New Hampshire Retirement System

Actuarial Valuation Report
as of June 30, 2019

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June 24, 2020

Board of Trustees
New Hampshire Retirement System
54 Regional Drive
Concord, New Hampshire 03301-8507

Re: New Hampshire Retirement System Actuarial Valuation as of June 30, 2019

Dear Board Members:

The results of the June 30, 2019 Annual Actuarial Valuation of the New Hampshire Retirement System (NHRS) are presented in this report. The purposes of the valuation were:

- to measure the System's funding progress; and
- to calculate employer contribution rates for Fiscal Years 2022 and 2023.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. This report should not be relied on for any purpose other than the purposes described above.

Calculations required for compliance with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, as well as No. 74 and No. 75, have been issued in separate reports.

The contribution rates in this report are determined according to Statute RSA 100-A:16, 53, 53-b, 53-c, and 53-d using the actuarial assumptions and methods disclosed in Section E of this report. This report includes risk measures on pages 32 through 38, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The valuation was based upon information, furnished by NHRS staff, concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries as of June 30, 2019. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data provided by NHRS. Detailed demographic information can be found in the "CAFR Schedules and GASB Statement Nos. 67 and 74 Plan Reporting and Accounting Schedules" report dated October 31, 2019.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. The actuarial assumptions are established by the Board after consulting with the actuary under New Hampshire Statute RSA 100-A:14 IX. Actuarial methods and assumptions were adopted by the Board pursuant to the 4-year actuarial experience study covering the period from July 1, 2015 to June 30, 2019. We believe that the assumptions and methods used in this report are reasonable and appropriate for the purposes for which they

have been used. However, other assumptions and methods could also be reasonable and could result in materially different results. In addition, because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial. The actuarial funding method is the Individual Entry Age Actuarial Cost Method, in compliance with NHRS State Statutes. Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed.

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the New Hampshire Retirement System as of June 30, 2019. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable Statutes RSA 100-A:16, 100-A:53, 100-A:53-b, 100-A:53-c, 100-A:53-d and 100-A:53-e.

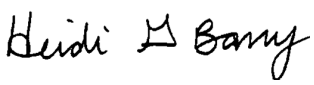
Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

If there is other information that you need in order to make an informed decision regarding the matters discussed in this report, please contact us.

David T. Kausch, Heidi G. Barry and Casey T. Ahlbrandt-Rains are independent of the plan sponsors, are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

David T. Kausch, FSA, EA, FCA, MAAA, PhD



Heidi G. Barry, ASA, FCA, MAAA

Casey T. Ahlbrandt-Rains, ASA, MAAA

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SECTION A

INTRODUCTION

Highlights of
June 30, 2019 Actuarial Valuation

Employer Contribution Rates for the 2022/2023 Biennium

	Computed Employer Contribution Rates as a Percent of Payroll*			
	State Members			
	Employees	Teachers	Police	Fire
Pension	13.75%	N/A	30.67%	29.78%
Medical Subsidy	0.78%	N/A	3.21%	3.21%
Total	14.53%	N/A	33.88%	32.99%

	Computed Employer Contribution Rates as a Percent of Payroll*			
	Political Subdivision Members			
	Employees	Teachers	Police	Fire
Pension	13.75%	19.48%	30.67%	29.78%
Medical Subsidy	0.31%	1.54%	3.21%	3.21%
Total	14.06%	21.02%	33.88%	32.99%

** The grand total contribution rates for NHRS (State and Political Subdivisions combined) are 18.67% of payroll for pension and 1.36% for the medical subsidy for a grand total of 20.03% of payroll.*

The Pension Funded Ratio (Actuarial Value of Assets divided by the Actuarial Accrued Liability) for NHRS in total is 60.8%.

Changes to the System Included in the June 30, 2019 Actuarial Valuation

1) The actuarial assumptions resulting from the July 1, 2015 through June 30, 2019 experience study were adopted by the Board and have been incorporated for actuarial valuation purposes. These changes increased the total employer contribution rate by 3.90% of payroll (pension and medical subsidy combined), and decreased the pension funded ratio by 4.0%.

2) House Bill No. 616 grants a one-time 1.5% COLA on the first $50,000 of an annual pension benefit to members who retired on or before July 1, 2014, or any beneficiary of such member, who is receiving a survivorship pension benefit. The COLA will take effect on the retired member's first anniversary date of retirement occurring after July 1, 2020. The impact of this change was an increase in actuarial accrued liabilities of approximately $65 million, a decrease in the funded status of 0.2%, and an increase in the total employer contribution rate of 0.14% of pay for state and 0.19% of pay for political subdivision (varying by member classification). Please see pages 18 and 31 for further details.

3) The Board adopted a funding method change for the Teachers' medical subsidy which strengthened the account margin from 20% to 50%, based on our recommendation resulting from the experience study. This method change increased the Teacher's medical subsidy employer contribution rate by 0.19% of pay.

Other Highlights

1) In total, plan experience between June 30, 2018 and June 30, 2019 was unfavorable for pension and favorable for the medical subsidy. The dollar weighted rate of return for the year ending June 30, 2019 was 5.6% on the market value of assets (Note: This dollar weighted measure may differ from investment manager calculations and should not be used as a measure of investment performance.) On the basis of statutory funding, the rate of return for 2019 was 6.6% on the actuarial value of assets, resulting in a recognized asset loss of $60 million (pension and medical subsidy combined). The return on the actuarial value of assets exceeds the return on the market value of assets because some of this year's low market return is deferred and prior years' high returns are recognized this year. Investment experience over the two-year valuation cycle was favorable, as the recognized asset loss in 2019 was offset by recognized asset gains from 2018 of $93 million. Plan experience as a whole was unfavorable for pension and favorable for the medical subsidy over the two-year period from July 1, 2017 through June 30, 2019. Please see page 31 for additional details.

2) Total covered payroll increased by 2.6% versus the assumed increase of 3.25% (2.75% for Teachers through June 30, 2019) resulting in pension liability gains which reduced the total employer contribution rate by 0.01% of pay. Please see page 38 for additional details.

3) Between the 2018 and 2019 valuation, the pension funded ratio increased by 1.2 percentage points (63.6% to 64.8% before assumption changes). The funded ratio was 60.8% after reflecting the newly adopted actuarial assumptions. See page 15.

4) The medical subsidy benefits are effectively pay-as-you-go with total assets in the four subaccounts being roughly half a year's total benefit payments. The market value of assets available to fund medical subsidy benefits decreased from $37.3 million to $36.8 million. See Comment 5 on page 21.

5) This valuation incorporates additional changes to data collection and actuarial methods following an in-depth review of the census data and an independent actuarial audit. A summary of the data and description of the actuarial methods used in the valuation may be found in Sections D and E of this report.

Details of the impact of changes can be found in the Comments section.

Executive Summary
Pension

Covered Group	Employees	Teachers	Police	Fire	Total
I. Number of Participants as of June 30, 2019					
a. Actives	24,654	17,730	4,216	1,688	48,288
b. Retirees, Disabilities, and Beneficiaries	18,824	13,740	4,082	1,706	38,352
c. Vested Terminations	1,366	1,034	125	27	2,552
d. Non-Vested Inactive Terminations	8,332	3,476	669	53	12,530
e. Total	53,176	35,980	9,092	3,474	101,722
f. Total Covered Annual Payroll	$ 1,244,930,212	$ 1,135,606,524	$ 313,016,249	$ 131,453,037	$ 2,825,006,022
II. Statutory Funding Information					
a. Actuarial Present Value of Projected Benefits	$ 5,792,593,227	$ 6,785,991,443	$ 3,366,900,398	$ 1,541,723,565	$ 17,487,208,633
b. Actuarial Present Value of Future Normal Costs	803,587,011	948,478,856	489,670,234	231,307,140	2,473,043,241
c. Actuarial Accrued Liability (AAL): a. – b.	4,989,006,216	5,837,512,587	2,877,230,164	1,310,416,425	15,014,165,392
d. Actuarial Value of Assets	3,063,967,170	3,326,087,948	1,838,867,763	893,010,033	9,121,932,914
e. Unfunded Actuarial Accrued Liability (UAAL): c. – d.	1,925,039,046	2,511,424,639	1,038,362,401	417,406,392	5,892,232,478
f. Funded Status: d. / c.	61.4%	57.0%	63.9%	68.1%	60.8%
III. Additional Information on Payroll					
State	$ 567,292,108	$ -	$ 85,189,248	$ 4,292,320	$ 656,773,676
Political Subdivisions	677,638,104	1,135,606,524	227,827,001	127,160,717	2,168,232,346
Total	$ 1,244,930,212	$ 1,135,606,524	$ 313,016,249	$ 131,453,037	$ 2,825,006,022

Executive Summary
Medical Subsidy

Covered Group	State Employees	Political Subdivision Employees	Teachers	Police and Fire	Grand Total
I. Number of Participants Covered by					
Post Retirement Medical Subsidy as of June 30, 2019					
a. Actives	-	-	-	2,222	2,222
b. Retirees, Disabilities, and Beneficiaries	1,542	1,125	4,138	2,871	9,676
c. Vested Terminations	-	-	-	-	-
d. Total	1,542	1,125	4,138	5,093	11,898
e. Total NHRS Covered Annual Payroll	$ 567,292,108	$ 677,638,104	$ 1,135,606,524	$ 444,469,286	$ 2,825,006,022
II. Statutory Funding Information					
a. Actuarial Present Value of Projected Benefits	$ 63,402,295	$ 54,311,753	$ 241,739,747	$ 346,885,153	$ 706,338,948
b. Actuarial Present Value of Future Normal Costs	-	-	-	10,914,676	10,914,676
c. Actuarial Accrued Liability (AAL): a. – b.	63,402,295	54,311,753	241,739,747	335,970,477	695,424,272
d. Valuation Assets	2,075,732	14,555,216	4,219,363	15,796,102	36,646,413
e. Unfunded Actuarial Accrued Liability (UAAL): c. – d.	61,326,563	39,756,537	237,520,384	320,174,375	658,777,859
f. Funded Status: d. / c.	3.3%	26.8%	1.7%	4.7%	5.3%

Executive Summary
Contribution Rates

State Members

Covered Group	Employees	Teachers	Police	Fire	Total
Total Normal Cost (% of Payroll)	9.58%		18.27%	18.87%	10.77%
UAAL Contribution (% of Payroll)	11.17%		23.95%	22.71%	12.90%
Total Pension Contribution (% of Payroll)	20.75%		42.22%	41.58%	23.67%
Fiscal Year 2022					
Member Contributions (% of Payroll)	7.00%		11.55%	11.80%	7.62%
Employer Pension Contribution (% of Payroll)	13.75%		30.67%	29.78%	16.05%
Employer Medical Subsidy Contribution (% of Payroll)	0.78%		3.21%	3.21%	1.11%
Total Employer Contributions for Fiscal Year 2022					
1. Percent of Payroll	14.53%	N/A	33.88%	32.99%	17.16%
2. Projected Payroll for Fiscal Year	$ 615,392,549		$ 92,412,406	$ 4,656,264	$ 712,461,219
3. Projected Dollar Amount	$ 89,416,537	N/A	$ 31,309,323	$ 1,536,101	$ 122,261,961
Fiscal Year 2023					
Member Contributions (% of Payroll)	7.00%		11.55%	11.80%	7.62%
Employer Pension Contribution (% of Payroll)	13.75%		30.67%	29.78%	16.05%
Employer Medical Subsidy Contribution (% of Payroll)	0.78%		3.21%	3.21%	1.11%
Total Employer Contributions for Fiscal Year 2023					
1. Percent of Payroll	14.53%	N/A	33.88%	32.99%	17.16%
2. Projected Payroll for Fiscal Year	$ 632,315,844		$ 94,953,747	$ 4,784,311	$ 732,053,902
3. Projected Dollar Amount	$ 91,875,492	N/A	$ 32,170,329	$ 1,578,344	$ 125,624,165

Executive Summary
Contribution Rates (Concluded)

Political Subdivison Members

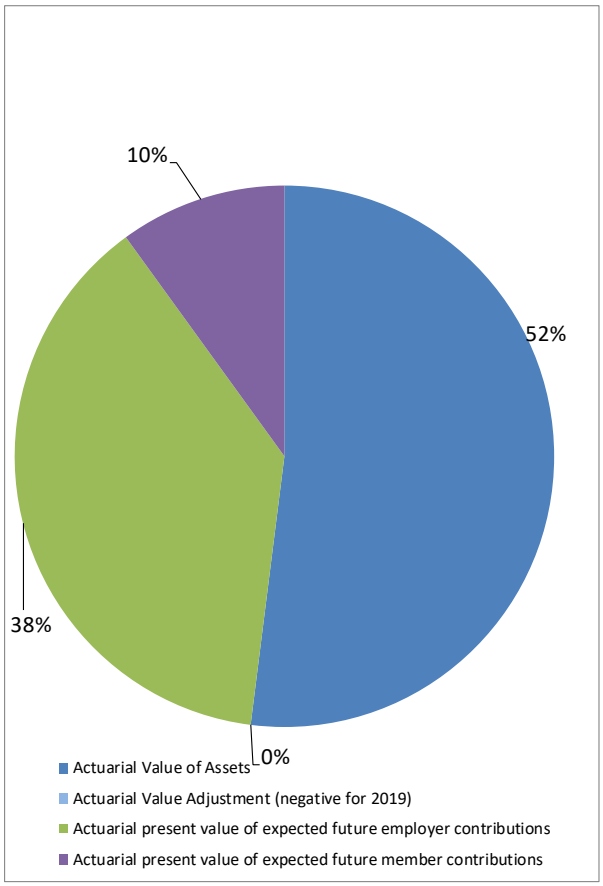
Covered Group	Employees	Teachers	Police	Fire	Total
Total Normal Cost (% of Payroll)	9.58%	9.82%	18.27%	18.87%	11.17%
UAAL Contribution (% of Payroll)	11.17%	16.66%	23.95%	22.71%	16.07%
Total Pension Contribution (% of Payroll)	20.75%	26.48%	42.22%	41.58%	27.24%
Fiscal Year 2022					
Member Contributions (% of Payroll)	7.00%	7.00%	11.55%	11.80%	7.76%
Employer Pension Contribution (% of Payroll)	13.75%	19.48%	30.67%	29.78%	19.48%
Employer Medical Subsidy Contribution (% of Payroll)	0.31%	1.54%	3.21%	3.21%	1.43%
Total Employer Contributions for Fiscal Year 2022					
1. Percent of Payroll	14.06%	21.02%	33.88%	32.99%	20.91%
2. Projected Payroll for Fiscal Year	$ 735,094,732	$ 1,213,997,602	$ 247,144,349	$ 137,942,617	$ 2,334,179,300
3. Projected Dollar Amount	$ 103,354,319	$ 255,182,296	$ 83,732,505	$ 45,507,269	$ 487,776,389
Fiscal Year 2023					
Member Contributions (% of Payroll)	7.00%	7.00%	11.55%	11.80%	7.76%
Employer Pension Contribution (% of Payroll)	13.75%	19.48%	30.67%	29.78%	19.48%
Employer Medical Subsidy Contribution (% of Payroll)	0.31%	1.54%	3.21%	3.21%	1.43%
Total Employer Contributions for Fiscal Year 2023					
1. Percent of Payroll	14.06%	21.02%	33.88%	32.99%	20.91%
2. Projected Payroll for Fiscal Year	$ 755,309,837	$ 1,241,312,548	$ 253,940,819	$ 141,736,039	$ 2,392,299,243
3. Projected Dollar Amount	$ 106,196,563	$ 260,923,898	$ 86,035,149	$ 46,758,719	$ 499,914,329

Total NHRS Members

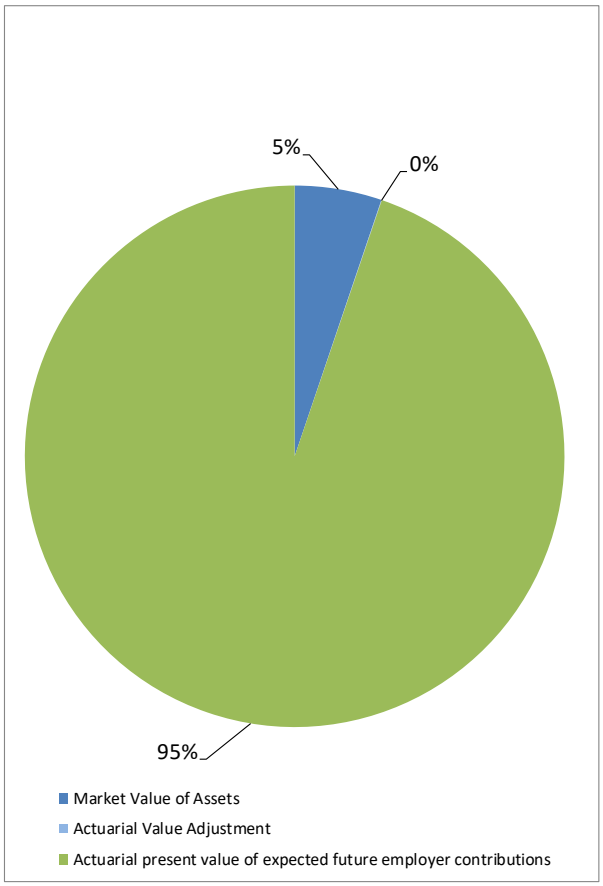
Covered Group	Employees	Teachers	Police	Fire	Total
Fiscal Year 2022					
1. Projected Payroll for Fiscal Year	$ 1,350,487,281	$ 1,213,997,602	$ 339,556,755	$ 142,598,881	$ 3,046,640,519
2. Projected Employer Dollar Amount	$ 192,770,856	$ 255,182,296	$ 115,041,828	$ 47,043,370	$ 610,038,350
Fiscal Year 2023					
1. Projected Payroll for Fiscal Year	$ 1,387,625,681	$ 1,241,312,548	$ 348,894,566	$ 146,520,350	$ 3,124,353,145
2. Projected Employer Dollar Amount	$ 198,072,055	$ 260,923,898	$ 118,205,478	$ 48,337,063	$ 625,538,494

Sources of Funds

Pension

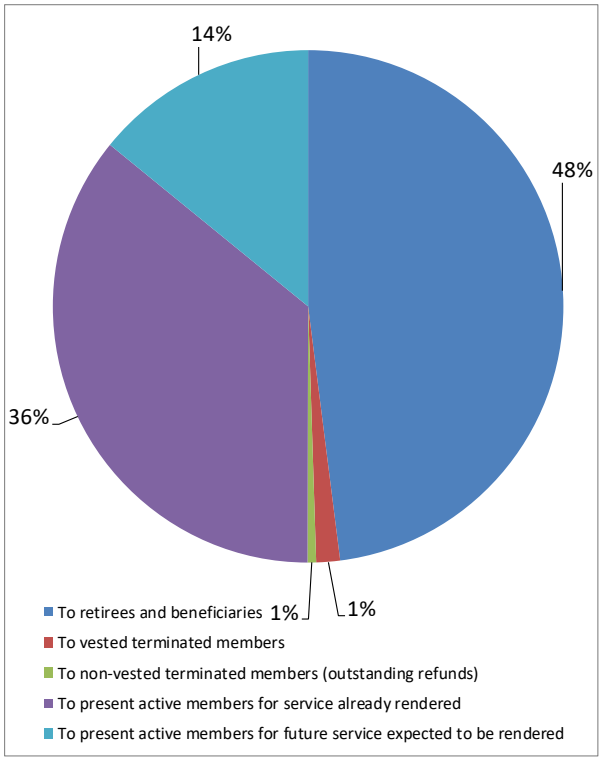


Medical Subsidy

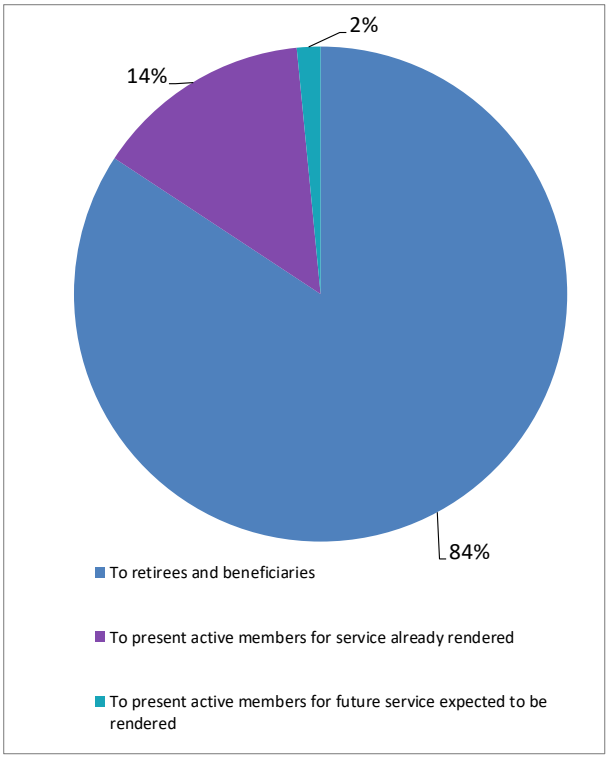


Uses of Funds

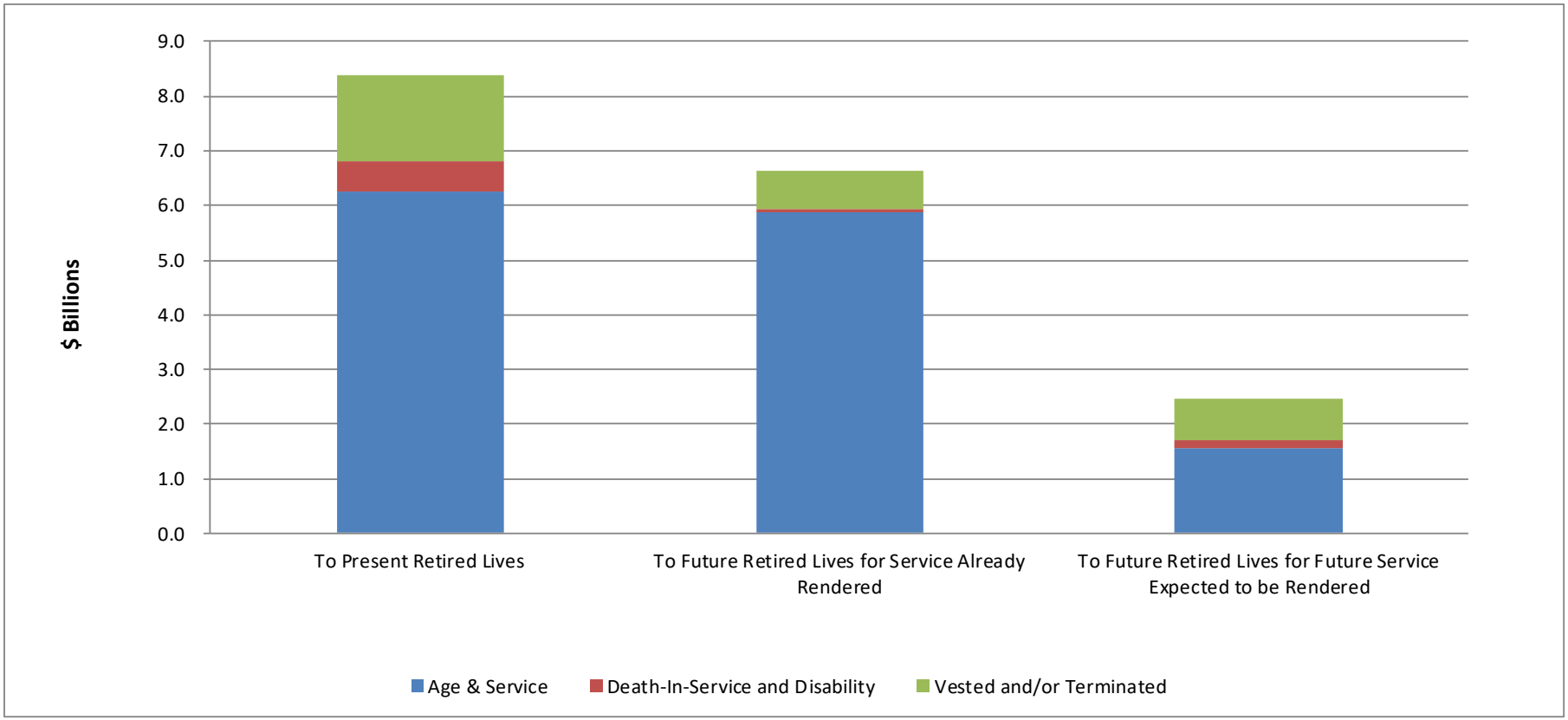
Pension



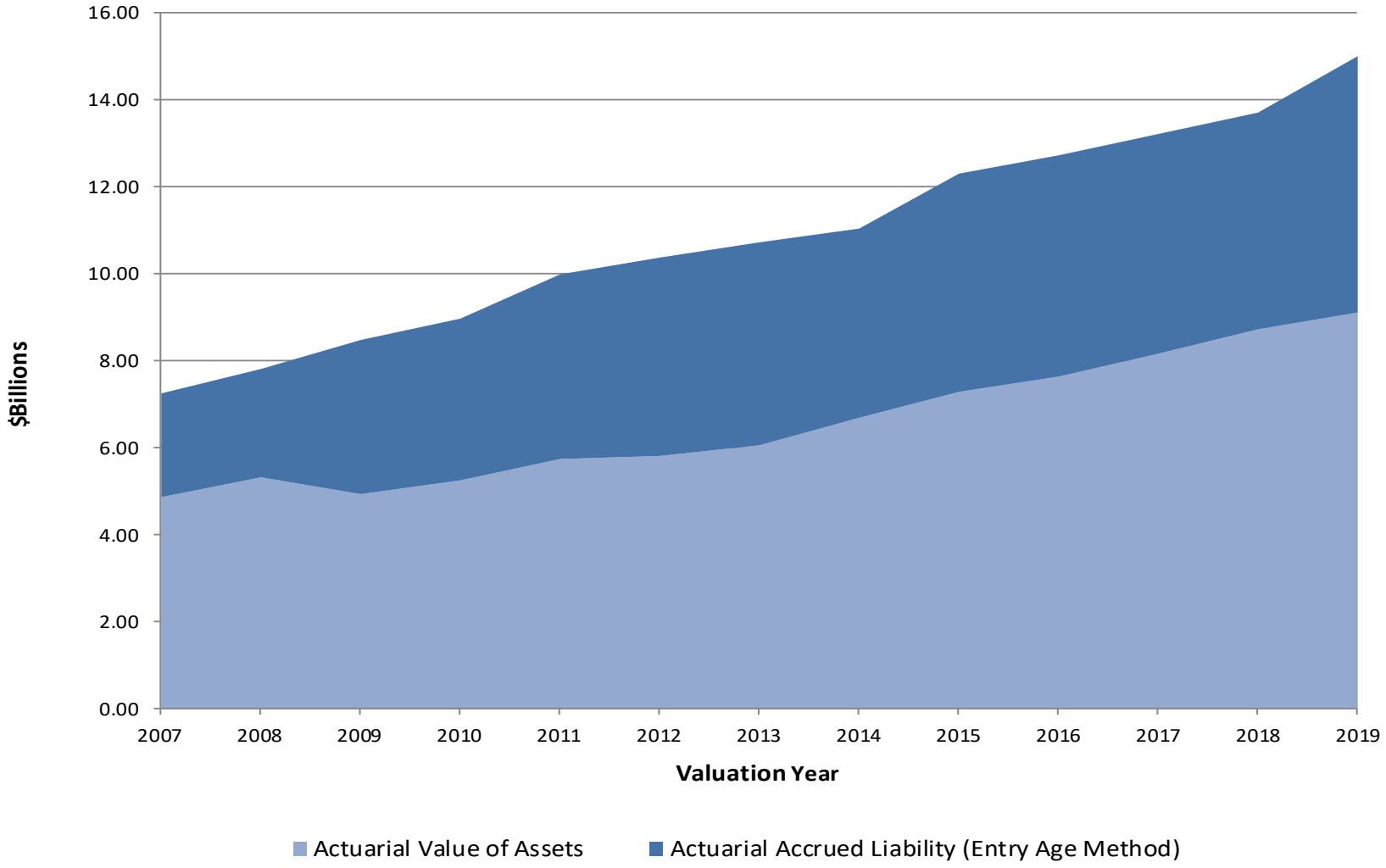
Medical Subsidy



Comparison of Pension Liabilities by Type



Historical Pension Funded Status



Results of the Valuation

Actuarial Valuation

This is the actuarial valuation of the New Hampshire Retirement System, prepared as of June 30, 2019.

The primary purposes of this valuation report are to measure the plan's liabilities, to analyze changes in NHRS' actuarial position and to determine employer contribution rates.

Valuations for certifying contribution rates are prepared biennially, as of June 30 on the odd numbered years (2019, 2021, etc.). The June 30, 2019 actuarial valuation will establish the Fiscal Year 2022 and Fiscal Year 2023 employer contribution rates.

In addition, this report provides summaries of the member data, financial data, and actuarial assumptions and methods. Detailed information regarding member data and plan provisions can be found in the "CAFR Schedules and GASB Statement Nos. 67 and 74 Plan Reporting and Accounting Schedules" report dated October 31, 2019. Calculations required for compliance with the Governmental Accounting Standards Board (GASB) Statement Nos. 68 and 75 have been issued in a separate report dated December 19, 2019.

Financing Objectives

NHRS is supported by member contributions, employer contributions, and net earnings on the investments of the fund. The member contribution rate is set by statute at 7.00% of member compensation for Group I Members (Employees and Teachers), 11.55% of member compensation for Police Members and 11.80% of member compensation for Fire Members. The employer contributions are determined in accordance with statute by an actuarial valuation. Legislation was enacted in 2007 which requires the use of the entry-age actuarial cost method and a closed 30-year amortization of unfunded actuarial accrued liability in the determination of the employer contributions. The legislature subsequently adopted the use of a layered amortization approach. The outstanding UAAL balance as of June 30, 2017 is referred to hereafter as the "Initial UAAL". The first layer will be the amortization of the Initial UAAL scheduled to be paid by 2039. New layers will be established as they occur in future biennial valuations and will be amortized over separate 20-year periods.

The Initial UAAL was projected forward and amortized over a closed period of 20 years beginning June 30, 2019 while new layers for changes in liability as of June 30, 2019 were projected forward and amortized over a closed period of 20 years beginning June 30, 2021. This method of layered amortization resulted in a lower calculated contribution for FY 2022 and 2023. If the previous method of amortizing the UAAL over the closed 20-year period as of June 30, 2019 had been used for this valuation, the resulting total rate for pension would have been 15.51% (versus 15.33% using layered amortization).

The closed amortization period means that the unfunded actuarial accrued liability is expected to be fully paid off by June 30, 2041 if all assumptions are met. The contribution rates set by this valuation are scheduled to come into effect beginning July 1, 2021. The total UAAL is expected to decrease each year beginning July 1, 2021, if all actuarial assumptions are met (see page 28).

Detailed amortization schedules for each member classification can be found on pages 40 through 52.

Employer Contribution Rates for the 2022/2023 Biennium

There are four pension member classifications: Employees, Teachers, Police and Fire. There are four separate 401(h) member classifications: State Employees, Political Subdivision Employees, Teachers and Police/Fire. The table below shows the pension and medical subsidy employer contribution rates for the FY 2022/2023 Biennium for each member classification.

	Computed Employer Contribution Rates as a Percent of Payroll*			
	State Members			
	Employees	Teachers	Police	Fire
Pension	13.75%	N/A	30.67%	29.78%
Medical Subsidy	0.78%	N/A	3.21%	3.21%
Total	14.53%	N/A	33.88%	32.99%

	Computed Employer Contribution Rates as a Percent of Payroll*			
	Political Subdivision Members			
	Employees	Teachers	Police	Fire
Pension	13.75%	19.48%	30.67%	29.78%
Medical Subsidy	0.31%	1.54%	3.21%	3.21%
Total	14.06%	21.02%	33.88%	32.99%

** The grand total contribution rates for NHRS (State and Political Subdivisions combined) are 18.67% of payroll for pension and 1.36% for the medical subsidy for a grand total of 20.03% of payroll.*

Medical Subsidy

The accounts for Teachers and State Employees have reached pay-as-you-go status.

The Political Subdivision Employees' account is projected to reach pay-as-you-go status in the fiscal year ending June 30, 2031. This is one year later than the projection in the prior rate-setting valuation.

The Police/Fire account is projected to reach pay-as-you-go status in the fiscal year ending June 30, 2029. This is two years later than the projection in the prior rate-setting valuation.

The medical subsidy contribution rates for State Employees and Teachers shown above are the computed amounts needed for pay-as-you-go financing of the retiree medical subsidy with a 20% margin (50% for Teachers) for adverse experience by June 30, 2023 and to maintain that margin thereafter. It is imperative that NHRS monitor collections closely to ensure the necessary funds are collected to provide the benefit.

History of Certified Contribution Rates

Pension

Fiscal Year Ending	Employer Contribution Rates				
	Employees	Teachers	Police	Fire	Total
2010	9.09%	9.38%	17.34%	22.52%	10.70%
2011	9.09%	9.38%	17.34%	22.52%	10.70%
July 1, 2011 -July 30, 2011	10.71%	11.51%	22.92%	28.25%	13.11%
Aug 1, 2011 - June 30, 2012	8.48%	8.99%	15.98%	18.92%	9.97%
2013	8.48%	8.99%	15.98%	18.92%	9.97%
2014-2015#	10.44%	11.96%	21.35%	23.79%	12.79%
2016-2017	10.86%	12.72%	22.54%	25.32%	13.55%
2018-2019	11.08%	15.70%	25.33%	27.79%	15.27%
2020-2021	10.88%	15.99%	24.77%	26.43%	15.17%
2022-2023	13.75%	19.48%	30.67%	29.78%	18.67%

Fiscal Year Ending	Employer Dollars ($Millions)*				
	Employees	Teachers	Police	Fire	Total
2010	$101.2	$ 97.1	$46.4	$25.0	$269.7
2011	$103.5	$ 98.0	$46.9	$26.2	$274.6
2012	$ 94.4	$ 93.5	$44.5	$22.2	$254.6
2013	$ 91.7	$ 92.9	$43.2	$22.0	$249.8
2014	$115.5	$126.1	$58.9	$27.9	$328.4
2015	$118.3	$124.2	$61.1	$28.7	$332.3
2016	$124.6	$136.4	$65.6	$30.9	$357.5
2017	$129.1	$138.6	$66.9	$32.0	$366.6
2018	$134.7	$174.6	$77.6	$35.8	$422.7
2019	$138.5	$178.3	$80.6	$37.0	$434.4
2020	*$139.2*	*$185.7*	*$79.7*	*$35.7*	*$440.3*
2021	*$143.0*	*$189.8*	*$81.9*	*$36.7*	*$451.4*
2022	*$185.7*	*$236.5*	*$104.1*	*$42.5*	*$568.8*
2023	*$190.8*	*$241.8*	*$107.0*	*$43.6*	*$583.2*

** Dollar amounts for 2020 and beyond are estimated. The total rate as a percent of payroll will vary over the projection period as different payroll growth assumptions apply.*

 # Rates shown are for Political Subdivision. Rates for State are 10.51%, 21.45% and 23.90% for Employees, Police and Fire, respectively.

History of Certified Contribution Rates (Continued)

Medical Subsidy

	Employer Contribution Rates				
Fiscal Year Ending	State Employees	Employees Political Sub	Teachers	Police & Fire	Total
2010	3.03%	0.00%	1.32%	2.17%	1.47%
2011	3.03%	0.00%	1.32%	2.17%	1.47%
July 1, 2011 -July 30, 2011	1.60%	0.38%	2.44%	2.65%	1.82%
Aug 1, 2011 - June 30, 2012	1.60%	0.32%	2.31%	3.97%	1.95%
2013	1.60%	0.32%	2.31%	3.97%	1.95%
2014-15	1.62%	0.33%	2.20%	3.95%	1.90%
2016-17	1.64%	0.31%	2.95%	3.84%	2.21%
2018-19	1.07%	0.30%	1.66%	4.10%	1.60%
2020-21	1.05%	0.29%	1.81%	3.66%	1.58%
2022-23	0.78%	0.31%	1.54%	3.21%	1.36%

	Employer Dollars ($Millions)*				
Fiscal Year Ending	State Employees	Employees Political Sub	Teachers	Police & Fire	Total
2010	$10.4	$0.4	$13.6	$8.1	$32.6
2011	$10.3	$0.4	$13.8	$8.4	$32.9
2012	$8.3	$1.9	$24.0	$14.7	$48.9
2013	$8.8	$1.9	$23.8	$15.3	$49.8
2014	$8.2	$2.0	$23.3	$15.4	$48.9
2015	$8.6	$1.8	$22.6	$16.0	$49.0
2016	$8.6	$1.9	$31.8	$15.9	$58.2
2017	$8.9	$2.0	$32.0	$16.2	$59.1
2018	$6.0	$2.0	$18.4	$17.8	$44.2
2019	$6.2	$2.0	$18.8	$18.5	$45.5
2020	*$6.1*	*$2.0*	*$21.0*	*$16.7*	*$45.8*
2021	*$6.3*	*$2.1*	*$21.5*	*$17.2*	*$47.1*
2022	*$4.8*	*$2.3*	*$18.7*	*$15.5*	*$41.3*
2023	*$4.9*	*$2.3*	*$19.1*	*$15.9*	*$42.2*

** Dollar amounts for 2020 and beyond are estimated. The total rate as a percent of payroll will vary over the projection period as different payroll growth assumptions apply.*

History of Certified Contribution Rates (Concluded)

Member Contributions

	Member Contribution Rates				
Fiscal Year Ending	Employees	Teachers	Police	Fire	Total
2010	5.00%	5.00%	9.30%	9.30%	5.64%
2011	5.00%	5.00%	9.30%	9.30%	5.64%
2012	7.00%	7.00%	11.55%	11.80%	7.69%
2013	7.00%	7.00%	11.55%	11.80%	7.69%
2014-15	7.00%	7.00%	11.55%	11.80%	7.69%
2016-17	7.00%	7.00%	11.55%	11.80%	7.71%
2018-19	7.00%	7.00%	11.55%	11.80%	7.71%
2020-21	7.00%	7.00%	11.55%	11.80%	7.72%
2022-23	7.00%	7.00%	11.55%	11.80%	7.73%

	Member Dollars ($Millions)*				
Fiscal Year Ending	Employees	Teachers	Police	Fire	Total
2010	$59.6	$54.2	$25.4	$10.2	$149.5
2011	$59.3	$56.2	$26.2	$10.7	$152.4
2012	$80.5	$75.0	$30.7	$13.4	$199.6
2013	$77.8	$74.1	$31.0	$13.7	$196.5
2014	$78.9	$74.7	$31.8	$13.7	$199.0
2015	$81.7	$74.8	$33.4	$14.2	$204.1
2016	$82.7	$76.7	$34.0	$14.6	$208.0
2017	$85.4	$78.0	$34.7	$15.0	$213.1
2018	$87.1	$79.3	$35.9	$15.2	$217.5
2019	$89.8	$81.1	$37.2	$15.9	$224.0
2020	*$89.5*	*$81.3*	*$37.1*	*$15.9*	*$223.8*
2021	*$92.0*	*$83.1*	*$38.2*	*$16.4*	*$229.7*
2022	*$94.5*	*$85.0*	*$39.2*	*$16.8*	*$235.5*
2023	*$97.1*	*$86.9*	*$40.3*	*$17.3*	*$241.6*

** Dollar amounts for 2020 and beyond are estimated. The total rate as a percent of payroll will vary over the projection period as different payroll growth assumptions apply.*

Funded Status

As of the valuation date, the Unfunded Actuarial Accrued Liability (UAAL) is $5,892.2 million (pension only), and the funded ratio (the ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability) is 60.8% (pension only). This valuation was prepared using the Entry-Age Actuarial Cost Method. For comparison, the funded ratio as of June 30, 2018 was 63.6% (pension only).

The funded status measure is not appropriate for assessing the sufficiency of assets to cover the estimated cost of settling the Plan's benefit obligation. The funded status is appropriate for assessing the need for additional UAAL contributions. The funded status on the basis of the market value of assets would be 61.1%.

Variability of Future Contribution Rates

The Actuarial Cost Method used to determine the contribution rate is intended to produce contribution rates which are generally level as a percent of payroll. Even so, when experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year-to-year.

The level percent of payroll amortization of the UAAL assumes that the plan will remain open to new hires, that the size of the covered active population will remain constant, and that the covered payroll will grow at 2.75% per year (2.25% for Teachers). To the extent that this does not occur, there may be variability in future contribution rates.

Headcount growth for Teachers was analyzed as part of the review process in the experience study. The continued assumption of (0.50)% per year was recommended. The average decrease in the headcount over a 10-year period is 0.54% while the average decrease over a 3-year period is 0.10%.

Actuarial Value of Assets

The Market Value of Assets of the System totaling approximately $9.208 billion is greater than the Actuarial Value of Assets of $9.159 billion by about $49 million as of the valuation date (see page 61). This difference will be gradually recognized over the next four years.

The dollar-weighted rate of return for the year ending June 30, 2019 was 5.6% on the market value of assets. (Note: This dollar-weighted measure may differ from investment manager calculations and should not be used as a measure of investment performance.) The recognized dollar-weighted rate of return on the actuarial value of assets was 6.6% for the year ending June 30, 2019.

Please see Section C for additional asset information.

Actuarial Assumptions

Normal cost rates from the first year of the rate setting biennium are projected forward to better reflect the impact of the changing benefit tiers and generational mortality. This method for determining the normal cost was first used for the June 30, 2015 valuation.

The assumptions were revised in accordance with the July 1, 2015 through June 30, 2019 experience study. In addition to changes in demographic assumptions, interest rate and wage inflation assumptions were changed from 7.25%/3.25% to 6.75%/2.75%, respectively. Section E summarizes the current assumptions. The changes in actuarial assumptions increased the total employer contribution rate by 3.90% of payroll (pension and medical subsidy combined).

A summary of the changes to the major assumptions follows:

Mortality rates
The Society of Actuaries (SOA) published new tables for U.S. public pension plans called the Pub-2010 tables in February 2019. The SOA also published the MP-2019 projection scales to reflect mortality improvements after 2019. These tables were used for the corresponding employee groups with partial credibility adjustments to healthy retiree mortality rates. Changing this assumption resulted in a moderate increase in employer contribution rates for Employees and Teachers. The change in healthy post-retirement mortality tables for the Police and Fire groups resulted in a marginal decrease to contribution rates, which was outweighed by the moderate increase in rates resulting from changes to disabled post-retirement mortality tables.

Rates of Withdrawal
Overall rates of termination were decreased and male and female rates were combined for all groups. This change caused a marginal increase in employer contribution rates.

Rates of Disability
There was a decrease in the overall rates of disability for all four member classifications, which resulted in a marginal decrease in employer contribution rates.

Rates of Retirement
Male and female experience was updated separately for Group I and jointly for Group II. In general, rates of retirement were lowered from previous assumptions. This change caused a marginal decrease in employer contribution rates.

Merit and Longevity Salary Increases
Rates of merit and longevity pay increases were updated for all member classifications resulting in a moderate increase in employer contribution rates.

Medical Subsidy Margin for Adverse Experience
The margin for adverse experience was increased for the Teachers group from 20% to 50%, which increased the employer contribution by 0.19% of pay. The margin for all other groups remains at 20%.

Medical Subsidy Opt-In Assumption (for members who have currently opted-out)
There were no changes to the assumption that 25% of those members eligible for medical subsidy benefits who have opted-out will elect to opt-back in in the future.

Additional information regarding the assumption changes may be found in the experience study report.

A complete description of the assumptions used in the valuation is in Section E.

Actuarial Funding Methods

The method for determining the UAAL contribution was updated to include layers of increases or decreases in liability to be amortized over a closed period of no more than 20 years. The UAAL as of June 30, 2017 was projected forward and amortized over a closed period of 20 years beginning June 30, 2019 while new layers for changes in liability as of June 30, 2019 were projected forward and amortized over a closed period of 20 years beginning June 30, 2021. This method of layered amortization resulted in a lower calculated contribution for FY 2022 and 2023. If the previous method of amortizing the UAAL over the closed 20-year period as of June 30, 2019 had been used for this valuation, the resulting total rate for pension would have been 15.51% (versus 15.33% using layered amortization).

Solvency rates for medical subsidy benefits are set such that a specified margin is established by the end of the biennium and for all future years thereafter. The margin is intended to mitigate the risk of insolvency due to adverse experience. The margin requirement used to determine the health subsidy solvency rate for the Teachers group was increased from 20% to 50% which increased the Teacher contribution rate by 0.19% of active payroll. No change to the margin requirement of 20% was made for the other groups.

We believe that the actuarial assumptions contained in this report are reasonable under the Actuarial Standards of Practice and in compliance with the NHRS Statutes.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates, and amortization periods.

Benefit Changes

House Bill No. 616 grants a one-time 1.5% COLA on the first $50,000 of an annual pension benefit to members who retired on or before July 1, 2014, or any beneficiaries of such member, who is receiving a survivorship pension benefit. The COLA will take effect on the retired member's first anniversary date of retirement occurring after July 1, 2020.

The impact of this change was an increase in actuarial accrued liabilities of approximately $65 million, a decrease in the funded status of 0.2%, and an increase in the employer contribution rate of 0.14% of pay for state and 0.19% of pay for political subdivisions (rates varying by member classifications). Please see pages 18 and 31 for further details.

Summary of Changes from June 30, 2018 to June 30, 2019 ($ in Millions)

	Pension				
	Employees	Teachers	Police	Fire	Total
Reconciliation of UAAL					
Expected	**$1,562.9**	**$2,185.6**	**$851.0**	**$368.0**	**$4,967.5**
Impact of (Gain)Loss	42.8	22.6	26.4	(4.6)	87.2
Impact of Plan Change	18.8	26.9	13.1	5.9	64.7
Impact of Method Change	(76.1)	(56.7)	(22.0)	(11.2)	(166.0)
Impact of Assumption Change	376.6	333.0	169.9	59.3	938.8
Total	**$1,925.0**	**$2,511.4**	**$1,038.4**	**$417.4**	**$5,892.2**
Funded %					
Prior Valuation	**65.0 %**	**59.2 %**	**67.2 %**	**69.7 %**	**63.6 %**
Expected Change	1.2 %	1.1 %	1.2 %	1.1 %	1.1 %
Impact of Gain(Loss)	(0.6)%	(0.2)%	(0.7)%	0.3 %	(0.4)%
Impact of Plan Change	(0.2)%	(0.3)%	(0.3)%	(0.4)%	(0.2)%
Impact of Method Change	1.0 %	0.6 %	0.5 %	0.7 %	0.7 %
Impact of Assumption Change	(5.0)%	(3.4)%	(4.0)%	(3.3)%	(4.0)%
Total	**61.4 %**	**57.0 %**	**63.9 %**	**68.1 %**	**60.8 %**
Reconciliation of Employer Contribution Rate *					
State Employees					
Prior Rate-Setting Valuation	**10.88 %**		**24.77 %**	**26.43 %**	**12.69 %**
Impact of (Gain)Loss	(0.01)%		(0.75)%	(1.49)%	(0.12)%
Impact of Plan Change	0.11 %		0.32 %	0.34 %	0.14 %
Impact of Method Change	(0.46)%		(0.53)%	(0.65)%	(0.37)%
Impact of Assumption Change	3.23 %		6.86 %	5.15 %	3.71 %
Total	**13.75 %**		**30.67 %**	**29.78 %**	**16.05 %**
Political Subdivision Employees					
Prior Rate Setting Valuation	**10.88 %**	**15.99 %**	**24.77 %**	**26.43 %**	**15.92 %**
Impact of (Gain)Loss	(0.01)%	0.03 %	(0.75)%	(1.49)%	(0.15)%
Impact of Plan Change	0.11 %	0.19 %	0.32 %	0.34 %	0.19 %
Impact of Method Change	(0.46)%	(0.40)%	(0.53)%	(0.65)%	(0.43)%
Impact of Assumption Change	3.23 %	3.67 %	6.86 %	5.15 %	3.95 %
Total	**13.75 %**	**19.48 %**	**30.67 %**	**29.78 %**	**19.48 %**

	Medical Subsidy				
	State Employees	Political Subdivision Employees	Teachers	Police & Fire	Total
Reconciliation of UAAL					
Expected	**$56.8**	**$35.9**	**$224.3**	**$312.8**	**$629.8**
Impact of (Gain)Loss	(1.1)	(0.8)	1.3	(8.3)	(8.9)
Impact of Assumption Change	5.6	4.7	11.9	15.7	37.9
Total	**$61.3**	**$39.8**	**$237.5**	**$320.2**	**$658.8**
Reconciliation of Employer Contribution Rate *					
Prior Rate Setting Valuation	**1.05 %**	**0.29 %**	**1.81 %**	**3.66 %**	**1.58 %**
Impact of (Gain)Loss	(0.32)%	(0.01)%	(0.52)%	(0.47)%	(0.30)%
Impact of Method Change	0.00 %	0.00 %	0.19 %	0.00 %	0.08 %
Impact of Assumption Change	0.05 %	0.03 %	0.06 %	0.02 %	0.00 %
Total	**0.78 %**	**0.31 %**	**1.54 %**	**3.21 %**	**1.36 %**

** Reconciliation of employer rates is from the prior rate-setting actuarial valuation as of June 30, 2017.*

The pension funded percent of 60.8% is the ratio of the actuarial value of assets to the actuarial accrued liability for NHRS in total. That ratio is 61.1% based on market value of assets.

The funded percent is appropriate for assessing the need for future contributions, but does not give an indication for the amount of such contributions. The funded percent is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Plan's benefit obligations.

Comments

Comment 1

In total, plan experience between June 30, 2018 and June 30, 2019 was unfavorable for pension and favorable for the medical subsidy on the basis of statutory funding. The dollar-weighted rate of return for the year ending June 30, 2019 was 5.6% on the market value of assets. (Note: This dollar weighted measure may differ from investment manager calculations and should not be used as a measure of investment performance .) On the basis of statutory funding, the rate of return was 6.6% on the actuarial value of assets, resulting in a recognized asset loss of $60 million (pension and medical subsidy combined). The return on the actuarial value of assets exceeds the return on the market value of assets because some of this year's market loss is deferred and prior years' high returns are still being recognized this year.

Overall, the System had a loss of $78 million comprised of an asset loss of $60 million and a liability loss of $18 million. Additional information on gains and losses is on page 18 and 31.

Total covered payroll increased by 2.6% versus the assumed increase of 3.25% (2.75% for teachers) through June 30, 2019. Between the 2018 and 2019 valuation, the pension funded ratio increased by 1.2 percentage points (63.6% to 64.8%) before changes in actuarial assumptions. Note that the funded ratio is expected to increase each year with the receipt of contributions to fund the UAAL. The losses reflected in this valuation mean that the funded ratio did not increase as much as expected from plan funding. The funded ratio was 60.8% after reflecting the newly adopted actuarial assumptions.

The expectation if all assumptions are met is that future pension contribution rates will decline as new hires with lower normal cost replace those hired before July 1, 2011 with higher normal cost. The contribution for the unfunded actuarial accrued liability is designed to be a level percent of payroll with closed layered amortization periods ranging from 20-18 years in the 2022 Fiscal Year. Medical Subsidy contribution rates are expected to decline as the covered population diminishes. There are currently unrecognized asset gains which will put additional downward pressure on the rates to the extent that future market experience meets expectations. For additional information, see the projections beginning on page 22.

Comment 2

The System underwent an experience study for the 4-year period ending June 30, 2019. At the June 9, 2020 Board meeting, the Board adopted the use of a 6.75% investment return assumption, a 2.75% wage inflation assumption, an increase in the Teacher's Medical Subsidy margin to 50% and the demographic package of assumptions proposed in the experience study. The impact of the assumption and method changes can be found on pages 18 and 31. A brief summary of the assumption and method changes can be found on pages 16 and 17.

Comment 3

The normal cost rate as of June 30, 2019 for members hired on or after July 1, 2011 is shown in the table below:

Normal Cost	Employees	Teachers	Police	Fire	Total
Total	9.70 %	9.60 %	16.44 %	16.25 %	10.72 %
Member	7.00 %	7.00 %	11.55 %	11.80 %	7.73 %
Employer	2.70 %	2.60 %	4.89 %	4.45 %	2.99 %

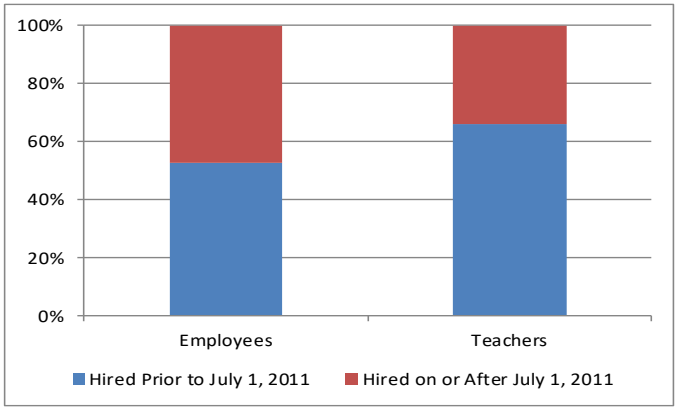
The total normal cost for the active populations of the four member classifications is expected to decrease each year towards the rates for new hires. Normal cost is expected to increase each year with generational mortality. Note that the group of those hired on and after July 1, 2011 is 42% of the total active population. There may be fluctuations in the normal cost rate for these members over the next few years which should level out over time as the group grows.

The tables and charts below show the proportion of the active member population by benefit structure for the four member classifications.

Proportion of Active Population by Benefit Structure as of June 30, 2019

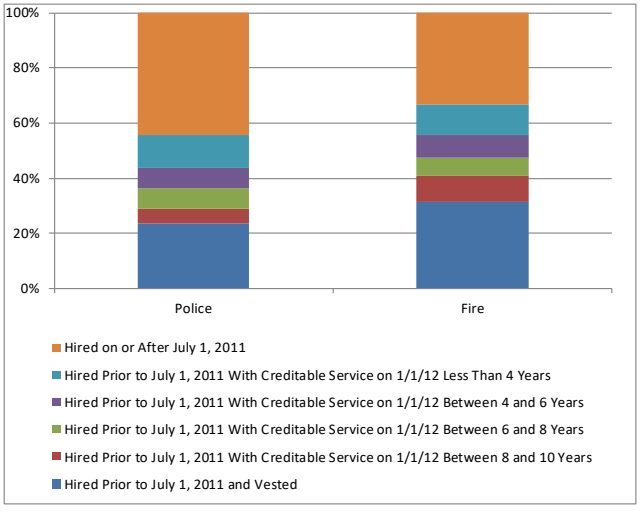
Group I

	Employees	Teachers
Hired Prior to July 1, 2011	13,022	11,750
Hired on or After July 1, 2011	11,632	5,980
Total	24,654	17,730



Group II

	Police	Fire
Hired Prior to July 1, 2011 and Vested	989	527
Hired Prior to July 1, 2011 With Creditable Service on 1/1/12 Between 8 and 10 Years	234	162
Hired Prior to July 1, 2011 With Creditable Service on 1/1/12 Between 6 and 8 Years	300	111
Hired Prior to July 1, 2011 With Creditable Service on 1/1/12 Between 4 and 6 Years	325	140
Hired Prior to July 1, 2011 With Creditable Service on 1/1/12 Less Than 4 Years	489	186
Hired on or After July 1, 2011	1,879	562
Total	4,216	1,688



Comment 4

Prior to June 30, 2007, the statutory funding method did not report a funded status nor did it report that assets were below the retiree liability. As of June 30, 2019, there were 73% of assets needed to cover retiree pension liabilities, as shown in the table on page 36. The assets in the plan are not sufficient to cover current retiree liabilities and the ratio of retiree benefit payroll to the market value of assets is 0.09; this means that approximately 12 years of current retiree benefit payments can be paid from current assets if all assumptions are met and ignoring future contributions. The ability to make such payments beyond that period is heavily dependent upon future contributions and future investment return.

Comment 5

June 30, 2019 Medical Subsidy Contribution Rates

Medical Subsidy benefits continue to warrant close monitoring. As required by the statutes, the objective is to contribute the minimum amount necessary to maintain assets sufficient to pay medical subsidy benefits in each of the four subaccounts. Given the absence of assets from prior pre-funding (as exists for pension benefits), medical subsidy benefits payable in the future will be largely funded by future employer contributions. However, employer contributions toward medical subsidy benefits are subject to certain limitations as defined in IRC Section 401(h).

In addition, year-to-year deviations between actual contributions and benefits and projected contributions and benefits are more problematic with regard to medical subsidy funding than pension funding due to the lack of significant assets for medical subsidy benefits and the lag between the setting of the rates and the collection of contributions.

For purposes of determining the contribution rates for the 2022-2023 biennium as shown on page 1, we have assumed that benefits for all members receiving a benefit on the valuation date and those Group I eligible members not yet age 60 get paid. In addition, there is a significant number of eligible members who are not receiving benefits, particularly for Group I. 25% of those who opted-out of receiving benefits are assumed to opt-back in on the valuation date. We have assumed that each subaccount maintains at least a 20% margin (50% for Teachers) for every future year, starting at the end of the 2022-2023 biennium. The margin for Teachers was increased from 20% to 50% as a result of the most recent experience study which caused an increase in the employer contribution rate of 0.19% of pay.

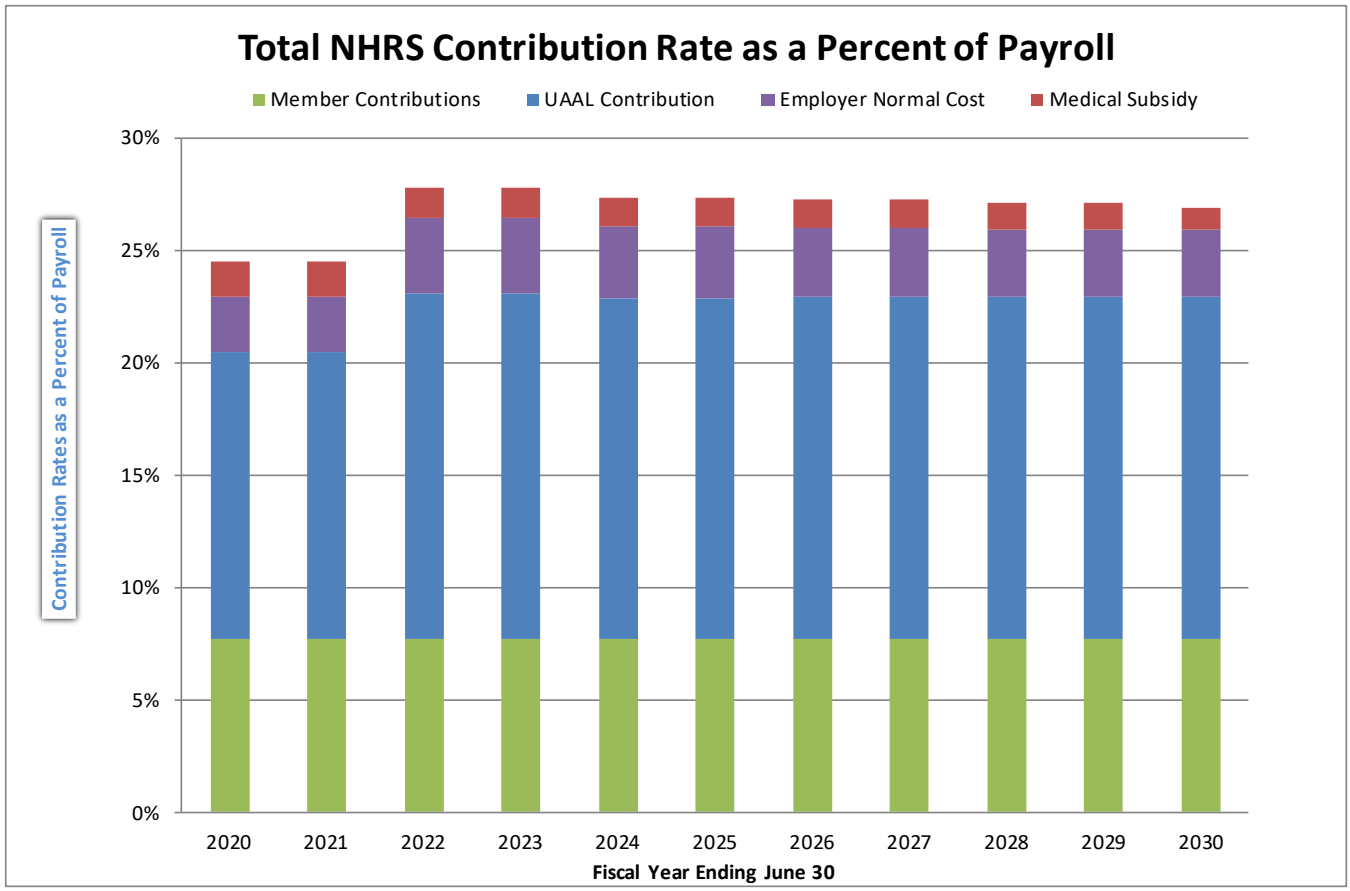
Comment 6

Recognition of Experience Gains and Losses in Layered Amortization of UAAL

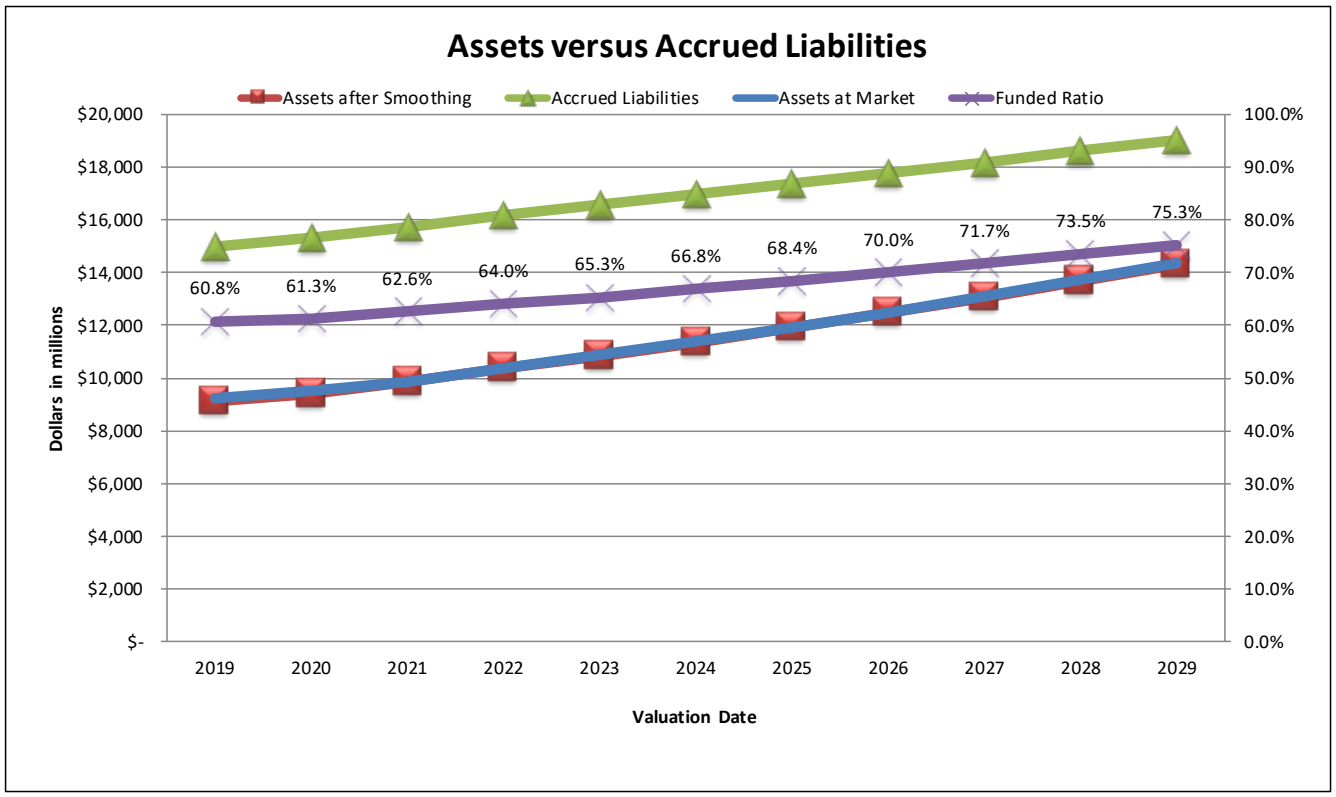
Initial UAAL projected to June 30, 2021 was determined in the June 30, 2017 actuarial funding valuation. This projected amount is used to calculate the change in UAAL resulting from System experience for the purposes of determining layered UAAL contributions (pages 40, 42, 45, 48 and 51), and deviates slightly from year-to-year calculations of expected UAAL used to measure gains and losses. Gains and losses established for the basis of this calculation will, in total, differ from the sum of the 2018 and 2019 aggregate gains and losses shown on page 31.

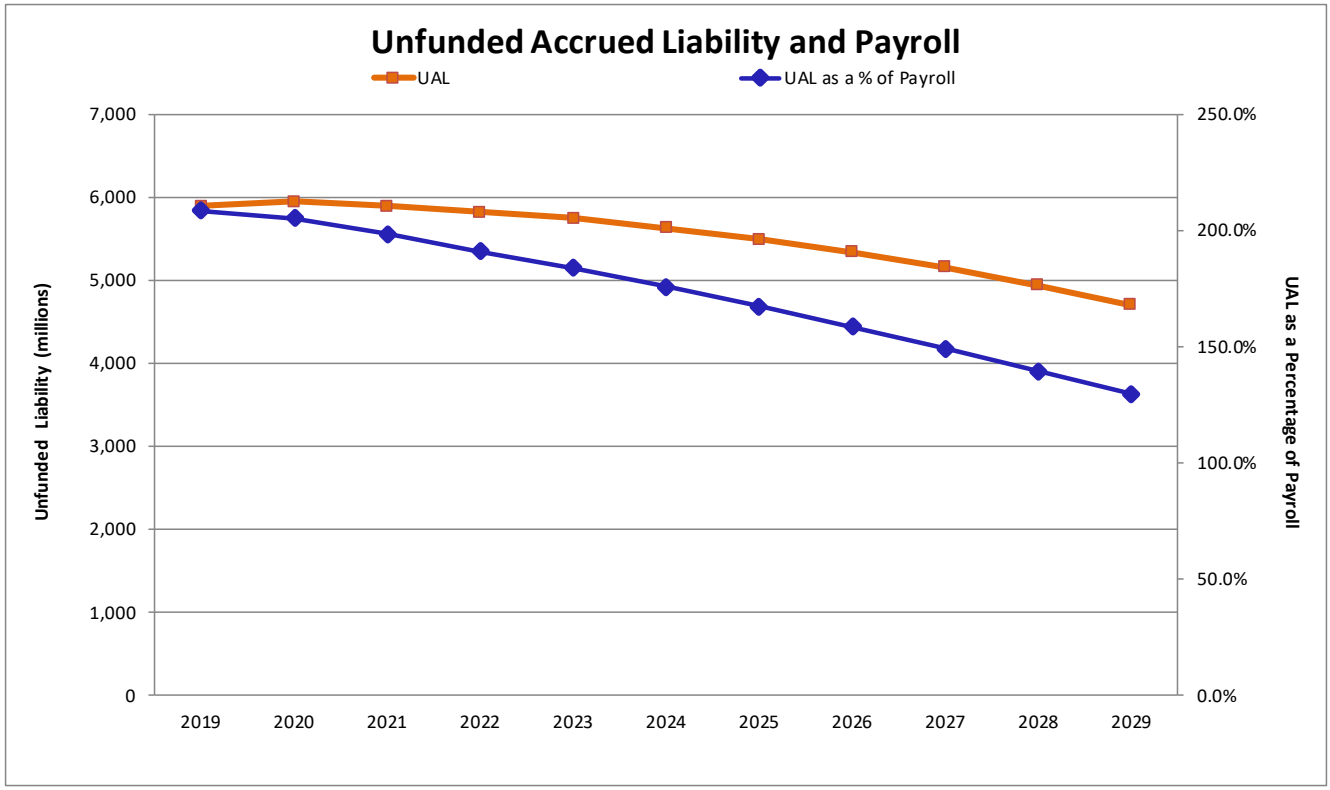
Projections

Projection results are useful in demonstrating changing relationships among key elements affecting system financial activity. For example, it demonstrates how benefits and system assets will grow in future decades. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. For instance, cash flow projected to occur 10 years in the future will not be exact (except by coincidence), but understanding the changing relationships between future benefit payout and future investment return can be very useful. It is important to understand that actual experience will differ from the projections.



Projected Contribution Rates - NHRS Total											
Fiscal Year Ending June 30	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Medical Subsidy	1.58%	1.58%	1.36%	1.36%	1.30%	1.30%	1.21%	1.21%	1.13%	1.13%	1.02%
Employer Normal Cost	2.44%	2.44%	3.34%	3.34%	3.20%	3.20%	3.09%	3.09%	3.02%	3.02%	2.96%
UAAL Contribution	12.73%	12.73%	15.33%	15.33%	15.12%	15.12%	15.19%	15.19%	15.19%	15.19%	15.19%
Employer Subtotal	**16.75%**	**16.75%**	**20.03%**	**20.03%**	**19.62%**	**19.62%**	**19.50%**	**19.50%**	**19.34%**	**19.34%**	**19.18%**
Member Contributions	7.72%	7.72%	7.73%	7.73%	7.73%	7.73%	7.73%	7.73%	7.73%	7.73%	7.73%
Grand Total	**24.47%**	**24.47%**	**27.76%**	**27.76%**	**27.35%**	**27.35%**	**27.23%**	**27.23%**	**27.07%**	**27.07%**	**26.91%**


Assets versus Accrued Liabilities
Assets after Smoothing
Accrued Liabilities
Assets at Market
Funded Ratio
$20,000
$18,000
$16,000
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$-
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
60.8%
61.3%
62.6%
64.0%
65.3%
66.8%
68.4%
70.0%
71.7%
73.5%
75.3%
Dollars in millions
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
Valuation Date


Unfunded Accrued Liability and Payroll
UAL
UAL as a % of Payroll
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
Unfunded Liability (millions)
UAL as a Percentage of Payroll
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029

The actuarial projections of retirement and medical subsidy benefits are based on the regular valuation assumptions of NHRS including an open active group with constant population (Teachers' active population is assumed to decline 0.50% per year). The projections lead to some general observations:

1. Employer contribution rates are projected to be stable and gradually decline throughout the projection period. The expected gradual decline is due to the lower normal cost for post-July 1, 2011 hires, declining medical subsidy contributions as a percent of payroll, and decreases from the asset smoothing method caused by past gains being phased into the actuarial value of assets. Normal cost is expected to increase each year with generational mortality. Note that for the current valuation, the determination of the UAAL amortization assumes no future asset gains or losses.

2. The funded ratio is projected to increase steadily to 76% by the end of the projection period. The statutory amortization period is projected to fully fund the initial UAAL by June 30, 2039, in the absence of future gains and losses. The June 30, 2019 gains and losses, assumptions and method change are projected to be fully amortized over 20 years from July 1, 2021 to June 30, 2041.

3. The projection of the funded ratio above reflects certain factors that are not reflected in the funded ratio projections provided in Section B. For example, the projection above reflects the phase-in of unrecognized investment gains and losses as of June 30, 2019.

4. The projection is highly sensitive to the actual and expected profile of new hires. This is the eighth valuation with members hired on and after July 1, 2011. As the group of those hired on or after July 1, 2011 grows, the projection results may fluctuate year-to-year until the population stabilizes.

SECTION B

FUNDING RESULTS

Development of Employer Contribution Rates
State Employees

Division:	Employees	Teachers	Police	Fire	Total
Normal Cost					
Age and Service Retirement	5.34%		11.79%	15.06%	6.24%
Termination	3.32%		4.20%	1.84%	3.42%
Death-in-Service	0.16%		0.27%	0.31%	0.18%
Disability	0.41%		1.66%	1.31%	0.58%
Expenses	0.35%		0.35%	0.35%	0.35%
Total	9.58%		18.27%	18.87%	10.77%
UAAL Payment*	11.17%		23.95%	22.71%	12.90%
Total Pension Contribution	20.75%		42.22%	41.58%	23.67%
Fiscal Year 2022					
Member Contributions	7.00%		11.55%	11.80%	7.62%
Employer Pension Contribution	13.75%		30.67%	29.78%	16.05%
Employer Medical Subsidy Contribution	0.78%		3.21%	3.21%	1.11%
Total Employer Contribution	**14.53%**	N/A	**33.88%**	**32.99%**	**17.16%**
Projected Payroll for Fiscal Year	$ 615,392,549		$ 92,412,406	$ 4,656,264	$ 712,461,219
Estimated Employer Dollar Contribution	$ 89,416,537	N/A	$ 31,309,323	$ 1,536,101	$ 122,261,961
Fiscal Year 2023					
Member Contributions	7.00%		11.55%	11.80%	7.62%
Employer Pension Contribution	13.75%		30.67%	29.78%	16.05%
Employer Medical Subsidy Contribution	0.78%		3.21%	3.21%	1.11%
Total Employer Contribution	**14.53%**	N/A	**33.88%**	**32.99%**	**17.16%**
Projected Payroll for Fiscal Year	$ 632,315,844		$ 94,953,747	$ 4,784,311	$ 732,053,902
Estimated Employer Dollar Contribution	$ 91,875,492	N/A	$ 32,170,329	$ 1,578,344	$ 125,624,165
Contribution Rates from Prior Valuation					
FY 2020#	**11.93%**		**28.43%**	**30.09%**	**14.08%**
FY 2021#	**11.93%**		**28.43%**	**30.09%**	**14.08%**

* *Unfunded Actuarial Accrued Liability - Please refer to pages 39-50 for more detail regarding the development of UAAL amortization payments, and page 17 for description of the UAAL amortization policy.*

\# *Computed in June 30, 2017 Actuarial Valuation.*

Development of Employer Contribution Rates
Political Subdivision Members

Division:	Employees	Teachers	Police	Fire	Total
Normal Cost					
Age and Service Retirement	5.34%	6.30%	11.79%	15.06%	7.09%
Termination	3.32%	2.96%	4.20%	1.84%	3.14%
Death-in-Service	0.16%	0.10%	0.27%	0.31%	0.15%
Disability	0.41%	0.11%	1.66%	1.31%	0.44%
Expenses	0.35%	0.35%	0.35%	0.35%	0.35%
Total	9.58%	9.82%	18.27%	18.87%	11.17%
UAAL Payment*	11.17%	16.66%	23.95%	22.71%	16.07%
Total Pension Contribution	20.75%	26.48%	42.22%	41.58%	27.24%
Fiscal Year 2022					
Member Contributions	7.00%	7.00%	11.55%	11.80%	7.76%
Employer Pension Contribution	13.75%	19.48%	30.67%	29.78%	19.48%
Employer Medical Subsidy Contribution	0.31%	1.54%	3.21%	3.21%	1.43%
Total Employer Contribution	**14.06%**	**21.02%**	**33.88%**	**32.99%**	**20.91%**
Projected Payroll for Fiscal Year	$ 735,094,732	$ 1,213,997,602	$ 247,144,349	$ 137,942,617	$ 2,334,179,300
Estimated Employer Dollar Contribution	$ 103,354,319	$ 255,182,296	$ 83,732,505	$ 45,507,269	$ 487,776,389
Fiscal Year 2023					
Member Contributions	7.00%	7.00%	11.55%	11.80%	7.76%
Employer Pension Contribution	13.75%	19.48%	30.67%	29.78%	19.48%
Employer Medical Subsidy Contribution	0.31%	1.54%	3.21%	3.21%	1.43%
Total Employer Contribution	**14.06%**	**21.02%**	**33.88%**	**32.99%**	**20.91%**
Projected Payroll for Fiscal Year	$ 755,309,837	$ 1,241,312,548	$ 253,940,819	$ 141,736,039	$ 2,392,299,243
Estimated Employer Dollar Contribution	$ 106,196,563	$ 260,923,898	$ 86,035,149	$ 46,758,719	$ 499,914,329
Employer Contribution Rates from Prior Valuation					
FY 2020#	**11.17%**	**17.80%**	**28.43%**	**30.09%**	**17.56%**
FY 2021#	**11.17%**	**17.80%**	**28.43%**	**30.09%**	**17.56%**

* *Unfunded Actuarial Accrued Liability - Please refer to pages 39-50 for more detail regarding the development of UAAL amortization payments, and page 17 for description of the UAAL amortization policy.*

\# *Computed in June 30, 2017 Actuarial Valuation.*

Development of Pension Actuarial Liabilities
June 30, 2019

Actuarial Present Value of	Total Present Value (1)	Portion Covered by Future Normal Cost Contributions (2)	Actuarial Accrued Liabilities (1) - (2)
Age and service allowances based on total service likely to be rendered by present active members	$ 7,438,787,059	$ 1,571,468,072	$ 5,867,318,987
Disability benefits likely to be paid to present active members	150,367,564	103,832,457	46,535,107
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	65,784,178	33,116,395	32,667,783
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	1,082,204,160	764,626,317	317,577,843
Benefits likely to be paid to current inactive and vested deferred members	357,276,101	-	357,276,101
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees	8,392,789,571	-	8,392,789,571
Total	$ 17,487,208,633	$ 2,473,043,241	$ 15,014,165,392
Actuarial Value of Assets	$ 9,121,932,914	$ -	$ 9,121,932,914
Liabilities to be Covered by Future Contributions	$ 8,365,275,719	$ 2,473,043,241	$ 5,892,232,478
Funded Ratio			60.8%

NHRS Total Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Level Percent Amortization

Year	Fiscal Year Ending June 30,	Employer Contribution Rates UAAL Payment*	Projected Payroll	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	11.83%	$ 2,897	$ 5,892	$ 343	$ 5,934	61.3%
	2021	11.83%	2,971	5,934	352	5,972	62.1%
1	2022	N/A	3,047	5,972	467	5,892	63.6%
2	2023	N/A	3,124	5,892	479	5,795	65.0%
3	2024	N/A	3,204	5,795	491	5,679	66.6%
4	2025	N/A	3,286	5,679	504	5,542	68.1%
5	2026	N/A	3,370	5,542	516	5,383	69.7%
6	2027	N/A	3,456	5,383	529	5,199	71.4%
7	2028	N/A	3,544	5,199	543	4,989	73.2%
8	2029	N/A	3,635	4,989	556	4,752	75.0%
9	2030	N/A	3,727	4,752	570	4,483	77.0%
10	2031	N/A	3,823	4,483	585	4,181	79.0%
11	2032	N/A	3,920	4,181	600	3,843	81.1%
12	2033	N/A	4,021	3,843	615	3,468	83.4%
13	2034	N/A	4,123	3,468	631	3,050	85.7%
14	2035	N/A	4,229	3,050	647	2,587	88.2%
15	2036	N/A	4,337	2,587	663	2,076	90.7%
16	2037	N/A	4,448	2,076	680	1,514	93.4%
17	2038	N/A	4,562	1,514	698	895	96.2%
18	2039	N/A	4,679	895	715	217	99.1%
19	2040	N/A	4,798	217	115	113	99.6%
20	2041	N/A	4,921	113	118	-	100.0%

** The payroll projections for Teachers is assumed to be at a different rate than the other member classifications. Therefore, each member classification has a level percentage of payroll, but the aggregate rate will vary.*

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year-to-year.

NHRS Total Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Level Dollar Amortization

(Not the Statutory Method – Hypothetical Illustration)

Year	Fiscal Year Ending June 30,	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	$ 5,892	$ 343	$ 5,934	61.3%
	2021	5,934	352	5,972	62.1%
1	2022	5,972	559	5,797	64.1%
2	2023	5,797	559	5,611	66.2%
3	2024	5,611	559	5,411	68.2%
4	2025	5,411	559	5,199	70.2%
5	2026	5,199	559	4,971	72.3%
6	2027	4,971	559	4,729	74.3%
7	2028	4,729	559	4,470	76.4%
8	2029	4,470	559	4,194	78.5%
9	2030	4,194	559	3,899	80.6%
10	2031	3,899	559	3,584	82.7%
11	2032	3,584	559	3,248	84.8%
12	2033	3,248	559	2,889	86.9%
13	2034	2,889	559	2,506	89.0%
14	2035	2,506	559	2,097	91.2%
15	2036	2,097	559	1,661	93.3%
16	2037	1,661	559	1,195	95.3%
17	2038	1,195	559	697	97.4%
18	2039	697	559	167	99.4%
19	2040	167	89	86	99.7%
20	2041	86	89	-	100.0%

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year to year.

Actuarial Balance Sheet as of June 30, 2019

Assets and Present Value of Expected Future Contributions

	Pension	Medical Subsidy
A. Present valuation assets		
1. Net assets from system financial statements	$ 9,170,772,530	$ 36,842,621
2. Actuarial value adjustment	(48,839,616)	(196,208)
3. Actuarial valuation assets	9,121,932,914	36,646,413
B. Actuarial present value of expected future employer contributions		
1. For normal costs	652,961,614	10,914,676
2. For unfunded actuarial accrued liability	5,892,232,478	658,777,859
3. Total	6,545,194,092	669,692,535
C. Actuarial present value of expected future member contributions	1,820,081,627	-
D. Total Present and Expected Future Resources	$ 17,487,208,633	$ 706,338,948

Present Value of Expected Future Benefit Payments

A. To retirees and beneficiaries	$ 8,392,789,571	$ 595,065,577
B. To vested terminated members	262,592,429	-
C. To non-vested terminated members (outstanding refunds)	94,683,672	-
D. To present active members		
1. Allocated to service rendered prior to valuation date - actuarial accrued liability	6,264,099,720	100,358,695
2. Allocated to service likely to be rendered after valuation date	2,473,043,241	10,914,676
3. Total	8,737,142,961	111,273,371
E. Total Actuarial Present Value of Expected Future Benefit Payments	$ 17,487,208,633	$ 706,338,948

Experience Gain/(Loss) -- June 30, 2019

	Pension	Medical Subsidy
(1) Actual UAAL* as of June 30, 2017	$ 5,042,765,222	$ 657,695,295
(2) Normal cost from 2017 valuation	279,372,304	2,311,860
(3) Actual contributions (employer and employee)	640,229,409	44,194,281
(4) Interest accrual: [(1)+1/2 [(2)-(3)]] x {.0725 for pension; .0325 for medical subsidy}	352,519,409	20,694,508
(5) Expected UAAL end of year: (1)+(2)-(3)+(4)	5,034,427,526	636,507,382
(6) Change from legislation	-	-
(7) Change from revised actuarial assumptions	-	-
(8) Expected UAAL after changes: (5)+(6)+(7)	5,034,427,526	636,507,382
(9) Actual UAAL* as of June 30, 2018	**4,992,209,359**	**652,800,203**
(10) Gain/(loss) for year: (8)-(9)	**42,218,167**	**(16,292,821)**
(11) Gain/(loss) as percent of actuarial accrued liabilities at start of year	0.3 %	(2.3)%
(12) Normal cost from 2018 valuation	285,306,615	2,046,540
(13) Actual contributions (employer and employee)	658,398,461	45,509,112
(14) Interest accrual: [(9+1/2 [(12)-(13)]] x {.0725 for pension; .0325 for medical subsidy}	348,410,599	20,509,740
(15) Expected UAAL end of year: (9)+(12)-(13)+(14)	4,967,528,112	629,847,371
(16) Change from legislation	64,666,472	-
(17) Change from revised actuarial methodology and assumptions	772,788,485	37,826,828
(18) Expected UAAL after changes: (15)+(16)+(17)	5,804,983,069	667,674,199
(19) Actual UAAL as of June 30, 2019	**5,892,232,478**	**658,777,859**
(20) Gain/(loss) for year: (18)-(19)	**(87,249,409)**	**8,896,340**
(21) Gain/(loss) as percent of actuarial accrued liabilities at start of year	(0.6)%	1.3 %

** Unfunded Actuarial Accrued Liabilities.*

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures are discussed in the following pages. A historical summary of these plan maturity measures can be found on page 35.

Funded Ratio

The ratio of actuarial value of assets to actuarial accrued liabilities is expected to trend toward 100% by June 30, 2041. Each subsequent change in liability as calculated in odd-numbered years shall be separately amortized over a fixed period of no longer than 20 years.

Ratio of Actual Total Payroll to Expected Total Payroll

This ratio is expected to remain near 100% each year.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Unfunded Actuarial Accrued Liability to Payroll

The ratio of the unfunded actuarial accrued liability to payroll is expected to trend toward 0% by June 30, 2041.

Ratio of Actuarial Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the actuarial value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Plan Maturity Measures (Concluded)

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. Total AAL / Total Payroll is expected to grow as the System matures. The rate of growth may slow down as members hired on or after July 1, 2011 replace current members.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Standard Deviation of Investment Return to Payroll

This measure illustrates the impact of a one standard deviation change in investment return as a percent of payroll. Investment return experience other than expected ultimately affects the employer contribution rates. The higher the ratio of this risk metric, the greater the expected volatility in employer contribution rates. Absent changes in investment policy, this metric is expected to increase as the assets grow to 100% of the AAL.

Standard Deviation of Contribution Rate

This measure illustrates the impact of a one standard deviation change in investment return on the annual contribution rate. Absent a change in amortization policy, this rate is expected to increase substantially as the amortization period decreases.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Summary of Risk Measures
Pension

Valuation Year	Funded Ratio				Actual Total Payroll / Expected Total Payroll	Net Cash Flow as a Percent of MVA	Ratio of Actives to Retirees[1]	UAAL Amortization Period	Ratio to Payroll				
		Percentage of AAL Covered by Net Actuarial Value of Assets Available											
	NHRS in Total	Aggregate Member Contributions	Current Retirees & Beneficiaries	Active & Inactive Members					UAAL	AVA	AAL	Standard Deviation of Investment Return	Standard Deviation of Contribution Rate
June 30, 2008	67.8%	100%	83%	0%	101%	(1.2)%	2.2	30	109%	230%	339%	***	***
June 30, 2009*	58.3	100	63	0	103	(2.3)	2.1	30	145	202	346	23%	0.3%
June 30, 2010	58.5	100	61	0	98	(2.8)	2.0	30	150	211	361	23	0.3%
June 30, 2011#*	57.4	100	63	0	98	(3.1)	1.8	29	169	228	397	26	0.3%
June 30, 2012	56.1	100	58	0	96	(2.3)	1.7	28	183	234	417	28	0.3%
June 30, 2013	56.7	100	59	0	97	(2.9)	1.6	27	185	243	428	29	0.3%
June 30, 2014	60.7	100	67	0	97	(1.7)	1.6	26	173	267	440	32	0.4%
June 30, 2015#^	59.2	100	66	0	99	(1.8)	1.5	25	195	283	478	33	0.4%
June 30, 2016	60.0	100	67	0	98	(1.7)	1.5	24	196	294	489	34	0.4%
June 30, 2017#	61.8	100	72	0	99	(2.0)	1.3	23	189	306	495	36	0.5%
June 30, 2018	63.6	100	75	0	100	(1.7)	1.3	22	181	317	498	37	0.5%
June 30, 2019#*@^	60.8	100	73	0	100	(1.8)	1.3	21	209	323	531	40	0.6%

 # After reflection of changes in assumptions.
** After reflection of changes in legislation.*
@ After reflection of changes in methodology.
**** Unavailable.*
^ The standard deviation of investment return was updated in these years as the result of an experience study.
1 Beginning with the valuation year ended June 30, 2019, the ratio of actives to retirees excludes additional data records which have resulted from additional annuities, survivor benefits, or members having benefits in more than one valuation group. There were 2,371 such records in 2019.

These risk measures are provided in accordance with the System's Actuarial Funding Policy. Short-term fluctuations will occur due to experience, plan changes, and assumption and method changes. Long-term expectations are described on the prior pages.

UAAL Amortization Period: The unfunded liability as of June 30, 2017 shall be amortized through 2039 (a 20-year period beginning on July 1, 2019). Each subsequent change in liability as calculated in odd-numbered years shall be separately amortized over a fixed period of no longer than 20 years.

Pension Solvency Test

The New Hampshire Retirement System funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will pay all promised benefits when due -- the ultimate test of financial soundness.

A solvency test is one means of checking a system's progress under its funding program. In a solvency test, the plan's present assets (cash and investments) are compared with:

1) Active member contributions on deposit;
2) The liabilities for future benefits to present retired lives; and
3) The liabilities for service already rendered by active and inactive members.

In a system that has been following the discipline of level percent-of-payroll financing, with assumptions and benefits unchanged and all assumptions met, the liabilities for active member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by active members (liability 3) will be partially covered by the remainder of present assets. The larger the funded portion of liability 3, the stronger the condition of the System.

As of June 30, 2019, there were 73% of assets needed to cover retiree liabilities, as shown in the table below.

Prior to June 30, 2007, the statutory funding method did not report a funded status nor did it report that assets were below the retiree liability. The assets in the plan are not sufficient to cover current retiree liabilities and the ratio of retiree benefit payroll to the market value of assets is 0.09. Approximately 12 years of current retiree benefit payments can be paid from current assets if all assumptions are met and ignoring future contributions. The ability to make such payments beyond that period is heavily dependent upon future contributions and future investment return.

Total of all Groups
($ in Thousands)

Fiscal Year		Projected Pension Liabilities for (1) Aggregate Member Contributions	(2) Current Retirees & Beneficiaries	(3) Active & Inactive Members (Employer Financed Portion)	Net Assets Available for Benefits	Percentage of Accrued Liabilities Covered by Net Assets Available (1)	(2)	(3)
2010		$2,553,612	$4,378,205	$2,022,115	$5,233,838	100%	61%	0%
2011	#*	2,631,430	4,959,865	2,406,956	5,740,516	100%	63%	0%
2012		2,773,081	5,246,672	2,341,847	5,817,882	100%	58%	0%
2013		2,808,526	5,519,814	2,380,428	6,070,681	100%	59%	0%
2014		2,842,340	5,789,052	2,413,782	6,700,553	100%	67%	0%
2015	#	2,949,169	6,565,522	2,788,945	7,280,761	100%	66%	0%
2016		2,978,817	6,964,227	2,789,822	7,636,066	100%	67%	0%
2017	#	2,915,811	7,315,440	2,977,198	8,165,684	100%	72%	0%
2018		2,927,793	7,667,448	3,107,908	8,710,939	100%	75%	0%
2019	#*@	3,019,358	8,392,790	3,602,017	9,121,933	100%	73%	0%

 # After reflection of changes in assumptions.
** After reflection of changes in legislation.*
@ After reflection of changes in methodology.

Pension Solvency Test -- Comparative Statement
($ in Thousands)

Group	Fiscal Year		Projected Pension Liabilities for (1) Aggregate Member Contributions	(2) Current Retirees & Beneficiaries	(3) Active & Inactive Members (Employer Financed Portion)	Net Assets Available for Benefits	Percentage of Accrued Liabilities Covered by Net Assets Available (1)	(2)	(3)
Employees	2010		$ 955,735	$ 1,344,902	$ 680,958	$ 1,721,002	100%	57%	0%
Teachers	2010		998,775	1,770,635	783,710	2,049,650	100%	59%	0%
Police	2010		397,440	851,136	386,621	997,325	100%	70%	0%
Fire	2010		201,661	411,532	170,827	465,861	100%	64%	0%
Employees	2011	#*	995,389	1,548,109	810,983	1,834,609	100%	54%	0%
Teachers	2011	#*	1,041,699	1,893,862	973,407	2,153,182	100%	59%	0%
Police	2011	#*	396,344	1,030,900	432,256	1,179,798	100%	76%	0%
Fire	2011	#*	197,998	486,994	190,310	572,927	100%	77%	0%
Employees	2012		1,052,106	1,641,026	756,255	1,877,395	100%	50%	0%
Teachers	2012		1,101,262	1,999,152	949,670	2,173,315	100%	54%	0%
Police	2012		411,672	1,092,005	432,116	1,189,308	100%	71%	0%
Fire	2012		208,041	514,489	203,805	577,864	100%	72%	0%
Employees	2013		1,069,628	1,729,855	755,482	1,977,479	100%	52%	0%
Teachers	2013		1,107,192	2,087,926	977,937	2,255,011	100%	55%	0%
Police	2013		417,630	1,160,173	438,580	1,236,579	100%	71%	0%
Fire	2013		214,076	541,860	208,430	601,612	100%	72%	0%
Employees	2014		1,083,878	1,823,517	784,437	2,195,284	100%	61%	0%
Teachers	2014		1,113,650	2,198,892	966,511	2,482,496	100%	62%	0%
Police	2014		422,972	1,209,741	454,133	1,361,280	100%	78%	0%
Fire	2014		221,840	556,902	208,701	661,493	100%	79%	0%
Employees	2015	#	1,137,601	2,007,299	863,247	2,403,294	100%	63%	0%
Teachers	2015	#	1,155,922	2,555,611	1,141,245	2,682,083	100%	60%	0%
Police	2015	#	433,215	1,364,908	543,229	1,477,517	100%	77%	0%
Fire	2015	#	222,431	637,704	241,223	717,867	100%	78%	0%
Employees	2016		1,152,928	2,139,549	857,347	2,538,563	100%	65%	0%
Teachers	2016		1,171,831	2,692,037	1,156,821	2,799,863	100%	60%	0%
Police	2016		430,490	1,460,840	535,225	1,546,665	100%	76%	0%
Fire	2016		223,568	671,801	240,428	750,975	100%	79%	0%
Employees	2017		1,133,071	2,272,436	934,564	2,734,558	100%	70%	0%
Teachers	2017	#	1,132,876	2,819,228	1,211,560	2,979,005	100%	65%	0%
Police	2017		426,606	1,526,761	570,755	1,650,908	100%	80%	0%
Fire	2017		223,258	697,015	260,320	801,214	100%	83%	0%
Employees	2018		1,128,180	2,391,404	974,131	2,922,358	100%	75%	0%
Teachers	2018		1,142,455	2,956,675	1,268,903	3,176,932	100%	69%	0%
Police	2018		428,859	1,596,512	591,281	1,758,301	100%	83%	0%
Fire	2018		228,299	722,857	273,593	853,348	100%	86%	0%
Employees	2019	#*@	1,160,917	2,646,257	1,181,832	3,063,967	100%	72%	0%
Teachers	2019	#*@	1,181,186	3,195,041	1,461,286	3,326,088	100%	67%	0%
Police	2019	#*@	441,940	1,768,684	666,606	1,838,868	100%	79%	0%
Fire	2019	#*@	235,315	782,808	292,293	893,010	100%	84%	0%

 # After reflection of changes in assumptions.
** After reflection of changes in legislation.*
@ After reflection of changes in methodology.

Impact of Payroll Growth Experience on Contribution Rates

Year ending: **June 30, 2019**

Prior to any assumption changes

Member Classification	**Employees**	**Teachers**	**Police**	**Fire**	**Total**
2018 Valuation Payroll	$ 1,205,121	$ 1,116,218	$ 302,199	$ 128,697	$ 2,752,235
Payroll Increase Assumption	3.25%	2.75%	3.25%	3.25%	
2019 Expected Valuation Payroll	$ 1,244,287	$ 1,146,914	$ 312,020	$ 132,880	$ 2,836,102
2019 Actual Valaution Payroll	$ 1,244,930	$ 1,135,607	$ 313,016	$ 131,453	$ 2,825,006
All dollar amounts in thousands					
Actual/Expected Payroll	100.1%	99.0%	100.3%	98.9%	99.6%
Active Actuarial Accrued Liability	$ 1,991,271	$ 2,310,757	$ 1,000,481	$ 497,487	$ 5,799,997
Estimated pay gain/(loss) on liability	$ (1,028)	$ 23,008	$ (3,182)	$ 5,399	$ 24,197
Total Contribution Rate in Effect	18.08%	22.70%	36.88%	39.59%	
Estimated excess/(shortfall) contributions (w/interest)	$ 120	$ (2,659)	$ 380	$ (585)	$ (2,743)
Estimated Increase/(Decrease) on UAL as of June, 30, 2019	$ 907	$ (20,349)	$ 2,802	$ (4,814)	$ (21,454)
Total UAL as of June, 30, 2019	$ 1,548,369	$ 2,178,399	$ 868,507	$ 358,137	$ 4,953,411
UAL contribution rate for FY 2022	8.71%	14.07%	19.38%	18.96%	12.52%
Estimated UAL contribution rate on expected payroll	8.71%	14.06%	19.38%	19.01%	12.53%
Estimated Impact of change in payroll on contribution rate	0.00%	0.01%	0.00%	-0.05%	-0.01%

Schedule of Pension Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percent of Covered Payroll [(b)-(a)]/(c)
June 30, 2008	$ 5,302,034,006	$ 7,821,316,352	$ 2,519,282,346	67.8%	$ 2,308,320,669	109.1 %
June 30, 2009*	4,937,319,506	8,475,051,817	3,537,732,311	58.3%	2,448,287,042	144.5 %
June 30, 2010	5,233,838,359	8,953,932,346	3,720,093,987	58.5%	2,481,383,620	149.9 %
June 30, 2011#*	5,740,516,293	9,998,251,218	4,257,734,925	57.4%	2,517,779,470	169.1 %
June 30, 2012	5,817,881,588	10,361,600,451	4,543,718,863	56.1%	2,487,757,437	182.6 %
June 30, 2013	6,070,681,258	10,708,768,437	4,638,087,179	56.7%	2,501,741,708	185.4 %
June 30, 2014	6,700,553,435	11,045,173,866	4,344,620,431	60.7%	2,507,898,809	173.2 %
June 30, 2015#	7,280,760,612	12,303,635,908	5,022,875,296	59.2%	2,575,031,210	195.1 %
June 30, 2016	7,636,066,231	12,732,865,722	5,096,799,491	60.0%	2,601,403,606	195.9 %
June 30, 2017#	8,165,684,152	13,208,449,374	5,042,765,222	61.8%	2,667,611,532	189.0 %
June 30, 2018	8,710,939,332	13,703,148,691	4,992,209,359	63.6%	2,752,235,069	181.4 %
June 30, 2019*@	9,121,932,914	14,075,344,005	4,953,411,091	64.8%	2,825,006,022	175.3 %
June 30, 2019#*@	**9,121,932,914**	**15,014,165,392**	**5,892,232,478**	**60.8%**	**2,825,006,022**	**208.6 %**

 # After reflection of changes in assumptions.
** After reflection of changes in legislation.*
@ After reflection of changes in methodology.

Development of Employer Contribution Rates
Total System Amortization of Unfunded Actuarial Accrued Liability Schedule

Source of UAAL For Year Ending	Projected 6/30/2021 UAAL Amount	Remaining Financing Period 6/30/2021	Amort. Factor	FY 2022 Contribution Dollar	FY 2022 Contribution % of Payroll
Initial Unfunded Actuarial Accrued Liability					
6/30/2017	$ 4,979,820,696	18 yrs.	12.646208	$ 393,906,217	**12.93%**
(Gain) Loss From Experience					
6/30/2019	13,977,046	20 yrs.	12.729482	1,094,603	**0.04%**
Changes From Updated Actuarial Assumptions and Methods					
6/30/2019	904,746,214	20 yrs.	13.606532	66,517,718	**2.18%**
Changes From Updated Benefits					
6/30/2019	73,691,077	20 yrs.	13.574245	5,430,834	**0.18%**
Totals	$ 5,972,235,033			$ 466,949,372	**15.33%**

Employees Pension
Development of Pension Actuarial Liabilities
June 30, 2019

Actuarial Present Value of	Total Present Value (1)	Portion Covered by Future Normal Cost Contributions (2)	Actuarial Accrued Liabilities (1) - (2)
Age and service allowances based on total service likely to be rendered by present active members	$ 2,447,324,257	$ 443,820,305	$ 2,003,503,952
Disability benefits likely to be paid to present active members	53,665,382	32,704,645	20,960,737
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	26,736,562	12,806,808	13,929,754
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	453,215,905	314,255,253	138,960,652
Benefits likely to be paid to current inactive and vested deferred members	165,394,588	-	165,394,588
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees	2,646,256,533	-	2,646,256,533
Total	$ 5,792,593,227	$ 803,587,011	$ 4,989,006,216
Actuarial Value of Assets	$ 3,063,967,170	$ -	$ 3,063,967,170
Liabilities to be Covered by Future Contributions	$ 2,728,626,057	$ 803,587,011	$ 1,925,039,046
Funded Ratio			61.4%

Development of Employer Contribution Rates
Employees Amortization of Unfunded Actuarial Accrued Liability Schedule

Source of UAAL For Year Ending		Projected 6/30/2021 UAAL Amount	Remaining Financing Period 6/30/2021		Amort. Factor	FY 2022 Contribution Dollar	FY 2022 Contribution % of Payroll
Initial Unfunded Actuarial Accrued Liability							
6/30/2017	$	1,590,810,193	18	yrs.	12.843277	$ 123,863,258	**9.17%**
(Gain) Loss From Experience							
6/30/2019		2,001,150	20	yrs.	13.798623	145,025	**0.01%**
Changes From Updated Actuarial Assumptions and Methods							
6/30/2019		349,661,690	20	yrs.	13.798623	25,340,332	**1.88%**
Changes From Updated Benefits							
6/30/2019		21,405,139	20	yrs.	13.798623	1,551,252	**0.11%**
Totals	$	1,963,878,172				$ 150,899,867	**11.17%**

Employees Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Year	Fiscal Year Ending June 30,	Employer Contribution Rates UAAL Payment*	Projected Payroll	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	8.30%	$ 1,279	$ 1,925	$ 106	$ 1,945	61.8%
	2021	8.30%	1,314	1,945	109	1,964	62.5%
1	2022	11.17%	1,350	1,964	151	1,940	63.9%
2	2023	11.17%	1,388	1,940	155	1,911	65.4%
3	2024	11.17%	1,426	1,911	159	1,876	66.9%
4	2025	11.17%	1,465	1,876	164	1,833	68.5%
5	2026	11.17%	1,505	1,833	168	1,783	70.1%
6	2027	11.17%	1,547	1,783	173	1,724	71.7%
7	2028	11.17%	1,589	1,724	178	1,657	73.5%
8	2029	11.17%	1,633	1,657	182	1,581	75.3%
9	2030	11.17%	1,678	1,581	187	1,494	77.2%
10	2031	11.17%	1,724	1,494	193	1,395	79.2%
11	2032	11.17%	1,771	1,395	198	1,285	81.3%
12	2033	11.17%	1,820	1,285	203	1,162	83.5%
13	2034	11.17%	1,870	1,162	209	1,025	85.8%
14	2035	11.17%	1,922	1,025	215	871	88.3%
15	2036	11.17%	1,974	871	221	702	90.8%
16	2037	11.17%	2,029	702	227	515	93.5%
17	2038	11.17%	2,084	515	233	309	96.2%
18	2039	11.17%	2,142	309	239	83	99.0%
19	2040	2.00%	2,201	83	44	43	99.5%
20	2041	2.00%	2,261	43	45	-	100.0%

** UAAL rates for the first biennium are based on the adopted rates from the previous rate setting valuation less the employer normal cost from this valuation.*

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year to year.

Teachers Pension
Development of Pension Actuarial Liabilities
June 30, 2019

Actuarial Present Value of	Total Present Value (1)	Portion Covered by Future Normal Cost Contributions (2)	Actuarial Accrued Liabilities (1) - (2)
Age and service allowances based on total service likely to be rendered by present active members	$ 2,940,760,710	$ 619,425,957	$ 2,321,334,753
Disability benefits likely to be paid to present active members	20,795,374	10,032,377	10,762,997
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	20,059,627	9,039,864	11,019,763
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	462,859,744	309,980,658	152,879,086
Benefits likely to be paid to current inactive and vested deferred members	146,475,244	-	146,475,244
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees	3,195,040,744	-	3,195,040,744
Total	$ 6,785,991,443	$ 948,478,856	$ 5,837,512,587
Actuarial Value of Assets	$ 3,326,087,948	$ -	$ 3,326,087,948
Liabilities to be Covered by Future Contributions	$ 3,459,903,495	$ 948,478,856	$ 2,511,424,639
Funded Ratio			57.0%

Development of Employer Contribution Rates
Teachers Amortization of Unfunded Actuarial Accrued Liability Schedule

Source of UAAL For Year Ending	Projected 6/30/2021 UAAL Amount	Remaining Financing Period 6/30/2021	Amort. Factor	FY 2022 Contribution Dollar	FY 2022 Contribution % of Payroll
Initial Unfunded Actuarial Accrued Liability					
6/30/2017	$ 2,150,643,947	18 yrs.	12.386962	$ 173,621,578	**14.30%**
(Gain) Loss From Experience					
6/30/2019	27,739,272	20 yrs.	13.259913	2,091,965	**0.17%**
Changes From Updated Actuarial Assumptions and Methods					
6/30/2019	322,610,433	20 yrs.	13.259913	24,329,756	**2.00%**
Changes From Updated Benefits					
6/30/2019	30,693,083	20 yrs.	13.259913	2,314,727	**0.19%**
Totals	$ 2,531,686,735			$ 202,358,026	**16.66%**

Teachers Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Year	Fiscal Year Ending June 30,	Employer Contribution Rates UAAL Payment*	Projected Payroll	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	13.17%	$ 1,161	$ 2,511	$ 153	$ 2,522	57.6%
	2021	13.17%	1,187	2,522	$ 156	2,531	58.5%
1	2022	16.66%	1,214	2,531	$ 202	2,493	60.1%
2	2023	16.66%	1,241	2,493	$ 207	2,447	61.8%
3	2024	16.66%	1,269	2,447	$ 212	2,394	63.5%
4	2025	16.66%	1,298	2,394	$ 216	2,332	65.2%
5	2026	16.66%	1,327	2,332	$ 221	2,261	67.0%
6	2027	16.66%	1,357	2,261	$ 226	2,180	68.9%
7	2028	16.66%	1,387	2,180	$ 231	2,088	70.9%
8	2029	16.66%	1,419	2,088	$ 236	1,985	72.9%
9	2030	16.66%	1,451	1,985	$ 242	1,869	75.1%
10	2031	16.66%	1,483	1,869	$ 247	1,740	77.3%
11	2032	16.66%	1,517	1,740	$ 253	1,596	79.6%
12	2033	16.66%	1,551	1,596	$ 258	1,437	82.0%
13	2034	16.66%	1,586	1,437	$ 264	1,261	84.6%
14	2035	16.66%	1,621	1,261	$ 270	1,067	87.3%
15	2036	16.66%	1,658	1,067	$ 276	853	90.0%
16	2037	16.66%	1,695	853	$ 282	619	92.9%
17	2038	16.66%	1,733	619	$ 289	362	96.0%
18	2039	16.66%	1,772	362	$ 295	82	99.1%
19	2040	2.36%	1,812	82	$ 43	43	99.5%
20	2041	2.36%	1,853	43	$ 44	-	100.0%

** UAAL rates for the first biennium are based on the adopted rates from the previous rate setting valuation less the employer normal cost from this valuation.*

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year-to-year.

Police Pension
Development of Pension Actuarial Liabilities
June 30, 2019

Actuarial Present Value of	Total Present Value (1)	Portion Covered by Future Normal Cost Contributions (2)	Actuarial Accrued Liabilities (1) - (2)
Age and service allowances based on total service likely to be rendered by present active members	$ 1,352,649,652	$ 320,931,423	$ 1,031,718,229
Disability benefits likely to be paid to present active members	58,097,487	44,566,233	13,531,254
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	12,220,586	7,359,395	4,861,191
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	138,084,309	116,813,183	21,271,126
Benefits likely to be paid to current inactive and vested deferred members	37,164,403	-	37,164,403
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees	1,768,683,961	-	1,768,683,961
Total	$ 3,366,900,398	$ 489,670,234	$ 2,877,230,164
Actuarial Value of Assets	$ 1,838,867,763	$ -	$ 1,838,867,763
Liabilities to be Covered by Future Contributions	$ 1,528,032,635	$ 489,670,234	$ 1,038,362,401
Funded Ratio			63.9%

Development of Employer Contribution Rates
Police Amortization of Unfunded Actuarial Accrued Liability Schedule

Source of UAAL For Year Ending	Projected 6/30/2021 UAAL Amount	Remaining Financing Period 6/30/2021	Amort. Factor	FY 2022 Contribution Dollar	FY 2022 Contribution % of Payroll
Initial Unfunded Actuarial Accrued Liability					
6/30/2017	$ 864,646,389	18 yrs.	12.843277	$ 67,322,877	**19.83%**
(Gain) Loss From Experience					
6/30/2019	1,328,017	20 yrs.	13.798623	96,243	**0.03%**
Changes From Updated Actuarial Assumptions and Methods					
6/30/2019	176,756,062	20 yrs.	13.798623	12,809,689	**3.77%**
Changes From Updated Benefits					
6/30/2019	14,882,813	20 yrs.	13.798623	1,078,572	**0.32%**
Totals	$ 1,057,613,281			$ 81,307,381	**23.95%**

Police Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Year	Fiscal Year Ending June 30,	Employer Contribution Rates UAAL Payment*	Projected Payroll	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	18.05%	$ 322	$ 1,038	$ 58	$ 1,049	64.5%
	2021	18.05%	330	1,049	60	1,058	65.2%
1	2022	23.95%	340	1,058	81	1,045	66.5%
2	2023	23.95%	349	1,045	84	1,029	67.8%
3	2024	23.95%	358	1,029	86	1,010	69.2%
4	2025	23.95%	368	1,010	88	987	70.6%
5	2026	23.95%	378	987	91	960	72.0%
6	2027	23.95%	389	960	93	928	73.5%
7	2028	23.95%	400	928	96	892	75.1%
8	2029	23.95%	411	892	98	851	76.8%
9	2030	23.95%	422	851	101	804	78.6%
10	2031	23.95%	433	804	104	751	80.5%
11	2032	23.95%	445	751	107	691	82.4%
12	2033	23.95%	458	691	110	625	84.5%
13	2034	23.95%	470	625	113	550	86.7%
14	2035	23.95%	483	550	116	468	89.0%
15	2036	23.95%	496	468	119	377	91.3%
16	2037	23.95%	510	377	122	276	93.8%
17	2038	23.95%	524	276	126	165	96.4%
18	2039	23.95%	539	165	129	43	99.1%
19	2040	4.12%	553	43	23	22	99.5%
20	2041	4.12%	569	22	23	-	100.0%

** UAAL rates for the first biennium are based on the adopted rates from the previous rate setting valuation less the employer normal cost from this valuation.*

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year-to-year.

Fire Pension
Development of Pension Actuarial Liabilities
June 30, 2019

Actuarial Present Value of	Total Present Value (1)	Portion Covered by Future Normal Cost Contributions (2)	Actuarial Accrued Liabilities (1) - (2)
Age and service allowances based on total service likely to be rendered by present active members	$ 698,052,440	$ 187,290,387	$ 510,762,053
Disability benefits likely to be paid to present active members	17,809,321	16,529,202	1,280,119
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	6,767,403	3,910,328	2,857,075
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	28,044,202	23,577,223	4,466,979
Benefits likely to be paid to current inactive and vested deferred members	8,241,866	-	8,241,866
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees	782,808,333	-	782,808,333
Total	$ 1,541,723,565	$ 231,307,140	$ 1,310,416,425
Actuarial Value of Assets	$ 893,010,033	$ -	$ 893,010,033
Liabilities to be Covered by Future Contributions	$ 648,713,532	$ 231,307,140	$ 417,406,392
Funded Ratio			68.1%

Development of Employer Contribution Rates
Fire Amortization of Unfunded Actuarial Accrued Liability Schedule

Source of UAAL For Year Ending	Projected 6/30/2021 UAAL Amount	Remaining Financing Period 6/30/2021	Amort. Factor	FY 2022 Contribution Dollar	FY 2022 Contribution % of Payroll
Initial Unfunded Actuarial Accrued Liability					
6/30/2017	$ 373,720,167	18 yrs.	12.843277	$ 29,098,504	**20.41%**
(Gain) Loss From Experience					
6/30/2019	(17,091,393)	20 yrs.	13.798623	(1,238,630)	**(0.87%)**
Changes From Updated Actuarial Assumptions and Methods					
6/30/2019	55,718,029	20 yrs.	13.798623	4,037,941	**2.83%**
Changes From Updated Benefits					
6/30/2019	6,710,042	20 yrs.	13.798623	486,283	**0.34%**
Totals	$ 419,056,845			$ 32,384,098	**22.71%**

Fire Pension
Unfunded Actuarial Accrued Liability Payoff Projection
($ in Millions)

Year	Fiscal Year Ending June 30,	Employer Contribution Rates: UAAL Payment*	Projected Payroll	UAAL Beginning of Year	UAAL Payment	UAAL End of Year	End of Year Funded Ratio
	2020	19.36%	$ 135	$ 417	$ 26	$ 419	68.9%
	2021	19.36%	139	419	27	419	69.7%
1	2022	22.71%	143	419	32	414	70.9%
2	2023	22.71%	147	414	33	407	72.0%
3	2024	22.71%	151	407	34	400	73.1%
4	2025	22.71%	155	400	35	390	74.3%
5	2026	22.71%	159	390	36	379	75.5%
6	2027	22.71%	163	379	37	367	76.8%
7	2028	22.71%	168	367	38	352	78.2%
8	2029	22.71%	172	352	39	335	79.6%
9	2030	22.71%	177	335	40	316	81.1%
10	2031	22.71%	182	316	41	295	82.7%
11	2032	22.71%	187	295	42	271	84.4%
12	2033	22.71%	192	271	44	244	86.2%
13	2034	22.71%	197	244	45	214	88.1%
14	2035	22.71%	203	214	46	181	90.1%
15	2036	22.71%	208	181	47	144	92.3%
16	2037	22.71%	214	144	49	104	94.6%
17	2038	22.71%	220	104	50	59	97.0%
18	2039	22.71%	226	59	51	10	99.5%
19	2040	2.30%	232	10	5	5	99.7%
20	2041	2.30%	239	5	5	-	100.0%

** UAAL rates for the first biennium are based on the adopted rates from the previous rate setting valuation less the employer normal cost from this valuation.*

The funded ratio is projected in this amortization schedule assuming all actuarial assumptions are exactly met. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. It is important to understand that actual experience will differ from the projections shown on this page. When experience differs from the assumptions, as it often does, the employer's contribution rate can vary from year-to-year.

Medical Subsidy
Determination of Unfunded Actuarial Accrued Liability
as of June 30, 2019

	State Employees	Political Subdivision Employees	Teachers	Police & Fire	Total
A. Present Value of Future Medical Benefits					
1. Retirees and Beneficiaries	$ 63,402,295	$ 54,311,753	$ 241,739,747	$ 235,611,782	$ 595,065,577
2. Vested Terminated Members	-	-	-	-	-
3. Active Members	-	-	-	111,273,371	111,273,371
Total Present Value of Future Medical Benefits	63,402,295	54,311,753	241,739,747	346,885,153	706,338,948
B. Present Value of Future Employer Normal Costs	-	-	-	10,914,676	10,914,676
C. Present Value of Future Contributions from Current Active Members	-	-	-	-	-
D. Actuarial Medical Accrued Liability (A.-B.-C.)	63,402,295	54,311,753	241,739,747	335,970,477	695,424,272
E. 401(h) Subtrust Actuarial Value of Assets	2,075,732	14,555,216	4,219,363	15,796,102	36,646,413
F. Unfunded Actuarial Accrued Liability (D.-E.)	$ 61,326,563	$ 39,756,537	$ 237,520,384	$ 320,174,375	$ 658,777,859

The Unfunded Actuarial Accrued Liability (UAAL) shown here is for funding purposes using a discount rate of 2.75% per year. This differs from the Net OPEB Liability reported under GASB Statement No. 74 for accounting and reporting purposes.

Determination of Medical Subsidy Contribution Rates

There are four separate 401(h) member classifications: State Employees, Political Subdivision Employees, Teachers and Police/Fire.

Under New Hampshire Statute, contribution rates to the 401(h) sub-trust are determined as the lesser of 25% of the employers' total contributions or the actuarial required contribution rate that keeps the medical subsidy sub-trust solvent (the "solvency rate"). Under IRS Regulations, 401(h) sub-trust contributions are limited by 25% of the total contributions to the plan (other than contributions to fund past service credits). NHRS maintains the historical information for determining compliance with IRC Section 401(h). A test for compliance with IRC Section 401(h) was outside the scope of this valuation.

The 401(h) cash flow projections on the following pages are used to develop the employer contribution rates for the medical subsidy. The medical subsidy contribution rates are the computed amounts needed for pay-as-you-go financing of the retiree medical subsidy with a 20% margin for adverse experience (50% for Teachers) by June 30, 2023 and to maintain that margin thereafter. The margin for Teachers was increased from 20% to 50% as a result of the most recent experience study which caused an increase in the employer contribution rate of 0.19% of pay.

For purposes of determining the contribution rates for the 2022-2023 biennium, we have assumed that benefits for all members receiving a benefit on the valuation date and those Group I eligible members not yet age 60 get paid. In addition, there are a significant number of eligible members who are not receiving benefits, particularly for Group I. 25% of those who opted-out of receiving benefits are assumed to opt-back in on the valuation date.

It is imperative that NHRS monitor collections closely to ensure the necessary funds are collected to provide the benefit.

NHRS - 401(h) Cash Flow Projections
June 30, 2019

State Employees

Year Ending	Valuation Pay	Employer Contributions			Benefits and Expenses Paid	Solvency Assets	Projected Margin
		Rate -- Total	Rate -- Health	Dollars -- Health			
6/30/2019	$ 567,292,108					$ 2,086,846	
6/30/2020	582,892,641	11.93%	1.05%	$ 6,120,373	$ 6,355,119	1,985,039	31%
6/30/2021	598,922,189	11.93%	1.05%	6,288,683	6,055,680	2,359,896	39%
6/30/2022	615,392,549	14.53%	**0.78%**	4,800,062	5,752,780	1,534,317	27%
6/30/2023	632,315,844	14.53%	**0.78%**	4,932,064	5,449,475	1,103,010	20%
6/30/2024	649,704,530	14.53%	0.78%	5,067,695	5,144,071		
6/30/2025	667,571,405	14.47%	0.72%	4,838,481	4,838,481		
6/30/2026	685,929,619	14.41%	0.66%	4,526,211	4,526,211		
6/30/2027	704,792,684	14.35%	0.60%	4,218,603	4,218,603		
6/30/2028	724,174,483	14.29%	0.54%	3,922,526	3,922,526		
6/30/2029	744,089,281	14.24%	0.49%	3,636,459	3,636,459		
6/30/2030	764,551,736	14.19%	0.44%	3,354,384	3,354,384		
6/30/2031	785,576,909	14.14%	0.39%	3,077,910	3,077,910		
6/30/2032	807,180,274	14.10%	0.35%	2,812,407	2,812,407		
6/30/2033	829,377,732	14.06%	0.31%	2,556,938	2,556,938		
6/30/2034	852,185,620	14.02%	0.27%	2,317,695	2,317,695		
6/30/2035	875,620,725	13.99%	0.24%	2,088,826	2,088,826		
6/30/2036	899,700,295	13.96%	0.21%	1,876,101	1,876,101		
6/30/2037	924,442,053	13.93%	0.18%	1,674,475	1,674,475		
6/30/2038	949,864,209	13.91%	0.16%	1,488,852	1,488,852		
6/30/2039	975,985,475	13.88%	0.13%	1,316,597	1,316,597		
6/30/2040	1,002,825,076	13.87%	0.12%	1,157,839	1,157,839		
6/30/2041	1,030,402,766	13.85%	0.10%	1,012,545	1,012,545		

NHRS - 401(h) Cash Flow Projections
June 30, 2019

Political Subdivision Employees

Year Ending	Valuation Pay	Employer Contribution			Benefits and Expenses Paid	Solvency Assets	Projected Margin
		Rate -- Total	Rate -- Health	Dollars -- Health			
6/30/2019	$ 677,638,104					$ 14,633,146	
6/30/2020	696,273,152	11.17%	0.29%	$ 2,019,192	$5,094,857	12,441,415	246%
6/30/2021	715,420,664	11.17%	0.29%	2,074,720	4,907,053	10,353,286	213%
6/30/2022	735,094,732	14.06%	**0.31%**	2,278,794	4,714,489	8,534,233	182%
6/30/2023	755,309,837	14.06%	**0.31%**	2,341,460	4,518,275	6,860,011	153%
6/30/2024	776,080,858	14.06%	0.31%	2,405,851	4,317,237		
6/30/2025	797,423,082	14.06%	0.31%	2,472,012	4,107,874		
6/30/2026	819,352,217	14.06%	0.31%	2,539,992	3,899,307		
6/30/2027	841,884,403	14.06%	0.31%	2,609,842	3,691,693		
6/30/2028	865,036,224	14.06%	0.31%	2,681,612	3,473,031		
6/30/2029	888,824,720	14.06%	0.31%	2,755,357	3,253,936		
6/30/2030	913,267,400	14.06%	0.31%	2,831,129	3,034,900		
6/30/2031	938,382,254	14.05%	0.30%	2,814,906	2,814,906		
6/30/2032	964,187,766	14.02%	0.27%	2,595,416	2,595,416		
6/30/2033	990,702,930	13.99%	0.24%	2,380,512	2,380,512		
6/30/2034	1,017,947,261	13.96%	0.21%	2,169,782	2,169,782		
6/30/2035	1,045,940,811	13.94%	0.19%	1,964,704	1,964,704		
6/30/2036	1,074,704,183	13.91%	0.16%	1,766,727	1,766,727		
6/30/2037	1,104,258,548	13.89%	0.14%	1,577,214	1,577,214		
6/30/2038	1,134,625,658	13.87%	0.12%	1,397,389	1,397,389		
6/30/2039	1,165,827,864	13.86%	0.11%	1,228,320	1,228,320		
6/30/2040	1,197,888,130	13.84%	0.09%	1,070,900	1,070,900		
6/30/2041	1,230,830,054	13.83%	0.08%	925,811	925,811		

NHRS - 401(h) Cash Flow Projections
June 30, 2019

Teachers

Year Ending	Valuation Pay	Employer Contributions			Benefits and Expenses Paid	Solvency Assets	Projected Margin
		Rate -- Total	Rate -- Health	Dollars -- Health			
6/30/2019	$ 1,135,606,524					$ 4,241,953	
6/30/2020	1,161,157,671	17.80%	1.81%	$ 21,016,954	$20,090,998	5,485,492	27%
6/30/2021	1,187,283,719	17.80%	1.81%	21,489,835	19,561,059	7,849,635	40%
6/30/2022	1,213,997,603	21.02%	**1.54%**	18,695,563	19,030,228	8,033,525	42%
6/30/2023	1,241,312,549	21.02%	**1.54%**	19,116,213	18,471,802	9,241,947	50%
6/30/2024	1,269,242,081	20.89%	1.41%	17,888,829	17,888,829		
6/30/2025	1,297,800,028	20.81%	1.33%	17,272,386	17,272,386		
6/30/2026	1,327,000,529	20.73%	1.25%	16,623,881	16,623,881		
6/30/2027	1,356,858,041	20.66%	1.18%	15,948,512	15,948,512		
6/30/2028	1,387,387,347	20.58%	1.10%	15,246,362	15,246,362		
6/30/2029	1,418,603,562	20.50%	1.02%	14,517,978	14,517,978		
6/30/2030	1,450,522,142	20.43%	0.95%	13,766,677	13,766,677		
6/30/2031	1,483,158,890	20.36%	0.88%	12,995,961	12,995,961		
6/30/2032	1,516,529,965	20.28%	0.80%	12,207,920	12,207,920		
6/30/2033	1,550,651,889	20.22%	0.74%	11,406,498	11,406,498		
6/30/2034	1,585,541,557	20.15%	0.67%	10,596,227	10,596,227		
6/30/2035	1,621,216,242	20.08%	0.60%	9,782,211	9,782,211		
6/30/2036	1,657,693,607	20.02%	0.54%	8,970,094	8,970,094		
6/30/2037	1,694,991,713	19.96%	0.48%	8,165,952	8,165,952		
6/30/2038	1,733,129,027	19.91%	0.43%	7,380,400	7,380,400		
6/30/2039	1,772,124,430	19.85%	0.37%	6,611,709	6,611,709		
6/30/2040	1,811,997,230	19.80%	0.32%	5,870,323	5,870,323		
6/30/2041	1,852,767,168	19.76%	0.28%	5,162,841	5,162,841		

NHRS - 401(h) Cash Flow Projections
June 30, 2019

Police and Fire

Year Ending	Valuation Pay	Employer Contributions			Benefits and Expenses Paid	Solvency Assets	Projected Margin
		Rate -- Total	Rate -- Health	Dollars -- Health			
6/30/2019	$ 444,469,286					$ 15,880,676	
6/30/2020	456,692,191	N/A	3.66%	$ 16,714,934	$17,560,450	16,078,570	92%
6/30/2021	469,251,226	N/A	3.66%	17,174,595	18,252,628	16,049,457	88%
6/30/2022	482,155,635	N/A	**3.21%**	15,477,196	18,761,494	13,737,652	73%
6/30/2023	495,414,915	N/A	**3.21%**	15,902,819	19,126,526	11,332,437	59%
6/30/2024	509,038,825	N/A	3.21%	16,340,146	19,319,107		
6/30/2025	523,037,393	N/A	3.21%	16,789,500	19,370,500		
6/30/2026	537,420,921	N/A	3.21%	17,251,212	19,284,929		
6/30/2027	552,199,996	N/A	3.21%	17,725,620	19,135,069		
6/30/2028	567,385,496	N/A	3.21%	18,213,074	18,892,181		
6/30/2029	582,988,597	N/A	3.19%	18,569,096	18,569,096		
6/30/2030	599,020,783	N/A	3.03%	18,152,401	18,152,401		
6/30/2031	615,493,855	N/A	2.87%	17,691,409	17,691,409		
6/30/2032	632,419,936	N/A	2.72%	17,179,735	17,179,735		
6/30/2033	649,811,484	N/A	2.56%	16,614,236	16,614,236		
6/30/2034	667,681,300	N/A	2.40%	16,027,537	16,027,537		
6/30/2035	686,042,536	N/A	2.25%	15,414,977	15,414,977		
6/30/2036	704,908,706	N/A	2.10%	14,784,367	14,784,367		
6/30/2037	724,293,695	N/A	1.95%	14,129,451	14,129,451		
6/30/2038	744,211,772	N/A	1.81%	13,469,726	13,469,726		
6/30/2039	764,677,596	N/A	1.68%	12,813,154	12,813,154		
6/30/2040	785,706,230	N/A	1.55%	12,180,747	12,180,747		
6/30/2041	807,313,151	N/A	1.43%	11,575,722	11,575,722		

SECTION C

FUND ASSETS

Comparative Balance Sheet at Market Value

	June 30, 2019	June 30, 2018
ASSETS		
Cash & Cash Equivalents	$ 234,592,233	$ 291,278,933
RECEIVABLES		
Due From Employers	$ 50,176,293	$ 50,630,008
Due From Plan Members	22,246,433	22,496,292
Due from Brokers for Securities Sold	25,744,036	17,390,199
Interest & Dividends	16,512,694	17,110,713
Other	5,810,536	4,481,845
Total Receivables	$ 120,489,992	$ 112,109,057
INVESTMENTS		
Equity Investments		
Domestic	$ 3,487,514,620	$ 2,954,524,278
International	713,706,500	1,282,363,537
Fixed Income Investments		
Domestic	1,916,263,516	1,627,218,573
International	188,033,561	205,798,449
Real Estate	923,712,323	805,152,829
Alternative Investments	1,665,288,822	1,633,707,602
Total Investments	$ 8,894,519,342	$ 8,508,765,268
Other Assets	1,070,219	140,620
TOTAL ASSETS	$ 9,250,671,786	$ 8,912,293,878
LIABILITIES		
Management Fees & Other Payables	$ 9,834,620	$ 9,960,600
Due to Brokers for Securities Purchased	33,222,015	28,158,043
TOTAL LIABILITIES	$ 43,056,635	$ 38,118,643
NET ASSETS HELD IN TRUST FOR BENEFITS	$ 9,207,615,151	$ 8,874,175,235

Reconciliation of System Assets

Item	June 30, 2019 Employees	Teachers	Police#	Fire#	Total
A. Market Value of Assets at Beginning of Year	$ 2,983,733,684	$ 3,227,892,056	$ 1,793,624,210	$ 868,925,285	$ 8,874,175,235
B. Revenues and Expenditures					
1. Contributions					
a. Employee Contributions	$ 89,782,292	$ 81,113,337	$ 37,208,337	$ 15,891,168	$ 223,995,134
b. Employer Contributions*	146,742,582	197,098,676	93,643,989	42,427,193	479,912,440
c. Total	$ 236,524,874	$ 278,212,013	$ 130,852,326	$ 58,318,361	$ 703,907,574
2. Investment Return					
a. Interest, Dividends, and Other Income	$63,240,093.00	$67,923,660	$ 38,046,491	$ 18,413,646	$ 187,623,890
b. Net Realized and Unrealized Gains/(Losses)	110,819,540	120,238,116	66,600,367	32,257,798	329,915,821
c. Investment Expenses*	(9,005,082)	(9,682,203)	(5,416,923)	(2,621,477)	(26,725,685)
d. Net Investment Income	$ 165,054,551	$ 178,479,573	$ 99,229,935	$ 48,049,967	$ 490,814,026
3. Benefits and Refunds					
a. Refunds	$ (12,928,621)	$ (5,418,828)	$ (4,483,959)	$ (633,085)	$ (23,464,493)
b. Regular Monthly Benefits	(259,230,898)	(307,494,750)	(144,658,652)	(67,028,806)	(778,413,106)
c. Partial Lump-Sum Benefits Paid	(1,536,257)	(428,861)	(399,121)	(129,368)	(2,493,607)
d. Medical Premium Subsidy Payments	(11,422,844)	(19,800,844)	(10,676,259)	(5,897,994)	(47,797,941)
e. Total	$ (285,118,620)	$ (333,143,283)	$ (160,217,991)	$ (73,689,253)	$ (852,169,147)
4. Administrative Expenses*	$ (2,589,034)	$ (2,749,990)	$ (1,529,692)	$ (719,502)	$ (7,588,218)
5. Miscellaneous Expenses	$ (513,548)	$ (552,306)	$ (308,943)	$ (149,522)	$ (1,524,319)
6. Interest Expense on OPEB Deficit	$ -	$ -	$ -	$ -	$ -
7. Interest Income on OPEB Deficit	$ -	$ -	$ -	$ -	$ -
8. Transfers	$ -	$ -	$ -	$ -	$ -
C. Market Value of Assets at End of Year	$ 3,097,091,907	$ 3,348,138,063	$ 1,861,649,845	$ 900,735,336	$ 9,207,615,151

 # 401(h) subsidy income and expense reported by NHRS in total for Police and Fire was allocated by staff to be approximately 81% to Police and 19% to Fire for purposes of this schedule.

** Information regarding net cash flows for funding purposes is provided separately from the GASB Statement Nos. 67 and 74 information and may differ. Amounts include $3,850 in employer contributions and $559,534 in administrative expenses that were unallocated in the GASB accounting statements.*

Development of Actuarial Value of Assets

Year Ended June 30:	2017	2018	2019	2020	2021	2022	2023
A. Actuarial Value Beginning of Year	$ 7,663,416,136	$ 8,204,537,196	$ 8,747,715,939				
B. Market Value End of Year	8,293,261,180	8,874,175,235	9,207,615,151				
C. Market Value Beginning of Year	7,460,944,677	8,293,261,180	8,874,175,235				
D. Non-Investment Net Cash Flow*	(150,426,632)	(139,877,807)	(157,374,111)				
E. Investment Income							
E1. Market Total: B - C - D	982,743,135	720,791,862	490,814,027				
E2. Assumed Rate	7.25%	7.25%	7.25%				
E3. Amount for Immediate Recognition	550,144,704	589,758,376	628,504,594				
E4. Amount for Phased-In Recognition: E1-E3	432,598,431	131,033,486	(137,690,567)				
F. Phased-In Recognition of Investment Income							
F1. Current Year: 0.20 x E4	86,519,686	26,206,697	(27,538,113)				
F2. First Prior Year	(92,471,186)	86,519,686	26,206,697	$ (27,538,113)			
F3. Second Prior Year	(52,984,178)	(92,471,186)	86,519,686	26,206,697	$ (27,538,113)		
F4. Third Prior Year	126,027,156	(52,984,178)	(92,471,186)	86,519,686	26,206,697	$ (27,538,113)	
F5. Fourth Prior Year	74,311,510	126,027,155	(52,984,179)	(92,471,187)	86,519,687	26,206,698	$ (27,538,115)
F6. Total Recognized Investment Gain	141,402,988	93,298,174	(60,267,095)	(7,282,917)	85,188,271	(1,331,415)	(27,538,115)
G. Preliminary Actuarial Value End of Year: A + D + E3 + F6	$ 8,204,537,196	$ 8,747,715,939	$ 9,158,579,327				
H. Additional Recognized G/L due to Corridor	-	-	-				
I. Final Actuarial Value after 20% Corridor	$ 8,204,537,196	$ 8,747,715,939	$ 9,158,579,327				
J. Difference between Market & Actuarial Value: B-I	$ 88,723,984	$ 126,459,296	$ 49,035,824				
K. Recognized Rate of Return	9.11%	8.40%	6.55%				
L. Market Rate of Return	13.31%	8.77%	5.58%				
M. Ratio of Actuarial Value to Market Value	98.93%	98.57%	99.47%				

The Actuarial Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed 5-year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. The Actuarial Value of Assets is unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If assumed rates are exactly realized for 4 consecutive years, it will become equal to Market Value. Final Actuarial Value of Assets may not be less than 80% nor more than 120% of Market Value of Assets.

** Information regarding net cash flows for funding purposes is provided separately from the GASB Statement Nos. 67 and 74 information and may differ. Total non-investment net cash flow includes $3,850 in employer contributions and $559,534 in administrative expenses that were unallocated in the GASB accounting statements.*

Allocation of Assets
June 30, 2019

	Employees	Teachers	Police	Fire	Total
Allocated Fund Assets (Actuarial Value)	$3,080,598,118	$3,330,307,311	$1,851,735,492	$895,938,406	$9,158,579,327
Less Reserve for TSAs	$0	$0	$0	$0	$0
Less 401(h) Account	$16,630,948	$4,219,363	$12,867,729	$2,928,373	$36,646,413
Net Pension Valuation Assets	$3,063,967,170	$3,326,087,948	$1,838,867,763	$893,010,033	$9,121,932,914

The Actuarial Value of Assets was allocated to the pension and medical subsidy plans based on the Market Value of those plans. The Actuarial Value of Assets was then further allocated to each fund (either pension or medical subsidy) based on the Market Value of those funds. The 401(h) account for Police and Fire is combined. The allocation between Police and Fire is based on the percentage of the medical subsidy market value of assets, as reported by the System.

SECTION D

PARTICIPANT DATA

Active Members by Valuation Division

Valuation Group	Active Members	Valuation Payroll	Average Age	Average Service*	Average Pay
Employees:					
Male	9,650	$ 544,052,544	48.5	11.1	$56,379
Female	15,004	700,877,668	49.3	10.7	46,713
Total	24,654	1,244,930,212	49.0	10.8	50,496
Teachers:					
Male	3,772	256,518,633	46.2	14.4	68,006
Female	13,958	879,087,891	45.9	13.2	62,981
Total	17,730	1,135,606,524	46.0	13.4	64,050
Police:					
Male	3,618	274,308,662	39.0	11.1	75,818
Female	598	38,707,587	38.6	8.7	64,728
Total	4,216	313,016,249	38.9	10.8	74,245
Fire:					
Male	1,648	128,660,330	41.4	13.1	78,071
Female	40	2,792,707	39.6	11.1	69,818
Total	1,688	131,453,037	41.3	13.1	77,875
Total:					
Male	18,688	1,203,540,169	45.6	11.9	64,402
Female	29,600	1,621,465,853	47.5	11.8	54,779
Grand Total	48,288	$2,825,006,022	46.7	11.9	$58,503

** One month of service was added to the reported service for all active participants in consideration of potential subsidized service purchases in the future.*

Valuation Group	Active Members	Valuation Payroll
Employees:		
State	9,873	$ 567,292,108
Political Subdivisions	14,781	677,638,104
Subtotal	24,654	1,244,930,212
Teachers:	17,730	1,135,606,524
Police:		
State	1,083	85,189,248
Political Subdivisions	3,133	227,827,001
Subtotal	4,216	313,016,249
Fire:		
State	64	4,292,320
Political Subdivisions	1,624	127,160,717
Subtotal	1,688	131,453,037
Total	48,288	$ 2,825,006,022

Summary of Membership Data by Category

	June 30									
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Active Members										
Number	48,288	48,121	47,886	48,069	47,812	48,307	48,688	48,625	49,738	50,467
Average age (years)	46.7	46.8	46.9	46.9	47.0	47.1	47.0	46.9	46.6	46.3
Average service* (years)	11.9	12.0	12.1	12.1	12.2	12.1	12.0	11.8	11.4	11.1
Average salary	$58,503	$57,194	$55,708	$54,118	$53,857	$51,916	$51,383	$51,162	$50,621	$49,168
Total payroll supplied, annualized	$ 2,825,006,022	$ 2,752,235,069	$ 2,667,611,532	$ 2,601,403,606	$ 2,575,031,210	$ 2,507,898,809	$ 2,501,741,708	$ 2,487,757,437	$ 2,517,779,470	$ 2,481,383,620
Vested Inactive Members										
Number	2,552	2,420	2,281	1,785	1,999	1,297	1,261	1,372	1,496	1,515
Average age (years)	52.1	52.2	51.8	52.1	51.7	52.3	52.3	51.5	51.5	51.5
Non-Vested Inactive Members										
Number	12,530	11,454	10,477	9,528	8,690	8,102	7,273	7,041	5,677	5,677
Service Retirees										
Number	33,573	32,385	31,186	28,403	27,114	26,958	25,785	24,622	23,390	22,248
Average age (years)	70.0	70.0	70.0	70.0	69.0	69.0	69.2	69.0	69.0	68.0
Total annual benefits	$ 708,597,132	$ 673,359,556	$ 639,679,378	$ 608,332,888	$ 570,043,185	$ 537,980,513	$ 511,111,807	$ 484,434,150	$ 457,444,791	$ 427,718,788
Average annual benefit	$ 21,106	$ 20,792	$ 20,512	$ 21,418	$ 21,024	$ 19,956	$ 19,822	$ 19,675	$ 19,557	$ 19,225
Disability Retirees										
Number	1,627	1,616	1,600	1,600	1,586	1,561	1,558	1,542	1,511	1,474
Average age (years)	64.6	64.2	64.0	63.7	63.4	62.0	62.0	62.0	62.0	61.0
Total annual benefits	$ 33,041,012	$ 32,273,693	$ 31,739,977	$ 31,124,304	$ 30,483,173	$ 30,088,288	$ 29,774,641	$ 29,220,458	$ 27,994,176	$ 26,945,959
Average annual benefit	$ 20,308	$ 19,971	$ 19,837	$ 19,453	$ 19,220	$ 19,275	$ 19,111	$ 18,950	$ 18,527	$ 18,281
Beneficiaries										
Number	3,152	3,011	2,908	2,773	2,650	2,535	2,386	2,290	2,229	2,123
Average age (years)	74.5	74.2	73.9	73.9	73.6	73.4	73.4	73.0	73.0	73.0
Total annual benefits	$ 46,998,152	$ 43,797,864	$ 41,692,950	$ 38,818,283	$ 36,495,210	$ 34,600,022	$ 32,258,707	$ 30,363,269	$ 28,908,530	$ 27,390,320
Average annual benefit	$ 14,911	$ 14,546	$ 14,337	$ 13,999	$ 13,772	$ 13,649	$ 13,520	$ 13,259	$ 12,969	$ 12,902
Total Covered Lives	101,722	99,007	96,338	92,158	89,851	88,760	86,951	85,492	84,041	83,504

** Beginning in 2017, one month of service was added to the reported service for all active participants in consideration of potential subsidized service purchases in the future.*

SECTION E

METHODS AND ASSUMPTIONS

Valuation Methods

Pension

Actuarial Cost Method **-** Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gain/(losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability.

Financing of Unfunded Actuarial Accrued Liabilities **-** Unfunded Actuarial Accrued Liabilities are amortized by level (principal & interest combined) percent-of-payroll contributions from the contribution effective date. The unfunded liability as of June 30, 2017 shall be amortized through 2039. Each subsequent change in liability as calculated in odd-numbered years shall be separately amortized over a fixed period of no longer than 20 years.

The rate-setting valuations project the unfunded actuarial accrued liability to the beginning of the applicable biennium to determine the unfunded amortization rate. We projected the normal cost rates from the first year of the rate setting biennium to better reflect the impact of the changing benefit tiers and generational mortality. We developed projected normal cost rates based on a new entrant profile determined by the current active population with 3-8 years of service.

Medical Subsidy

Liabilities are determined under the entry-age actuarial cost method.

Under New Hampshire Statute, contribution rates to the 401(h) sub-trust are determined as the lesser of 25% of the employers' total contributions or the actuarial required contribution rate that keeps the medical subsidy sub-trust solvent (the "solvency rate"). Under IRS Regulations, 401(h) sub-trust contributions are limited by 25% of the total contributions to the plan (other than contributions to fund past service credits). NHRS maintains the historical information for determining compliance with IRC Section 401(h). A test for compliance with IRC Section 401(h) was outside the scope of this valuation.

Solvency rates for medical subsidy benefits are set such that a specified margin is established by the end of the biennium and for all future years thereafter. The margin is intended to mitigate the risk of insolvency due to adverse experience.

At the November 12, 2013 Board meeting, the Board elected to incorporate a 20% margin requirement for all four member classifications.

At the June 9, 2020 Board meeting, the Board elected to increase the margin for the Teachers group from 20% to 50%. No change to the margin requirement of 20% was made for the other groups.

Valuation Methods

Actuarial Value of Assets **-** The Actuarial Value of Assets recognizes assumed investment return fully each year. Differences between actual return on the Market Value of assets and assumed return on the Actuarial Value of Assets are phased-in over a closed 5-year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than Market Value. The Actuarial Value of Assets is unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If assumed rates are exactly realized for 4 consecutive years, it will become equal to Market Value. Actuarial Value is limited to a 20% corridor around the Market Value.

The Actuarial Value of Assets was allocated to the pension and medical subsidy plans based on the Market Value of those plans. The Actuarial Value of Assets was then further allocated to each fund (either pension or medical subsidy) based on the Market Value of those funds.

For purposes of determining the medical subsidy solvency rates, the Market Value of Assets was used for all group funds due to the short time horizon before these closed group funds are expected to become pay-as-you-go.

Development of Amortization Payment

The employer contribution rates determined by the 2019 valuation are for the 2022-2023 biennium. The Unfunded Actuarial Accrued Liability (UAAL) was determined using the Actuarial Value of assets and actuarial accrued liability calculated as of the valuation date. The UAAL amortization payment (one component of the contribution requirement), is the level percent of pay required to fully amortize the UAAL over multiple periods beginning on July 1, 2019. This UAAL payment reflects any payments expected to be made and interest to be accrued between the valuation date and the date contributions determined by this report are scheduled to begin. It was assumed that the entire pension contribution as determined by the June 30, 2017 valuation effective from July 1, 2019 to June 30, 2021 would be contributed to the net pension assets. The unfunded liability as of June 30, 2017 shall be amortized through 2039. Each subsequent change in liability as calculated in odd-numbered years shall be separately amortized over a fixed period of no longer than 20 years.

Valuation Assumptions

The actuarial assumptions used in the valuation are shown in this section. All actuarial assumptions and the rationale for the assumptions are based on the July 1, 2015 to June 30, 2019 experience study.

All actuarial assumptions are expectations of future experience, not market measures. Under RSA 100-A:14 IX, the Board of Trustees sets the actuarial assumptions after consulting with the actuary.

Economic Assumptions

The investment return rate assumed in the valuations is 6.75% per year, compounded annually (net after investment expenses). ***The investment return rate*** assumed in the medical subsidy valuations is 2.75% per year, compounded annually (net after investment expenses) for purposes of computing accrued liabilities. However, for determining the solvency contribution rate for the medical subsidy account and GASB 74, the investment return rate assumption was 6.75% on the market value of assets.

The ***Wage Inflation Rate*** assumed in this valuation was 2.75% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes related to individual merit and seniority effects.

The ***Price Inflation*** assumption is 2.0% per year.

The assumed ***Real Rate of Return*** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 6.75% investment return rate translates to an assumed real rate of return over wage inflation of 4.00%. The assumed real rate of return over price inflation would be higher – at 4.75%, with a 2.0% price inflation assumption.

The active member population for Employees, Police and Fire is assumed to remain constant. For purposes of financing the unfunded liabilities, total payroll is assumed to grow at the wage inflation rate – 2.75% per year. For Teachers, the active member population is assumed to decline by 0.50% per year. For purposes of financing the unfunded liabilities, total payroll for Teachers is assumed to grow at the wage inflation rate minus 0.50% which is 2.25% per year.

Pay increase assumptions for individual active members are shown for sample ages on the following pages. Part of the assumption for each age is for merit and/or seniority increase, and the other 2.75% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.

Valuation Assumptions

Employees

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

	Salary Increase Assumptions for an Individual Member		
Service Index	Merit & Seniority	Base (Economy)	Increase Next Year
1	12.00%	2.75%	14.75%
2	6.00%	2.75%	8.75%
3	3.00%	2.75%	5.75%
4	2.75%	2.75%	5.50%
5	2.50%	2.75%	5.25%
6	2.25%	2.75%	5.00%
7	2.00%	2.75%	4.75%
8	1.75%	2.75%	4.50%
9	1.50%	2.75%	4.25%
10	1.25%	2.75%	4.00%
11	1.00%	2.75%	3.75%
12	0.75%	2.75%	3.50%
13	0.50%	2.75%	3.25%
14	0.50%	2.75%	3.25%
15	0.50%	2.75%	3.25%
16	0.50%	2.75%	3.25%
17	0.50%	2.75%	3.25%
18	0.50%	2.75%	3.25%
19	0.50%	2.75%	3.25%
20	0.50%	2.75%	3.25%
21	0.50%	2.75%	3.25%
22	0.50%	2.75%	3.25%
23	0.50%	2.75%	3.25%
24	0.50%	2.75%	3.25%
25	0.50%	2.75%	3.25%
Ref:	853 - -2.75%		

Valuation Assumptions

Employees (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

For Members Hired Prior to July 1, 2011

Retirement Ages	% of Active Members Retiring within Next Year					
	Male			Female		
	Normal	Early	Early Rule of 70	Normal	Early	Early Rule of 70
45			0.60%			0.60%
46			0.60%			0.60%
47			0.70%			0.70%
48			0.90%			0.90%
49			1.10%			1.10%
50		0.50%	1.80%		0.50%	1.80%
51		0.50%	2.10%		0.50%	2.10%
52		0.60%	2.40%		0.60%	2.40%
53		0.70%	3.50%		0.70%	3.50%
54		0.90%	3.90%		0.90%	3.90%
55		1.50%	6.30%		1.50%	6.30%
56		2.10%	6.90%		2.10%	6.90%
57		2.10%	9.80%		2.10%	9.80%
58		2.90%	11.10%		2.90%	11.10%
59		3.90%	13.70%		3.90%	13.70%
60	10.80%			10.80%		
61	10.10%			10.50%		
62	15.50%			13.90%		
63	16.10%			13.60%		
64	13.50%			14.30%		
65	17.10%			19.20%		
66	24.80%			24.00%		
67	23.10%			23.70%		
68	19.80%			20.20%		
69	18.80%			20.10%		
70	100.00%			100.00%		
Ref.	3082	3084	3085	3083	3084	3085

Valuation Assumptions

Employees (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

For Members Hired on or After July 1, 2011

Retirement Ages	% of Active Members Retiring within Next Year			
	Male		Female	
	Normal	Early	Normal	Early
60		10.8%		10.8%
61		10.1%		10.5%
62		15.5%		13.9%
63		16.1%		13.6%
64		13.5%		14.3%
65	45.0%		44.0%	
66	45.0%		44.0%	
67	23.0%		22.0%	
68	21.0%		18.0%	
69	20.0%		19.0%	
70	100.0%		100.0%	
Ref.	999	3082	999	3083
	65	60	65	60

Valuation Assumptions

Employees (Concluded)

Rates of separation from active membership were as shown below (rates do not apply to members eligible for normal retirement and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year	
		Male	Female
	0	27.00%	27.00%
	1	21.00%	21.00%
	2	15.00%	15.00%
	3	12.00%	12.00%
	4	10.00%	10.00%
25	5+	8.26%	8.26%
30		6.84%	6.84%
35		5.74%	5.74%
40		4.97%	4.97%
45		4.39%	4.39%
50		3.81%	3.81%
55		3.48%	3.48%
60		3.23%	3.23%
Ref.		37	37
		1.29	1.29
		1269	1269

Rates of disability among active members. 60% are assumed to be ordinary disability and 40% are assumed to be accidental disability.

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	Men	Women
20	0.000%	0.000%
25	0.011%	0.011%
30	0.014%	0.014%
35	0.018%	0.018%
40	0.038%	0.038%
45	0.072%	0.072%
50	0.150%	0.150%
55	0.281%	0.281%
Ref	19	19
	0.60	0.60

Valuation Assumptions

Teachers

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

Service Index	Salary Increase Assumptions for an Individual Member: Merit & Seniority	Base (Economy)	Increase Next Year
1	8.00%	2.75%	10.75%
2	8.00%	2.75%	10.75%
3	4.00%	2.75%	6.75%
4	3.50%	2.75%	6.25%
5	3.25%	2.75%	6.00%
6	3.00%	2.75%	5.75%
7	2.75%	2.75%	5.50%
8	2.50%	2.75%	5.25%
9	2.25%	2.75%	5.00%
10	2.00%	2.75%	4.75%
11	1.75%	2.75%	4.50%
12	1.50%	2.75%	4.25%
13	1.25%	2.75%	4.00%
14	1.00%	2.75%	3.75%
15	1.00%	2.75%	3.75%
16	1.00%	2.75%	3.75%
17	1.00%	2.75%	3.75%
18	1.00%	2.75%	3.75%
19	1.00%	2.75%	3.75%
20	1.00%	2.75%	3.75%
21	1.00%	2.75%	3.75%
22	1.00%	2.75%	3.75%
23	1.00%	2.75%	3.75%
24	1.00%	2.75%	3.75%
25	1.00%	2.75%	3.75%
Ref:	854 - -2.75%		

The Teachers' active head count is assumed to decline 0.50% per year. The open group payroll growth assumption is consequently 2.25% per year (2.75% - 0.50%).

Valuation Assumptions

Teachers (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

For Members Hired Prior to July 1, 2011

Retirement Ages	% of Active Members Retiring within Next Year					
	Male			Female		
	Normal	Early	Early Rule of 70	Normal	Early	Early Rule of 70
45			0.60%			0.60%
46			0.60%			0.60%
47			0.60%			0.60%
48			0.60%			0.60%
49			0.60%			0.60%
50		0.40%	0.80%		0.40%	0.80%
51		0.50%	1.00%		0.50%	1.00%
52		0.60%	1.20%		0.60%	1.20%
53		0.70%	0.90%		0.70%	0.90%
54		1.00%	1.90%		1.00%	1.90%
55		1.50%	4.80%		1.50%	4.80%
56		2.00%	6.60%		2.00%	6.60%
57		2.90%	9.00%		2.90%	9.00%
58		4.30%	12.00%		4.30%	12.00%
59		6.80%	15.90%		6.80%	15.90%
60	16.00%			13.00%		
61	16.00%			14.00%		
62	20.00%			18.00%		
63	16.00%			19.00%		
64	20.00%			19.00%		
65	24.50%			28.00%		
66	32.00%			35.00%		
67	28.00%			32.00%		
68	28.00%			28.00%		
69	28.00%			30.00%		
70	100.00%			100.00%		
Ref.	3086	3088	3089	3087	3088	3089

Valuation Assumptions

Teachers (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

For Members Hired on or After July 1, 2011

Retirement Ages	% of Active Members Retiring within Next Year			
	Male		Female	
	Normal	Early	Normal	Early
60		16%		13%
61		16%		14%
62		20%		18%
63		16%		19%
64		20%		19%
65	58%		56%	
66	58%		56%	
67	25%		27%	
68	25%		27%	
69	25%		27%	
70	100%		100%	
Ref.	999	3086	999	3087
	65	60	65	60

Valuation Assumptions

Teachers (Concluded)

Rates of separation from active membership were as shown below (rates do not apply to members eligible for normal retirement and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year	
		Male	Female
	0	25.0%	25.0%
	1	15.0%	15.0%
	2	12.0%	12.0%
	3	10.0%	10.0%
	4	8.0%	8.0%
25	5+	7.7%	7.7%
30		6.0%	6.0%
35		4.6%	4.6%
40		3.7%	3.7%
45		2.8%	2.8%
50		2.4%	2.4%
55		2.3%	2.3%
60		2.3%	2.3%
Ref.		870	870
		1.10	1.10
		81	81

Rates of disability among active members. 80% percent are assumed to be ordinary disability and 20% percent are assumed to be accidental disability.

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	Male	Female
20	0.000%	0.000%
25	0.004%	0.004%
30	0.005%	0.005%
35	0.006%	0.006%
40	0.013%	0.013%
45	0.024%	0.024%
50	0.050%	0.050%
55	0.094%	0.094%
Ref	19	19
	0.20	0.20

Valuation Assumptions

Police

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

	Salary Increase Assumptions for an Individual Member		
Service Index	Merit & Seniority	Base (Economy)	Increase Next Year
1	25.00%	2.75%	27.75%
2	19.00%	2.75%	21.75%
3	6.00%	2.75%	8.75%
4	4.50%	2.75%	7.25%
5	3.50%	2.75%	6.25%
6	2.75%	2.75%	5.50%
7	2.25%	2.75%	5.00%
8	1.80%	2.75%	4.55%
9	1.50%	2.75%	4.25%
10	1.50%	2.75%	4.25%
11	1.50%	2.75%	4.25%
12	1.50%	2.75%	4.25%
13	1.50%	2.75%	4.25%
14	1.50%	2.75%	4.25%
15	1.50%	2.75%	4.25%
16	1.50%	2.75%	4.25%
17	1.50%	2.75%	4.25%
18	1.50%	2.75%	4.25%
19	1.50%	2.75%	4.25%
20	1.50%	2.75%	4.25%
21	1.50%	2.75%	4.25%
22	1.50%	2.75%	4.25%
23	1.50%	2.75%	4.25%
24	1.50%	2.75%	4.25%
25	1.50%	2.75%	4.25%
Ref:	855 - -2.75%		

Valuation Assumptions

Police (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

(Applying to Eligible Members)

For Members Hired Prior to July 1, 2011 Who Have Vested Status as of January 1, 2012		For Members Hired on or After July 1, 2011 and for Members Hired Prior to July 1, 2011 Who Have Non-Vested Status as of January 1, 2012				
Retirement Ages	% of Active Members Retiring within Next Year	Age 46 with 21 Years	Age 47 with 22 Years	Age 48 with 23 Years	Age 49 with 24 Years	Age 50 with 25 Years
45	21%					
46	21%	27%				
47	21%	27%	31%			
48	21%	25%	31%	34%		
49	21%	25%	31%	34%	38%	
50	21%	25%	27%	34%	38%	40%
51	21%	21%	27%	31%	38%	40%
52	21%	21%	21%	31%	33%	40%
53	21%	21%	21%	21%	33%	38%
54	21%	21%	21%	21%	21%	38%
55	21%	21%	21%	21%	21%	21%
56	21%	21%	21%	21%	21%	21%
57	21%	21%	21%	21%	21%	21%
58	21%	21%	21%	21%	21%	21%
59	21%	21%	21%	21%	21%	21%
60	21%	21%	21%	21%	21%	21%
61	21%	21%	21%	21%	21%	21%
62	21%	21%	21%	21%	21%	21%
63	21%	21%	21%	21%	21%	21%
64	21%	21%	21%	21%	21%	21%
65	21%	21%	21%	21%	21%	21%
66	21%	21%	21%	21%	21%	21%
67	21%	21%	21%	21%	21%	21%
68	21%	21%	21%	21%	21%	21%
69	21%	21%	21%	21%	21%	21%
70	100%	100%	100%	100%	100%	100%
Ref.	3090 45					

Valuation Assumptions

Police (Concluded)

Rates of separation from active membership were as shown below (rates do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year	
		Male	Female
	0	25.00%	25.00%
	1	16.00%	16.00%
	2	10.50%	10.50%
	3	7.00%	7.00%
	4	5.50%	5.50%
25	5+	6.58%	6.58%
30		4.97%	4.97%
35		3.84%	3.84%
40		2.99%	2.99%
45		2.39%	2.39%
50		2.03%	2.03%
55		1.88%	1.88%
60		1.88%	1.88%
Ref.		80	80
		0.47	0.47
		1270	1270

Rates of disability among active members. 25% percent are assumed to be ordinary disability and 75% percent are assumed to be accidental disability.

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	Ordinary	Accidental
20	0.013%	0.039%
25	0.013%	0.039%
30	0.013%	0.039%
35	0.029%	0.088%
40	0.064%	0.191%
45	0.114%	0.343%
50	0.183%	0.549%
55	0.272%	0.818%
Ref	35	35
	0.16	0.49

Valuation Assumptions

Fire

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

	Salary Increase Assumptions for an Individual Member		
Service Index	Merit & Seniority	Base (Economy)	Increase Next Year
1	25.00%	2.75%	27.75%
2	15.00%	2.75%	17.75%
3	7.00%	2.75%	9.75%
4	5.00%	2.75%	7.75%
5	3.75%	2.75%	6.50%
6	2.50%	2.75%	5.25%
7	2.00%	2.75%	4.75%
8	1.50%	2.75%	4.25%
9	1.00%	2.75%	3.75%
10	1.00%	2.75%	3.75%
11	1.00%	2.75%	3.75%
12	1.00%	2.75%	3.75%
13	1.00%	2.75%	3.75%
14	1.00%	2.75%	3.75%
15	1.00%	2.75%	3.75%
16	1.00%	2.75%	3.75%
17	1.00%	2.75%	3.75%
18	1.00%	2.75%	3.75%
19	1.00%	2.75%	3.75%
20	1.00%	2.75%	3.75%
21	1.00%	2.75%	3.75%
22	1.00%	2.75%	3.75%
23	1.00%	2.75%	3.75%
24	1.00%	2.75%	3.75%
25	1.00%	2.75%	3.75%
Ref:	861 - -2.75%		

Valuation Assumptions

Fire (Continued)

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

(Applying to Eligible Members)

For Members Hired Prior to July 1, 2011 Who Have Vested Status as of January 1, 2012		For Members Hired on or After July 1, 2011 and for Members Hired Prior to July 1, 2011 Who Have Non-Vested Status as of January 1, 2012				
Retirement Ages	**% of Active Members Retiring within Next Year**	**Age 46 with 21 Years**	**Age 47 with 22 Years**	**Age 48 with 23 Years**	**Age 49 with 24 Years**	**Age 50 with 25 Years**
45	11%					
46	11%	15%				
47	11%	15%	18%			
48	11%	15%	18%	22%		
49	11%	15%	18%	22%	26%	
50	16%	15%	18%	21%	26%	30%
51	16%	16%	18%	21%	26%	30%
52	16%	16%	16%	21%	21%	30%
53	16%	16%	16%	16%	21%	22%
54	16%	16%	16%	16%	16%	22%
55	19%	19%	19%	19%	19%	19%
56	19%	19%	19%	19%	19%	19%
57	19%	19%	19%	19%	19%	19%
58	19%	19%	19%	19%	19%	19%
59	19%	19%	19%	19%	19%	19%
60	23%	23%	23%	23%	23%	23%
61	23%	23%	23%	23%	23%	23%
62	23%	23%	23%	23%	23%	23%
63	23%	23%	23%	23%	23%	23%
64	23%	23%	23%	23%	23%	23%
65	28%	28%	28%	28%	28%	28%
66	28%	28%	28%	28%	28%	28%
67	28%	28%	28%	28%	28%	28%
68	28%	28%	28%	28%	28%	28%
69	28%	28%	28%	28%	28%	28%
70	100%	100%	100%	100%	100%	100%
Ref.	3091 45					

Valuation Assumptions

Fire (Concluded)

Rates of separation from active membership were as shown below (rates do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year	
		Male	Female
	0	7.25%	7.25%
	1	5.00%	5.00%
	2	2.50%	2.50%
	3	2.00%	2.00%
	4	1.50%	1.50%
25	5 & Over	1.15%	1.15%
30		1.15%	1.15%
35		1.15%	1.15%
40		1.15%	1.15%
45		1.15%	1.15%
50		1.15%	1.15%
55		1.15%	1.15%
60		1.15%	1.15%
Ref.		151 1.15 1271	151 1.15 1271

Rates of disability among active members. 40% percent are assumed to be ordinary disability and 60% percent are assumed to be accidental disability.

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	Ordinary	Accidental
20	0.029%	0.043%
25	0.042%	0.063%
30	0.051%	0.076%
35	0.062%	0.093%
40	0.085%	0.127%
45	0.125%	0.187%
50	0.182%	0.274%
55	0.275%	0.413%
Ref	3 0.24	3 0.36

Valuation Assumptions

Healthy Mortality

The standard mortality tables for death after retirement are the Pub-2010 Healthy Retiree Mortality Tables with credibility adjustments for each group (Police and Fire combined) and projected fully generational mortality improvements using Scale MP-2019.

The applicable published healthy mortality tables for each valuation group are shown below.

Employees: *PubG-2010 amount-weighted Healthy Retiree General Mortality Tables*
Teachers: *PubT-2010 amount-weighted Healthy Retiree Teachers Mortality Tables*
Police and Fire: *PubS-2010 amount-weighted Healthy Retiree Safety Mortality Tables*

This assumption is used to measure the probabilities of each benefit payment being made after retirement.

Sample rates of mortality and future life expectancy years are shown in the following tables.

Employees

Sample Attained Ages	Probability of Dying Next Year*		Future Life Expectancy (years)*	
	Men	Women	Men	Women
35	0.065%	0.033%	51.01	53.45
40	0.081%	0.045%	45.73	48.11
45	0.111%	0.069%	40.49	42.80
50	0.282%	0.234%	35.36	37.61
55	0.428%	0.328%	30.46	32.66
60	0.648%	0.445%	25.76	27.83
65	0.931%	0.645%	21.28	23.15
70	1.446%	1.055%	17.03	18.64
75	2.476%	1.892%	13.09	14.43
80	4.467%	3.475%	9.62	10.68
Ref:	2705 x 1.01	2706 x 1.09		

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale. The rates shown include the credibility adjustment for each member classification.*

Valuation Assumptions

Teachers

Sample Attained Ages	Probability of Dying Next Year*		Future Life Expectancy (years)*	
	Men	Women	Men	Women
35	0.042%	0.027%	53.53	55.61
40	0.052%	0.037%	48.24	50.30
45	0.069%	0.049%	42.97	45.01
50	0.109%	0.082%	37.73	39.73
55	0.224%	0.213%	32.58	34.57
60	0.380%	0.320%	27.61	29.61
65	0.609%	0.452%	22.85	24.78
70	1.024%	0.736%	18.31	20.07
75	1.901%	1.414%	14.08	15.60
80	3.635%	2.807%	10.34	11.61
Ref:	2701 x 1.02	2702 x 1.05		

Police and Fire

Sample Attained Ages	Probability of Dying Next Year*		Future Life Expectancy (years)*	
	Men	Women	Men	Women
35	0.062%	0.046%	51.57	53.44
40	0.074%	0.057%	46.29	48.12
45	0.117%	0.084%	41.06	42.83
50	0.173%	0.142%	35.89	37.59
55	0.289%	0.269%	30.80	32.48
60	0.509%	0.469%	25.91	27.59
65	0.854%	0.736%	21.29	22.95
70	1.412%	1.198%	16.98	18.53
75	2.490%	2.095%	13.02	14.44
80	4.539%	3.722%	9.56	10.84
Ref:	2703 x 0.96	2704 x 0.99		

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale. The rates shown include the credibility adjustment for each member classification.*

Valuation Assumptions

Disabled Mortality

Disabled pension mortality is based on the Pub-2010 Disabled Retiree Mortality Tables for males and females with fully generational mortality improvements using Scale MP-2019. Due to limited disabled mortality experience, credibility adjustments were not applied.

The applicable published disabled mortality tables for each valuation group are shown below.

Employees: *PubG-2010 amount-weighted Disabled Retiree General Mortality Tables*
Teachers: *PubT-2010 amount-weighted Disabled Retiree Teachers Mortality Tables*
Police and Fire: *PubS-2010 amount-weighted Disabled Retiree Safety Mortality Tables*

The probabilities of disabled mortality at sample attained ages are as follows:

Employees

Sample Ages	Probability of Occurrence Next Year* Disabled Death	
	Men	Women
20	0.428%	0.253%
25	0.326%	0.198%
30	0.476%	0.337%
35	0.632%	0.522%
40	0.780%	0.714%
45	1.010%	0.964%
50	1.502%	1.431%
55	2.079%	1.832%
Ref	2711	2712
	1.00	1.00

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale.*

Valuation Assumptions

Teachers

Sample Ages	Probability of Occurrence Next Year* Disabled Death Men	Women
20	0.428%	0.253%
25	0.326%	0.198%
30	0.476%	0.337%
35	0.632%	0.522%
40	0.780%	0.714%
45	1.010%	0.964%
50	1.502%	1.431%
55	2.079%	1.832%
Ref	2707	2708
	1.00	1.00

Police and Fire

Sample Ages	Probability of Occurrence Next Year* Disabled Death Men	Women
20	0.126%	0.058%
25	0.126%	0.078%
30	0.164%	0.117%
35	0.190%	0.157%
40	0.210%	0.186%
45	0.243%	0.218%
50	0.330%	0.293%
55	0.472%	0.485%
Ref	2709	2710
	1.00	1.00

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale.*

Valuation Assumptions

Pre-Retirement Mortality

For active members dying before retirement, the Pub-2010 Employee Mortality Tables for males and females with fully generational mortality improvements using Scale MP-2019. Due to limited active member mortality experience, credibility adjustments were not applied.

The applicable published disabled mortality tables for each valuation group are shown below.

Employees: *PubG-2010 amount-weighted Employee General Mortality Tables*
Teachers: *PubT-2010 amount-weighted Employee Teachers Mortality Tables*
Police and Fire: *PubS-2010 amount-weighted Employee Safety Mortality Tables*

The probabilities of dying prior to retirement at sample attained ages are as follows:

Employees

Sample Ages	Probability of Occurrence Next Year* Death Before Retirement Men	Women
20	0.038%	0.014%
25	0.033%	0.011%
30	0.048%	0.020%
35	0.065%	0.030%
40	0.080%	0.041%
45	0.098%	0.055%
50	0.139%	0.080%
55	0.215%	0.129%
Ref	2723 x 1.00	2724 x 1.00

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale.*

Valuation Assumptions

Teachers

Sample Ages	Probability of Occurrence Next Year* Death Before Retirement Men	Women
20	0.035%	0.014%
25	0.019%	0.011%
30	0.030%	0.018%
35	0.041%	0.026%
40	0.051%	0.035%
45	0.067%	0.047%
50	0.104%	0.070%
55	0.169%	0.113%
Ref	2719 x 1.00	2720 x 1.00

Police and Fire

Sample Ages	Probability of Occurrence Next Year* Death Before Retirement Men	Women
20	0.043%	0.017%
25	0.043%	0.024%
30	0.055%	0.035%
35	0.065%	0.047%
40	0.071%	0.056%
45	0.082%	0.066%
50	0.112%	0.088%
55	0.172%	0.129%
Ref	2721 x 1.00	2722 x 1.00

** Applicable to calendar year 2019. Rates and life expectancy in future years are determined by the MP-2019 projection scale.*

Weighting of Mortality

The weighting of ordinary and accidental deaths by member classification is as follows:

	Employees	Teachers	Police	Fire
Ordinary	98%	98%	50%	50%
Accidental	2%	2%	50%	50%

Miscellaneous and Technical Assumptions

Administrative & Investment Expenses	The investment return assumption is intended to be the return net of investment expenses. Assumed administrative expenses are added to the Normal Cost, and were 0.35% of payroll.
Benefit Service	Exact Fractional service is used to determine the amount of benefit payable.
COLA	None assumed.
Data Adjustments	**Active Data** - New active member pays were annualized. - 84 active records were excluded due to reported pays being $0. - 5 active records were excluded due to reported employment service being less than 0. - 2 active members and 4 deferred members who were reported as being vested as of 12/31/2011 were also reported as being hired on or after 7/1/2011. For the purposes of retirement eligibility, it was assumed these members were not hired on or after 7/1/2011. **Terminated Vested Data** - Additional data reflecting adjustments to accrued benefits was received after initial results were published. These adjustments will be reflected in future valuations. **Retiree Data** - 914 payee records were excluded due to non-blank Benefit Termination Dates. **Medical Subsidy Data** - 371 records were excluded due to non-blank Benefit Termination Dates. - 4 records were excluded due to having an 'F' in the field "Medical Subsidy Eligible."
Decrement Operation	Disability and turnover decrements do not operate during normal retirement eligibility for Group I and Group II members. They do operate for early retirement for Group I members.
Decrement Timing	Normal and early retirement decrements for the Teachers group are assumed to occur at the beginning of the year. All other decrements for all groups were assumed to occur mid-year.
Eligibility Testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

Incidence of Contributions	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
IRC Section 415(b) and 401(a)(17)	For purposes of the valuation, the limitations under IRC Section 401(a)(17) and 415(b) were not reflected due to immateriality.
Liability Adjustments	Normal, early and vesting retirement liabilities are increased by 8.5%, 5.5%, 11.0% and 12.0% for Employees, Teachers, Police and Fire respectively to account for end of career pay increases. Members hired after July 1, 2011 or who have non-vested status as of January 1, 2012 are assumed to have no adjustment for end of career payments.
Marriage Assumption	Group I: 55% of males and 55% of females are assumed to be married for purposes of death-in-service benefits. Group II: 65% of males and 65% of females are assumed to be married for purposes of death-in-service and death after retirement benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.
Medical Subsidy	Actual medical subsidy recipients are included in the valuation plus 25% of those who opted-out. For those members reported as eligible in the future but not currently receiving, we assumed that members would commence benefits at age eligibility. The solvency rates for the medical subsidy benefits were determined to provide an estimated margin of 20% of the benefits (50% for Teachers) by the end of the first year of the biennium and thereafter. The margin is intended to mitigate the risk of insolvency due to adverse experience. A retired member's medical subsidy amount is provided by System staff. If the member is under the age of 65, the pre-65 subsidy amount used is the amount reported by System staff, and the post-65 subsidy amount is assumed to be at the post-65 rates. It is assumed that 80% of active married members will have their spouses continue to receive a medical subsidy under the plan.
Normal Form of Benefit	This valuation assumes that members will elect the normal form of payment. Alternate forms of payment are available and are actuarially adjusted based on the valuation interest and mortality. Group I: The assumed normal form of benefit is a straight life benefit. Group II: The assumed normal form of benefit is straight life for single members and joint and 50% survivor for married members.

Option Factors	Each option factor is determined on an actuarial equivalent basis using valuation assumptions. No adjustment for optional forms of payment are reflected in the valuation.
Pay Increase Timing	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
New Entrant Profile	For purposes of projecting the normal cost to the beginning of the rate setting biennium, the new entrant profile is based on actual members with 3-8 years of service on the valuation date.
Service Credit Accruals	It is assumed that members accrue one year of service credit per year.
Service Purchases	One month of service was added to the reported service for all active participants in consideration of potential subsidized service purchases in the future.
Split Benefits	Active members with service in more than one plan are valued as if all service accrued is in their current plan. Split benefits are valued upon retirement, as reported in the data.

SECTION F

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL)	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
Actuarial Assumptions	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
Actuarial Cost Method	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
Actuarial Equivalent	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV)	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
Actuarial Present Value of Future Benefits (APVFB)	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan.
Actuarial Value of Assets	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Annual Required Contribution (ARC).

Glossary

Amortization Method	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.
Amortization Payment	That portion of the plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Amortization Period	The period used in calculating the Amortization Payment.
Annual Required Contribution (ARC)	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ARC consists of the Employer Normal Cost and Amortization Payment.
Closed Amortization Period	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
Employer Normal Cost	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Equivalent Single Amortization Period	For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL payment.
Experience Gain/Loss	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience, e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience, i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

Glossary

Funded Ratio	The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability.
GASB	Governmental Accounting Standards Board.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
Open Amortization Period	An open amortization period is one which is used to determine the amortization payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the amortization period each year. In theory, if an open amortization period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.
Unfunded Actuarial Accrued Liability	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
Solvency Rate	The minimum contribution necessary to prevent insolvency (a fund balance less than $0) during or after the biennium in which contributions are being calculated. If fund balances are projected to be less than $0 prior to the beginning of the biennium (due to the lag between the valuation date and contribution certification), then the solvency rate is the minimum contribution necessary to bring the balance back to $0 by the end of the biennium. After the fund balance reaches $0, the solvency rate is becomes the pay-as-you-go rate.
Valuation Date	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.

SECTION G

FUNDING POLICY

New Hampshire Retirement System
Actuarial Funding Policy
(Adopted: March 11, 2014
Revised: October 8, 2019)

FUNDING OBJECTIVES

The main financial objective of the New Hampshire Retirement System (NHRS) is to receive employer and member contributions to fund the long-term costs of benefits provided by statute to plan members and beneficiaries. From the perspective of the members and beneficiaries, a funding policy based on actuarially determined contributions is one which will pay all benefits provided by statute when due. From the perspective of the contributing plan sponsors and taxpayers, the actuarially determined contributions have the additional objectives of keeping contribution rates relatively stable as a percentage of active member payroll and equitably allocating the costs over the active members' period of active service. For pension funding, the payment of benefits is supported in part by income earned on investment assets. This funding policy meets those criteria. It is stipulated by state law and implemented through the application of Board adopted governance policies.

Statutory Pension Funding Policy for NHRS

The statute that establishes the pension funding policy for NHRS is RSA 100-A:16.

RSA 100-A:16 Excerpts:

> **100-A:16 Method of Financing** – All of the assets of the Retirement System shall be credited, according to the purpose for which they are held, between 2 funds, namely, the member annuity savings fund and the state annuity accumulation fund. Each of the funds shall be subdivided on account of the various member classifications. In making the determinations required under this section for financing the Retirement System, the Board of Trustees shall use the entry age normal funding methodology. The Board of Trustees shall direct the System's actuary to prepare biennial valuations of the System's assets and liabilities commencing with the valuation prepared as of June 30, 2007. Such biennial valuation shall be the basis for determining the annual contribution requirements of the System until the next following biennial valuation.
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> …
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> II(b) The contributions of each employer for benefits under the retirement system on account of group II members shall consist of a percentage of the earnable compensation of its members to be known as the "normal contribution," and an additional amount to be known as the "accrued liability contribution;" provided that beginning with state fiscal year 2013 and for each state fiscal year thereafter, any employer shall pay the full amount of such total contributions. The rate percent of such normal contribution, including contributions on behalf of group II members whose group II creditable service is in excess of 40 years, in each instance shall be fixed on the basis of the liabilities of the system with respect to the particular members of the various member classifications as shown by actuarial valuations,
>
> II(c) The contributions of each employer for benefits under the retirement system on account of group I members shall consist of a percentage of the earnable compensation of its members to be known as the "normal contribution," and an additional amount to be known as the "accrued

liability contribution;" provided that beginning with state fiscal year 2013 and for each state fiscal year thereafter, any employer shall pay both normal and accrued liability contributions. The rate percent of such normal contribution in each instance shall be fixed on the basis of the liabilities of the system with respect to the particular members of the various member classifications as shown by actuarial valuation,

...

II(e)(1) Immediately following the actuarial valuation prepared as of June 30 of each fiscal year, the Board shall have an actuary determine the amount of the unfunded accrued liability for each member classification as the amount of the total liabilities of the state annuity accumulation fund on account of such classification which is not dischargeable by the total of the funds in hand to the credit of the state annuity accumulation fund on account of such classification, and the aforesaid normal contributions to be made on account of the members in such classification during the remainder of their active service. The amount so determined with respect to each member classification shall be known as the "unfunded accrued liability" with respect to such classification.

(2) On the basis of each such unfunded accrued liability, the board shall have an actuary determine the level annual contribution required to discharge such amount as provided in subparagraph (3).

(3) The unfunded liability as of June 30, 2017 shall be amortized through 2039. Each subsequent change in liability as calculated in odd-numbered years shall be separately amortized over a fixed period of no longer than 20 years.

Board Established Policy Associated with Funding:

Actuarial Cost Method

The law stipulates under RSA 100-A:16 the use of the entry age normal actuarial cost method for each of the four member classifications. The purpose of this method is to determine the annual Normal Cost for each individual active member, payable from the date of employment to the date of retirement, that is:

Sufficient to accumulate to the value of the member's benefit at the time of retirement, and A constant percentage of the member's year by year projected covered pay.

The Actuarial Accrued Liability under this cost method is the accumulation of normal costs accrued prior to the actuarial valuation date. The Actuarial Accrued Liability represents the theoretical amount of assets required to fund benefits earned on members' past service. The Normal Cost represents the cost required to fund benefits accruing during the current year.

Under RSA 100-A:16, II (i), if the actuarially determined normal contribution rate as set forth in subparagraphs (b) and (c) on account of any of the various member classifications shall be negative in any fiscal year, then the excess amount resulting from the difference between zero and the negative actuarially determined normal contribution rate shall be used to reduce the member contribution rate for that member classification in that fiscal year.

Under RSA 100-A:16, II-a. (a) if within a member classification the employer rates have lowered to require them to be equal to the member rates, then for all subsequent years the employer rates and the members' rates for such member classification shall continue to be equal whether the system liabilities increase or decrease.

Asset Valuation Method

The Actuarial Value of Assets is based on the market value with investment gains and losses smoothed over 5 years. The Actuarial Value of Assets will not consistently be above or below the Market Value and is expected to converge to the Market Value in a relatively short period of time. At any time, it may be either greater or less than Market Value. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than Market Value. If assumed rates are exactly realized for 4 consecutive years, the Actuarial Value will become equal to Market Value. Actuarial Value is limited to a 20% corridor around the Market Value. This means that if the preliminary development of the Actuarial Value results in an amount that is greater than 120% of the Market Value (or less than 80% of the Market Value), the final Actuarial Value is limited to 120% (or 80%) of the Market Value. Any gains or losses on the Market Value outside of the 20% corridor are therefore recognized immediately.

Amortization Method

Pursuant to the Laws of 2018, Chapter 48, RSA 100-A:16, II(e) was revised in June 2018 and stipulates that the Unfunded Accrued Actuarial Liability as of June 30, 2017 shall be amortized through 2039. It further states that each subsequent change in liability as calculated in odd-years will be amortized as a level percentage of pay for no longer than 20 years. For each Actuarial Valuation in the subsequent odd years, a new 20-year amortization, as a level percentage of payroll, of the actuarial gain or loss will be created in that actuarial valuation. This Actuarial Funding Policy implements the intent of the statute.

Beginning with the June 30, 2007 actuarial valuation which determined the employer contribution rates beginning with the fiscal year ending June 30, 2010, the 30-year period is a closed period ending June 30, 2039.

The amortization method is a level percentage of payroll, consistent with RSA 100-A:16 II (b) and (c).

Funding Target

The funding objective is to achieve 100% funding. For this purpose, 100% funding means that the Actuarial Value of Assets equals the Actuarial Accrued Liability. The amortization objective is to reach 100% funding by June 30, 2039 for the Unfunded Accrued Actuarial Liability as of June 30, 2017.

Risk Management

The main financial objective of this funding policy is to fund the long-term costs of benefits provided by statute to plan members and beneficiaries. There are numerous risks that NHRS faces in trying to achieve this objective including funding risk, demographic risk, investment risk, and benefit risk. The Board policies for managing these risks are outlined in this section.

Funding Risk

Frequency of Actuarial Valuations

Regular valuations manage funding risk by allowing employer contribution rates to reflect actual experience as it emerges. Funding valuations are required by RSA 100- A:16, III, as of June 30 every other year on the odd years to determine employer contribution rates for the biennium beginning two years after the valuation date.

Interim funding valuations on June 30 of the even years are required for financial reporting. Funding calculations from interim valuations may be used as additional information for budgeting contributions in anticipation of the next rate setting valuation.

Demographic and Investment Risk

Process for Reviewing and Updating Actuarial Assumptions

The Board adopts actuarial assumptions based on recommendations of the actuary. Demographic and investment risks may be managed in part by having regular reviews of the actuarial assumptions. The law stipulates that the Board shall have the actuary make an actuarial investigation into the experience of the System at least every 5 years (RSA 100-A:14, IX) and shall adopt actuarial assumptions as necessary. The Board shall have the actuary make an actuarial investigation into the experience of the System every 5 years and shall adopt actuarial assumptions as necessary. If circumstances warrant, the Board may undertake an experience study or change assumptions more frequently based on the recommendation of the actuary.

The experience study report shall include, but not necessarily be limited to analysis of and recommendations regarding the following assumptions.

i. Pre-retirement withdrawal rates
ii. Retirement rates
iii. Disability rates
iv. Pay increase rates
v. Mortality rates both before and after retirement
vi. Investment returns considering both real return and inflation, which must be consistent with the investment policy

The actuary shall assume no change in the active member population unless there is compelling evidence to support the expectation of a significant increase or decrease in the workforce covered by the System.

The experience study report will serve as the basis for determinations by the Board regarding whether or not demographic or economic assumptions should be modified for future valuations.

In the interim years, the actuary shall issue a written opinion in regard to the reasonableness of the assumed rate of return that shall address any difference between the assumed rate of return and the expected rate of return as determined by the investment committee (RSA 100-A:15, VII. (c)(1)).

Responding to Favorable/Unfavorable Investment Experience

Investment risk is addressed in the System's Investment Manual. Annual investment experience other than assumed is reflected in the valuation asset method described above.

Asset Liability Studies

The Board adopts an asset allocation based on recommendations from the Independent Investment Committee (IIC), which relies upon the advice from the Director of Investments and the Investment Consultant to formulate its recommendations to the Board. The asset allocation approved by the Board will reflect the results of an Asset Liability Study performed at least once in every five-year period, or more often, as recommended by the IIC, System staff, and Investment Consultant.

Risk Measures

In order to quantify the risks outlined in this actuarial funding policy, the following metrics will be included in annual valuation reports. These metrics provide quantifiable measurements of risk and its movement over time:

i. Funded ratio (Actuarial Value of Assets divided by Actuarial Accrued Liability).
   - Measures progress towards the funding objective of the 100% target funded ratio.

ii. Actual Total Payroll versus expected Total Payroll for each member classification.
   - Measures the funding risk associated with receiving contributions as a level percent of payroll.

iii. Dollar standard deviation of investment return divided by Total Payroll
   - Measures the risk associated with negative asset returns relative impact on the funded status of the plan. A decrease in this measure indicates a decrease in investment risk.

iv. Total Unfunded Actuarial Accrued Liability (UAAL) divided by Total Payroll

- Measures the risk associated with contribution decreases relative impact on the ability to fund the UAAL. A decrease in this measure indicates a decrease in contribution risk.

v. Total Actuarial Accrued Liability (AAL) divided by Total Payroll

- Measures the risk associated with the ability to respond to liability experience through adjustments in contributions. A decrease in this measure indicates a decrease in experience risk. This also provides a long-term measure of the asset risk in situations where the System has a funded ratio below 100%.

vi. Total Actuarial Value of Assets divided by Total Payroll

- Measures the risk associated with the ability to respond to asset experience through adjustments in contributions. A decrease in this measure indicates a decrease in asset risk.

vii. Dollar standard deviation of contribution rate divided by Total Payroll

- Measures the impact of a one standard deviation change in investment return on the annual contribution rate. This rate is expected to stabilize with the introduction of layered amortization.

viii. Net Cash Flow as a Percent of Market Value of Assets

- Measures money coming in less money going out. This ratio is expected to be negative and trend toward the negative of the real return assumption.

ix. Ratio of Actives to Retirees

- Fully mature plans may have ratios near 1.0.

Benefit Risk

Responding to Legislative Proposals and Changes

Benefit risk may be managed as follows:

1. The NHRS shall review legislative proposals and changes for the potential legal, administrative, IRC compliance, and funding impact on the System. If a legislative proposal has the potential for a meaningful impact on plan funding, the Board shall consult with the actuary to estimate the actuarial impact to the System.

2. Under RSA 100-A:15 VII (d), the NHRS may request or recommend legislative proposals to comply with other state or federal regulations, improve administration, or secure funding for benefits provided by statute.

The NHRS does not determine the eligibility requirements for benefits nor the level of benefits.

New Hampshire Retirement System
Actuarial Funding Policy
(Adopted: March 11, 2014
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Statutory Medical Subsidy Funding Policy for NHRS

The statutes that establish the medical subsidy funding policy for NHRS are RSA 100-A:53, 53-b, 53-c, and 53-d.

RSA 100-A:53, 53-b, 53-c, and 53-d Excerpts:

Medical Subsidy Funding Policy

Medical Subsidy benefits provided through NHRS are funded on a pay-as-you-go basis. The medical subsidy benefits provided by statute are fixed amounts for a declining population and therefore pay-as-you-go is a reasonable funding method.

The four sections of the statute refer to four separate member classifications for funding Medical Subsidy benefits provided through the NHRS. These member classifications differ from the pension member classifications and are RSA 100-A:53, Group II; 100-A:53-b, Group I Teachers; 100-A:53-c, Group I Political Subdivision Employees; 100-A:53-d, Group I State Employees.

The comparable funding provisions of the four sections of the statute are as follows:

The benefits provided under RSA 100-A:52, 52-a, and 52-b shall be provided by a 401(h) subtrust of the New Hampshire Retirement System. Beginning July 1, 2009, the 401(h) subtrust shall be funded by allocating to the subtrust the lesser of:

(a) 25 percent of member classification employer contributions; or

(b) The percentage of employer contributions made for the member classification determined by the actuary to be the minimum rate necessary to maintain the benefits provided under RSA 100-A:52, 52-a, and 52-b.

All contributions made to the Retirement System to provide medical benefits under RSA 100-A:52, 52-a, and 52-b shall be maintained in a separate account, the 401(h) subtrust. All funds and accumulated interest shall not be used for or diverted to any purpose other than to provide said medical benefits. Similarly, none of the funds accumulated to provide the retirement benefits set forth in this chapter, may be used or diverted to provide medical benefits under RSA 100-A:52, 52-a, and 52-b. The funds, if any, providing medical benefits under RSA 100-A:52, 52-a, and 52-b may be invested pursuant to the provisions of RSA 100-A:15.

Board Established Policy Associated with Funding:

The law stipulates under RSA 100-A:53, 53-b, 53-c, and 53-d the minimum rate necessary to maintain benefits. For purposes of this determination, the contribution rate calculations are made with respect to

the market value of assets for each member classification separately. Any shortfall in assets for a member classification is to be made up through funding in the nearest rate setting biennium.

Risk Management

There are fewer risks in a pay-as-you-go medical subsidy arrangement than for pension pre-funding.

Solvency Risk

The greatest risk facing the pay-as-you-go financing of the statutory medical subsidy benefits is maintaining solvency of the four IRC Section 401(h) subtrusts. The contribution rate setting based on the June 30th valuation in the odd years determines the rates for the biennium beginning two years after the valuation and ending four years after the valuation date.

In order to mitigate the financing risk, the Board has adopted a policy of determining the employer contribution rate such that the expected assets in each of the four subtrusts will exceed the expected benefit payments for the year by at least 20% each year. This is referred to as a solvency margin. The Board may review the sufficiency of the margin and make changes based upon the recommendation of the actuary.

Risk Measures

In order to quantify the risks outlined in this actuarial funding policy, the following metrics will be included in annual valuation reports. These metrics provide quantifiable measurements of risk and its movement over time:

i. 20-year projections of contributions and benefit payments.
   - Measures progress towards the funding objective of solvency with a 20% margin.

ii. Actual Total Payroll versus expected Total Payroll for each member classification.
   - Measures the funding risk associated with receiving contributions as a level percent of payroll.

Miscellaneous Matters Associated with Funding:

Overall Conformance with Professional Standards of Practice

By law, the actuary shall be a member of the American Academy of Actuaries and have at least 7 years of actuarial experience (RSA 100-A:1, XXIX). The work of the actuary in connection with this policy shall conform to Actuarial Standards of Practice for public employee retirement plans promulgated by the Actuarial Standards Board and shall satisfy the requirements of the Governmental Accounting Standards Board with respect to the development of information needed by the system and by employers for financial reporting purposes.