

**Vermont State Teachers'
Retirement System
Actuarial Valuation and
Review as of June 30, 2019**

The logo for Segal Consulting is a large, dark blue, stylized shape that resembles a compass needle or a stylized letter 'S'. It is positioned in the upper right quadrant of the page. The text "Segal Consulting" is written in white, sans-serif font, with a white star icon to the left of the word "Segal".

 Segal Consulting

This report has been prepared at the request of the Board of Trustees to assist in administering the System. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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November 1, 2019

Board of Trustees
Vermont State Teachers' Retirement System
Montpelier, Vermont 05609

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2019, of the Vermont State Teachers' Retirement System. This report summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirement for the fiscal year ending June 30, 2021.


This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the Office of the State Treasurer. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Kathleen Riley and Matthew Strom. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report and to answering any questions at the next Board meeting.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: 
Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary

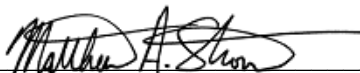

Matthew A. Strom, FSA, MAAA, EA
Senior Vice President and Actuary

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of June 30, 2019, pursuant to section 1942, subsection (n), of Title 16, Chapter 55, Vermont Statutes Annotated, relating to the Vermont State Teachers' Retirement System. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements No. 67 and 68 as of June 30, 2019 for the System is provided in separate reports.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of June 30, 2019, provided by the Office of the State Treasurer;
- The unaudited assets of the Plan as of June 30, 2019, provided by the Office of the State Treasurer;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The funding policy prescribed by State statute.

Valuation Highlights

1. Segal strongly recommends an actuarial funding policy that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy set in the Vermont State Pension Code meets this standard. Section 1944, subsection (c)(4), of Title 16, Chapter 55, Vermont Statutes Annotated calls for annual payments on the unfunded actuarial accrued liability to be made over a closed period ending on June 30, 2038. From July 1, 2009 to June 30, 2019, the amount of each annual payment was calculated assuming that the amortization period would remain closed and that the amortization amount would increase annually at the rate of 5% over the preceding year. Beginning on July 1, 2019 and annually thereafter, the amount of each annual payment is calculated assuming that the amortization period will remain closed and that the amortization amount will increase annually at the rate of 3% over the preceding year.
2. Actual employer contributions made during the fiscal year ending June 30, 2019, were \$119.2 million, or 112.8% of the actuarially determined contribution of \$105.6 million. The \$119.2 million employer contribution amount includes a one-time additional contribution of \$10.0 million paid during the fiscal year. In the prior fiscal year, actual employer contributions were \$114.6 million (including a one-time contribution of \$26.2 million paid after the end of the fiscal year), or 129.6% of the prior year's actuarially determined contribution.
3. The actuarially determined contribution for the fiscal year ending June 30, 2020, is \$129.5 million as determined with the June 30, 2018, actuarial valuation, and updated by the addendum to the valuation.
4. The funded percentage (the ratio of the actuarial value of assets to actuarial accrued liability) is 55.7%, compared to the prior year's funded percentage of 55.2%. This percentage is one measure of funding status and its history is a measure of funding progress. Using the market value of assets, the funded percentage is 54.3%, compared to 54.2% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
5. On October 31, 2018, the Board adopted Alternative Amortization Schedule 3 of the Addendum to the June 30, 2018 actuarial valuation. Under this amortization schedule, the impact of last year's \$26.2 million additional contribution was applied to fiscal year 2038 and supplemental payments ranging from \$1.2 million to \$1.6 million were calculated to be applied to the contributions for fiscal 2020 through fiscal 2029. This report recognizes the adoption of the alternative amortization schedule in the calculation of the actuarially determined contributions for fiscal 2020 and later years, and treats the adoption of this schedule as a component of an updated funding policy.
6. The results of this June 30, 2019, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2021, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2022. The actuarially determined contribution for fiscal 2021 is \$135.6 million, an increase of \$6.1 million from fiscal year 2020. Last year's estimate of the

actuarially determined contribution for fiscal 2021 is \$2.3 million less than this year's actual amount. This is due to larger amortization of unfunded actuarial liability than expected driven by demographic losses, investment losses on an actuarial basis, and the change in the funding policy described on the prior page. The estimated fiscal 2022 actuarially determined contribution is \$139.7 million. The actuarially determined contribution is equal to the Plan's employer normal cost, plus the amount necessary to amortize the unfunded actuarial accrued liability as of June 30, 2019, over a period ending on June 30, 2038, assuming that the amortization period will remain closed and that the amortization amount will increase annually at the rate of 3% over the preceding year.

7. The unfunded actuarial accrued liability is \$1.554 billion, which is an increase of \$41.0 million since the prior valuation.
8. The rate of return on the market value of assets was 6.3% for the July 1, 2018 to June 30, 2019 plan year. The return on the actuarial value of assets was 6.9% for the same period due to the recognition of prior year's investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.5%. We advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.5%.
9. The actuarial value of assets is 102.4% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. The recognition of the deferred market losses of \$46.4 million will also have an impact on the future funded percentage. If the net deferred losses were recognized immediately in the actuarial value of assets, the preliminary actuarially determined contribution rate (as shown on page 25, prior to application of the updated funding policy) would increase from 19.62% to 20.17% of payroll.
10. The actuarial loss from investment experience is \$11.6 million.
11. The net experience loss from sources other than investment experience was approximately \$37.3 million, or 1.1% of the actuarial accrued liability. Additional detail regarding this loss is shown in *Section 2, Subsection C*.
12. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2019, and June 30, 2020, will be provided separately. The actuarially determined contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial reporting.
13. This actuarial report as of June 30, 2019, is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the Plan.
14. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have included a discussion of various risks that may affect the System in *Section 2, Subsection L*.

Summary of Key Valuation Results

		2019	2018
Actuarially determined employer contributions:	• Actuarially determined employer contributions for fiscal 2021 (and 2020)*	\$135,649,428	\$129,491,206
	• Estimated actuarially determined contributions for fiscal 2022 (and 2021)*	139,718,911	133,375,942
Actuarial accrued liability for plan year beginning July 1:	• Retired members and beneficiaries	\$2,150,999,165	\$2,069,795,024
	• Deferred members as reported by the System	37,952,133	34,587,921
	• Active members	1,190,839,253	1,158,203,018
	• Inactive members as reported by the System	125,528,716	116,967,785
	• Total	3,505,319,267	3,379,553,748
	• Employer normal cost for plan year beginning July 1	7,003,176	6,909,481
Assets for plan year beginning July 1:	• Market value of assets (MVA)	\$1,904,488,565	\$1,832,372,553
	• Actuarial value of assets (AVA)	1,950,859,980	1,866,120,413
	• Actuarial value of assets as a percentage of market value of assets	102.43%	101.84%
Funded status for plan year beginning July 1:	• Unfunded actuarial accrued liability based on MVA	\$1,600,830,702	\$1,547,181,195
	• Funded percentage on MVA basis	54.33%	54.22%
	• Unfunded actuarial accrued liability based on AVA	\$1,554,459,287	\$1,513,433,335
	• Funded percentage on AVA basis	55.65%	55.22%
	• Remaining amortization period	19	20
Key assumptions:	• Interest rate	7.50%	7.50%
	• Inflation rate	2.50%	2.50%
Demographic data for plan year beginning July 1:	• Number of retired members and beneficiaries	9,514	9,269
	• Number of deferred members as reported by the System	819	787
	• Number of inactive members as reported by the System	2,756	2,613
	• Number of active members	9,862	9,892
	• Total payroll	\$624,908,253	\$612,899,069
	• Average payroll	63,365	61,959
	• Total monthly benefits for all retired members and beneficiaries	16,557,992	15,726,785
	• Average monthly benefit for all retired members and beneficiaries	1,740	1,697

* Actuarially determined contributions have been adjusted to reflect the Trustees' adoption of Alternative Amortization Schedule 3 of the Addendum to the June 30, 2018 actuarial valuation.

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the Plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Membership data	An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by the System. The System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan members for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each member for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the System and Board of Trustees. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to its other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

A. Membership Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A and B*.

MEMBER POPULATION: 2010 – 2019

As of July 1	Active Members	Deferred Members*	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives
2010	10,509	718	6,146	6,864	0.65
2011	10,123	647	7,005	7,652	0.76
2012	10,262	793	7,376	8,169	0.80
2013	10,101	751	7,743	8,494	0.84
2014	9,952	740	8,086	8,826	0.89
2015	9,585	1,163	8,484	9,647	1.01
2016	9,919	747	8,763	9,510	0.96
2017	10,028	763	9,021	9,784	0.98
2018	9,892	787	9,269	10,056	1.02
2019	9,862	819	9,514	10,333	1.05

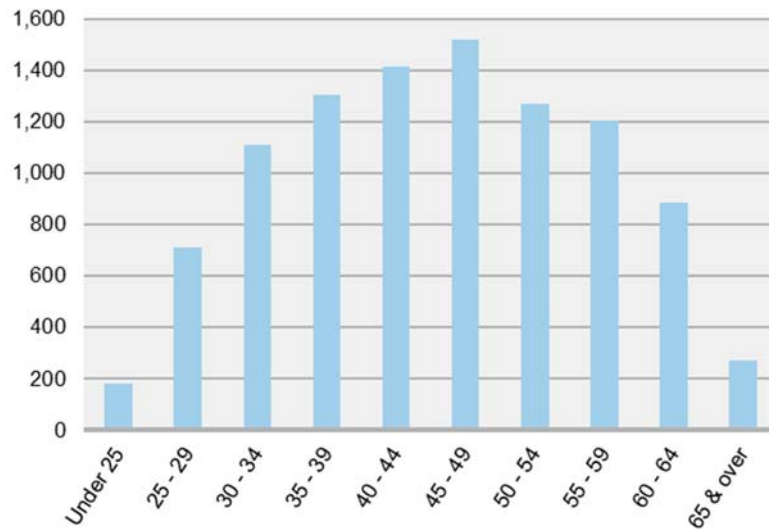
*Excludes inactive members as reported by the System.

Active Members

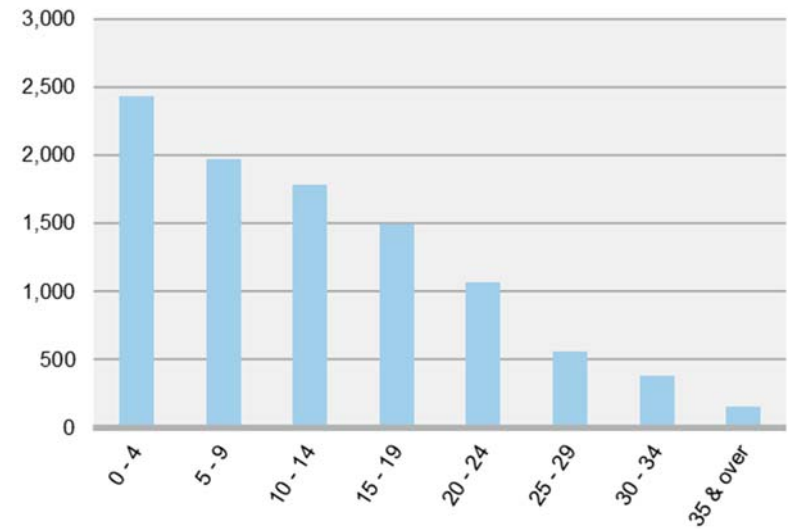
Plan costs are affected by the age, years of creditable service and payroll of active members. In this year's valuation, there were 9,862 active members with an average age of 45.7, average years of creditable service of 12.7 years, and average payroll of \$63,365. The 9,892 active members in the prior valuation had an average age of 45.7, average service of 12.6 years and average payroll of \$61,959.

Distribution of Active Members as of July 1, 2019

BY AGE



BY YEARS OF CREDITABLE SERVICE



Inactive and Deferred Members

In this year's valuation, there were 2,756 inactive members as reported by the System. A member is reported as inactive if they have withdrawn from active employment within the six-year period preceding the valuation date, or if they withdrew prior to the six-year period preceding the valuation date, but do not have a vested right to a deferred or immediate vested benefit and have not taken a refund of their employee contributions.

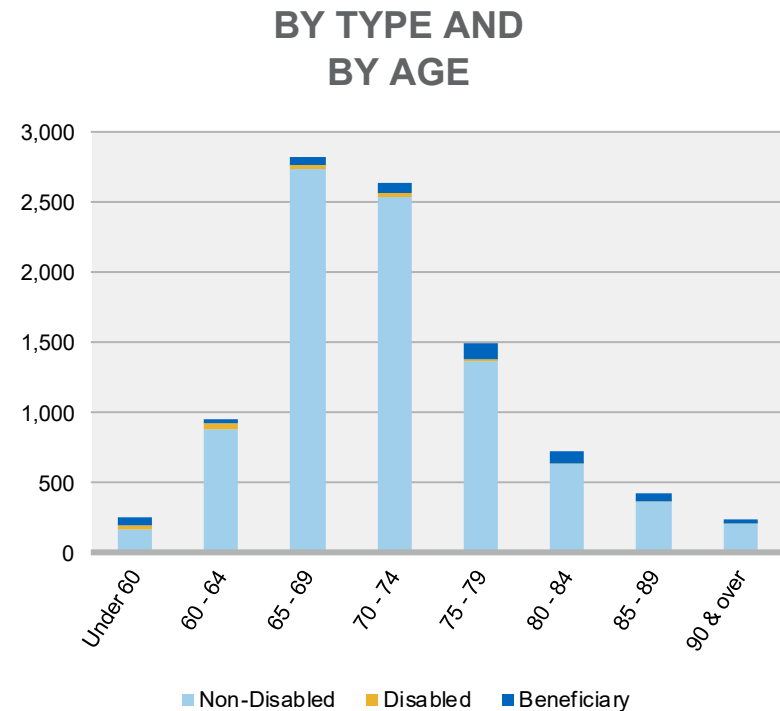
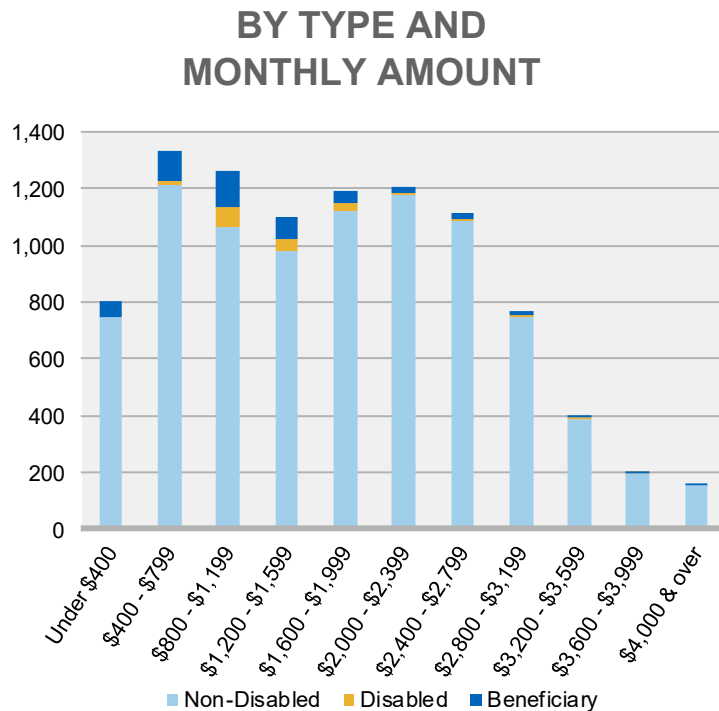
In addition, there were 819 deferred members as reported by the System. A member is reported as deferred if they have withdrawn from active employment prior to the six-year period preceding the valuation date and have a vested right to a deferred or immediate vested benefit.

Retired Members and Beneficiaries

As of July 1, 2019, 9,040 retired members (including disability retirees) and 474 beneficiaries were receiving total monthly benefits of \$16,557,992. For comparison, in the previous valuation, there were 8,809 retired members and 460 beneficiaries receiving monthly benefits of \$15,726,785.

As of July 1, 2019, the average monthly benefit for retired members and beneficiaries is \$1,740, compared to \$1,697 in the previous valuation. The average age for retired members and beneficiaries is 72.2 in the current valuation, compared with 71.8 in the prior valuation.

Distribution of Pensioners as of July 1, 2019



Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBERSHIP DATA STATISTICS: 2010 – 2019

As of July 1	Active Members			Retired Members*		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2010	10,509	47.1	13.8	5,831	--	\$1,319
2011	10,123	46.9	13.8	6,667	--	1,417
2012	10,262	46.9	13.1	7,014	--	1,482
2013	10,101	46.6	13.1	7,356	--	1,514
2014	9,952	46.5	13.2	7,674	69.7	1,547
2015	9,585	46.2	12.9	8,006	70.0	1,614
2016	9,919	45.9	12.7	8,259	70.8	1,641
2017	10,028	45.8	12.6	8,581	71.2	1,683
2018	9,892	45.7	12.6	8,809	71.7	1,726
2019	9,862	45.7	12.7	9,040	72.1	1,771

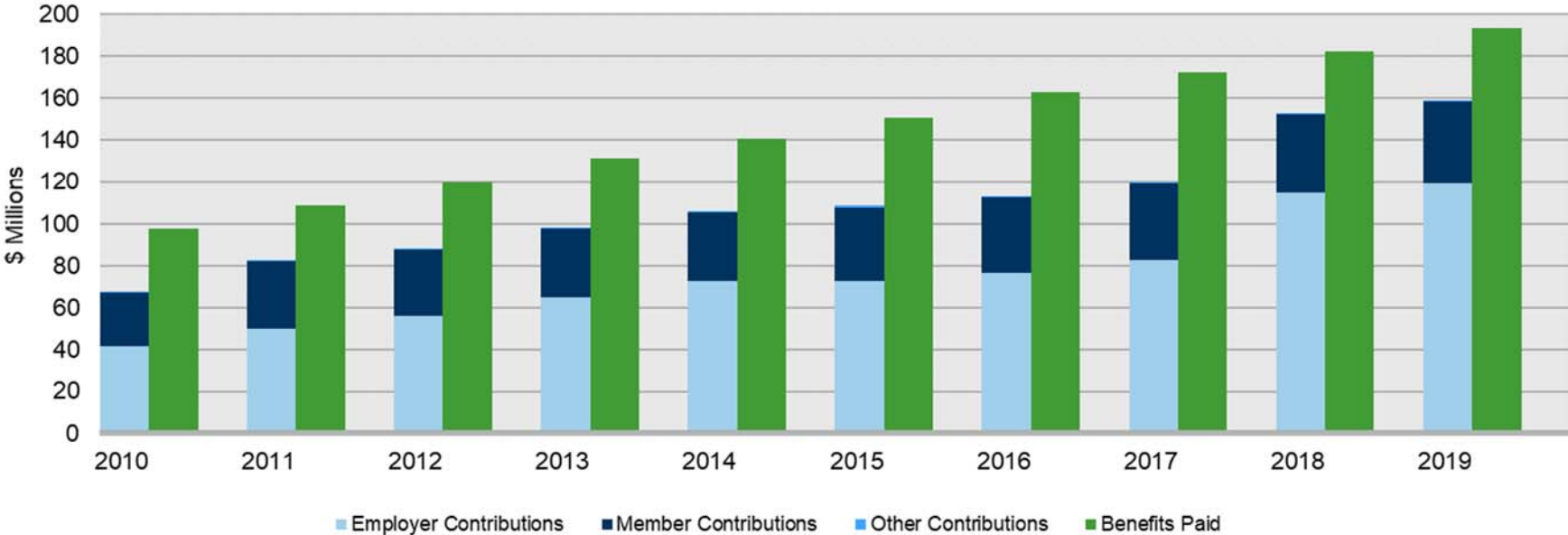
* Not including beneficiaries

B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3, Exhibits C, D and E*.

**COMPARISON OF CONTRIBUTIONS TO BENEFITS PAID
FOR YEARS ENDED JUNE 30, 2010 – 2019**



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has adopted an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuation is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

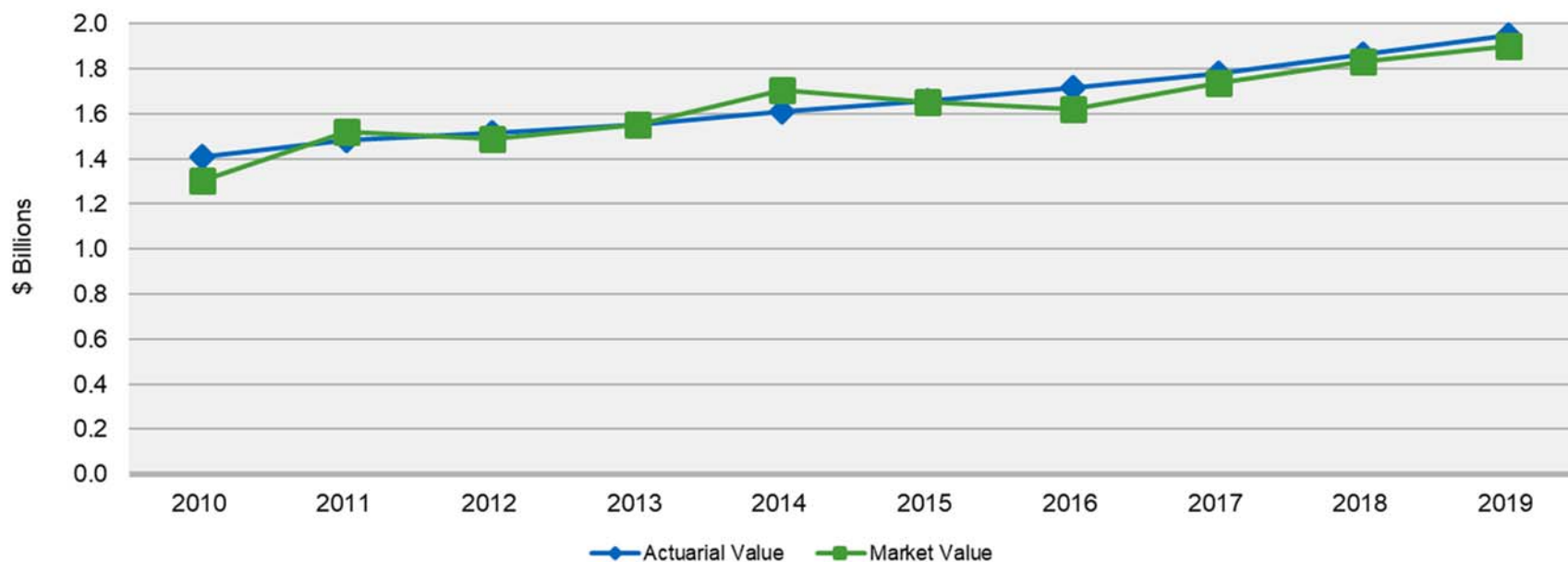
DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2019

1	Actuarial value of assets, June 30, 2018		\$1,866,120,413
2	Net new money, including expected investment income (7.50%)		96,332,421
3	Preliminary asset value: 1 + 2		1,962,452,834
4	Smoothing adjustment		
	(a) Market value, June 30, 2019	\$1,904,488,565	
	(b) Preliminary asset value	1,962,452,834	
	(c) Unrecognized appreciation	-57,964,269	
	(d) Adjustment	x 20%	-11,592,854
5	Actuarial value of assets, June 30, 2019: 3 + 4d		\$1,950,859,980

The assets for valuation purposes are 102.43% of market value.

Both the actuarial value and market value of assets are representations of the Plan’s financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan’s liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2010 – 2019



C. Actuarial Experience

To calculate the actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The net experience loss is \$48,932,512, which includes \$11,592,854 from investment losses and \$37,339,658 in losses from all other sources. The net experience variation from individual sources other than investments was 1.1% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2019

1	Net loss from investments*	-\$11,592,854
2	Net loss from other experience	<u>-37,339,658</u>
3	Net experience loss: 1 + 2	-\$48,932,512

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the System's investment policy. The rate of return on the market value of assets was 6.30% for the year ended June 30, 2019.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.50%. The actual rate of return on an actuarial basis for the 2019 plan year was 6.87%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2019 with regard to its investments.

INVESTMENT EXPERIENCE

	Year Ended June 30, 2019	
	Market Value	Actuarial Value
1 Investment income	\$113,804,311	\$126,427,866
2 Average value of assets	1,806,528,404	1,840,276,264
3 Rate of return: 1 ÷ 2	6.30%	6.87%
4 Assumed rate of return	7.50%	7.50%
5 Expected investment income: 2 × 4	\$135,489,630	\$138,020,720
6 Actuarial gain/(loss): 1 - 5	<u>-\$21,685,319</u>	<u>-\$11,592,854</u>

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The table below shows the rate of return on an actuarial basis compared to the market value investment return for the last 20 years, including averages over select time periods.

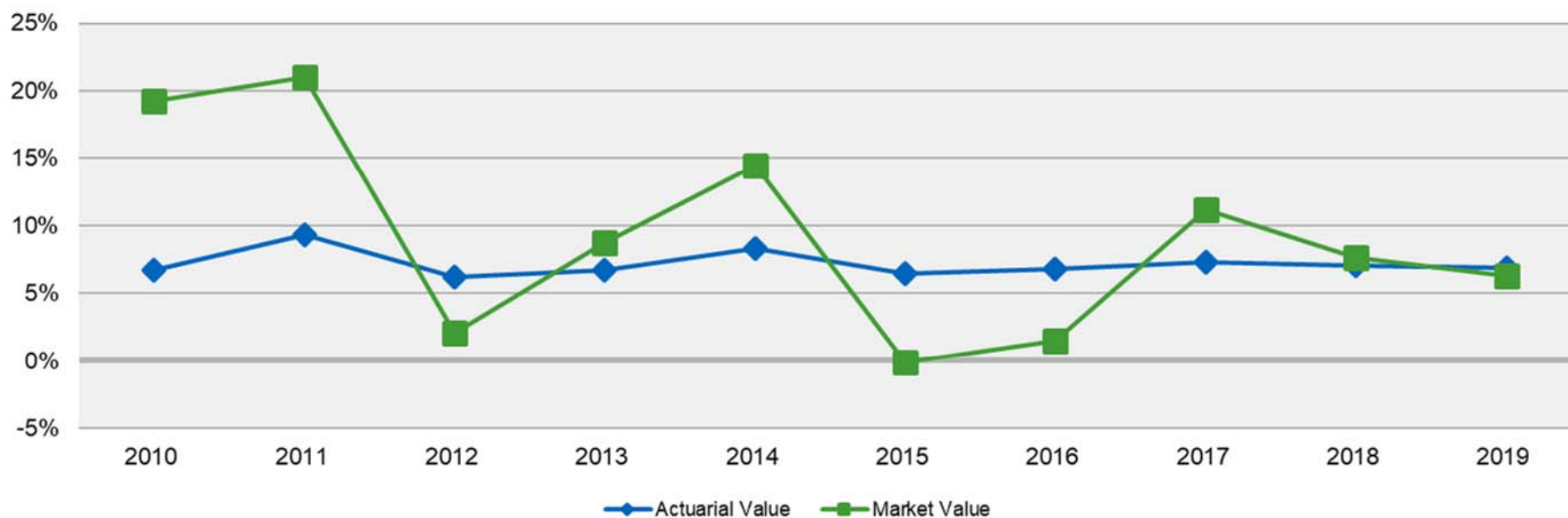
INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 2000 – 2019

Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
2000	\$122,585,157	13.28%	\$96,459,461	8.75%	2010	\$90,911,582	6.75%	\$214,806,420	19.22%
2001	105,052,742	10.25	-26,277,091	-2.23	2011	129,010,590	9.32	268,197,459	20.97
2002	74,521,272	6.71	-50,765,984	-4.50	2012	91,041,364	6.25	31,182,310	2.09
2003	73,318,724	6.34	57,742,544	5.48	2013	99,823,830	6.72	127,041,593	8.70
2004	92,527,288	7.68	172,235,639	15.86	2014	125,880,755	8.29	219,532,643	14.44
2005	102,130,985	8.05	120,839,819	9.83	2015	103,064,276	6.50	-1,244,071	-0.07
2006	112,662,977	8.44	136,026,631	10.35	2016	110,878,140	6.79	24,710,920	1.52
2007	148,468,597	10.53	250,776,668	17.74	2017	123,782,547	7.34	178,144,379	11.20
2008	105,606,299	6.94	-103,733,250	-6.38	2018	122,579,470	7.02	129,866,264	7.61
2009	-177,198,490	-11.23	-302,070,164	-20.49	2019	126,427,866	6.87	113,804,311	6.30
							Most recent five-year average return	6.91%	5.23%
							Most recent ten-year average return	7.16%	8.49%
							Most recent 15-year average return	6.21%	6.28%
							Most recent 20-year average return	6.67%	5.92%

Note: Each year's yield is weighted by the average asset value in that year.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

MARKET AND ACTUARIAL RATES OF RETURN FOR YEARS ENDED JUNE 30, 2010 – 2019



Administrative Expenses

Administrative expenses for the System are paid by the State, therefore there is no provision for administrative expenses in the determination of the actuarially determined contribution.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among members,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- actual COLAs paid (more or less than assumed), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended June 30, 2019, amounted to \$37,339,658, which is 1.1% of the actuarial accrued liability prior to reflection of the assumption changes.

EXPERIENCE GAIN/(LOSS) DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2019

Net turnover	-\$21,031,002
Retirement	-20,019,165
Mortality	-2,743,845
Disability retirements	-128,020
Salary increases for continuing actives	10,407,130
COLA experience	7,683,366
Miscellaneous	<u>-11,508,122</u>
Total	-\$37,339,658

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of June 30, 2019 is \$3,505,319,267, an increase of \$125,765,519, or 3.7%, from the actuarial accrued liability as of the prior valuation date. The liability is expected to grow each year with normal cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

There were no changes in actuarial assumptions since the prior valuation. Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

There were no changes in plan provisions since the prior valuation. A summary of plan provisions is in *Section 4, Exhibit II*.

E. Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED ACTUARIAL ACCRUED LIABILITY FOR YEAR ENDED JUNE 30, 2019

1	Unfunded actuarial accrued liability at beginning of year	\$1,513,433,335
2	Normal cost at beginning of year	39,773,702
3	Total contributions	-158,598,351
4	Interest	
	• For whole year on 1 + 2	\$116,490,527
	• For half year on 3	<u>-5,572,438</u>
	Total interest	<u>110,918,089</u>
5	Expected unfunded actuarial accrued liability	\$1,505,526,775
6	Changes due to:	
	• (Gain)/loss	\$48,932,512
	• Assumptions	0
	• Funding method	0
	• Plan provisions	<u>0</u>
	Total changes	<u>48,932,512</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$1,554,459,287</u>

F. Actuarially Determined Contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. The statute governing the System specifies the funding policy used to calculate the actuarially determined contribution based on a closed amortization period ending on June 30, 2038. As of July 1, 2019, there are 19 years remaining on this schedule.

The actuarially determined contribution for the fiscal year ending June 30, 2020, is \$129,491,206 as determined with the June 30, 2018, actuarial valuation, and updated by the addendum to the valuation. The results of this June 30, 2019, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2021, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2022, as shown in *Section H*.

The preliminary contribution requirement as of July 1, 2019, is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, and actuarial gains and losses.

PRELIMINARY CONTRIBUTION REQUIREMENT

		Year Beginning July 1			
		2019		2018	
		Amount	% of Payroll	Amount	% of Payroll
1	Total normal cost, adjusted for timing*	\$42,252,197	6.46%	\$41,238,252	6.43%
2	Expected employee contributions	<u>-35,249,021</u>	<u>-5.39%</u>	<u>-34,328,771</u>	<u>-5.35%</u>
3	Employer normal cost: 1 + 2	\$7,003,176	1.07%	\$6,909,481	1.08%
4	Actuarial accrued liability	3,505,319,267		3,379,553,748	
5	Actuarial value of assets	1,950,859,980		1,866,120,413	
6	Unfunded actuarial accrued liability: 4 – 5	1,554,459,287		1,513,433,335	
7	Payment on unfunded actuarial accrued liability, adjusted for timing*	121,289,738	18.55%	97,214,107	15.15%
8	Preliminary contribution requirement: 3 + 7	<u>\$128,292,914</u>	<u>19.62%</u>	<u>\$104,123,588</u>	<u>16.23%</u>
9	Projected payroll	\$653,965,905		\$641,547,696	

*Contributions are assumed to be paid at the middle of the year. Effective July 1, 2019, amortization payments are determined based upon 3% annual increases.

Reconciliation of Preliminary Contribution Requirement

The chart below details the changes in the preliminary contribution requirement from the prior valuation to the current year's valuation.

RECONCILIATION OF PRELIMINARY CONTRIBUTION REQUIREMENT FROM JULY 1, 2018 TO JULY 1, 2019

	Amount	% of Payroll
Preliminary contribution requirement as of July 1, 2018	\$104,123,588	16.23%
Effect of:		
• Plan amendment(s)	0	0.00%
• Change in asset method	0	0.00%
• Expected change in amortization payment due to payroll growth	4,860,706	0.76%
• Expected change in amortization method	17,321,294	2.70%
• Change in actuarial assumptions	0	0.00%
• Total contributions (more)/less than actuarially determined contribution	-1,372,892	-0.21%
• Investment (gain)/loss	775,376	0.12%
• Other gains and losses on accrued liability	2,497,425	0.39%
• Net effect of other changes, including composition and number of members, payroll	<u>87,417</u>	-0.37%
Total change	24,169,326	3.39%
Preliminary contribution requirement as of July 1, 2019	\$128,292,914	19.62%

G. Amortization Schedule for Unfunded Actuarial Accrued Liability – Schedule of Contributions Required by Statute

A schedule of projected future unfunded actuarial accrued liability payments, calculated as required by state statute, and projected funded percentages is shown below.

UNFUNDED LIABILITY AMORTIZATION SCHEDULE

As of June 30	Balance	Amortization Payment (Year Following)	Funded Percentage
2019	\$1,554,459,287	\$121,289,738	55.65%
2020	1,545,287,857	124,928,430	56.80%
2021	1,531,655,893	128,676,283	58.04%
2022	1,513,115,675	132,536,571	59.34%
2023	1,489,182,509	136,512,669	60.73%
2024	1,459,331,850	140,608,049	62.20%
2025	1,422,996,211	144,826,290	63.78%
2026	1,379,561,833	149,171,079	65.48%
2027	1,328,365,104	153,646,211	67.32%
2028	1,268,688,705	158,255,597	69.30%
2029	1,199,757,462	163,003,265	71.45%
2030	1,120,733,889	167,893,363	73.77%
2031	1,030,713,386	172,930,164	76.28%
2032	928,719,080	178,118,069	78.99%
2033	813,696,266	183,461,611	81.92%
2034	684,506,438	188,965,460	85.06%
2035	539,920,863	194,634,423	88.44%
2036	378,613,662	200,473,456	92.06%
2037	199,154,384	206,487,660	95.91%
2038	0	0	100.00%

Amortization Schedule for Unfunded Actuarial Accrued Liability – Recommended Schedule of Contributions

A schedule of projected future unfunded actuarial accrued liability payments, as recommended by the Board of Trustees, and projected funded percentages is shown below. In fiscal 2018, an additional payment of \$26.2 million was made. The intent of the Board was that this payment, plus investment earnings, would be set aside to reduce the final payment in fiscal 2038. This schedule reflects that adjustment.

UNFUNDED LIABILITY AMORTIZATION SCHEDULE

As of June 30	Balance	Amortization Payment (Year Following)	Funded Percentage
2019	\$1,554,459,287	\$124,695,298	55.65%
2020	1,541,756,897	128,436,157	56.86%
2021	1,524,223,222	132,289,242	58.20%
2022	1,501,379,559	136,257,919	59.62%
2023	1,472,707,808	140,345,656	61.11%
2024	1,437,647,420	144,556,026	62.71%
2025	1,395,592,098	148,892,707	64.43%
2026	1,345,886,261	153,359,488	66.28%
2027	1,287,821,230	157,960,273	68.27%
2028	1,220,631,125	162,699,081	70.42%
2029	1,143,488,462	165,927,223	72.74%
2030	1,057,213,090	170,905,040	75.21%
2031	959,305,955	176,032,191	77.88%
2032	848,739,841	181,313,157	80.76%
2033	724,405,847	186,752,552	83.87%
2034	585,107,118	192,355,128	87.20%
2035	429,552,110	198,125,782	90.78%
2036	256,347,336	204,069,555	94.61%
2037	63,989,568	66,345,796	98.68%
2038	0	0	100.00%

Note: Amortization payments are calculated to increase by approximately 3% each year.

H. Projection of Actuarially Determined Contribution for Following Two Fiscal Years

On the basis of the June 30, 2019, actuarial valuation, the employer normal cost rate is 1.07%. This rate is applied to the projected payrolls for fiscal 2021 and fiscal 2022 to determine the employer normal cost for each year. The payment on the unfunded liability is added to the employer normal cost to determine the actuarially determined contribution for the fiscal year ending June 30, 2021, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2022, as shown below. The final actuarially determined contribution for fiscal 2022 will be determined with the next valuation.

ACTUARIALLY DETERMINED CONTRIBUTION: 2021 – 2022

Fiscal Year Ended June 30	Projected Payroll*	Employer Normal Cost Rate	Projected Contributions		
			Employer Normal Cost	Unfunded Liability	Total
2021	\$673,584,882	1.07%	\$7,213,271	\$128,436,157	\$135,649,428
2022	693,792,429	1.07%	7,429,669	132,289,242	139,718,911

* In these projections, total payroll is assumed to increase by 3% each year.

These actuarially determined contribution amounts shown above are based on the recommended amounts by the Board, as shown on page 28. Based solely on statutory requirements, the projected contributions would total \$132,141,701 for fiscal 2021 and \$136,105,952 for fiscal 2022.

Pursuant to Section 1944, subsection (b)(2), of Title 16, Chapter 55, Vermont Statutes Annotated, if expected employee contributions were 5.00% for all Group C active members, the employer normal cost rate would be 1.46%, which would result in an employer normal cost for fiscal 2021 of \$9,840,519 and a total employer contribution requirement of \$138,276,676. For fiscal 2022, the total employer contribution requirement would be \$142,424,976.

I. History of Employer Contributions

A history of the most recent years of employer contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2011 – 2020

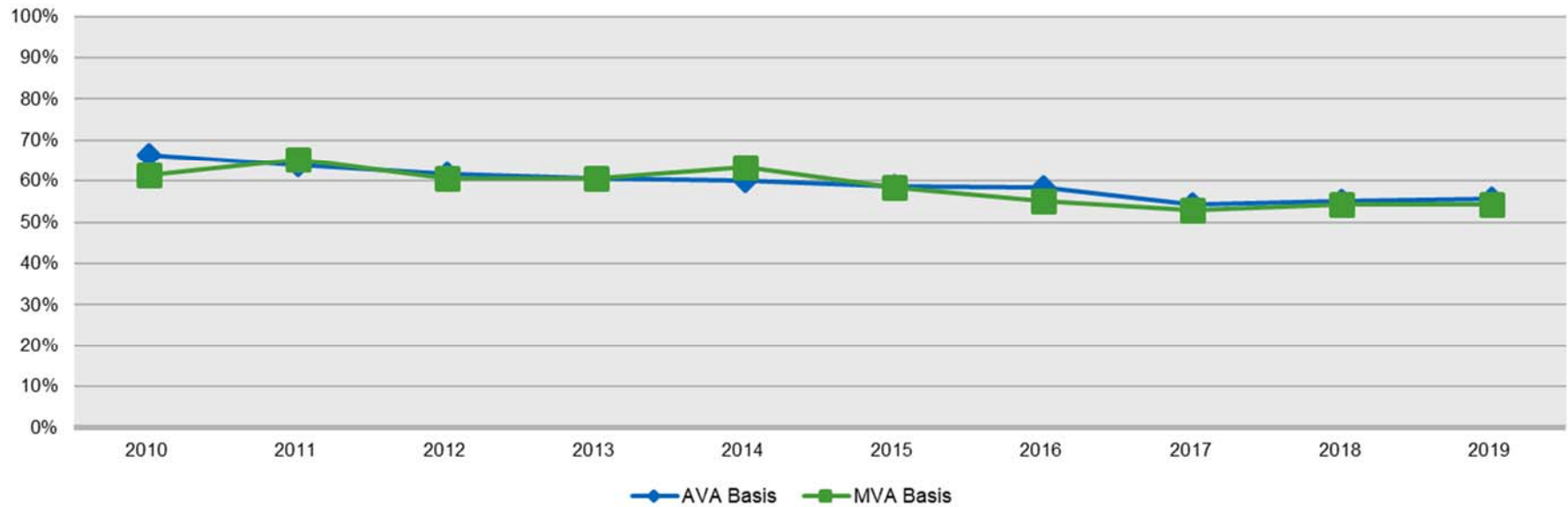
Fiscal Year Ended June 30	Actuarially Determined Contribution		Actual Employer Contribution		Percent Contributed
	Amount*	Percentage of Payroll**	Amount	Percentage of Payroll**	
2011	\$48,233,006	8.22%	\$50,268,131	8.57%	104.22%
2012	51,241,932	8.72%	56,152,011	9.56%	109.58%
2013	60,182,755	10.51%	65,086,320	11.37%	108.15%
2014	68,352,825	11.66%	72,668,413	12.39%	106.31%
2015	72,857,863	14.90%	72,908,805	14.91%	100.07%
2016	76,102,909	12.84%	76,947,869	12.98%	101.11%
2017	82,659,576	14.39%	82,887,174	14.43%	100.28%
2018	88,409,437	14.64%	114,598,921	18.97%	129.62%
2019	105,640,777	16.13%	119,174,913	18.20%	112.81%
2020	129,491,206	19.60%	--	--	--

* Budgeted contribution amount from prior valuation report

**Based on expected payroll

J. History of Funded Percentage

A history of the most recent years of funded percentage as of July 1st is shown below.



K. Actuarial Balance Sheet

An overview of the Plan’s funding is provided by an Actuarial Balance Sheet, which compares the total liabilities (current and future) to the total assets (current and future). The liabilities are calculated by determining the amount and timing of all future payments that will be made by the Plan for current members. These payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value of all benefits, referred to as the “liability” of the Plan.

Second, this liability is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	Year Ended	
	June 30, 2019	June 30, 2018
Liabilities		
• Present value of benefits for retired members and beneficiaries	\$2,150,999,165	\$2,069,795,024
• Present value of benefits for inactive former members	163,480,849	151,555,706
• Present value of benefits for active members	<u>1,483,053,294</u>	<u>1,441,998,453</u>
Total liabilities	\$3,797,533,308	\$3,663,349,183
Assets		
• Total valuation value of assets	\$1,950,859,980	\$1,866,120,413
• Present value of future contributions by members	263,332,427	255,569,223
• Present value of future employer contributions for:		
» Entry age cost	28,881,614	28,226,212
» Unfunded actuarial accrued liability	<u>1,554,459,287</u>	<u>1,513,433,335</u>
Total of current and future assets	<u>\$3,797,533,308</u>	<u>\$3,663,349,183</u>

L. Risk

The actuarial valuation results depend on a single set of assumptions; however, there is a risk that emerging results may differ significantly as actual experience proves to be different than projected from the current assumptions.

In 2019, the Board engaged Segal to perform a detailed analysis of the potential range of the impact of risks relative to the Plan's future financial condition. This study included an overview of risks that affect the System and stakeholders, as well as various stochastic and deterministic modeling scenarios, primarily focusing on investment returns.

Below is a brief discussion of some of the risks that may affect the Plan. This discussion is focused on funding-related risks, but similar concerns may apply to risks regarding the level of expense and liabilities reported for Plan accounting purposes as well.

A detailed risk assessment is important for VSTRS because:

- The negative cash flow position of the Plan could be exacerbated by relatively small deviations from assumed future experience.
- Retired and inactive members account for more than half of the Plan's liabilities limiting options for reducing plan liabilities in the event of adverse experience.
- The risks identified below show significant potential for variability.

The following risks could significantly affect the Plan's future condition:

- **Investment Risk** (the risk that returns will be different than expected)

If the prior year's investment performance resulted in a market value of assets that is 10% different than the current value, it would result in a change of \$190.4 million in the asset value. A 10% increase in assets would cause the unfunded liability (market value basis) to decrease from \$1.601 billion to \$1.410 billion. Likewise, a 10% decrease in the asset value, would cause the unfunded liability to increase from \$1.601 billion to \$1.791 billion.

Since the Plan's assets are much larger than contributions, investment performance may create volatility in the actuarially determined contribution requirements. For example, for each 1% difference in actual return, the actuarially determined contribution would increase or decrease by 0.23%, disregarding the effects of the five-year phase-in of investment gains and losses.

To illustrate the potential for future investment volatility, the market value rate of return over the last 12 years has ranged from a low of -20.49% to a high of 20.97%.

➤ **Longevity Risk** (the risk that mortality experience will be different than expected)

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

The current mortality assumptions represent our best estimate of the mortality rates for this plan; however, a 10% reduction in the assumed mortality rates results in an increase in the liabilities of roughly 3% for most plans. For VSTRS, a 3% liability increase would result in an increase in the unfunded accrued liability of \$104.5 million. The unfunded accrued liability (market value of assets basis) would increase from \$1.601 billion to \$1.706 billion.

➤ **Demographic Risk** (the risk that member experience will be different than assumed)

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active member turnover than assumed.
- Salary increases more or less than assumed.

➤ **Actual Experience**

- Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past 12 years:
 - » The investment gain(loss) for a year (actuarial basis) has ranged from a loss of \$312.7 million to a gain of \$23.7 million.
 - » The non-investment gain(loss) for a year has ranged from a loss of \$86.0 million to a gain of \$30.2 million.
- The funded percentage on the actuarial value of assets has ranged from a low of 54.22% to a high of 66.46% over the past ten years.

➤ **Maturity Measures**

The risk associated with a pension plan increases as it becomes more mature, meaning that the actives represent a smaller portion of the liabilities of the plan. When this happens, there is a greater risk that fluctuations in the experience of the non-active members or of the assets of the plan can result in large swings in the contribution requirements.

- Over the past ten years, the ratio of non-active members to active members has increased from a low of 0.65 to a high of 1.05. Currently the Plan has a non-active to active member ratio of 1.05.

- As of July 1, 2019, the retired life actuarial accrued liability represents 61% of the total actuarial accrued liability. In addition, the actuarial accrued liability for inactive members represents 5% of the total. The higher the non-active actuarial accrued liability is as a percent of the total liability, the greater the danger of volatility in results.
- For the prior year, benefits paid were \$34.6 million more than contributions received, or 1.9% of the market value of assets. In the absence of the additional \$10.0 million employer contribution, negative cash flow would have equaled 2.4% of market value of assets. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of July 1		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	9,862	9,892	-0.3%
• Average age	45.7	45.7	0.0
• Average years of creditable service	12.7	12.6	0.1
• Total payroll	\$624,908,253	\$612,899,069	2.0%
• Average payroll	63,365	61,959	2.3%
• Total active vested members	7,424	7,413	0.2%
Inactive members:			
• Number of deferreds as reported by the System	819	787	4.1%
• Number of inactives as reported by the System	2,756	2,613	5.5%
Retired members:			
• Number in pay status	8,867	8,646	2.6%
• Average age	72.2	71.8	0.4
• Average monthly benefit	\$1,778	\$1,733	2.6%
Disability retirees:			
• Number in pay status	173	163	6.1%
• Average age	68.6	68.3	0.3
• Average monthly benefit	\$1,397	\$1,338	4.4%
Beneficiaries:			
• Number in pay status	474	460	3.0%
• Average age	73.5	73.3	0.2
• Average monthly benefit	\$1,158	\$1,127	2.8%

EXHIBIT B – RECONCILIATION OF MEMBERSHIP DATA

	Active Members	Deferreds	Inactives	Disability Retirees	Retired Members	Beneficiaries	Total
Number as of July 1, 2018	9,892	787	2,613	163	8,646	460	22,561
• New members	638	N/A	151	0	12	0	801
• Inactives as reported by the System	-706	-4	710	N/A	N/A	N/A	0
• Deferreds as reported by the System	0	100	-100	N/A	N/A	N/A	0
• Retirements	-283	-49	-40	N/A	372	N/A	0
• New disabilities	-9	0	-1	11	-1	N/A	0
• Return to work from disability	0	N/A	N/A	0	N/A	N/A	0
• Died with beneficiary	-1	0	0	0	-41	42	0
• Died without beneficiary	-3	-3	-4	-2	-123	-29	-164
• Lump sum cash-outs	-55	-8	-192	0	0	0	-255
• Rehire	392	-6	-382	0	-4	N/A	0
• Certain period expired	N/A	N/A	0	0	0	-2	-2
• Data adjustments	-3	2	1	1	6	3	10
Number as of July 1, 2019	9,862	819	2,756	173	8,867	474	22,951

EXHIBIT C – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended June 30, 2019	Year Ended June 30, 2018
Net assets at market value at the beginning of the year	\$1,832,372,553	\$1,738,557,573
Contribution income:		
• Employer contributions	\$119,174,913	\$114,598,921
• Member contributions	39,075,342	37,888,566
• Less administrative expenses	<u>-2,714,661</u>	<u>-2,448,365</u>
<i>Net contribution income</i>	<i>\$155,535,594</i>	<i>\$150,039,122</i>
Net other income	\$348,096	\$468,500
Investment income:		
• Interest, dividends and other income	\$24,380,954	\$23,160,822
• Asset appreciation	89,423,357	106,705,442
• Less investment fees	<u>-4,375,164</u>	<u>-4,299,983</u>
<i>Net investment income</i>	<i><u>\$109,429,147</u></i>	<i><u>\$125,566,281</u></i>
Total income available for benefits	\$265,312,837	\$276,073,903
Less benefit payments:		
• Benefits	-\$189,875,739	-\$179,504,941
• Refunds of contributions	-2,672,047	-2,149,962
• Death claims	-530,077	-334,966
• Transfers to other pension trust funds	<u>-118,962</u>	<u>-269,054</u>
<i>Net benefit payments</i>	<i>-\$193,196,825</i>	<i>-\$182,258,923</i>
Change in reserve for future benefits	\$72,116,012	\$93,814,980
Net assets at market value at the end of the year	\$1,904,488,565	\$1,832,372,553

EXHIBIT D – SUMMARY STATEMENT OF PLAN ASSETS

	June 30, 2019	June 30, 2018
Cash equivalents	\$14,500,204	\$14,709,699
Total accounts receivable	143,964,514	92,016,116
Prepaid expenses	62,394	85,472
Capital assets, net of depreciation	1,485,741	1,827,930
Investments:		
• Fixed Income	\$149,877,676	\$220,506,378
• Equities	145,672,975	267,620,098
• Mutual and commingled funds	1,415,305,263	1,117,905,351
• Real estate and venture capital	<u>175,573,584</u>	<u>196,393,546</u>
Total investments at market value	\$1,886,429,498	\$1,802,425,373
Total assets	\$2,046,442,351	\$1,911,064,590
Total liabilities	-\$141,953,786	-\$78,692,037
Net assets at market value	\$1,904,488,565	\$1,832,372,553
Net assets at actuarial value	\$1,950,859,980	\$1,866,120,413

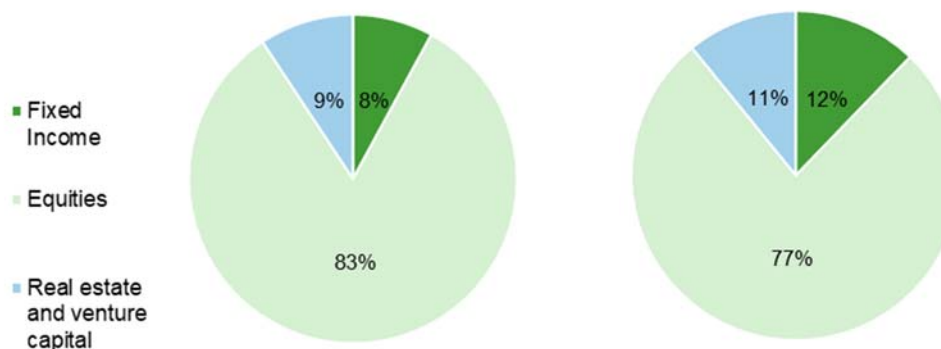


EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2019

Year Ended June 30	Employer Contributions	Member Contributions	Net Other Income	Net Investment Return*	Admin. Expenses**	Benefit Payments***	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2009							\$1,145,066,114	\$1,374,079,337	120.00%
2010	\$41,920,603	\$25,315,397	\$442,258	\$208,723,610	-\$18,282,431	-\$97,935,502	1,305,250,049	1,410,368,434	108.05%
2011	50,268,131	32,062,253	208,107	261,886,312	-20,149,407	-108,758,513	1,520,766,932	1,486,698,448	97.76%
2012	56,152,011	31,827,995	85,110	24,726,665	-22,224,879	-119,713,933	1,491,619,901	1,517,410,471	101.73%
2013	65,086,320	32,343,368	292,953	120,403,032	-24,139,941	-131,254,070	1,554,351,563	1,552,924,370	99.91%
2014	72,668,413	32,558,584	410,500	212,338,194	-26,115,813	-140,846,837	1,705,364,604	1,610,285,523	94.42%
2015	72,908,805	34,863,531	830,887	-7,566,696	-2,551,845	-150,732,845	1,653,116,441	1,662,345,707	100.56%
2016	76,947,869	35,408,763	464,668	19,877,270	-2,163,853	-162,751,409	1,620,899,749	1,716,296,235	105.89%
2017	82,887,174	36,142,411	241,526	173,166,614	-2,623,838	-172,156,063	1,738,557,573	1,779,592,227	102.36%
2018	114,598,921	37,888,566	468,500	125,566,281	-2,448,365	-182,258,923	1,832,372,553	1,866,120,413	101.84%
2019	119,174,913	39,075,342	348,096	109,429,147	-2,714,661	-193,196,825	1,904,488,565	1,950,859,980	102.43%

* On a market basis, net of investment fees

** Includes depreciation and health/life insurance expenses (2014 and prior)

*** Includes "other expenses"

EXHIBIT F – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners:	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge that may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than 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, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially 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):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <p>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</p> <p>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</p> <p>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</p>

Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive 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. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded percentage and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
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 assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Fund is calculated, including: <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;

	<p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore 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. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
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.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more Actuarial Assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded percentage, using the market value of assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the

	fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one that is used to determine the Amortization Payment, but which does not change over time. 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 with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

Rationale for Assumptions:	The information and analysis used in selecting each assumption (except for economic assumptions and mortality tables) that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated March 2, 2016 (as prepared by Buck Consultants). Economic assumptions, including inflation, investment return, and assumed cost-of-living adjustment increases were studied and adopted by the Board on July 13, 2017. Mortality table assumptions were studied and adopted by the Board on September 25, 2017. Rates of annual increase in salary were modified and adopted by the Board on September 25, 2017. The next Actuarial Experience study will be performed in 2020 for the June 30, 2020 valuation.																					
Inflation:	2.50%.																					
Investment Return:	7.50%. The investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.																					
Salary Increases:	<table border="1"> <thead> <tr> <th data-bbox="632 932 840 1011">Age</th> <th data-bbox="840 932 1192 1011">Annual Rate of Salary Increase (%)</th> </tr> </thead> <tbody> <tr> <td data-bbox="632 1011 840 1057">20</td> <td data-bbox="840 1011 1192 1057">9.09%</td> </tr> <tr> <td data-bbox="632 1057 840 1102">25</td> <td data-bbox="840 1057 1192 1102">7.78%</td> </tr> <tr> <td data-bbox="632 1102 840 1148">30</td> <td data-bbox="840 1102 1192 1148">6.47%</td> </tr> <tr> <td data-bbox="632 1148 840 1193">35</td> <td data-bbox="840 1148 1192 1193">5.60%</td> </tr> <tr> <td data-bbox="632 1193 840 1239">40</td> <td data-bbox="840 1193 1192 1239">4.92%</td> </tr> <tr> <td data-bbox="632 1239 840 1284">45</td> <td data-bbox="840 1239 1192 1284">4.43%</td> </tr> <tr> <td data-bbox="632 1284 840 1330">50</td> <td data-bbox="840 1284 1192 1330">4.09%</td> </tr> <tr> <td data-bbox="632 1330 840 1375">55</td> <td data-bbox="840 1330 1192 1375">3.85%</td> </tr> <tr> <td data-bbox="632 1375 840 1437">60</td> <td data-bbox="840 1375 1192 1437">3.75%</td> </tr> </tbody> </table>		Age	Annual Rate of Salary Increase (%)	20	9.09%	25	7.78%	30	6.47%	35	5.60%	40	4.92%	45	4.43%	50	4.09%	55	3.85%	60	3.75%
Age	Annual Rate of Salary Increase (%)																					
20	9.09%																					
25	7.78%																					
30	6.47%																					
35	5.60%																					
40	4.92%																					
45	4.43%																					
50	4.09%																					
55	3.85%																					
60	3.75%																					

Cost-of-Living Adjustments:

Assumed to occur on January 1 following one year of retirement at the rate of 2.55% per annum for Group A members and 1.40% per annum for Group C members (beginning at age 62 for Group C members who elect reduced early retirement). The January 1, 2020 COLA is assumed to be 1.60% for group A and 1.00% for groups B and C.

Mortality Rates:*Death in Active Service:*

- All Groups 98% of RP-2006 White Collar Employee with generational projection using Scale SSA-2017.

Healthy Post-retirement:

- All Groups 98% of RP-2006 White Collar Annuitant with generational projection using Scale SSA-2017.

Disabled Post-retirement:

- All Groups RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017.

The tables with the generational projection to the ages of members as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date.

The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the various industries and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual amount of deaths by benefit amount and the projected amount based on the prior assumption over the five-year period ending June 30, 2016. The mortality tables were then adjusted to future years using a generational projection with Scale SSA-2017 to reflect future mortality improvement.

Separation from Service before Retirement (Due to Withdrawal and Disability):

Representative values of the assumed annual rates of withdrawal and disability are as follows:

Age	Rate (%)			
	Withdrawal		Disability	
	Male	Female	Male	Female
25	21.00%	20.00%	0.005%	0.008%
30	12.60	14.00	0.008	0.008
35	8.40	11.30	0.010	0.008
40	6.50	9.03	0.015	0.010
45	5.80	6.30	0.026	0.023
50	5.40	5.25	0.067	0.070
55	5.40	5.04	0.044	0.048
60	5.40	5.04	0.147	0.084

Retirement Rates:

Age	Reduced Early Retirement		Full Early Retirement
	Group A	Group C	Grandfathered (Group C)
55	6.13%	6.13%	6.13%
56	6.25	6.25	6.25
57	6.25	6.25	6.25
58	6.25	6.25	6.25
59	9.38	9.38	9.38
60	12.50	18.75	18.75
61	18.75	18.75	18.75

Age	Service Retirement		
	Group A	Group C	
		Non-grandfathered	Grandfathered
60	12.50%	17.00%	N/A
61	18.80	17.00	N/A
62	25.00	20.00	20.00%
63	22.00	22.00	22.00
64	22.00	22.00	22.00
65	33.00	33.00	33.00
66	33.00	33.00	33.00
67	33.00	33.00	33.00
68	22.00	22.00	22.00
69	33.00	33.00	33.00
70	100.00	100.00	100.00

Non-grandfathered members are assumed to retire with 25% probability if they are first eligible for service retirement on or before age 62 and 27.5% probability if they are first eligible for service retirement between age 62 and age 65.

Group A and Grandfathered Group C members are assumed to retire at the following rates upon completion of 30 years of creditable service:

Age	Retirement After 30 Years of Service	
	Group A	Grandfathered (Group C)
49	0.00%	0.00%
50	40.00	40.00
51	20.00	20.00
52	20.00	20.00
53	20.00	20.00
54	20.00	20.00
55	20.00	8.75
56	10.00	6.25
57	10.00	6.25
58	10.00	10.00
59	10.00	10.00
60	30.00	25.00
61	25.50	17.00

The retirement rates were based on historical and current demographic data, adjusted to reflect conditions of the various industries, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior assumption over the four-year period ending June 30, 2014.

Inactive Members as Reported by the System:

Valuation liability equals 250% of accumulated contributions.

Deferred Members as Reported by the System:

Assumed to retire at their Normal Retirement Age with a deferred vested benefit.

Future Administrative Expenses:

No provisions made.

Unknown Data for Members:

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Percent Married:	85% of male members and 35% of female members are assumed to be married.
Age of Spouse:	Females three years younger than males.
Benefit Elections:	All members are assumed to elect the single life annuity option.
Actuarial Value of Assets:	The amount of the assets for valuation purposes equals the preliminary asset value plus 20% of the difference between market and preliminary asset values. The preliminary asset value is equal to the previous year's asset value (for valuation purposes) adjusted for contributions less benefit payments and expenses plus expected investment income. If necessary, a further adjustment is made to ensure that the valuation assets are within 20% of the market value.
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each member.
Changes in Actuarial Assumptions:	There have been no changes in actuarial assumptions since the prior valuation.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Effective Date:	July 1, 1947.					
Creditable Service:	Service as a member plus purchased service.					
Average Final Compensation (AFC):	Average annual compensation during highest 3 consecutive years.					
Grandfathered Status:	Group C members who were within five years of normal retirement eligibility as defined prior to July 1, 2010, are “grandfathered”.					
Normal Retirement – Eligibility:	<ul style="list-style-type: none"> • Group A • Group C 	<p>Age 60 or 30 years of creditable service.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 150px;">Grandfathered</td> <td>Age 62 or 30 years of creditable service</td> </tr> <tr> <td>Non-grandfathered</td> <td>Age 65 or age plus creditable service equal to 90.</td> </tr> </table>	Grandfathered	Age 62 or 30 years of creditable service	Non-grandfathered	Age 65 or age plus creditable service equal to 90.
Grandfathered	Age 62 or 30 years of creditable service					
Non-grandfathered	Age 65 or age plus creditable service equal to 90.					
Normal Retirement – Amount:	<ul style="list-style-type: none"> • Group A • Group C 	<p>Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/60th of AFC times creditable service.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 150px;">Grandfathered</td> <td>Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80th of AFC times creditable service prior to July 1, 1990, plus 1/60th of AFC times creditable service after July 1, 1990.</td> </tr> <tr> <td>Non-grandfathered</td> <td>Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80th of AFC times creditable service prior to July 1, 1990, plus 1/60th of AFC times creditable service after July 1, 1990 up to 20 years of service, plus 1/50th of AFC for years of service after 20.</td> </tr> </table> <p>If a member already has 20 or more years of service on June 30, 2010, the 1/50th will be applied to all service accrued after July 1, 2010.</p> <p>Minimum benefit applicable to Group A of \$6,600 after 30 years of creditable service (pro-rata for service less than 30 years).</p> <p>Maximum benefit applicable to Group C: Grandfathered maximum benefit is 50% of AFC up to June 30, 2010. May continue to accrue up to 53.34% of AFC with service earned after July 1, 2010. Non-grandfathered maximum benefit is 60% of AFC.</p>	Grandfathered	Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80 th of AFC times creditable service prior to July 1, 1990, plus 1/60 th of AFC times creditable service after July 1, 1990.	Non-grandfathered	Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80 th of AFC times creditable service prior to July 1, 1990, plus 1/60 th of AFC times creditable service after July 1, 1990 up to 20 years of service, plus 1/50 th of AFC for years of service after 20.
Grandfathered	Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80 th of AFC times creditable service prior to July 1, 1990, plus 1/60 th of AFC times creditable service after July 1, 1990.					
Non-grandfathered	Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80 th of AFC times creditable service prior to July 1, 1990, plus 1/60 th of AFC times creditable service after July 1, 1990 up to 20 years of service, plus 1/50 th of AFC for years of service after 20.					
Early Retirement – Eligibility:	<ul style="list-style-type: none"> • Group A • Group C 	<p>Age 55.</p> <p>Age 55 with 5 years of creditable service.</p>				

Early Retirement – Amount:	<ul style="list-style-type: none"> • Group A Actuarial equivalent of normal retirement allowance using AFC and creditable service at early retirement. • Group C Grandfathered Accrued normal benefit reduced 6% for each year prior to age 62. Non-grandfathered Accrued normal benefit reduced by actuarial reduction from normal retirement age.
Vesting:	<ul style="list-style-type: none"> • All groups – 5 years of creditable service. • Allowance beginning at age 60 calculated as a normal retirement allowance based on AFC and creditable service at termination.
Disability Retirement – Eligibility:	<ul style="list-style-type: none"> • All groups – Total and permanent disability after 5 years of creditable service (5 years preceding retirement served in State).
Disability Retirement – Amount:	<ul style="list-style-type: none"> • All groups – Calculated as a service allowance based on AFC and creditable service at disability retirement, subject to a 25% of AFC minimum.
Death Benefit – Eligibility:	<ul style="list-style-type: none"> • Group A Age 60 or 30 years of creditable service; 10 years of creditable service if in service at death. • Group C Age 55 and 5 years of creditable service or 10 years of creditable service.
Death Benefit – Amount:	<ul style="list-style-type: none"> • All groups – Accrued allowance paid under 100% survivorship option. If the eligibility requirements are not met or if beneficiary so elects, the member's accumulated contributions are paid to the beneficiary or estate. Certain children's benefits may also be payable.
Post-Retirement Adjustments:	<ul style="list-style-type: none"> • Group A Allowances in payment for at least one year increased on each January 1 by the percentage increase in Consumer Price Index, but not more than 5%. • Group C Same, but increase is based on half of the Consumer Price Index increase. For members receiving a reduced early retirement allowance, the adjustment will not apply before age 62.
Refund of Contributions:	If no other beneficiary is payable, a terminated member receives his accumulated contributions with interest.
Member Contribution Rates:	<ul style="list-style-type: none"> • Group A 5.5% of earnable compensation. Contributions stop after 25 years of creditable service. • Group C 5% of earnable compensation with at least five years of service as of July 1, 2014. 6% of earnable compensation with less than five years of service as of July 1, 2014.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Section 5: Additional Summary Tables of Member Data

**TABLE 1 – MEMBERS IN ACTIVE SERVICE AS OF JUNE 30, 2019
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

All Employee Groups

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	180	180	--	--	--	--	--	--	--
	\$39,950	\$39,950	--	--	--	--	--	--	--
25 - 29	712	554	158	--	--	--	--	--	--
	\$45,874	\$44,679	\$50,063	--	--	--	--	--	--
30 - 34	1,108	474	520	114	--	--	--	--	--
	\$52,296	\$48,572	\$54,135	\$59,386	--	--	--	--	--
35 - 39	1,306	352	439	419	96	--	--	--	--
	\$57,867	\$50,074	\$57,037	\$62,799	\$68,707	--	--	--	--
40 - 44	1,411	288	295	391	354	83	--	--	--
	\$63,754	\$50,225	\$59,822	\$67,222	\$71,804	\$73,997	--	--	--
45 - 49	1,517	255	212	282	372	343	53	--	--
	\$67,954	\$52,053	\$60,470	\$67,282	\$73,246	\$77,030	\$82,105	--	--
50 - 54	1,269	150	147	239	220	255	197	61	--
	\$70,682	\$55,413	\$61,504	\$68,073	\$72,217	\$76,227	\$80,201	\$81,114	--
55 - 59	1,203	104	110	179	215	207	175	189	24
	\$71,954	\$58,098	\$60,982	\$67,677	\$71,628	\$76,884	\$78,506	\$78,098	\$78,441
60 - 64	886	62	77	122	183	140	111	105	86
	\$71,038	\$54,219	\$56,480	\$63,643	\$71,245	\$73,658	\$77,957	\$79,573	\$82,634
65 & over	270	19	19	41	52	44	26	23	46
	\$71,470	\$48,604	\$69,704	\$66,050	\$69,169	\$72,580	\$72,826	\$79,757	\$83,105
Total	9,862	2,438	1,977	1,787	1,492	1,072	562	378	156
	\$63,365	\$48,798	\$57,152	\$65,583	\$71,839	\$75,953	\$79,069	\$79,096	\$82,128

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
0 – 500	7	\$881	0	\$0	0	\$0
501 – 1,000	9	7,149	0	0	0	0
1,001 – 1,500	26	32,643	0	0	2	2,607
1,501 – 2,000	41	74,144	0	0	7	12,386
2,001 – 2,500	71	160,317	0	0	7	15,436
2,501 – 3,000	121	335,178	0	0	11	29,239
3,001 – 3,500	108	349,887	0	0	7	22,882
3,501 – 4,000	124	462,585	0	0	8	30,216
4,001 – 4,500	155	660,236	0	0	11	46,257
4,501 – 5,000	131	621,461	0	0	8	38,022
5,001 – 5,500	144	753,501	0	0	10	52,576
5,501 – 6,000	154	884,615	0	0	7	40,524
6,001 – 6,500	123	769,845	0	0	6	37,568
6,501 – 7,000	134	903,358	1	6,983	13	88,273
7,001 – 7,500	135	975,616	1	7,238	13	94,026
7,501 – 8,000	108	837,066	2	15,653	6	46,411
8,001 – 8,500	116	957,143	2	16,453	15	123,306
8,501 – 9,000	102	890,894	1	8,855	11	96,700
9,001 – 9,500	120	1,111,592	6	55,765	21	195,016
9,501 – 10,000	125	1,215,925	4	39,357	18	175,019
10,001 – 10,500	129	1,323,876	7	71,798	9	92,190
10,501 – 11,000	100	1,077,603	8	85,424	18	193,283
11,001 – 11,500	135	1,519,568	12	134,471	16	179,738
11,501 – 12,000	128	1,505,443	6	70,307	11	128,904
12,001 – 12,500	115	1,406,566	10	121,493	12	146,542
12,501 – 13,000	107	1,362,106	4	51,337	19	241,394
13,001 – 13,500	87	1,154,755	5	66,804	14	184,922
13,501 – 14,000	96	1,318,680	9	124,156	6	82,553
14,001 – 14,500	84	1,196,393	6	84,897	9	128,342
14,501 – 15,000	102	1,502,812	4	58,941	4	59,286

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers (continued)

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
15,001 – 15,500	97	\$1,477,570	5	\$76,216	12	\$183,349
15,501 – 16,000	112	1,764,273	6	94,510	7	109,737
16,001 – 16,500	98	1,591,079	5	81,328	10	161,574
16,501 – 17,000	96	1,607,209	4	67,155	8	134,424
17,001 – 17,500	102	1,760,079	3	51,652	10	172,660
17,501 – 18,000	105	1,863,657	3	53,452	5	88,773
18,001 – 18,500	97	1,772,454	4	73,270	8	145,955
18,501 – 19,000	109	2,042,130	3	56,454	9	169,141
19,001 – 19,500	102	1,961,483	4	77,085	7	134,919
19,501 – 20,000	98	1,935,907	1	19,986	5	98,567
20,001 – 20,500	102	2,065,885	5	101,472	5	101,350
20,501 – 21,000	91	1,889,720	3	61,980	8	166,223
21,001 – 21,500	114	2,422,393	2	42,674	5	106,481
21,501 – 22,000	115	2,501,662	3	65,140	9	195,794
22,001 – 22,500	127	2,826,562	4	89,170	2	44,796
22,501 – 23,000	120	2,729,753	4	91,186	7	159,132
23,001 – 23,500	138	3,212,351	2	46,608	1	23,232
23,501 – 24,000	156	3,707,695	3	71,175	2	47,548
24,001 – 24,500	118	2,863,176	1	24,242	0	0
24,501 – 25,000	125	3,093,382	0	0	2	49,623
25,001 – 25,500	133	3,357,372	1	25,281	2	50,032
25,501 – 26,000	106	2,729,516	0	0	2	51,300
26,001 – 26,500	125	3,282,322	1	26,013	3	78,997
26,501 – 27,000	129	3,451,527	0	0	1	26,782
27,001 – 27,500	114	3,105,381	2	54,644	1	27,238
27,501 – 28,000	132	3,662,868	0	0	3	83,405
28,001 – 28,500	114	3,224,369	1	28,073	5	140,928
28,501 – 29,000	138	3,968,018	2	57,790	2	57,700
29,001 – 29,500	121	3,541,085	2	58,588	4	116,880
29,501 – 30,000	132	3,925,144	1	29,807	1	29,841

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers (continued)

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
30,001 – 30,500	118	\$3,570,102	0	\$0	1	\$30,437
30,501 – 31,000	113	3,476,302	0	0	1	30,800
31,001 – 31,500	95	2,966,445	0	0	0	0
31,501 – 32,000	109	3,461,436	2	63,549	2	63,533
32,001 – 32,500	113	3,646,716	0	0	3	96,808
32,501 – 33,000	99	3,243,714	1	32,893	1	32,555
33,001 – 33,500	107	3,559,222	0	0	2	66,045
33,501 – 34,000	84	2,833,616	1	33,879	2	67,581
34,001 – 34,500	92	3,150,840	2	68,497	1	34,219
34,501 – 35,000	101	3,509,500	0	0	1	34,712
35,001 – 35,500	97	3,418,418	1	35,243	2	70,340
35,501 – 36,000	80	2,858,644	0	0	4	142,878
36,001 – 36,500	64	2,318,913	0	0	1	36,475
36,501 – 37,000	65	2,387,434	1	36,998	1	36,921
37,001 – 37,500	71	2,644,027	0	0	2	74,420
37,501 – 38,000	70	2,642,414	0	0	1	37,550
38,001 – 38,500	55	2,103,135	0	0	0	0
38,501 – 39,000	53	2,053,136	0	0	0	0
39,001 – 39,500	57	2,237,166	0	0	0	0
39,501 – 40,000	54	2,147,358	0	0	1	39,803
Over 40,000	567	26,271,643	2	84,600	3	152,242
Total	8,867	\$189,208,042	173	\$2,900,542	474	\$6,587,319

**TABLE 3A – INACTIVE MEMBERSHIP AS OF JUNE 30, 2019
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE ANNUAL ALLOWANCE**

Service Pensioners

Age	Years of Creditable Service at Retirement								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 60	171	1	6	12	11	13	7	113	8
	\$30,103	\$4,082	\$2,924	\$4,969	\$11,209	\$12,821	\$13,587	\$38,577	\$40,268
60 - 64	881	14	25	68	97	89	108	374	106
	\$27,572	\$10,042	\$4,444	\$6,286	\$12,284	\$16,460	\$35,564	\$34,689	\$39,063
65 - 69	2,729	32	213	372	392	361	259	780	320
	\$23,027	\$10,412	\$5,992	\$8,333	\$15,024	\$21,243	\$30,469	\$31,766	\$37,202
70 - 74	2,529	30	167	396	318	371	238	766	243
	\$21,010	\$5,945	\$5,995	\$7,932	\$13,450	\$19,854	\$26,316	\$29,024	\$35,701
75 - 79	1,359	32	61	225	189	198	125	412	117
	\$18,425	\$5,240	\$6,245	\$7,620	\$11,528	\$16,357	\$21,344	\$26,102	\$33,654
80 - 84	629	18	24	104	98	110	73	140	62
	\$17,048	\$3,059	\$5,574	\$7,149	\$11,537	\$15,129	\$20,879	\$25,092	\$31,594
85 - 89	360	10	18	49	47	51	55	81	49
	\$15,453	\$2,417	\$5,364	\$6,587	\$10,331	\$14,058	\$15,195	\$21,711	\$26,999
90 & over	209	7	14	39	38	34	17	42	18
	\$11,809	\$2,122	\$3,370	\$5,667	\$8,064	\$11,733	\$12,525	\$20,310	\$22,981
Total	8,867	144	528	1,265	1,190	1,227	882	2,708	923
	\$21,338	\$6,375	\$5,804	\$7,691	\$13,095	\$18,488	\$26,453	\$29,993	\$35,401

**TABLE 3B – INACTIVE MEMBERSHIP AS OF JUNE 30, 2019
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE ANNUAL ALLOWANCE**

Disability Pensioners

Age	Years of Creditable Service at Retirement								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 60	24	--	3	3	5	9	4	--	--
	\$20,246	--	\$11,081	\$13,691	\$17,271	\$21,752	\$32,369	--	--
60 - 64	43	--	5	12	10	11	4	1	--
	\$19,132	--	\$12,659	\$14,573	\$15,323	\$26,453	\$27,870	\$28,829	--
65 - 69	37	--	8	13	9	5	2	--	--
	\$14,315	--	\$11,060	\$12,247	\$14,643	\$21,687	\$20,877	--	--
70 - 74	27	--	4	5	4	8	6	--	--
	\$16,742	--	\$13,625	\$11,790	\$18,007	\$16,359	\$22,612	--	--
75 - 79	23	--	1	7	6	5	4	--	--
	\$15,512	--	\$19,470	\$13,359	\$12,406	\$16,001	\$22,338	--	--
80 - 84	10	--	--	1	3	3	3	--	--
	\$13,615	--	--	\$11,202	\$11,193	\$10,979	\$19,477	--	--
85 - 89	6	--	--	--	2	2	2	--	--
	\$14,280	--	--	--	\$18,505	\$8,431	\$15,905	--	--
90 & over	3	--	--	1	1	--	--	1	--
	\$10,542	--	--	\$10,485	\$8,153	--	--	\$12,987	--
Total	173	--	21	42	40	43	25	2	--
	\$16,766	--	\$12,333	\$13,079	\$14,915	\$19,904	\$23,919	\$20,908	--