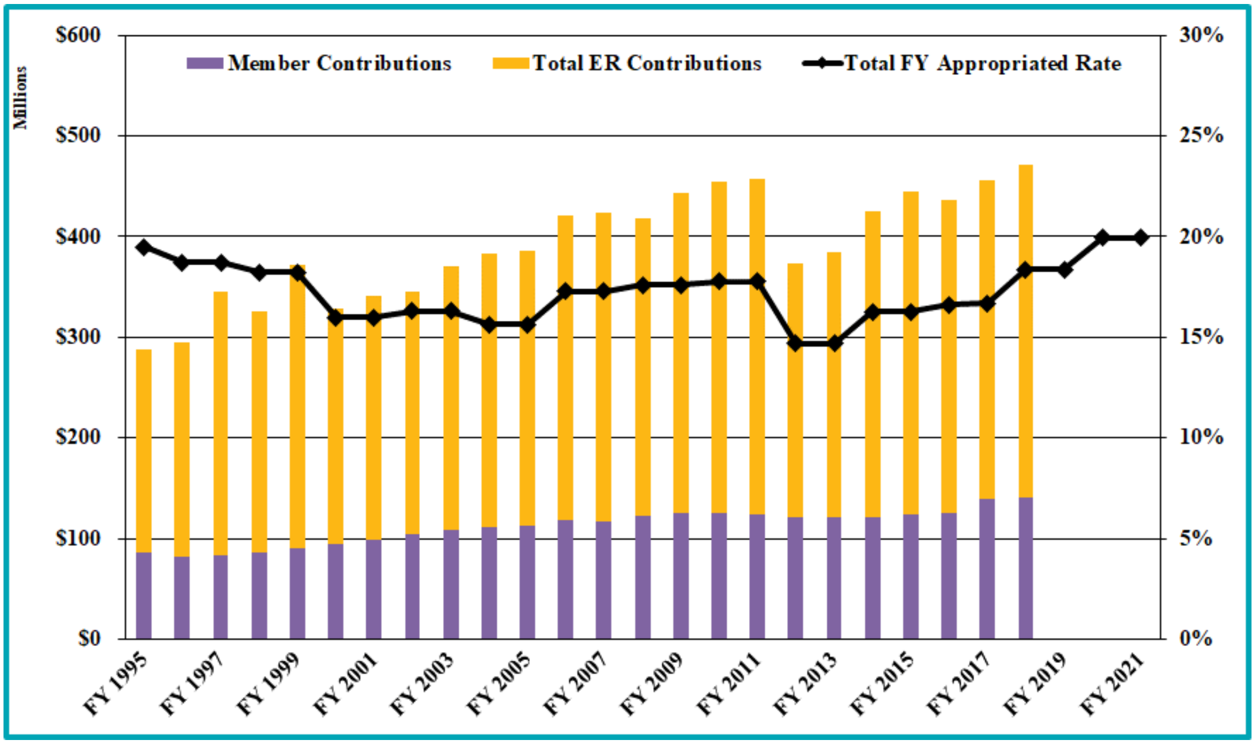
rate of investment return from 6.875% to 6.75%. These losses were partially offset by net positive investment experience recognized in 2018.

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 2018 was based on a roll-forward of the June 30, 2015 valuation to June 30, 2016, as previously described in this Board Summary.

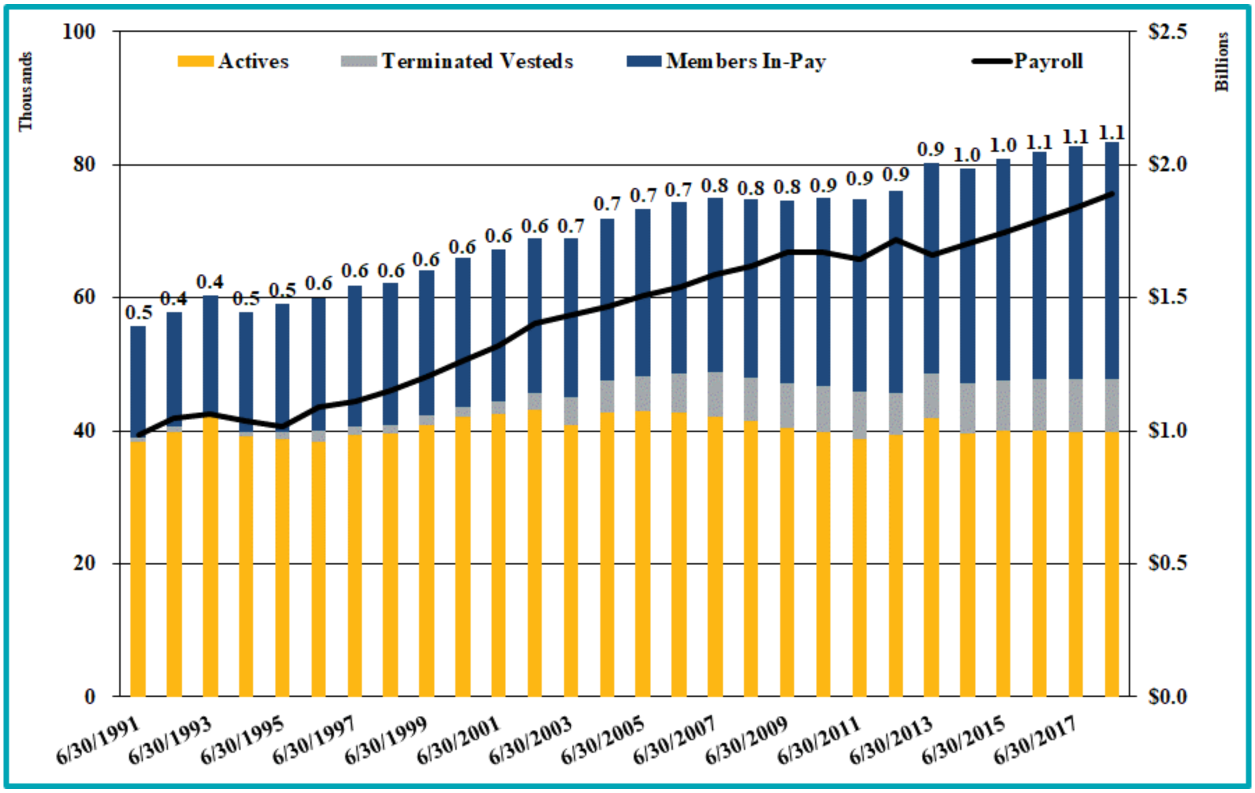


Participant Trends

The stacked bars in the graph that follows show the number of active members, terminated vested members, and members in pay status covered by the Program as of June 30 of each year indicated and is read using the left-hand axis of the graph. There has been an approximately 0.1% per year average growth in the number of active members and an approximately 2.8% per year growth in the number of in-pay members of the Program over the period shown. The terminated vested group has averaged 10.0% per year growth over this same period. As with many funds in this country, there has been a steady growth in the number of retired members as the Program has matured.

The labels above each bar show the "support ratio," which is the ratio of inactive members (members in pay status plus terminated vested members) to active members. This ratio has been generally increasing since 1991 for the Program. As this ratio grows, the cash flows (contributions less benefits and expenses) of a pension plan tend to become more negative. The more negative a plan's cash flows, the more sensitive, in terms of contribution volatility, the plan is to volatile investment markets.

The black line in the graph indicates the total active member covered payroll in the Program and is read using the right-hand axis of the graph. It has been generally increasing since 1991.



Projections

Our analysis of the projected financial trends for the Program is an important part of this valuation. In this section, we present sensitivity analysis of future valuation results in terms of benefit security, the previously referenced AVA funded ratio (AVA over AL), and the expected employer contribution rates. We first 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. We then present the same projections based on continuing to achieve all assumptions exactly, **except** for having investment earnings one percent above and then one percent below the assumed 6.75% return. The primary purpose of presenting these projections is to demonstrate how sensitive future valuation results are to deviations in actual returns from the assumed investment return.

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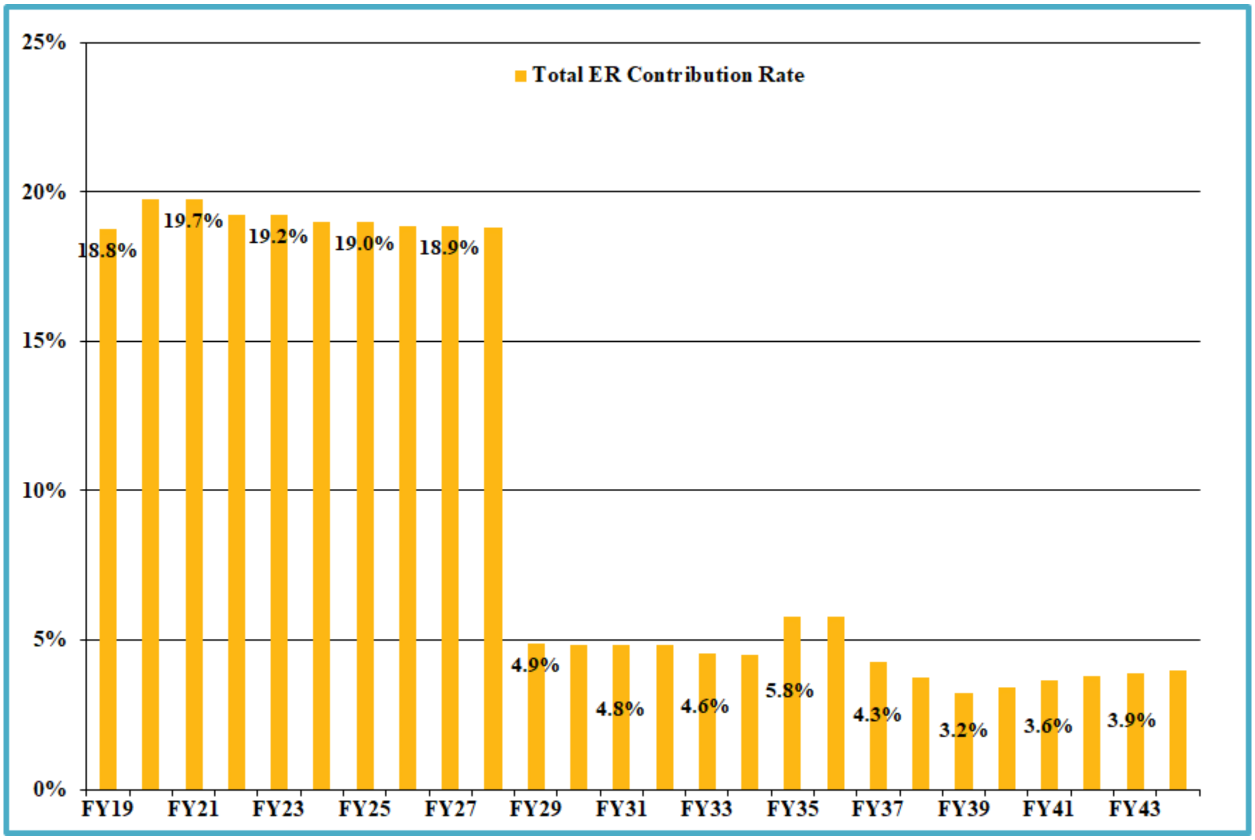
Baseline Projections



The graph above shows the expected progress of the Program's employer contribution rates 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 4.9%, with small further changes thereafter. Note that this projection is based on the assumption that all actuarial assumptions are exactly met each and every year, including the 6.75% investment assumption. 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.

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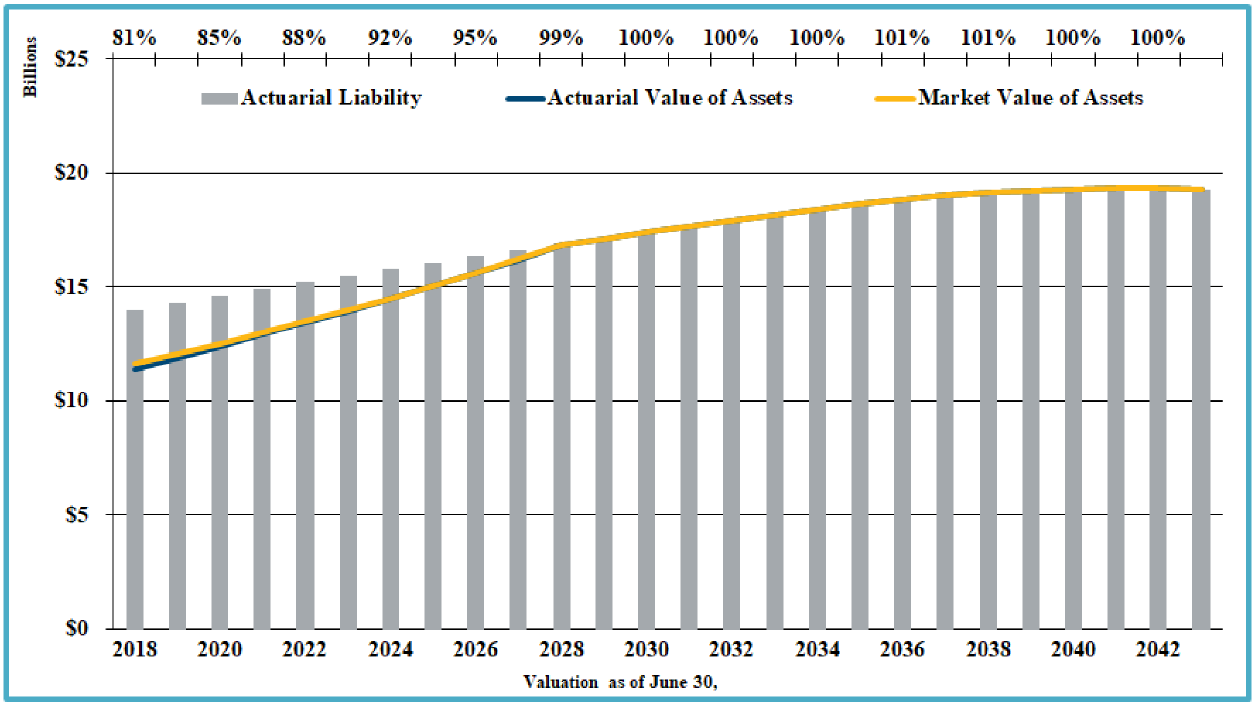

The graph above shows the projected funded ratio (AVA divided by AL) over the next 25 years in this baseline scenario. It shows that the Program's funded ratio is projected to improve from the starting level of 81% as of June 30, 2018 to 100% funding as of June 30, 2028, which is the year that the Maine 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 then stays at 100% thereafter.

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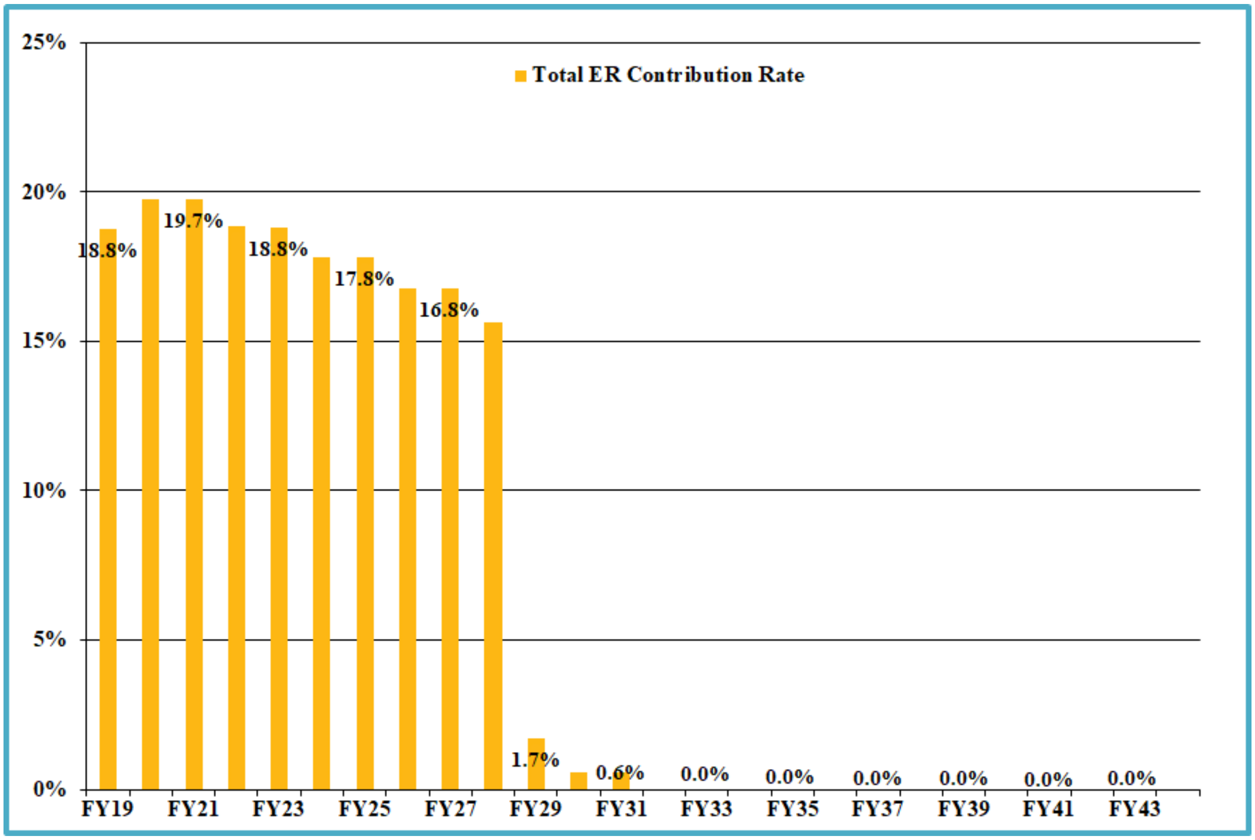
Projections with Asset Returns of 7.75%



The future funding of this Program will be significantly driven by the investment earnings as relatively minor changes in the market returns can have significant effects on the Program's funded ratio. The graph above shows that with a 7.75% annual return in each year while exactly meeting all other assumptions, the composite total employer contribution rate would decrease the next nine years until the end of the initial UAL payoff period. After the payoff period, both the normal cost rate and the UAL rates would go to zero. This is due to the excess earnings each year resulting in a surplus of assets such that the amortization of the surpluses would be more than enough to offset the entirety of the employer normal cost for the remainder of the projection period.

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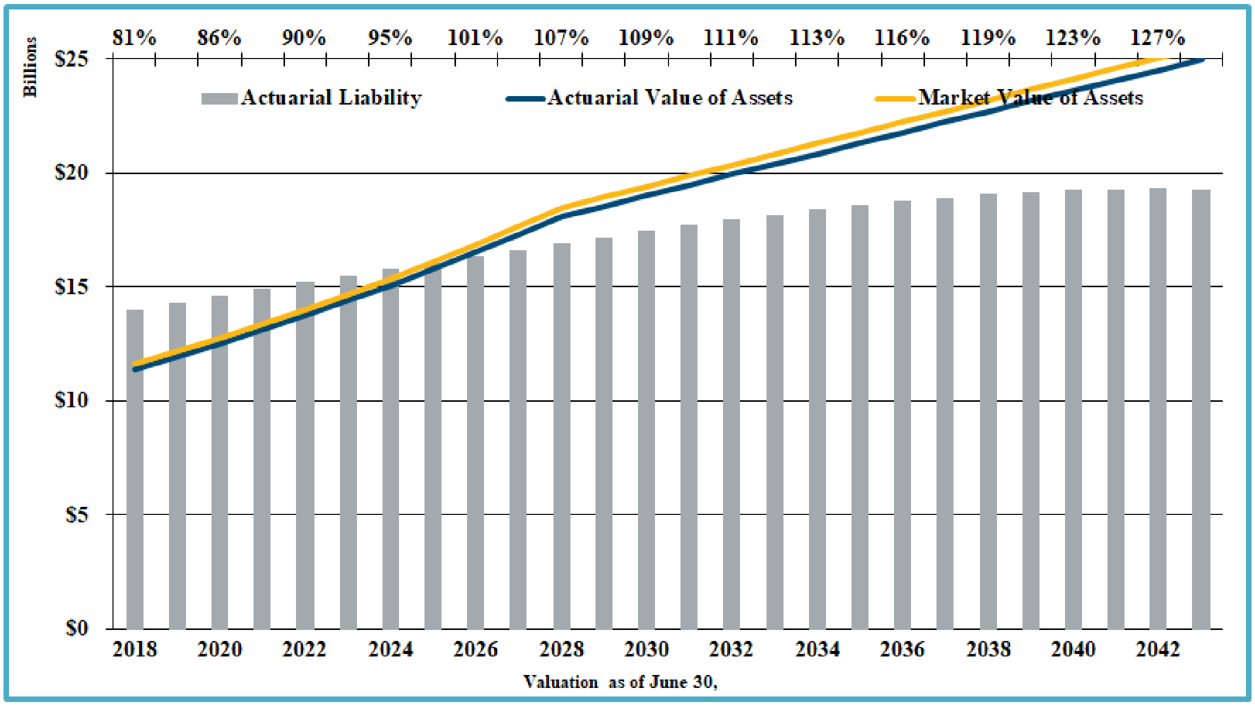

Assuming the same 7.75% return on investments scenario, the above graph shows that the Program's AVA funded ratio would increase to reach 100% by 2026, and then continue to improve. The reason the UAL payments in the graph above continue until 2028 even though the Program reaches 100% funding in the year 2026 is the timing of when the valuation is performed and when the State's biennial budget and thus the contribution rates are set.

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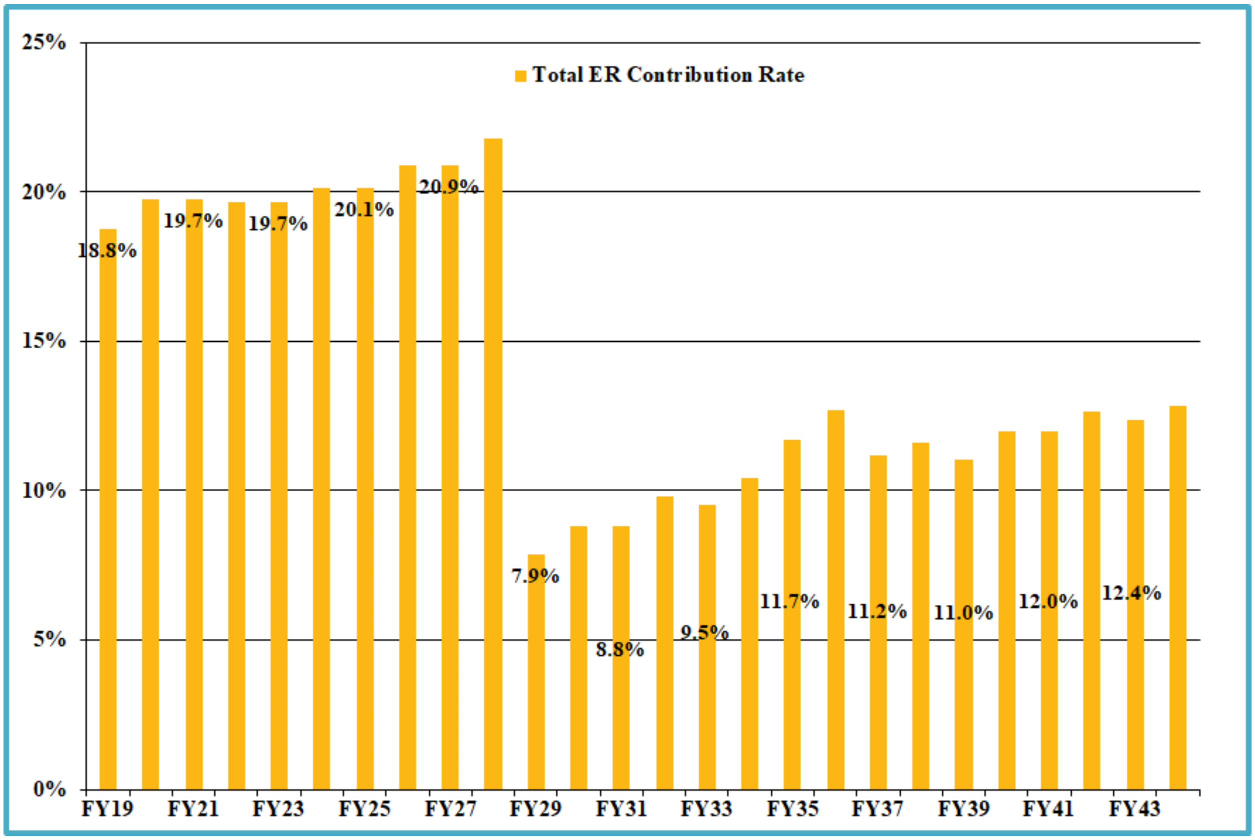
Projections with Asset Returns of 5.75%



Just as returns in excess of the rate of return assumption will lead to declining employer contributions and an improved funded ratio, the opposite will occur if actual investment earnings are below the assumed rate. The graph above shows the contribution projection under a 5.75% annual return scenario, continuing to meet all other assumptions exactly. The composite employer contribution rate in this scenario would slowly rise to around 22% of payroll at its highest in order to meet the Constitutional funding requirements. Beyond 2028, there will then be continued unfunded actuarial contributions in this scenario in order to amortize the annual investment losses of one percent each year compared to the assumed rate of return.

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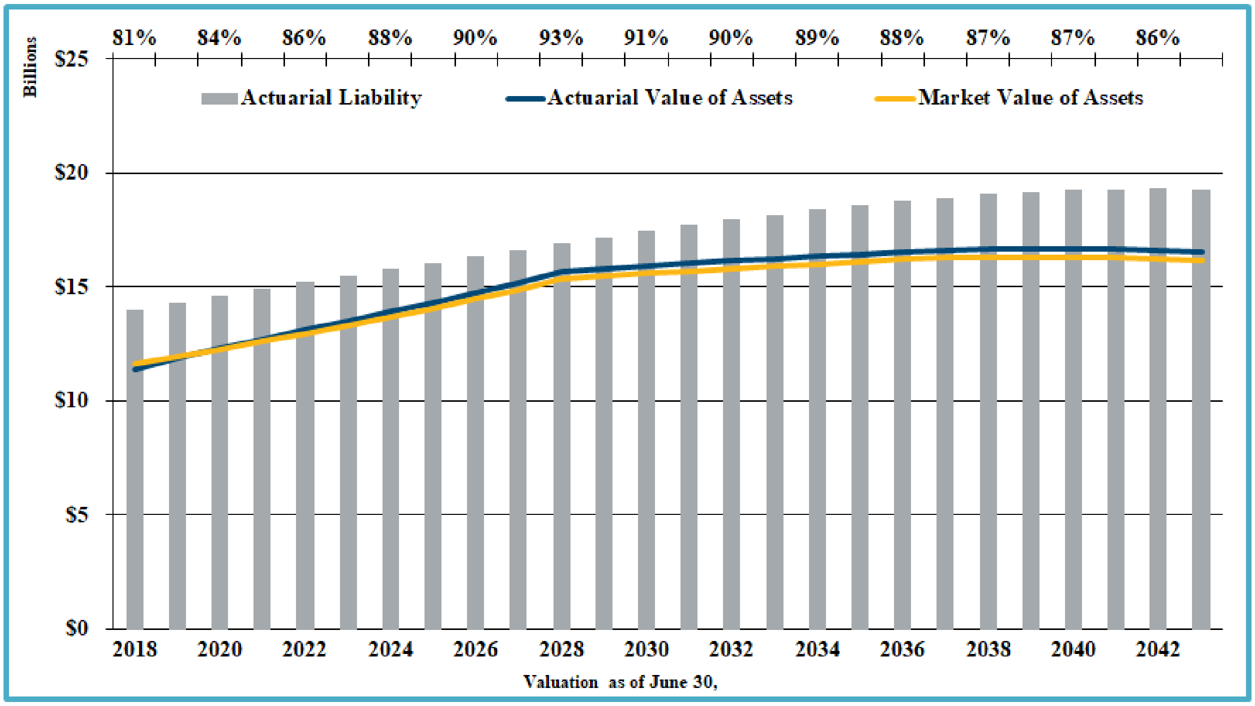

The above graph shows that the Program's AVA funded ratio in this 5.75% rate of return scenario would increase more slowly than in the baseline scenario and would only reach 93% before decreasing to 86% over the next 25 years with actual returns at 5.75%, one percentage point lower than the assumed rate. In addition, under this scenario, the Program would still have an unfunded actuarial liability (UAL) in 2028, the end of the current amortization period. The Constitutional Amendment would be satisfied, in that the UAL existing on July 1, 1997 would be paid off by 2028, but new losses that create additional UAL would continue to be funded over up to twenty years each based on the Constitutional Amendment.

Principal Results Summary

The balance of this Board Summary section of the Actuarial Valuation Report presents a summary of the principal results of the valuation, comparing key results between this year's valuation and last year's 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.

SECTION I – BOARD SUMMARY

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

Valuation as of:	June 30, 2017	June 30, 2018	% Change
Member Counts			
Active Members	39,836	39,843	0.0%
Retired Members	26,424	27,152	2.8%
Beneficiaries of Retired Members	6,174	6,215	0.7%
Survivors of Deceased Members	636	626	(1.6)%
Disabled Members	1,636	1,608	(1.7)%
Terminated Vested Members	8,010	7,965	(0.6)%
Inactives Due Refunds	38,463	39,074	1.6%
Total Membership	121,179	122,483	1.1%
Annual Payroll of Active Members	$ 1,837,608,866	$ 1,891,366,352	2.9%
Annual Payments to Benefit Recipients	$ 761,472,435	$ 792,094,655	4.0%
Assets and Liabilities			
Actuarial Liability (AL)	$13,484,886,512	$14,031,187,845	4.1%
Actuarial Value of Assets (AVA)	10,904,082,221	11,419,986,652	4.7%
Unfunded Actuarial Liability (UAL)	$ 2,580,804,291	$ 2,611,201,193	1.2%
AVA Funded Ratio (AVA/AL)	80.9%	81.4%	
MVA Funded Ratio (MVA/AL)	80.8%	82.9%	
Accrued Benefit Liability (PVAB)	$12,361,180,500	$12,829,762,283	3.8%
Market Value of Assets (MVA)	10,893,291,864	11,632,179,683	6.8%
Unfunded PVAB	$ 1,467,888,636	$ 1,197,582,600	(18.4)%
Accrued Benefit Funded Ratio	88.1%	90.7%	
Contributions as a Percentage of Payroll			
Program Employer Normal Cost Rate	4.04%	4.18%	
Program UAL Amortization Rate	15.99%	15.74%	
Total Program Employer Rate	20.03%	19.92%	
From 2016 Ratemaking (FY18/FY19)	18.38%	18.37%	
From 2018 Ratemaking (FY20/FY21)	19.93%	19.93%	

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Table I-3
Summary of Principal Results
Teacher Program

Valuation as of:	**June 30, 2017**	**June 30, 2018**	**% Change**
Member Counts			
Active Members	27,153	27,396	0.9%
Retired Members	16,128	16,691	3.5%
Beneficiaries of Retired Members	2,873	2,906	1.1%
Survivors of Deceased Members	281	285	1.4%
Disabled Members	695	684	(1.6)%
Terminated Vested Members	5,096	4,983	(2.2)%
Inactives Due Refunds	31,288	31,513	0.7%
Total Membership	83,514	84,458	1.1%
Annual Payroll of Active Members	$ 1,203,601,341	$ 1,243,442,243	3.3%
Annual Payments to Benefit Recipients	$ 474,743,782	$ 497,775,004	4.9%
Assets and Liabilities			
Actuarial Liability (AL)	$ 8,721,778,572	$ 9,099,129,498	4.3%
Actuarial Value of Assets (AVA)	7,276,442,901	7,608,317,761	4.6%
Unfunded Actuarial Liability (UAL)	$ 1,445,335,671	$ 1,490,811,737	3.1%
AVA Funded Ratio (AVA/AL)	83.4%	83.6%	
MVA Funded Ratio (MVA/AL)	83.3%	85.2%	
Accrued Benefit Liability (PVAB)	$ 7,916,260,933	$ 8,240,066,231	4.1%
Market Value of Assets (MVA)	7,269,242,349	7,749,686,754	6.6%
Unfunded PVAB	$ 647,018,584	$ 490,379,477	(24.2)%
Accrued Benefit Funded Ratio	91.8%	94.0%	
Contributions as a Percentage of Payroll			
Program Employer Normal Cost Rate	3.89%	4.06%	
Program UAL Rate	12.76%	14.00%	
Total Program Employer Rate	16.65%	18.06%	
From 2016 Ratemaking (FY18/FY19)	15.05%	15.05%	
From 2018 Ratemaking (FY20/FY21)	18.49%	18.49%	

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

Valuation as of:	June 30, 2017	June 30, 2018	% Change
Member Counts			
Active Members	12,683	12,447	(1.9)%
Retired Members	10,296	10,461	1.6%
Beneficiaries of Retired Members	3,301	3,309	0.2%
Survivors of Deceased Members	355	341	(3.9)%
Disabled Members	941	924	(1.8)%
Terminated Vested Members	2,914	2,982	2.3%
Inactives Due Refunds	7,175	7,561	5.4%
Total Membership	37,665	38,025	1.0%
Annual Payroll of Active Members	$ 634,007,525	$ 647,924,109	2.2%
Annual Payments to Benefit Recipients	$ 286,728,653	$ 294,319,651	2.6%
Assets and Liabilities			
Actuarial Liability (AL)	$ 4,763,107,940	$ 4,932,058,347	3.5%
Actuarial Value of Assets (AVA)	3,627,639,320	3,811,668,891	5.1%
Unfunded Actuarial Liability (UAL)	$ 1,135,468,620	$1,120,389,456	(1.3)%
AVA Funded Ratio (AVA/AL)	76.2%	77.3%	
MVA Funded Ratio (MVA/AL)	76.1%	78.7%	
Accrued Benefit Liability (PVAB)	$ 4,444,919,567	$ 4,589,696,052	3.3%
Market Value of Assets (MVA)	3,624,049,515	3,882,492,929	7.1%
Unfunded PVAB	$ 820,870,052	$ 707,203,123	(13.8)%
Accrued Benefit Funded Ratio	81.5%	84.6%	
Contributions as a Percentage of Payroll			
Program Employer Normal Cost Rate	4.31%	4.40%	
Program UAL Rate	22.12%	19.08%	
Total Program Employer Rate	26.43%	23.48%	
From 2016 Ratemaking (FY18/FY19)	24.30%	24.25%	
From 2018 Ratemaking (FY20/FY21)	22.54%	22.53%	

SECTION I – BOARD SUMMARY

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

Valuation as of:	June 30, 2017	June 30, 2018	% Change
Member Counts			
Active Members	10,914	10,704	(1.9)%
Retired Members	9,280	9,525	2.6%
Beneficiaries of Retired Members	2,903	2,965	2.1%
Survivors of Deceased Members	341	326	(4.4)%
Disabled Members	864	850	(1.6)%
Terminated Vested Members	2,635	2,678	1.6%
Inactives Due Refunds	6,291	6,634	5.5%
Total Membership	33,228	33,682	1.4%
Annual Payroll of Active Members	$ 527,444,182	$ 539,377,384	2.3%
Annual Payments to Benefit Recipients	$ 248,196,086	$ 258,659,480	4.2%
Assets and Liabilities			
Actuarial Liability (AL)	$ 4,017,685,306	$ 4,198,210,148	4.5%
Actuarial Value of Assets (AVA)	3,062,081,411	3,249,770,360	6.1%
Unfunded Actuarial Liability (UAL)	$ 955,603,895	$ 948,439,788	(0.7)%
AVA Funded Ratio (AVA/AL)	76.2%	77.4%	
MVA Funded Ratio (MVA/AL)	76.1%	78.8%	
Accrued Benefit Liability (PVAB)	$ 3,758,139,270	$ 3,916,703,072	4.2%
Market Value of Assets (MVA)	3,059,051,267	3,310,153,846	8.2%
Unfunded PVAB	$ 699,088,003	$ 606,549,226	(13.2)%
Accrued Benefit Funded Ratio	81.4%	84.5%	
Contributions as a Percentage of Payroll			
Employer Normal Cost Rate	4.18%	4.29%	
UAL Rate	21.57%	18.63%	
Total Employer Rate	25.75%	22.92%	
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, 2017	June 30, 2018	% Change
Member Counts			
Active Members	1,769	1,743	(1.5)%
Retired Members	1,016	936	(7.9)%
Beneficiaries of Retired Members	398	344	(13.6)%
Survivors of Deceased Members	14	15	7.1%
Disabled Members	77	74	(3.9)%
Terminated Vested Members	279	304	9.0%
Inactives Due Refunds	884	927	4.9%
Total Membership	4,437	4,343	(2.1)%
Annual Payroll of Active Members	$ 106,563,343	$ 108,546,725	1.9%
Annual Payments to Benefit Recipients	$ 38,532,566	$ 35,660,171	(7.5)%
Assets and Liabilities			
Actuarial Liability (AL)	$ 745,422,634	$ 733,848,199	(1.6)%
Actuarial Value of Assets (AVA)	565,557,909	561,898,531	(0.6)%
Unfunded Actuarial Liability (UAL)	$ 179,864,725	$ 171,949,668	(4.4)%
AVA Funded Ratio (AVA/AL)	75.9%	76.6%	
MVA Funded Ratio (MVA/AL)	75.8%	78.0%	
Accrued Benefit Liability (PVAB)	$ 686,780,297	$ 672,992,980	(2.0)%
Market Value of Assets (MVA)	564,998,248	572,339,083	1.3%
Unfunded PVAB	$ 121,782,049	$ 100,653,897	(17.3)%
Accrued Benefit Funded Ratio	82.3%	85.0%	
Contributions as a Percentage of Payroll			
Employer Normal Cost Rate	4.96%	4.96%	
UAL Rate	24.82%	21.26%	
Total Employer Rate	29.78%	26.22%	
From 2016 Ratemaking (FY18/FY19)	25.48%	25.43%	
From 2018 Ratemaking (FY20/FY21)	25.17%	25.17%	

SECTION II – 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, 2017 and June 30, 2018;
- Statement of the changes in total MainePERS DB market values during the year;
- Development of the total MainePERS DB actuarial value of assets;
- Allocation of 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 meets its obligations.

Current actuarial methods employed in this Program use an allocated portion of the actuarial value of assets developed for the total MainePERS DB assets. The actuarial methodology used for the total 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, all as of the valuation date. 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, 6.875% for this valuation.

SECTION II – ASSETS

Table II-1 that follows develops the change in the market value of assets for the total MainePERS DB assets during FY 2018.

Table II-1
Changes in Market Value of Total MainePERS Defined Benefit (DB) Assets

Market Value of Total MainePERS DB Assets – June 30, 2017		**$ 13,614,858,621**
Additions		
Contributions:		
Employer Contributions	$ 398,374,880	
Member Contributions	189,721,447	
Transfers	(391,976)	
Total Contributions	$ 587,704,351	
Investment Income:		
Net Appreciation (Depreciation) in Fair Value of Investments	$ 1,449,141,598	
Interest on Bank Balances	961,757	
Total Investment Income	$ 1,450,103,355	
Investment Activity Expenses:		
Management Fees	$ (95,999,972)	
Investment Related Expense	(5,279,709)	
Banking Fees	(35,774)	
Total Investment Activity Expenses	$ (101,315,455)	
Net Income from Investing Activities	$ 1,348,787,900	
Total Additions		$ 1,936,492,251
Deductions		
Retirement Benefits	$ (892,014,792)	
Disability Benefits	(31,271,605)	
Survivor Benefits	(23,477,031)	
Refunds	(22,588,511)	
Administrative Expenses	(12,593,673)	
Total Deductions		$ (981,945,612)
Total		
Net Increase (Decrease)		$ 954,546,639
Market Value of Total MainePERS DB Assets – June 30, 2018		**$ 14,569,405,260**

SECTION II – ASSETS

Table II-2 below develops the actuarial value of assets for the total MainePERS DB assets as of June 30, 2018 using the adopted actuarial valuation methodology.

Table II-2
Development of Actuarial Value of Total MainePERS Defined Benefit (DB) Assets as of June 30, 2018

1.	Actuarial Value of Total MainePERS DB Assets at June 30, 2017	$ 13,628,344,828
2.	Amount in (1) with Interest to June 30, 2018	14,565,293,535
3.	Employer and Member Contributions for FY 2018	587,704,351
4.	Interest on Contributions in (3), Assuming Received Uniformly throughout FY 2018	19,866,556
5.	Total Disbursements without Administrative Expenses for FY 2018	(969,351,939)
6.	Interest on Disbursements in (5), Assuming Payments made Uniformly throughout FY 2018	(32,767,640)
7.	Expected Value of Total MainePERS DB Assets at June 30, 2018 = (2) + (3) + (4) + (5) + (6)	$ 14,170,744,863
8.	Actual Market Value of Total MainePERS DB Assets at June 30, 2018	14,569,405,260
9.	Excess of (8) Over (7)	398,660,397
10.	Actuarial Value of Total MainePERS DB Assets at June 30, 2018 = (7) + [33⅓% of (9)]	$ 14,303,631,662

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, 6.875% for this valuation. The previous table, Table II-2, illustrates the calculation of the actuarial value of assets for the total MainePERS DB assets as of June 30, 2018.

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, 2018 valuation as shown in Table II-2 above is 0.981758 ($14,303,631,662 ÷ $14,569,405,260). 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 II-3
Allocation of Actuarial Value of Total MainePERS DB Assets
as of June 30, 2018

Program	Market Value	Actuarial Value
Teacher	$ 7,749,686,754	$ 7,608,317,761
State (Regular & Special)	3,882,492,929	3,811,668,891
Judicial	71,233,840	69,934,400
Legislative	12,755,821	12,523,131
Participating Local Districts (Consolidated & Non-Consolidated)	2,853,235,916	2,801,187,479
Total	$ 14,569,405,260	$ 14,303,631,662

Investment Performance

The market value of assets for the total MainePERS DB assets returned a positive 9.95% during FY 2018. This is greater than the assumed return of 6.875% for FY 2018. The equivalent market value returns in FY 2017 and FY 2016 were positive 12.72% and positive 0.32%, respectively.

On an actuarial value of assets basis, the return for FY 2018 was a positive 7.86%. This return is lower than the return on a market value basis, but it is higher than the 6.875% assumption for FY 2018. Therefore, this return gave rise to an investment gain on the Program's assets this year.

Cash Flow Projections

Table II-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
2019	$ 852,760,000	$359,763,000	$147,816,000	$507,579,000
2020	882,717,000	388,998,000	151,881,000	540,879,000
2021	911,391,000	399,634,000	156,057,000	555,691,000
2022	939,172,000	400,362,000	160,349,000	560,711,000
2023	967,782,000	411,320,000	164,759,000	576,079,000
2024	995,608,000	417,024,000	169,290,000	586,314,000
2025	1,024,677,000	428,445,000	173,945,000	602,390,000
2026	1,053,275,000	437,367,000	178,728,000	616,095,000
2027	1,081,024,000	449,352,000	183,644,000	632,996,000
2028	1,106,728,000	460,243,000	188,694,000	648,937,000

In Table II-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 II-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 budget UAL contributions for FY 19 through FY 21. 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 six.

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 2019.

SECTION III – LIABILITIES

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

- Disclosure of the Program's liabilities as of June 30, 2017 and June 30, 2018;
- 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 III-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.

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

The PVB is compared to the current market value of assets, the expected future value of member contributions, and the expected future value of total employer contributions. The future employer contribution is calculated as the employer contribution rate projected to be developed for each Fiscal Year times the expected future payroll of the active population as of the valuation 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 required on the payroll of new hires to pay for benefits of existing members. This surplus or shortfall

SECTION III – LIABILITIES

indicates the size of the Program's stored gains or losses that remain outside of the valuation process. These gains or losses may enter the ratemaking process depending on the future investment performance.

Table III-1
Disclosure of Liabilities

	June 30, 2017	June 30, 2018
Present Value of Benefits (PVB)		
Active Member Benefits	$ 6,298,111,798	$ 6,619,296,005
Retired, Disabled, Survivor, and Beneficiary Benefits	8,076,838,290	8,411,202,297
Terminated (Vested & Nonvested) Benefits	650,711,709	619,587,244
Total PVB	**$ 15,025,661,797**	**$ 15,650,085,546**
Market Value of Assets (MVA)	$ 10,893,291,864	$ 11,632,179,683
Future Member Contributions	1,069,234,483	1,110,068,806
Future Employer Contributions Assuming No Further Gains or Losses or New Hires	3,141,709,556	3,213,773,735
Projected (Surplus)/Shortfall	(78,574,106)	(305,936,678)
Total Resources	**$ 15,025,661,797**	**$ 15,650,085,546**
Actuarial Liability (AL)		
Present Value of Benefits (PVB)	$ 15,025,661,797	$ 15,650,085,546
Present Value of Future Normal Costs (PVFNC)		
Employer Portion	471,540,802	508,828,895
Member Portion	1,069,234,483	1,110,068,806
Actuarial Liability (AL = PVB – PVFNC)	**$** 13,484,886,512	**$** 14,031,187,845
Actuarial Value of Assets (AVA)	10,904,082,221	11,419,986,652
Net (Surplus)/Unfunded (AL – AVA)	**$** 2,580,804,291	**$** 2,611,201,193
Present Value of Accrued Benefits		
Present Value of Future Benefits (PVB)	$ 15,025,661,797	$ 15,650,085,546
Present Value of Future Benefit Accruals (PVFBA)	2,664,481,297	2,820,323,263
Accrued Liability (PVAB = PVB – PVFBA)	**$** 12,361,180,500	**$** 12,829,762,283
Market Value of Assets (MVA)	10,893,291,864	11,632,179,683
Net (Surplus)/Unfunded (PVAB – MVA)	**$ 1,467,888,636**	**$ 1,197,582,600**

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
- 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:

- Employer 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 III-2 below, we present key changes in the Program's liability measures since the last valuation.

Table III-2

	Present Value of Future Benefits	Actuarial Liability	Present Value of Accrued Benefits
Liability Measurement – June 30, 2017	$ 15,025,661,797	$ 13,484,886,512	$ 12,361,180,500
Liability Measurement – June 30, 2018	15,650,085,546	14,031,187,845	12,829,762,283
Liability Measurement Increase/ (Decrease) Due to:	$ 624,423,749	$ 546,301,333	$ 468,581,783
Program Amendment	$ 0	$ 0	$ 0
Assumption Change	256,265,431	191,998,939	169,669,870
Actuarial (Gain)/Loss	N/C	34,151,279	N/C
Benefits Accumulated and Other Sources	$ 368,158,318	$ 320,151,115	$ 298,911,913

N/C = Not calculated

SECTION III – LIABILITIES

Table III-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 III-3
Allocation of Actuarial Liability as of June 30, 2018

	Total Program	Teacher Program	State Regular Plans	State Special Plans
1. Actuarial Liabilities for:				
a. Active Members	$ 5,000,398,304	$3,373,048,513	$ 1,326,042,317	$ 301,307,474
b. Retired, Disabled, Survivor, and Beneficiary Members	8,411,202,297	5,320,009,421	2,676,101,618	415,091,258
c. Terminated (Vested & Nonvested) Members	619,587,244	406,071,564	196,066,213	17,449,467
2. Total Actuarial Liability [1(a) + 1(b) + 1(c)]	$ 14,031,187,845	$9,099,129,498	$ 4,198,210,148	$ 733,848,199
3. Actuarial Value of Assets	11,419,986,652	7,608,317,761	3,249,770,360	561,898,531
4. Unfunded Actuarial Liability (2 – 3)	$ 2,611,201,193	$1,490,811,737	$ 948,439,788	$ 171,949,668

SECTION IV – CONTRIBUTIONS

In this section, we present detailed information on employer contribution rates as developed in this June 30, 2018 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) 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.

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 of each active member's projected future benefit as of entry age into a Program. 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 cost rate. These rates are then multiplied by each member's salary as of the valuation date and added together to get the total normal cost dollars as of the valuation date for that Program and then divided by the total payroll at the valuation date for the Program to get the normal cost rate for that Program. This process results in specific 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 is expected to amortize the UAL according to the Program's amortization policy. Specifically, the remaining original UAL has 10 years of its amortization period left and all other gains, losses, and changes are amortized over twenty-year periods beginning on the date as of which they were first measured.

SECTION IV – CONTRIBUTIONS

Contribution Calculations

Table IV-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 IV-1
Composite Total Employer Rate

Valuation Date	June 30, 2017	June 30, 2018
Composite Employer NC Rate	4.04%	4.18%
Composite UAL Amortization Rate	15.99%	15.74%
Composite Total Employer Rate	20.03%	19.92%

Table IV-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 closed plan for prison employees no longer has any active participants as of the current June 30, 2018 valuation, so the liability and contributions associated with this group are now included with the State Regular Program.

Table IV-2
Total Employer Contribution Rates by Plan

Valuation Date June 30, 2018	Total NC Rate	Employee Contribution Rate	Employer NC Rate	UAL Contribution Rate	Total Employer Contribution Rate
Total Program	11.89%	7.71%	4.18%	15.74%	19.92%
Teacher Program	11.71%	7.65%	4.06%	14.00%	18.06%
State Program	12.22%	7.82%	4.40%	19.08%	23.48%
State Regular	11.94%	7.65%	4.29%	18.63%	22.92%
State Police*	21.99%	8.65%	13.34%	34.34%	47.68%
Inland F&W*	22.75%	8.65%	14.10%	35.52%	49.62%
Forest Rangers*	11.82%	8.65%	3.17%	18.46%	21.63%
25 & Out Plan	12.89%	8.65%	4.24%	20.13%	24.37%
1998 Special Plan	13.99%	8.65%	5.34%	21.86%	27.20%

*Closed plan

SECTION IV – CONTRIBUTIONS

Table IV-3 below provides the development of the UAL amortization rate for the Program as a whole and divided between the Teacher and State Programs.

Table IV-3
Derivation of Unfunded Actuarial Liability Rates

Valuation Date June 30, 2018	**Teacher Program**	**State Program (Regular and Special Plans)**	**Total Program**
1. Actuarial Liability (AL)	$9,099,129,498	$4,932,058,347	$ 14,031,187,845
2. Actuarial Value of Assets (AVA)	7,608,317,761	3,811,668,891	11,419,986,652
3. Unfunded Actuarial Liability (UAL)	$1,490,811,737	$1,120,389,456	$ 2,611,201,193
4. Remaining Balances of Prior Amortization Bases			
a. Original UAL Amount	$1,389,333,148	$ 800,015,433	$ 2,189,348,581
b. 2012 (Gain)/Loss Base	29,430,574	26,219,805	55,650,379
c. 2013 (Gain)/Loss Base	(127,881,700)	143,738,437	15,856,737
d. 2014 (Gain)/Loss Base	(201,746,076)	(91,236,887)	(292,982,963)
e. 2015 (Gain)/Loss Base	3,790,703	(6,070,492)	(2,279,789)
f. 2016 (Gain)/Loss Base	177,132,592	198,471,237	375,603,829
g. 2017 (Gain)/Loss Base	106,819,731	19,423,150	126,242,881
h. 2018 (Gain)/Loss Base	113,932,766	29,828,773	143,761,539
i. Sum of the Bases	$1,490,811,737	$ 1,120,389,456	$ 2,611,201,193
5. UAL Amortizations			
a. Original UAL Amount 10 Years	$ 169,440,748	$ 97,568,545	$ 267,009,293
b. 2012 (Gain)/Loss Base 14 Years	2,751,247	2,451,096	5,202,343
c. 2013 (Gain)/Loss Base 15 Years	(11,352,919)	12,760,629	1,407,710
d. 2014 (Gain)/Loss Base 16 Years	(17,082,645)	(7,725,391)	(24,808,036)
e. 2015 (Gain)/Loss Base 17 Years	307,304	(492,122)	(184,818)
f. 2016 (Gain)/Loss Base 18 Years	13,794,305	15,456,064	29,250,369
g. 2017 (Gain)/Loss Base 19 Years	8,014,866	1,457,352	9,472,218
h. 2018 (Gain)/Loss Base 20 Years	8,258,289	2,162,105	10,420,394
i. Sum of Amortization Payments	$ 174,131,195	$ 123,638,278	$ 297,769,473
6. Covered Payroll	$1,243,442,243	$ 647,924,109	$ 1,891,366,352
7. UAL Amortization Rates			
a. Original UAL Amount 10 Years	13.63%	15.06%	14.11%
b. 2012 (Gain)/Loss Base 14 Years	0.22%	0.38%	0.28%
c. 2013 (Gain)/Loss Base 15 Years	(0.91)%	1.97%	0.07%
d. 2014 (Gain)/Loss Base 16 Years	(1.37)%	(1.19)%	(1.31)%
e. 2015 (Gain)/Loss Base 17 Years	0.02%	(0.08)%	(0.01)%
f. 2016 (Gain)/Loss Base 18 Years	1.11%	2.39%	1.55%
g. 2017 (Gain)/Loss Base 19 Years	0.64%	0.22%	0.50%
h. 2018 (Gain)/Loss Base 20 Years	0.66%	0.33%	0.55%
i. Sum of UAL Amortization Rates	**14.00%**	**19.08%**	**15.74%**

SECTION IV – CONTRIBUTIONS

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

Table IV-4
Allocation of Unfunded Actuarial Liability Amortization Rates within State Program (Regular & Special Plans)

Valuation Date June 30, 2018	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	4.40%	4.29%	13.34%	14.10%	3.17%	4.24%	5.34%
2. Member Contribution Rate	7.82%	7.65%	8.65%	8.65%	8.65%	8.65%	8.65%
3. Total NC Rate	12.22%	11.94%	21.99%	22.75%	11.82%	12.89%	13.99%
4. UAL Amortization Rates*							
a. Original UAL Amount	15.06%	14.71%	27.10%	28.04%	14.57%	15.89%	17.24%
b. 2012 Loss Base	0.38%	0.37%	0.68%	0.71%	0.37%	0.40%	0.44%
c. 2013 Loss Base	1.97%	1.92%	3.55%	3.67%	1.91%	2.08%	2.26%
d. 2014 Gain Base	(1.19)%	(1.16)%	(2.14)%	(2.22)%	(1.15)%	(1.26)%	(1.36)%
e. 2015 Gain Base	(0.08)%	(0.08)%	(0.14)%	(0.15)%	(0.08)%	(0.08)%	(0.09)%
f. 2016 Loss Base	2.39%	2.34%	4.30%	4.45%	2.31%	2.52%	2.74%
g. 2017 Loss Base	0.22%	0.21%	0.40%	0.41%	0.21%	0.23%	0.25%
h. 2018 Loss Base	0.33%	0.32%	0.59%	0.61%	0.32%	0.35%	0.38%
i. Sum of Amortization Rates	19.08%	18.63%	34.34%	35.52%	18.46%	20.13%	21.86%

* 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 12.22% total NC rate for the State Program in total.

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

SECTION V – 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 V-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 V-2: Schedule of Changes in Net Pension Liability and Related Ratios
- Table V-3: Sensitivity of Net Pension Liability to Changes in Discount Rate
- Table V-4: Schedule of Employer Contributions
- Table V-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 V-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 public employees retirement systems (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 V-6: Analysis of Financial Experience
- Table V-7: Solvency Test

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, 2018 are discounted at the assumed valuation interest rate of 6.75% per annum in all of these disclosures.

SECTION V – FINANCIAL DISCLOSURE INFORMATION

Table V-1 below includes the relevant amounts as of June 30, 2017 and June 30, 2018 as well as a reconciliation between the two dates under FASB ASC Topic 960. During the year, the only assumption change was a decrease in the investment return from 6.875% to 6.75%.

Table V-1
Accrued Benefits Information

	June 30, 2017	June 30, 2018
FASB ASC Topic 960 Basis		
1. Present Value of Benefits Accrued to Date (PVAB)		
a. Members Currently Receiving Payments	$ 8,076,838,290	$ 8,411,202,297
b. Terminated Vested Members	650,711,709	619,587,244
c. Active Members	3,633,630,501	3,798,972,742
d. Total PVAB	$ 12,361,180,500	$12,829,762,283
2. Market Value of Assets (MVA)	10,893,291,864	11,632,179,683
3. Unfunded Present Value of Accrued Benefits, But Not Less Than Zero	$ 1,467,888,636	$ 1,197,582,600
4. Ratio of MVA to PVAB (2)/(1)(d)	88.1%	90.7%

Change in Present Value of Benefits Accrued to Date during FY 2018

Increase/(Decrease) during Year Attributable to:	
Passage of Time	$ 822,443,059
Benefits Paid	(810,211,176)
Assumption Changes	169,669,870
Program Changes	0
Benefits Accrued, Other Gains/Losses	286,680,030
Net Increase (Decrease)	$ 468,581,783

Table V-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, 2018 as well as related ratios calculated under the provisions of GASB Statement No. 67 for the Program.

As of the June 30, 2018 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.

SECTION V – FINANCIAL DISCLOSURE INFORMATION

Table V-2
Schedule of Changes in Net Pension Liability and Related Ratios
FY 2018

	Teacher Program	State Program	Total State and Teacher Program
Total Pension Liability (TPL)			
Service Cost (SC)	$ 138,926,091	$ 76,900,289	$ 215,826,380
Interest (Includes Interest on SC)	591,945,009	322,590,902	914,535,911
Changes of Benefit Terms	0	0	0
Differences Between Actual and Expected Experience	28,817,026	5,334,253	34,151,279
Changes of Assumptions	127,324,713	64,674,226	191,998,939
Benefit Payments, Including Refunds of Member Contributions	(509,661,913)	(300,549,263)	(810,211,176)
Net Change in TPL	**377,350,926**	**168,950,407**	**546,301,333**
Beginning of Year (BOY) TPL	**8,721,778,572**	**4,763,107,940**	**13,484,886,512**
End of Year (EOY) TPL	**$ 9,099,129,498**	**$4,932,058,347**	**$14,031,187,845**
Plan Fiduciary Net Position (FNP)			
Employer Contributions	$ 183,903,265	$ 156,604,894	$ 340,508,159
Member Contributions	94,494,581	46,350,299	140,844,880
Net Investment Income	718,432,478	359,395,075	1,077,827,553
Transfers	0	(5,355)	(5,355)
Benefit Payments, Including Refunds of Member Contributions	(509,661,913)	(300,549,263)	(810,211,176)
Administrative Expense	(6,724,006)	(3,352,236)	(10,076,242)
Net Change in FNP	480,444,405	258,443,414	738,887,819
BOY FNP	**7,269,242,349**	**3,624,049,515**	**10,893,291,864**
EOY FNP	**$ 7,749,686,754**	**$3,882,492,929**	**$11,632,179,683**
EOY Net Pension Liability (NPL)	**$ 1,349,442,744**	**$1,049,565,418**	**$ 2,399,008,162**
FNP as a Percentage of TPL	85.2%	78.7%	82.9%
Covered Payroll (Payroll)*	1,221,888,186	643,961,202	1,865,849,388
NPL as a Percentage of Payroll	110.4%	163.0%	128.6%

*For FY 2018.

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

The annual rate of investment return was reduced from 6.875% to 6.75%. The impact of this change is included in the TPL reconciliation as changes of assumptions.

SECTION V – FINANCIAL DISCLOSURE INFORMATION

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 these 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, 2018, we have 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 V-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 V-3
Sensitivity of Net Pension Liability to Changes in Discount Rate
FY 2018

	1% Decrease 5.750%	Discount Rate 6.750%	1% Increase 7.750%
Teacher Program			
Total Pension Liability (TPL)	$10,243,456,098	$ 9,099,129,498	$ 8,146,089,643
Plan Fiduciary Net Position (FNP)	7,749,686,754	7,749,686,754	7,749,686,754
Net Pension Liability (NPL)	$ 2,493,769,344	$ 1,349,442,744	$ 396,402,889
FNP as a Percentage of TPL	75.7%	85.2%	95.1%
State Program			
Total Pension Liability (TPL)	$ 5,507,115,234	$ 4,932,058,347	$ 4,449,107,642
Plan Fiduciary Net Position (FNP)	3,882,492,929	3,882,492,929	3,882,492,929
Net Pension Liability (NPL)	$ 1,624,622,305	$ 1,049,565,418	$ 566,614,713
FNP as a Percentage of TPL	70.5%	78.7%	87.3%
Total State and Teacher Program			
Total Pension Liability (TPL)	$15,750,571,332	$14,031,187,845	$12,595,197,285
Plan Fiduciary Net Position (FNP)	11,632,179,683	11,632,179,683	11,632,179,683
Net Pension Liability (NPL)	$ 4,118,391,649	$ 2,399,008,162	$ 963,017,602
FNP as a Percentage of TPL	73.9%	82.9%	92.4%

SECTION V – FINANCIAL DISCLOSURE INFORMATION

A one percent decrease in the discount rate increases the TPL by approximately 12% and increases the NPL by approximately 72%. A one percent increase in the discount rate decreases the TPL by approximately 10% and decreases the NPL by approximately 60%.

Table V-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 may be needed to indicate the change in assumptions that were recognized in the 2015 valuation that was the basis of this ADC, 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 V-4
Schedule of Employer Contributions
FY 2018

	Teacher Program	State Program	Total State and Teacher Program
Actuarially Determined Contribution (ADC)	$ 183,894,172	$ 156,482,572	$ 340,376,744
Contributions in Relation to the ADC	183,894,172	156,482,572	340,376,744
Contribution Deficiency/(Excess)	$ 0	$ 0	$ 0
Covered Payroll (Payroll)	$1,221,888,186	$ 643,961,202	$ 1,865,849,388
Contributions as a Percentage of Payroll	15.05%	24.30%	18.24%

SECTION V – FINANCIAL DISCLOSURE INFORMATION

Notes to Schedule of Employer Contributions

Valuation Date:	June 30, 2015
Timing:	June 30, 2018 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 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.

SECTION V – FINANCIAL DISCLOSURE INFORMATION

A complete description of the methods and assumptions used to determine contribution rates for the year ending June 30, 2018 can be found in the June 30, 2016 actuarial valuation report.

Other Information

None.

Table V-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 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, 2018, these values are thus developed as of June 30, 2017. 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 68 separately to the Teacher Program and the State Program based upon paragraph 19 of that statement, so this value has been provided for both of these Programs.

Table V-5
Average Expected Remaining Service Lives
For Measurement Year Ending June 30, 2018

Teacher Program

Status	Total Expected Future Service	Count	Average Remaining Service Lives
Actives	277,870	27,153	10
In-Pay Members	0	19,977	0
Terminated Vested Members	0	5,096	0
Inactives Due Refunds	0	31,288	0
Total Membership	277,870	83,514	3

State Program

Status	Total Expected Future Service	Count	Average Remaining Service Life
Actives	112,504	12,683	9
In-Pay Members	0	14,893	0
Terminated Vested Members	0	2,914	0
Inactives Due Refunds	0	7,175	0
Total Membership	112,504	37,665	3

SECTION V – FINANCIAL DISCLOSURE INFORMATION

Table V-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 V-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, 2013	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
Investment Income	$ (52,030,633)	$ 639,521,136	$ (67,533,511)	$ (284,220,804)	$ (18,117,992)	$ 94,329,730
Combined Liability Experience	21,191,240	17,694,276	44,287,643	(81,506,701)	(95,207,531)	(34,151,279)
Gain (or Loss) during Year from Financial Experience	$ (30,839,393)	$ 657,215,412	$ (23,245,868)	$ (365,727,505)	$ (113,325,523)	$ 60,178,451
Non-Recurring Items	50,659,935	(167,650,573)	0	(30,436,605)	0	(191,998,939)
Composite Gain (or Loss) During Year	**$ 19,820,542**	**$ 489,564,839**	**$ (23,245,868)**	**$ (396,164,110)**	**$ (113,325,523)**	**$ (131,820,488)**

SECTION V – FINANCIAL DISCLOSURE INFORMATION

Table V-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 solvency test 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 note that you may wish to note the change to a 6.75% annual rate of investment return, but it is our expectation that the System's staff will make the final determination regarding any notes needed for this schedule.

Table V-7
Solvency Test
Aggregate Actuarial Liabilities For

Valuation Date June 30,	(1) Active Member Contributions	(2) Retirees, Vested Terms, Beneficiaries	(3) Active Members (Employer Financed Portion)	Reported Assets*	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)	(3)
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%
2009	2,002,784,767	6,622,143,609	3,696,290,956	8,325,951,236	100%	95%	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.

APPENDIX A – MEMBERSHIP INFORMATION

Active Member Data as of June 30, 2018	
Teacher Plan	
Count	27,396
Average Current Age	46.2
Average Benefit Service	12.3
Average Vesting Service	12.5
Average Valuation Pay	$ 45,388
State Employee Regular Plan	
Count	10,704
Average Current Age	48.6
Average Benefit Service	12.3
Average Vesting Service	12.8
Average Valuation Pay	$ 50,390
Forest Rangers Special Plan (Closed Plan)	
Count	1
Average Current Age	59.6
Average Benefit Service	39.1
Average Vesting Service	39.1
Average Valuation Pay	$ 92,269
Inland Fisheries & Wildlife Officers Special Plan (Closed Plan)	
Count	1
Average Current Age	62.9
Average Benefit Service	40.2
Average Vesting Service	40.2
Average Valuation Pay	$ 68,892
State Police Special Plan (Closed Plan)	
Count	1
Average Current Age	64.8
Average Benefit Service	40.9
Average Vesting Service	40.9
Average Valuation Pay	$ 85,116

APPENDIX A – MEMBERSHIP INFORMATION

Active Member Data as of June 30, 2018	
State Employee Special 25 & Out Plan	
Count	478
Average Current Age	40.9
Average Benefit Service	14.3
Average Vesting Service	14.8
Average Valuation Pay	$ 81,156
State Employee 1998 Special Plan	
Count	1,262
Average Current Age	43.2
Average Benefit Service	11.5
Average Vesting Service	11.9
Average Valuation Pay	$ 55,078
State Employee Totals (Excludes Teachers)	
Count	12,447
Average Current Age	47.8
Average Benefit Service	12.3
Average Vesting Service	12.8
Average Valuation Pay	$ 52,055

Non-Active Member Data as of June 30, 2018
Teachers

	Count	Average Age	Total Annual Benefit	Average Annual Benefit
Retired	16,691	72.6	$ 441,905,255	$ 26,476
Retired – Concurrent Beneficiaries	1,394	73.0	8,301,755	5,955
Disabilities/1122	0		0	0
Disabilities/3 and 3A	684	67.7	19,778,305	28,916
Beneficiaries	1,512	71.4	26,065,263	17,239
Pre-Retirement Death Benefits	285	62.2	1,724,426	6,051
Terminated Vested	4,983	52.6	38,643,860	7,755
Inactive Due Refund	31,513	NA	NA	NA

APPENDIX A – MEMBERSHIP INFORMATION

Non-Active Member Data as of June 30, 2018 State Regular				
	Count	**Average Age**	**Total Annual Benefit**	**Average Annual Benefit**
Retired	9,525	72.7	$ 203,325,436	$ 21,347
Retired – Concurrent Beneficiaries	998	72.5	5,157,410	5,168
Disabilities/1122	2	91.7	37,032	18,516
Disabilities/3 and 3A	848	66.0	20,195,162	23,815
Beneficiaries	1,967	66.0	27,989,469	14,230
Pre-Retirement Death Benefits	326	67.6	1,954,971	5,997
Terminated Vested	2,678	52.9	20,486,664	7,650
Inactive Due Refund	6,634	NA	NA	NA

Non-Active Member Data as of June 30, 2018 Special Plans				
	Count	**Average Age**	**Total Annual Benefit**	**Average Annual Benefit**
Retired	936	68.2	$ 29,197,728	$ 31,194
Retired – Concurrent Beneficiaries	134	66.5	837,633	6,251
Disabilities/1122	1	87.6	19,707	19,707
Disabilities/3 and 3A	73	59.8	2,087,959	28,602
Beneficiaries	210	71.7	3,438,474	16,374
Pre-Retirement Death Benefits	15	45.3	78,670	5,245
Terminated Vested	304	47.3	2,388,713	7,858
Inactive Due Refund	927	NA	NA	NA

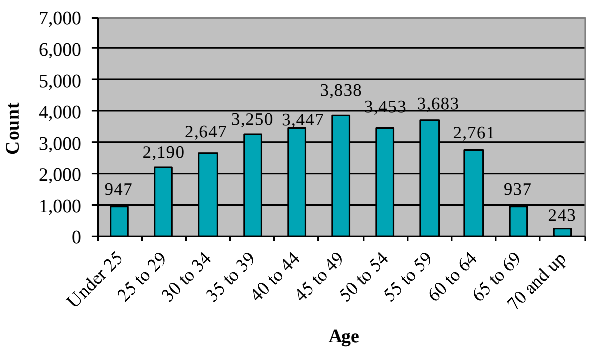
APPENDIX A – MEMBERSHIP INFORMATION

Distribution of Active Members
As of June 30, 2018

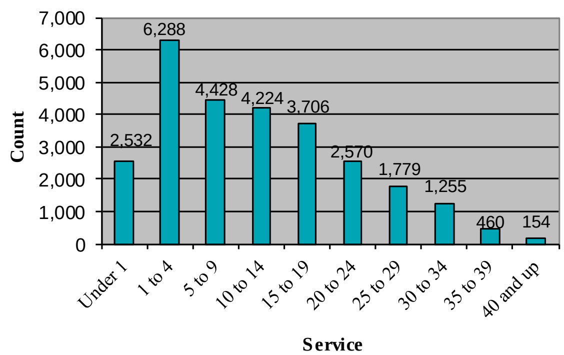
Teachers

	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	Totals
Under 25	513	434	0	0	0	0	0	0	0	0	947
25 to 29	386	1,359	445	0	0	0	0	0	0	0	2,190
30 to 34	298	961	1,018	370	0	0	0	0	0	0	2,647
35 to 39	292	807	698	1,110	343	0	0	0	0	0	3,250
40 to 44	291	771	602	620	907	256	0	0	0	0	3,447
45 to 49	256	722	566	649	644	784	215	2	0	0	3,838
50 to 54	159	487	455	553	546	452	607	194	0	0	3,453
55 to 59	139	342	321	492	649	478	467	648	147	0	3,683
60 to 64	98	255	219	303	475	441	360	288	249	73	2,761
65 to 69	59	91	83	105	122	141	108	104	57	67	937
70 and up	41	59	21	22	20	18	22	19	7	14	243
Total	2,532	6,288	4,428	4,224	3,706	2,570	1,779	1,255	460	154	27,396

Age Distribution



Service Distribution



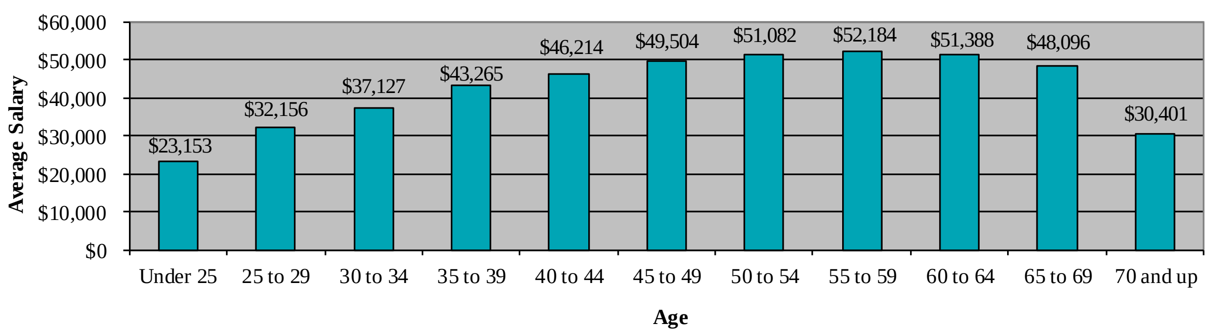
APPENDIX A – MEMBERSHIP INFORMATION

Distribution of Active Members
As of June 30, 2018

Teachers

	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	Average
Under 25	18,371	28,805	0	0	0	0	0	0	0	0	23,153
25 to 29	17,607	33,468	40,770	0	0	0	0	0	0	0	32,156
30 to 34	17,969	32,775	42,252	49,756	0	0	0	0	0	0	37,127
35 to 39	18,037	33,238	43,709	52,169	58,613	0	0	0	0	0	43,265
40 to 44	17,165	32,567	42,618	52,159	59,913	65,855	0	0	0	0	46,214
45 to 49	14,778	31,211	41,364	51,610	60,860	66,842	70,080	53,606	0	0	49,504
50 to 54	18,213	29,443	39,430	47,499	54,804	65,532	68,956	69,813	0	0	51,082
55 to 59	14,251	29,103	36,823	42,924	50,875	59,729	65,580	69,082	70,473	0	52,184
60 to 64	16,052	27,376	35,794	41,206	48,465	54,990	62,424	69,575	71,647	73,722	51,388
65 to 69	13,611	24,036	28,053	42,213	47,570	54,703	59,541	63,431	68,571	72,571	48,096
70 and up	13,646	9,681	20,436	31,062	46,083	53,508	41,550	54,245	61,059	63,376	30,401
Average	17,154	31,485	40,897	49,038	55,673	62,397	65,973	68,591	70,730	72,281	45,388

Average Salary Distribution



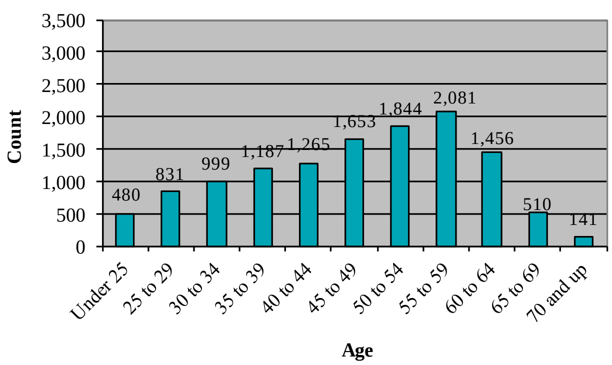
APPENDIX A – MEMBERSHIP INFORMATION

Distribution of Active Members
As of June 30, 2018

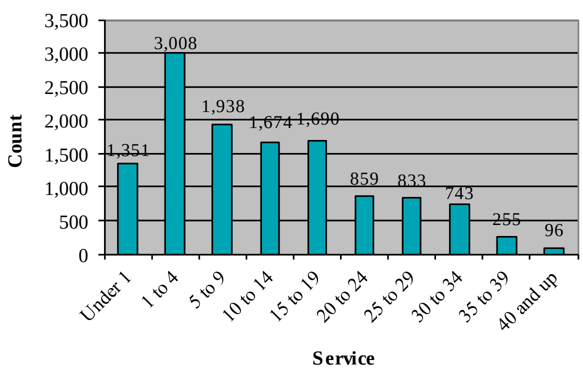
State

	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	Totals
Under 25	290	189	1	0	0	0	0	0	0	0	480
25 to 29	217	515	98	1	0	0	0	0	0	0	831
30 to 34	162	452	288	93	4	0	0	0	0	0	999
35 to 39	152	372	285	279	99	0	0	0	0	0	1,187
40 to 44	122	289	240	235	304	74	1	0	0	0	1,265
45 to 49	118	350	247	267	304	240	112	15	0	0	1,653
50 to 54	99	311	242	243	304	207	253	179	6	0	1,844
55 to 59	94	287	236	256	328	160	261	333	114	12	2,081
60 to 64	53	166	204	214	248	134	145	164	85	43	1,456
65 to 69	28	56	77	73	77	37	45	42	40	35	510
70 and up	16	21	20	13	22	7	16	10	10	6	141
Total	1,351	3,008	1,938	1,674	1,690	859	833	743	255	96	12,447

Age Distribution



Service Distribution



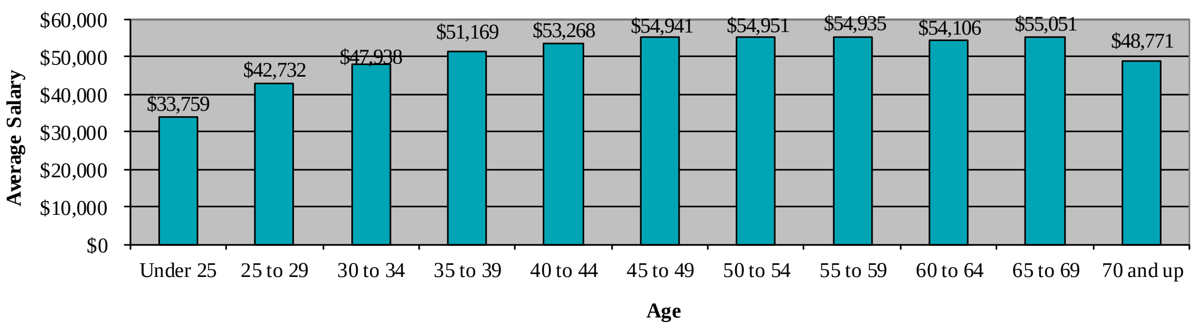
APPENDIX A – MEMBERSHIP INFORMATION

Distribution of Active Members
As of June 30, 2018

State

	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	Average
Under 25	29,118	40,831	42,790	0	0	0	0	0	0	0	33,759
25 to 29	34,957	44,816	49,127	29,994	0	0	0	0	0	0	42,732
30 to 34	37,821	46,038	54,735	53,152	61,759	0	0	0	0	0	47,938
35 to 39	37,246	49,320	52,322	57,593	58,070	0	0	0	0	0	51,169
40 to 44	35,608	45,970	52,757	56,026	62,398	66,174	60,486	0	0	0	53,268
45 to 49	36,742	45,007	51,525	55,902	60,684	69,853	61,239	67,070	0	0	54,941
50 to 54	37,921	45,505	51,015	54,330	58,799	63,812	62,268	59,651	60,074	0	54,951
55 to 59	33,002	44,699	51,789	52,480	57,286	61,711	60,516	61,593	61,105	66,401	54,935
60 to 64	38,874	43,136	47,450	52,991	55,360	59,313	60,232	60,891	65,433	59,981	54,106
65 to 69	28,238	39,111	56,689	56,497	54,202	58,067	65,107	64,662	63,421	60,028	55,051
70 and up	34,848	35,627	39,505	44,710	45,870	62,340	71,809	61,210	62,320	61,645	48,771
Average	34,614	45,236	51,767	54,848	58,574	64,351	61,561	61,249	62,934	60,905	52,055

Average Salary Distribution

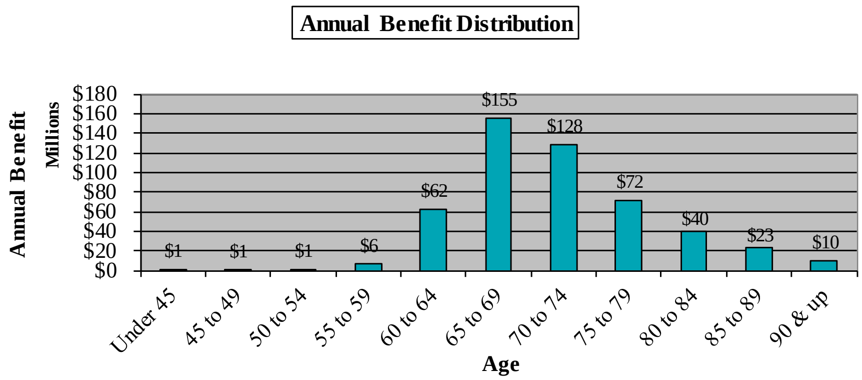


APPENDIX A – MEMBERSHIP INFORMATION

Distribution of Retirees, Disabled Members, Beneficiaries, and Survivors As of June 30, 2018

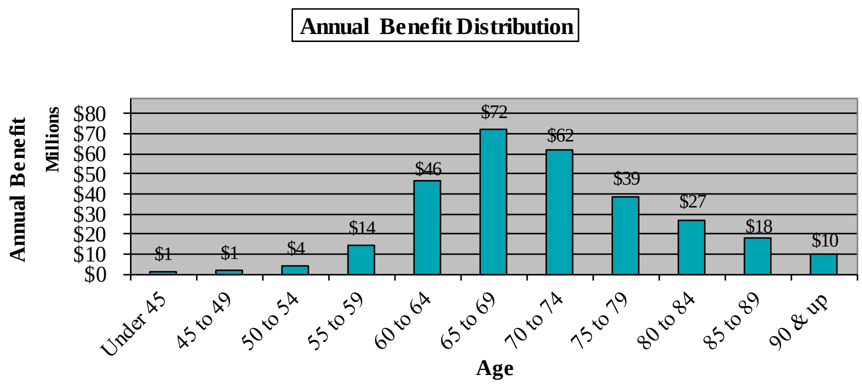
Teachers

Age	Count	Annual Benefit
Under 45	134	$ 894,989
45 to 49	61	550,428
50 to 54	87	1,135,480
55 to 59	271	6,169,660
60 to 64	2,218	62,227,225
65 to 69	5,970	154,784,079
70 to 74	5,195	128,104,422
75 to 79	3,089	71,603,491
80 to 84	1,834	39,643,949
85 to 89	1,125	22,797,647
90 & up	582	9,863,635
Total	20,566	$ 497,775,004



State

Age	Count	Annual Benefit
Under 45	139	$ 1,068,924
45 to 49	124	1,481,826
50 to 54	230	3,792,273
55 to 59	675	14,109,832
60 to 64	2,188	46,462,840
65 to 69	3,491	71,963,727
70 to 74	3,033	62,037,772
75 to 79	1,995	38,759,227
80 to 84	1,478	27,076,337
85 to 89	1,036	17,780,236
90 & up	646	9,786,658
Total	15,035	$ 294,319,650



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, 2017	**27,153**	**16,128**	**2,873**	**281**	**695**	**5,096**
New hires	1,882					
Rehires	602					(221)
Movement between plans	(4)					(1)
New retirees	(362)	912				(548)
New beneficiaries due to retirements			50			
New disabled retirees	(11)				16	(3)
New deferred vested members	(728)					787
Non-vested terminations	(926)					
Refunds	(189)					(109)
Deaths, no future benefits	(11)	(271)	(98)	(7)	(12)	(16)
Deaths with a survivor or beneficiary	(9)	(77)	81	17	(16)	(5)
Benefits expired				(6)		
Data correction	(1)	(1)			1	3
As of June 30, 2018	**27,396**	**16,691**	**2,906**	**285**	**684**	**4,983**

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, 2017	**12,683**	**10,296**	**3,301**	**355**	**941**	**2,914**
New hires	1,095					
Rehires	127					(38)
Movement between plans	(8)					(3)
New retirees	(343)	507				(164)
New beneficiaries due to retirements			46			
New disabled retirees	(25)				28	(3)
New deferred vested members	(306)					351
Non-vested terminations	(518)					
Refunds	(244)					(63)
Deaths, no future benefits	(7)	(242)	(143)	(16)	(19)	(8)
Deaths with a survivor or beneficiary	(7)	(102)	100	11	(26)	(5)
Benefits expired				(9)		
Data correction		2	5		-	1
As of June 30, 2018	**12,447**	**10,461**	**3,309**	**341**	**924**	**2,982**

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.

APPENDIX B – SUMMARY OF PROGRAM PROVISIONS

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 2.4% annual interest.

<u>Contribution Requirements for Special State Employee Groups</u>

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.

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 military service credit, other purchased service credit, 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.

APPENDIX B – SUMMARY OF PROGRAM PROVISIONS

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.

APPENDIX B – SUMMARY OF PROGRAM PROVISIONS

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.

APPENDIX B – SUMMARY OF PROGRAM PROVISIONS

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

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: 66⅔% 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 66⅔% 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.

8. Pre-Retirement Ordinary Death Benefits

Eligibility: Death while active, inactive eligible to retire, or disabled.

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.

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

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.

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.

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.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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

Service	State Employees and Teachers
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 2018)			
	State Employees		Teachers	
Age	Male	Female	Male	Female
50	41	32	39	26
55	58	43	55	35
60	78	62	74	51
65	111	95	106	79
70	172	153	163	126
75	280	251	266	207
80	471	424	448	350
85	822	753	783	621
90	1,453	1,351	1,383	1,115
95	2,301	2,230	2,191	1,840

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 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

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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 2018)			
	State Employees		Teachers	
Age	Male	Female	Male	Female
20	4	2	4	1
25	4	2	4	2
30	4	3	4	2
35	5	3	5	3
40	6	5	6	4
45	9	8	9	6
50	17	13	16	10
55	28	20	27	16
60	47	29	45	24
65	83	44	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.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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

	(Showing values in 2018)			
	State Employees		Teachers	
Age	Male	Female	Male	Female
25	82	24	82	24
30	79	30	79	30
35	92	42	92	42
40	111	58	111	58
45	173	90	173	90
50	211	119	211	119
55	244	150	244	150
60	277	178	277	178
65	332	216	332	216
70	429	294	429	294

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

	State Employees and Teachers		
Age	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

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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 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.

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 revised 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

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

	State Employees		
Age	Regular	Special	Teachers
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.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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.

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: 2.4%

COLA Timing: September 1

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

The annual rate of investment return was lowered from 6.875% to 6.75%.

15. Rationale for Change in Actuarial Assumptions

The Board continuously reviews the investment return assumption and adopted a reduced rate of 6.75% effective with the 2018 valuation, at the advice of its investment consultant.

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 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 10 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.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

3. Changes since Last Valuation

The amortization period for future gains and losses was changed from ten years to twenty years. Gains and Losses since 2012 were reset using a 20-year amortization years as of July 1, 2018.

4. Rationale for Change

Maine State's Constitution was amended to change the amortization of gains and losses from using a 10-year period to using a 20-year period.

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.

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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